Industria y Comercio
SUPERINTENDENCIA

DELEGATURA DE PROPIEDAD INDUSTRIAL

SOLICITUD

PATENTE DE INVENCIÓN

Superintendencia de Industria y Comercio
Radicado: NC2017/0009112 **Folios :** 469
Dependencia: 2020 **Fecha:** 2017-09-06 14:55:55
Tipo aplicación: Solicitud PCT

21. **EXPEDIENTE No.** _____

54. **TÍTULO** Composiciones acuosas para controlar plagas o regular el crecimiento de plantas dichas composiciones comprendiendo timol o carvacrol, Un surfactante ---

51. **CLASIFICACIÓN INTERNACIONAL** _____

71. **SOLICITANTE** Laboratoire M_2

DOMICILIO Canadá

74. **APODERADO** Fernando Triana Soto

22. **BOGOTÁ, D. C.,** Septiembre 6 / 2017

NC 2017/0009112

(FORMA P-10)

209984-Imprenta Nacional de Colombia-2014

1

Industria y Comercio
SUPERINTENDENCIA

Superintendencia de Industria y Comercio

Radicado: NC2017/0009112 **Folios :** 469
Dependencia:2020 **Fecha:**2017-09-06 14:55:55
Tipo aplicación: Solicitud PCT

...nesivo de radicación

TC

DIRECCIÓN DE NUEVAS CREACIONES
SOLICITUD FASE NACIONAL -PCT

1	**TIPO DE SOLICITUD**	☑ Patente de invención ☑ Capítulo I	☐ Patente de Modelo de Utilidad ☐ Capitulo II

2 DATOS SOLICITUD INTERNACIONAL PCT (86)

Solicitud Internacional No. PCT/ CA2016/050138 **Fecha** 16/02/2016

Publicación Internacional No. WO 2016/131134 A1 **Fecha** 25/08/2016

3 TÍTULO DE LA INVENCIÓN (200 caracteres o espacios máximos)

COMPOSICIONES ACUOSAS PARA CONTROLAR PLAGAS O REGULAR EL CRECIMIENTO DE PLANTAS, DICHAS COMPOSICIONES COMPRENDIENDO TIMOL O CARVACROL, UN SURFACTANTE, Y UN SOLVENTE

4 CLASIFICACIÓN INTERNACIONAL (CIP)

A01N 31/08 (2006.01) A01N 25/02 (2006.01) A01N 25/30 (2006.01) A01P 1/00 (2006.01) A01P 21/00 (2006.01) C05G 3/02 (2006.01)

5 SOLICITANTE (S) ☐ Esta persona también es inventor. Para datos adicionales utilizar hoja de información complementaria

	APELLIDOS O RAZÓN SOCIAL	NOMBRE	IDENTIFICACIÓN	TIPO
1.	LABORATOIRE M2			

6 DATOS DEL SOLICITANTE

DIRECCIÓN 4005-A, RUE DE LA GARLOCK, SHERBROOKE, QUÉBEC J1L 1W9, CANADÁ
No. TELÉFONO
CIUDAD QUÉBEC
CORREO ELECTRÓNICO
DEPARTAMENTO/ESTADO
NACIONALIDAD O LUGAR DE CONSTITUCIÓN CANADÁ
PAÍS DE RESIDENCIA CANADÁ

7 INVENTOR (ES) Para datos adicionales utilizar hoja de información complementaria

	APELLIDOS	NOMBRES	NACIONALIDAD
1.	DAIGLE	FRANCOIS	CANADÁ
2.	LETELLIER	ANN	CANADÁ
3.	QUESSY	SYLVAIN	CANADÁ
4.	AURAY	SERGE	CANADÁ
5.			

DIRECCIÓN DE CORREO ELECTRÓNICO:

8 DATOS INVENTOR (ES)

	PAÍS RESIDENCIA	DEPARTAMENTO/ESTADO	CIUDAD	DIRECCIÓN
1.	CANADÁ		QUÉBEC	214 RUE DU CHENE ROUGE, CANTON DE HATLEY, QUÉBEC J0B 2C0, CANADÁ
2.	CANADÁ		QUÉBEC	895, RUE ROYALE, MASSUEVILLE, QUÉBEC J0G 1K0, CANADÁ.
3.	CANADÁ		QUÉBEC	1035 CHENAL DU MOINE, STE-ANNE-DE-SOREL, QUÉBEC J3P 5N3, CANADÁ
4.	CANADÁ		QUÉBEC	4005-A, RUE DE LA GARLOCK, SHERBROOKE, QUÉBEC J1L 1W9, CANADÁ
5.				

OTRO(S) SOLICITANTE(S) Y/O (OTRO(S)) INVENTOR(ES)

☐ Los demás solicitantes y/o (demás) inventores se indican en una hoja a continuación.

9 ☐ **REPRESENTANTE LEGAL** ☑ **APODERADO**

APELLIDOS	NOMBRES	IDENTIFICACIÓN
TRIANA SOTO	FERNANDO	C.C . 79.154.036 T.P . 45265

DIRECCIÓN CALLE 93B No. 12-48, Piso 4o. BOGOTA, D.C., COLOMBIA
No. TELÉFONO 6019660
CIUDAD BOGOTÁ. D.C., COLOMBIA
CORREO ELECTRÓNICO tum@tumnet.com
PAÍS COLOMBIA
No. RADICACIÓN DE PROTOCOLO DE PODER GENERAL

10	DECLARACIONES DE PRIORIDAD	✓ SI	NO

(33) PAÍS DE ORIGEN	CODIGO PAÍS	(31) NÚMERO	(32) FECHA (AAAA/MM/DD)
1. ESTADOS UNIDOS DE AMÉRICA	US	62/116,630	16/02/2015
2.			
3.			

11 DECLARACIÓN SOBRE USO DE RECURSOS GENÉTICOS O BIOLÓGICOS

Declaro que el objeto de la presente solicitud de patente fue obtenido a partir de recursos genéticos o biológicos de los que cualquiera de los países miembros de la Comunidad Andina es país de origen.

☐ SI ☑ NO

Nota: En caso afirmativo deberá anexar copia del contrato de acceso de recursos genéticos o productos derivados, o certificado o número de registro, expedido por la Autoridad competente.

12 DECLARACIÓN SOBRE USO DE CONOCIMIENTOS TRADICIONALES

Declaro que el objeto de la presente solicitud de patente fue obtenido a partir de conocimientos tradicionales de comunidades indígenas, afroamericanas o locales de países miembros de la Comunidad Andina.

☐ SI ☑ NO

Nota: En caso afirmativo deberá anexar la licencia o autorización de uso de conocimiento tradicional, o certificado, o número de registro expedido por la Autoridad competente.

13 REDUCCIÓN DE TASAS

Declaro que carezco de medios económicos para presentar la solicitud de patente.

☐ SI ☑ NO

Nota: En caso de ser persona natural y carecer de medios económicos, y por lo tanto, aplique la reducción de tasas a que se refiere la resolución vigente en tarifas, debe firmar la presente solicitud bajo la gravedad de juramento.

Micro, pequeñas y medianas empresas ☐

Universidades públicas o privadas ☐

Entidades sin ánimo de lucro ☐

Debe aportar los documentos que se indican en el numeral 17 de anexos

14 AUTORIZACIÓN DE NOTIFICACIÓN EN LÍNEA ☑ SI ☐ NO

Manifiesto que he leído y entendido perfectamente los términos y condiciones de uso de medios electrónicos para las notificaciones en línea a través de Internet de los actos administrativos proferidos por la Superintendencia de Industria y Comercio que deben ser notificados personalmente y, en consecuencia, autorizo el servicio de notificación a través de internet.

15	COMPROBANTE DE PAGO O PAGO ELECTRÓNICO	N°	Fecha

16 FIRMA DEL SOLICITANTE, DEL APODERADO O DEL REPRESENTANTE LEGAL

Junto a cada firma, indicar el nombre del firmante y su calidad (si tal calidad no es obvia al leer el petitorio)

17 ANEXOS

Documentación Técnica
Solicitud Internacional en castellano

1. ☑ Descripción — N° de folios:
2. ☑ Reivindicaciones — N° Reivindicaciones: 69
3. ☑ Dibujos y/o figuras — N° folios:
4. ☑ Resumen.
5. ☐ Certificado de depósito de material biológico si fuera el caso.
6. ☐ Listado de secuencias de nucleótidos y/o aminoácidos en forma digital si fuera el caso.
7. ☑ Arte final 12 x 12.
8. ☑ Anexo formato digital.
9. ☐

Documentación Jurídica

9. ☑ Poderes, si fuera el caso.
10. ☑ Documento que legalmente pruebe la cesión del inventor al solicitante o a su causante.
11. ☐ Copia del contrato de acceso de recursos genéticos o productos derivados, certificado o número de registro, si fuera el caso.
12. ☐ Copia de la licencia o autorización de Conocimientos Tradicionales, certificado o número de registro, si fuera el caso.
13. **Reducción de tasas**

Micro, pequeñas o medinas empresas

☐ Copia simple de la declaración de renta del año inmediatamente anterior, o en su defecto prueba documental idónea.

☐ Documento de constancia de cumplimiento con lo establecido en la ley 905 de 2004.

Universidades públicas o privadas

☐ Copia acto de reconocimiento institucional emitido por el Ministerio de Educación

Entidades sin ánimo de lucro

☐ Copia de registro vigente en Cámara de comercio.
☐ Hoja de información complementaria.
☐ Otros, especificar

14. ☑ Comprobante de pago de la tasa de presentación de la solicitud.
15. ☐ Comprobante de pago por reivindicación de prioridad.

	16. ☐ Comprobante de pago de la tasa por concepto de excedente de palabras en la publicación. **17.** ☑ Comprobante de pago por reivindicación adicional a 10.

Industria y Comercio
SUPERINTENDENCIA

Espacio reservado para el adhesivo de radicación

DIRECCIÓN DE NUEVAS CREACIONES
MODIFICACIONES Y/O CORRECCIONES

1. Identificación del Tramite

☐ **Error material** ☑ **Modificación a una Solicitud en trámite**

☑ Patente de Invención
☐ Patente de Modelo de Utilidad
☐ Registro de Diseño Industrial
☐ Esquema de Trazado de Circuitos Integrados

2. Datos del solicitante

Persona Natural ☐ Persona Jurídica ☑

LABORATOIRE M2

Nombre o denominación / Nombre o razón social completa

Nombre representante legal

Tipo de empresa Micro ☐ Pequeña ☐ Mediana ☐ Otra ☑

Documento de identificación: ☐ C.C. ☐ C.E. ☐ NIT ☐ Otro Número _____

Nacionalidad/País de constitución	Dirección y domicilio del titular	Ciudad
CANADÁ	4005-A, RUE DE LA GARLOCK, SHERBROOKE, QUÉBEC J1L 1W9, CANADÁ	SEINE

Dirección electrónica	No. Fax	Número telefónico

☐ **Autorizo expresamente a la Superintendencia de Industria y Comercio para que todas las comunicaciones sean enviadas a través de la dirección de correo electrónico**

3. Datos del apoderado:

TRIANA SOTO FERNANDO	79.154.036	45.265
Apellidos y Nombre	**Documento de identificación**	**Tarjeta profesional**

Dirección y domicilio		Ciudad
CALLE 93B No. 12-48, Piso 4o. BOGOTA, D.C., COLOMBIA		BOGOTA
Dirección electrónica	**No. Fax**	**Número telefónico**
tum@tumnet.com	6-114209	6-019660

En caso de haber presentado poder general para asuntos que se adelanten ante la Delegatura de Propiedad Industrial, sírvase indicar el número de su radicación o protocolo de poder general _____

4. Datos del trámite

Corrección:

Expediente No _____

Aparece _____

_____

Debe ser _____

_____

Modificación:

☑ **Modificación al capítulo reivindicatorio.**
Se anexa formato digital con la solicitud

☐ **Modificación al capítulo descriptivo.**

☐ **Modificación al resumen.**

☐ **Modificación a los dibujos.**

☐ **Modificación al solicitante.**

5. Anexos

☑ Comprobante de pago de la tasa para la presentación de la corrección y/o modificación

☑ Poder, si fuere el caso.

☑ Documento que contiene las modificaciones o correcciones.

☑ Copia de la solicitud y sus anexos en formato magnético.

6. Firma FERNANDO TRIANA SOTO	
Nombre y apellidos	Firma
C.C 79.154.036	Tarjeta Profesional 45.265

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62/116,630 16 February 2015 (16.02.2015) US

(71) Applicant: **LABORATOIRE M2** [CA/CA]; 4005-A, rue de la Garlock, Sherbrooke, Québec J1L 1W9 (CA).

(72) Inventors: **DAIGLE, Francois**; 214 rue du Chene Rouge, Canton de Hatley, Québec J0B 2C0 (CA). **LETELLIER, Ann**; 895, rue Royale, Massueville, Québec J0G 1K0 (CA). **QUESSY, Sylvain**; 1035 Chenal du Moine, Ste-Anne-de-Sorel, Québec J3P 5N3 (CA). **AURAY, Serge**; 4005-A, rue de la Garlock, Sherbrooke, Québec J1L 1W9 (CA).

(74) Agent: **BENOIT & COTE INC.**; 800-1550 rue Metcalfe, Montréal, Québec H3A 1X6 (CA).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

WO 2016/131134 A1

(54) **Title**: AQUEOUS COMPOSITIONS FOR CONTROLLING PESTS OR REGULATING PLANT GROWTH, SAID COMPOSITIONS COMPRISING THYMOL OR CARVACROL, A SURFACTANT, AND A SOLVENT

(57) **Abstract**: The invention relates to compositions in which the phenolic compound thymol or carvacrol is solubilized or dispersed in water through the addition of a surfactant and a solvent. In certain embodiments is also comprised a further pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof. Also taught are methods for the control of pests or for regulating the growth of plants through contacting the plants, their seeds, or soil in which they grow with said compositions.

Title:

AQUEOUS COMPOSITIONS FOR CONTROLLING PESTS OR REGULATING PLANT GROWTH, SAID COMPOSITIONS COMPRISING THYMOL OR CARVACROL, A SURFACTANT, AND A SOLVENT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority of US provisional patent application 62/116,630, filed on February 16, 2015, the specification of which is hereby incorporated by reference.

BACKGROUND

(a) Field

[0002] The subject matter disclosed generally relates to pest control and/or fertilizer compositions, and uses thereof.

(b) Related Prior Art

[0003] Soil is a reservoir for a variety of plant and animal diseases. These include diseases caused by microorganisms (fungi, bacteria, actinomyces, phytoplasmas, protozoa and viruses), and larger soil organisms such as nematodes as well as insects (e.g. ants, aphids) and small animals (e.g. slugs, snails, rodents). Plant and animal pathogens may also be spread via insect vectors or by soil animals such as nematodes. The most common disease caused by soil-borne pathogen are rots that affect below the ground plant parts, and vascular wilts as a result of root infections. Some soil-borne pathogens also cause diseases on the aboveground parts of the plants (like on the foliage).

[0004] The most important pathogen group causing soil-borne disease are the multicellular organism fungi. In general, a fungal infection can cause local or extensive necrosis. It can also inhibit normal growth (hypotrophy) or induce excessive abnormal growth (hypertrophy or hyperplasia) in a portion of or throughout an entire plant. Symptoms associated with necrosis include leaf spots, blight, scab, rots, damping-off, anthracnose, dieback, and canker. Symptoms associated with hyperplasia include clubroot, galls, warts, and leaf

curls. The principal control measures include the use of disease-free seed and propagating stock, the destruction of all plant materials that may harbor pathogenic fungi, crop rotation, the development and use of resistant plant varieties, and the use of chemical and biological fungicides.

[0005] Many species of bacteria can cause disease in plants, animals and humans. The principal genera of plant pathogenic bacteria are *Agrobacterium, Clavibacter*, *Erwinia*, *Pseudomonas*, *Xanthomonas*, *Streptomyces*, and *Xylella*. Bacterial diseases can be grouped into four broad categories based on the extent of damage to plant tissue and the symptoms that they cause, which may include vascular wilt, necrosis, soft rot, and tumors. In order for a bacterium to produce a disease in a plant, the bacterium must first invade the plant tissue and multiply. Bacterial pathogens enter plants through wounds, principally produced by adverse weather conditions, humans, tools and machinery, insects, and nematodes, or through natural openings such as stomates, lenticels, hydathodes, nectar-producing glands, and leaf scars. Losses from bacterial diseases are reduced by the use of pathogen-free seed. Bactericidal seed compounds control some bacterial diseases, such as angular leaf spot of cotton, gladiolus scab, and soft rot of ornamentals. Protective bactericidal sprays are used against bacterial blights of beans and celery, fire blight, crown gall, blackleg of delphinium, and filbert and walnut blights.

[0006] Viruses and viroids are the smallest of the infectious agents. Both viruses and viroids are obligate parasites, as they are able to multiply or replicate only within a living cell of a particular host. A single plant species may be susceptible to infection by several different viruses or viroids. Most disease-causing viruses are carried and transmitted naturally by insects and mites, which are called vectors of the virus. The symptoms of viral and viroid plant diseases fall into four groups: (1) change in color : yellowing, green and yellow mottling, and vein clearing; (2) malformations : distortion of leaves and flowers, rosetting, proliferation and witches'-brooms (abnormal proliferation of shoots), and little or

no leaf development between the veins; (3) necrosis: leaf spots, ring spots, streaks, wilting or drooping, and internal death, especially of phloem (food-conducting) tissue; and (4) stunting or dwarfing of leaves, stems, or entire plants. Control is accomplished by several methods, such as growing resistant species and varieties of plants or obtaining virus-free seed, cuttings, or plants. Further control measures include controlling insect vectors by spraying plants with contact insecticides or fumigating soil to kill insects, nematodes, and other possible vectors. It also includes spraying leaves of plants with oils like mineral oil and paraffin, which helps to prevent viral propagation during insect infestation of growing plants.

[0007] A great many of the current pest control formulations, contain antimicrobial agents which are not naturally occurring. Typical antimicrobial agents include chemical disinfectants such as phenolic compounds, quaternary ammonium compounds, formaldehyde and halogen containing compounds. Such materials are not of natural origin (i.e. not found in nature) and are prepared through chemical processing and synthesis. A great many of these "synthetic" disinfectants cause undesirable effects on both the environment and on human health. The interaction of any synthetic chemical disinfectants, let alone a number of such chemicals with the environment always comes with unexpected consequences.

[0008] The non-selective way in which synthetic chemical disinfectants control pests also makes them undesirable. The chemicals can often have unexpected and serious detrimental effects on desirable insects or animals as well as the pest insect or animal.

[0009] Because of the often detrimental effects of synthetic chemical disinfectants a number of alternatives have been proposed and researched. One such alternative is the use of natural disinfectants or pesticides. Natural disinfectants or pesticides are compounds that exist in nature (e.g. in plants,

animals, or other insects) and have properties that allow them to be used as is, combined, or modified to be used as disinfectants or pesticides.

[0010] Although natural pesticides have previously been utilized, there still remains a need for effective natural pesticides that do not have the undesirable effects often exhibited by synthetic chemical pesticides.

[0011] There is therefore a need for compositions for controlling pests, for plant regulation, or both, that reduce or at least mitigate the drawbacks of the prior art.

SUMMARY

[0012] According to an embodiment, there is provided a composition for regulating plant growth comprising :

a pesticide composition consisting of :

a) from about 0.01% to about 25% weight of at least one antimicrobial isolated or synthetic phenolic compound of natural origin selected from the group consisting of thymol and/or carvacrol;

b) from about 0.001% to about 15% weight of an anionic, a cationic, an amphoteric, an non-ionic surfactant, or combinations thereof, sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% weight of a solvent;

d) sufficient water to make 100 weight percent,

and a supplement comprising

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

[0013] The antimicrobial compound may be of synthetic origin.

[0014] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0015] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0016] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0017] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0018] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0019] The pesticide may be chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

[0020] The fertilizer may be chosen from fertilizers an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

[0021] The defoamer may be chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

[0022] The plant growth regulator may be chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benazladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, N-acetylaspartic acid.

[0023] The supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

[0024] According to another embodiment, there is provided a method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of the present invention to control the pest.

[0025] According to another embodiment, there may be provided a method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[0026] The antimicrobial compound may be of synthetic origin.

[0027] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0028] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0029] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0030] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0031] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0032] The pest may be chosen from an insect, a nematode, a fungi, a bacteria, a larvae, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an algae, or combinations thereof.

[0033] The plant may be a weed. The arthropod may be a mite. The insect may be a moth. The bacteria may be chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

[0034] According to another embodiment, there is provided a method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition according to the present invention.

[0035] According to another embodiment, there is provided a method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[0036] The antimicrobial compound may be of synthetic origin.

[0037] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0038] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0039] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0040] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0041] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0042] The regulating the growth may comprise an increase in the number of fruit, vegetable, bulb or tuber from the plant.

[0043] The regulating the growth may comprise an increase in the size of fruit, vegetable, bulb or tuber from the plant.

[0044] The regulating the growth may comprise an increase in the number of healthy plants.

[0045] The plant may be chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

[0046] According to another embodiment, there is provided a method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a composition according to the present invention.

[0047] According to another embodiment, there is provided a method for regulating the growth of a seed, the method comprising contacting a seed or a

soil containing the seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[0048] The antimicrobial compound may be of synthetic origin.

[0049] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0050] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0051] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0052] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0053] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0054] The seed may be a tuber.

[0055] The tuber may be from a potato (kumara), a sweet potato, a yam, a cassava, and a dahilia.

[0056] The regulating the growth may comprise an increase in the length of a tuber sprout.

[0057] The following terms are defined below.

[0058] Before describing the present invention in detail, a number of terms will be defined. As used herein, the singular forms "a", "an", and "the" include plural referents unless the context clearly dictates otherwise.

[0059] The use of the word "a" or "an" when used in conjunction with the term "comprising" in the claims and/or the specification may mean "one", but it is also consistent with the meaning of "one or more", "at least one", and "one or more than one". Similarly, the word "another" may mean at least a second or more.

[0060] As used in this specification and claim(s), the words "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including, such as "include" and "includes") or "containing" (and any form of containing, such as "contain" and "contains"), are inclusive or open-ended and do not exclude additional, unrecited elements or process steps.

[0061] The term "about" is used to indicate that a value includes an inherent variation of error for the device or the method being employed to determine the value.

[0062] Weight percent, percent by weight, % by weight, wt %, and the like are synonyms that refer to the concentration of a substance as the weight of that substance divided by the weight of the composition and multiplied by 100.

[0063] It is noted that terms like "preferably", "commonly", and "typically" are not utilized herein to limit the scope of the claimed invention or to imply that certain features are critical, essential, or even important to the structure or function of the claimed invention. Rather, these terms are merely intended to

highlight alternative or additional features that can or cannot be utilized in a particular embodiment of the present invention.

[0064] For the purposes of describing and defining the present invention it is noted that the term "substantially" is utilized herein to represent the inherent degree of uncertainty that can be attributed to any quantitative comparison, value, measurement, or other representation. The term "substantially" is also utilized herein to represent the degree by which a quantitative representation can vary from a stated reference without resulting in a change in the basic function of the subject matter at issue.

[0065] The term « composition » as used herein is intended to encompass a product comprising the specified ingredients in the specified amounts, as well as any product which results, directly or indirectly, from combination of the specified ingredients in the specified amounts. Such term in relation to pharmaceutical composition or other compositions in general, is intended to encompass a product comprising the active ingredient(s) and the inert ingredient(s) that make up the carrier, as well as any product which results, directly or indirectly, from combination, complexation or aggregation of any two or more of the ingredients, or from dissociation of one or more of the ingredients, or from other types of reactions or interactions of one or more of the ingredients. Accordingly, the pharmaceutical compositions or other compositions in general of the present invention encompass any composition made by admixing a compound of the present invention and a pharmaceutically acceptable carrier. By "pharmaceutically acceptable" or "acceptable" it is meant the carrier, diluent or excipient must be compatible with the other ingredients of the formulation and not deleterious to the recipient thereof.

[0066] The terms "regulating plant growth" and "growth regulation amount" are intended to mean that the method and composition of the present invention regulate at least one aspect of the growth of a plant. The regulation of growth does not need to be on all aspects of plant growth. For example, the composition

of the present invention may regulate the growth of any one of the foliage, leaves, flowers, stems, branches, fruits, vegetables, bulb, tubers, or any other part of the plant, independently from other parts of the plant. As used herein, the term "growth regulating amount" is intended to mean an amount of the composition of the present invention that causes at least one of the aspects of the growth of a plant to be regulated as defined above. The regulation of plant growth may also include an overall increase on the growth of a plant. The regulation of plant growth may also show as an increase in the number of healthy plants in a culture of plants comprising several individuals. The regulation of plant growth may also include stimulation of fruit ripening. The regulation of plant growth may also include inhibition of plant growth and shoot growth. The regulation of plant growth may also include an increase in flowering. The regulation of plant growth may also include the regulation of leaf and fruit senescence. The growth regulating amount may span a range of concentration over which the effect may be observed, and each growth regulating effects may be observed at the detriment of the growth of other parts of the plant. Preferably, the growth regulating effect may be obtained without any phytotoxic effects to the remainder of the plants, but in some embodiments this may not be possible.

[0067] The term "pesticidal amount" to mean an amount of the composition of the present invention that will be sufficient to control a given pest. This, the amount may vary according to the targeted pest, which implies that a lower concentration may be sufficient to control one pest, and that a higher concentration may be required to control another pest.

[0068] The terms "fruit" and "vegetable" are intended to mean the common language usage of "fruit" and "vegetable" which normally means the fleshy seed-associated structures of a plant that are sweet or sour, and edible in the raw state, such as apples, bananas, grapes, lemons, oranges, and strawberries. It also includes the botanical usage of "fruit" and "vegetable" which includes many

structures that are not commonly called "fruits" or "vegetable", such as bean pods, corn kernels, tomatoes, and wheat grains.

[0069] The term "tuber" is intended to mean the enlarged structures in some plant species used as storage organs for nutrients. They are used for the plant's perennation (survival of the winter or dry months), to provide energy and nutrients for regrowth during the next growing season, and as a means of asexual reproduction. Stem tubers form from thickened rhizomes (underground stems) or stolons (horizontal connections between organisms). Common plant species with stem tubers include potato and yam. Some sources also treat modified lateral roots, (root tubers) under the definition; these are encountered in sweet potato, cassava, and dahlia.

[0070] Features and advantages of the subject matter hereof will become more apparent in light of the following detailed description of selected embodiments, as illustrated in the accompanying figures. As will be realized, the subject matter disclosed and claimed is capable of modifications in various respects, all without departing from the scope of the claims. Accordingly, the drawings and the description are to be regarded as illustrative in nature, and not as restrictive and the full scope of the subject matter is set forth in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0071] Further features and advantages of the present disclosure will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0072] Fig. 1 illustrates the cumulative germination of common ragweed (AMBAR) and barnyard grass (ECHCR) for the different compositions during 21 days in Petri dishes. Vertical bars represent ± SE

[0073] Fig. 2 illustrates the adjusted seed mortality of common ragweed (AMBAR) and barnyard grass (ECHCR) for the different compositions, after 21

days in Petri dishes. Columns with the same letter are not significantly different according to Fisher's Protected LSD at α=0.05. Vertical bars represent ± SE.

[0074] Fig. 3 illustrates a visual symptoms of water, compositions 10 and 11 phytoxicity observed on common ragweed (AMBAR) and barnyard grass (ECHCR).

[0075] Fig. 4 illustrates the mean rates (± SE) of codling moth egg mortality observed 7 days after spraying. Treatments with different letters are significantly different (ANOVA, HSD Tukey-Kramer test, α=0.05).

[0076] Fig. 5 illustrates the codling moth eggs seven days after spraying with water (control) (a), composition 8 (b) and composition 10 (c).

[0077] Fig. 6 illustrates the mean rates (± SE) of two spotted spider mites mortality, 24 hours after spraying. Treatments with different letters are significantly different (ANOVA, HSD Tukey-Kramer test, α=0.05).

[0078] Fig. 7 illustrates the King B agar media containing streptomycin inoculated with bacterial suspensions for sensitivity test. Quadrant 1 (Q1), *E. amylovora* 433; Quadrant 2 (Q2), *E. amylovora* 435; Quadrant 3 (Q3), *E. amylovora* 153sm5; and Quadrant 4 (Q4), *E. coli* ATCC25922.

[0079] Fig. 8 illustrates the King B agar media containing Composition 12 at different dilutions inoculated with bacterial suspensions for sensitivity test. Quadrant 1 (Q1), *E. amylovora* 433; Quadrant 2 (Q2), *E. amylovora* 435; Quadrant 3 (Q3), *E. amylovora* 153sm5; and Quadrant 4 (Q4), *E. coli* ATCC25922.

[0080] Fig. 9 illustrates the effect of compositions of the present invention on yield of harvested potato tubers at the end of the trial. This effect is measured as the mean of total tubers / plants (A) and mean weight of tubers and / plant (B). Light bars represent assay A where compositions of the present invention are

applied alone, and dark bars represent assay B where compositions of the present invention are applied in combination with oil and fungicide.

[0081] Fig 10. illustrates the mean % of green plants after application of the compositions of the present invention. Light bars represent assay A where compositions of the present invention are applied alone, dark bars represent assay B where compositions of the present invention are applied in combination with oil and fungicide.

[0082] Fig. 11. illustrates the mean % of plants with dry leaflets after application of the compositions of the present invention. Light bars represent assay A where compositions of the present invention are applied alone, dark bars represent assay B where compositions of the present invention are applied in combination with oil and fungicide.

[0083] Fig. 12. illustrates the mean % of plants with early blight symptoms (spotted leaflets, panel A) and magnitude of symptoms (number of spots / leaflets, panel B) following the application of compositions of the present invention, in combination with oil and fungicide.

DETAILED DESCRIPTION

[0084] In a first embodiment there is disclosed a composition for regulating plant growth comprising:

a pesticide composition which consists of :

a) from about 0.01% to about 25% weight of at least one antimicrobial isolated or synthetic phenolic compound of natural origin selected from the group consisting of thymol and/or carvacrol;
b) from about 0.001% to about 15% weight of an anionic, a cationic, an amphoteric, an non-ionic surfactant, or combinations thereof, sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% weight of a solvent;

d) sufficient water to make 100 weight percent,

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

Compositions of the present invention

[0085] The phenolic compounds of natural origin as used in the present invention can be synthetically made by known methods within the capacity of a skilled technician, or can be obtained from plant oil extracts. In an embodiment of the present invention, the phenolic compounds of natural origin are obtained from plant extracts. In a further embodiment of the present invention, the phenolic compounds of natural origin are commercially available. In yet a further embodiment of the present invention, the phenolic compounds of natural origin comprise carvacrol and thymol.

[0086] In an embodiment, the pesticide compositions of the present invention comprise thymol, carvacrol or mixtures thereof. In a further embodiment, the pesticide compositions of the present invention comprise one or more natural essential oils enriched in thymol, carvacrol or mixtures of thymol and carvacrol.

[0087] In an embodiment, the pesticide compositions of the present invention further comprise a surfactant. A surfactant operative herein comprises a water soluble or water dispersible nonionic, anionic, cationic, or an amphoteric compound. In a further embodiment, the pesticide compositions of the present invention comprise one or more of the conventional anionic surfactants known in the art. A representative listing of surfactants and properties thereof is detailed in Remington's Pharmaceutical Sciences, 17th edition (Mack Publishing Company). Non-limiting examples of surfactants according to an embodiment of the present invention include sodium lauryl sulfate, sorbitan stearate, sorbitan esters, sodium laureth sulfate, sarkosyl, cocamidopropyl betaine (CAPB), sodium lauryl ether sulfonate, alkyl benzene sulfonates, nonylphenol ethoxylate, ether ethoxylate, as

well as the surfactants listed in Table 9 below. It is appreciated that one or more additional surfactants may be included in the pesticide compositions of the present invention. A surfactant (surface active agent) is generally intended to refer to a substance which when dissolved in water, or other aqueous system, reduces the surface or interfacial tension between it and another substance or material. In an embodiment of the present invention, the surfactant aids in the dispersion or emulsification of the essential oils within the aqueous carrier. According to an embodiment, the dispersion is not necessarily and homogenous dispersion. The dispersion may necessitate agitation and/or shaking prior to use. According to another embodiment, the dispersion is a homogenous dispersion. In a further embodiment of the present invention, the anionic surfactant aids in braking down the structure of biofilms through denaturation. In yet a further embodiment, the surfactant acts as a "wetting" agent. Wetting agents typically reduce the surface tension of the water molecules, allowing for a greater spreading of the solution and a deeper penetration into small crack and crevices of the surface to be treated.

[0088] In embodiments, the composition of the present invention comprises from about 0.1% to about 15% w/w surfactant, or from about 0.5% to about 15% w/w, or from about 1% to about 15% w/w, or from about 2% to about 15% w/w, or from about 3% to about 15% w/w, or from about 4% to about 15% w/w, or from about 5% to about 15% w/w, or from about 7.5% to about 15% w/w, or from about 10% to about 15% w/w, or from about 12.5% to about 15% w/w, 0.1% to about 12.5% w/w surfactant, or from about 0.5% to about 12.5% w/w, or from about 1% to about 12.5% w/w, or from about 2% to about 12.5% w/w, or from about 3% to about 12.5% w/w, or from about 4% to about 12.5% w/w, or from about 5% to about 12.5% w/w, or from about 7.5% to about 12.5% w/w, or from about 10% to about 12.5% w/w, 0.1% to about 10% w/w surfactant, or from about 0.5% to about 10% w/w, or from about 1% to about 10% w/w, or from about 2% to about 10% w/w, or from about 3% to about 10% w/w, or from about

4% to about 10% w/w, or from about 5% to about 10% w/w, or from about 7.5% to about 10% w/w, 0.1% to about 7.5% w/w surfactant, or from about 0.5% to about 7.5% w/w, or from about 1% to about 7.5% w/w, or from about 2% to about 7.5% w/w, or from about 3% to about 7.5% w/w, or from about 4% to about 7.5% w/w, or from about 5% to about 7.5% w/w, 0.1% to about 5% w/w surfactant, or from about 0.5% to about 5% w/w, or from about 1% to about 5% w/w, or from about 2% to about 5% w/w, or from about 3% to about 5% w/w, or from about 4% to about 5% w/w, 0.1% to about 4% w/w surfactant, or from about 0.5% to about 4% w/w, or from about 1% to about 4% w/w, or from about 2% to about 4% w/w, or from about 3% to about 4% w/w, 0.1% to about 3% w/w surfactant, or from about 0.5% to about 3% w/w, or from about 1% to about 3% w/w, or from about 2% to about 3% w/w, 0.1% to about 2% w/w surfactant, or from about 0.5% to about 2% w/w, or from about 1% to about 2% w/w, 0.1% to about 1% w/w surfactant, or from about 0.5% to about 1% w/w, 0.1% to about 0.5% w/w surfactant.

[0089] Phenolic compounds (*e.g.* carvacrol, thymol) are typically not sufficiently soluble in an aqueous medium. The pesticide compositions of the present invention thus typically comprise a solvent. The solvents may be hydrophilic, hydrophobic or amphiphilic in nature. In an embodiment, the pesticide compositions of the present invention comprise an amphiphilic solvent. Amphiphilic solvents are capable of solubilizing the phenolic compounds of natural origin and/or the essential oil(s) in the aqueous carrier. Non-limiting examples of solvents according to an embodiment of the present invention include methanol, ethanol, hexadecane, propylene glycol, propylene glycol *n*-butyl ether, propylene glycol methyl ether acetate, propylene glycol methyl ether, dipropylene glycol *n*-propyl ether, ethylene glycol methyl ether and hexylene glycol. The addition of a significant amount of solvent to the pesticide solutions of the present invention, allows for the solutions to be used at temperatures slightly inferior to 0°C. It is well within the capacity of a skilled technician to

determine such amounts of solvent. In embodiments, the composition of the present invention comprises from about 0.1% to about 40% w/w solvent, or from about 0.5% to about 40% w/w, or from about 1% to about 40% w/w, or from about 5% to about 40% w/w, or from about 10% to about 40% w/w, or from about 15% to about 40% w/w, or from about 20% to about 40% w/w, or from about 25% to about 40% w/w, or from about 30% to about 40% w/w, or from about 35% to about 40% w/w,or from about 0.1% to about 35% w/w solvent, or from about 0.5% to about 35% w/w, or from about 1% to about 35% w/w, or from about 5% to about 35% w/w, or from about 10% to about 35% w/w, or from about 15% to about 35% w/w, or from about 20% to about 35% w/w, or from about 25% to about 35% w/w, or from about 30% to about 35% w/w, or from about 0.1% to about 30% w/w solvent, or from about 0.5% to about 30% w/w, or from about 1% to about 30% w/w, or from about 5% to about 30% w/w, or from about 10% to about 30% w/w, or from about 15% to about 30% w/w, or from about 20% to about 30% w/w, or from about 25% to about 30% w/w, or from about 0.1% to about 25% w/w solvent, or from about 0.5% to about 25% w/w, or from about 1% to about 25% w/w, or from about 5% to about 25% w/w, or from about 10% to about 25% w/w, or from about 15% to about 25% w/w, or from about 20% to about 25% w/w, or from about 0.1% to about 20% w/w solvent, or from about 0.5% to about 20% w/w, or from about 1% to about 20% w/w, or from about 5% to about 20% w/w, or from about 10% to about 20% w/w, or from about 15% to about 20% w/w, or from about 0.1% to about 15% w/w solvent, or from about 0.5% to about 15% w/w, or from about 1% to about 15% w/w, or from about 5% to about 15% w/w, or from about 10% to about 15% w/w, or from about 0.1% to about 10% w/w solvent, or from about 0.5% to about 10% w/w, or from about 1% to about 10% w/w, or from about 5% to about 10% w/w, or from about 0.1% to about 5% w/w solvent, or from about 0.5% to about 5% w/w, or from about 1% to about 5% w/w, or from about 0.1% to about 1% w/w solvent, or from about 0.5% to about 1% w/w, or from about 0.1% to about 0.5% w/w solvent.

[0090] Since the disinfectant compositions are typically prepared on site from mixtures of ingredients in concentrated solution, tap water is used for dilution. Tap water generally has a certain amount of hardness. Since the presence of dissolved minerals (e.g. Ca^{++}, Mg^{++}) may adversely affect the performance and properties of the disinfectant composition, a sequestering agent is included in the composition to chelate the dissolved minerals in the form of a water soluble complex. Sequestering agents are well known in the art. Non-limiting examples include ethylene diamine tetraacetic acid (EDTA) sodium salt, sodium gluconate, sodium citrate, trisodium ethylenediamine disuccinate, citric acid, trisodium NTA, sodium phosphate and sodium choleate. Sequestering agents typically prevent the dissolved minerals from binding to the surfactant molecules. Moreover, sequestering agents may remove minerals from the surface to be disinfected.

[0091] In an embodiment, the pesticide compositions of the present invention comprise one or more phenolic compounds of natural origin. In an embodiment of the present invention, the phenolic compounds are selected from the group consisting of thymol and carvacrol. In a further embodiment, the pesticide compositions of the present invention comprise carvacrol. In a further embodiment, the pesticide compositions of the present invention comprise thymol. In a further embodiment, the pesticide compositions of the present invention comprise carvacrol and thymol.

[0092] In embodiments, the composition of the present invention comprises from about 0.01% to about 25% w/w, or from about 0.02% to about 25%, or from about 0.03% to about 25%, or from about 0.04% to about 25%, or from about 0.05% to about 25%, or from about 0.06% to about 25%, or from about 0.07% to about 25%, or from about 0.08% to about 25%, or from about 0.09% to about 25%, or from about 0.10% to about 25%, or from about 0.11% to about 25%, or from about 0.12% to about 25%, or from about 0.13% to about 25%, or from about 0.14% to about 25%, or from about 0.15% to about 25%, or

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carvacrol. In another embodiment, the pesticide compositions of the present invention comprise 1.15% (w/w) thymol or carvacrol.

[0093] Phenolic compounds typically have an associated pungent odor severely impeding large-scale applications. In an embodiment, the pesticide compositions of the present invention may thus further comprise one or more agents having the dual function of further enhancing the disinfectant properties of the compositions while imparting a more pleasant odor thereto. In yet a further embodiment of the present invention, the pesticide compositions of the present invention may further comprise one or more agents imparting a pleasant odor thereto (fragrance agent). Non-limiting examples of agents imparting a pleasant odor and/or enhancing the disinfectant properties comprise carvacrol, cymene, cineol, eugenol, thymol, menthol, citral and limonene. Further suitable examples of such agents are within the capacity of a skilled technician.

[0094] The pesticide compositions of the present invention may optionally include a wide range of additional ingredients, which may be added to the supplement present in some embodiments of the present invention. Non-limiting examples of which include colorants, pH adjusting agents, and sequestering agents. Such additional ingredients are within the capacity of a skilled technician.

[0095] In an embodiment, the pesticide compositions of the present invention comprise one or more essential oils enriched in thymol and/or carvacrol. Thymol and carvacrol are naturally occurring pesticides which are readily degraded in the environment. As such, there is little or no accumulation in the environment or in living organisms, even following repeated application of the pesticide compositions of the present invention.

[0096] Compositions of the present invention can include any number of combinations of ingredients discussed throughout this specification (*e.g.*, phenolic compounds of natural origin, essential oils, surfactants, solvents,

sequestering agents, water, *etc.*). It is also contemplated that that the concentrations of the ingredients can vary. In non-limiting embodiments, for example, the compositions may include in their final form, for example, at least about 0.0001%, 0.0002%, 0.0003%, 0.0004%, 0.0005%, 0.0006%, 0.0007%, 0.0008%, 0.0009%, 0.0010%, 0.0011%, 0.0012%, 0.0013%, 0.0014%, 0.0015%, 0.0016%, 0.0017%, 0.0018%, 0.0019%, 0.0020%, 0.0021%, 0.0022%, 0.0023%, 0.0024%, 0.0025%, 0.0026%, 0.0027%, 0.0028%, 0.0029%, 0.0030%, 0.0031%, 0.0032%, 0.0033%, 0.0034%, 0.0035%, 0.0036%, 0.0037%, 0.0038%, 0.0039%, 0.0040%, 0.0041%, 0.0042%, 0.0043%, 0.0044%, 0.0045%, 0.0046%, 0.0047%, 0.0048%, 0.0049%, 0.0050%, 0.0051%, 0.0052%, 0.0053%, 0.0054%, 0.0055%, 0.0056%, 0.0057%, 0.0058%, 0.0059%, 0.0060%, 0.0061%, 0.0062%, 0.0063%, 0.0064%, 0.0065%, 0.0066%, 0.0067%, 0.0068%, 0.0069%, 0.0070%, 0.0071%, 0.0072%, 0.0073%, 0.0074%, 0.0075%, 0.0076%, 0.0077%, 0.0078%, 0.0079%, 0.0080%, 0.0081%, 0.0082%, 0.0083%, 0.0084%, 0.0085%, 0.0086%, 0.0087%, 0.0088%, 0.0089%, 0.0090%, 0.0091%, 0.0092%, 0.0093%, 0.0094%, 0.0095%, 0.0096%, 0.0097%, 0.0098%, 0.0099%, 0.0100%, 0.0200%, 0.0250%, 0.0275%, 0.0300%, 0.0325%, 0.0350%, 0.0375%, 0.0400%, 0.0425%, 0.0450%, 0.0475%, 0.0500%, 0.0525%, 0.0550%, 0.0575%, 0.0600%, 0.0625%, 0.0650%, 0.0675%, 0.0700%, 0.0725%, 0.0750%, 0.0775%, 0.0800%, 0.0825%, 0.0850%, 0.0875%, 0.0900%, 0.0925%, 0.0950%, 0.0975%, 0.1000%, 0.1250%, 0.1500%, 0.1750%, 0.2000%, 0.2250%, 0.2500%, 0.2750%, 0.3000%, 0.3250%, 0.3500%, 0.3750%, 0.4000%, 0.4250%, 0.4500%, 0.4750%, 0.5000%, 0.5250%, 0.0550%, 0.5750%, 0.6000%, 0.6250%, 0.6500%, 0.6750%, 0.7000%, 0.7250%, 0.7500%, 0.7750%, 0.8000%, 0.8250%, 0.8500%, 0.8750%, 0.9000%, 0.9250%, 0.9500%, 0.9750%, 1.0%, 1.1%, 1.2%, 1.3%, 1.4%, 1.5%, 1.6%, 1.7%, 1.8%, 1.9%, 2.0%, 2.1%, 2.2%, 2.3%, 2.4%, 2.5%, 2.6%, 2.7%, 2.8%, 2.9%, 3.0%, 3.1%, 3.2%, 3.3%, 3.4%, 3.5%, 3.6%, 3.7%, 3.8%, 3.9%, 4.0%, 4.1%, 4.2%, 4.3%, 4.4%, 4.5%, 4.6%, 4.7%, 4.8%, 4.9%, 5.0%, 5.1%, 5.2%, 5.3%, 5.4%, 5.5%, 5.6%, 5.7%, 5.8%, 5.9%, 6.0%, 6.1%, 6.2%, 6.3%, 6.4%, 6.5%, 6.6%, 6.7%, 6.8%, 6.9%,

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[0097] The pesticide composition of the present invention may be used alone or in combination with one or more substances that are used in agricultural settings. i.e. as part of the supplements. Examples of substances include but are not limited to pesticides, such as disinfectants, fungicide, bactericide, virucide, insect repellent, arthropod repellent, nematicide, insecticide, acaricide, herbicide and plant growth regulators. Substances also include fertilizers, such as inorganic fertilizer, nitrogen fertilizer, potassium fertilizer, phosphate fertilizer, organic fertilizer, manure, compost, rock phosphate, bone meal, alfalfa, wood chips, langbeinite, cover crops, potassium sulfate, rock powder, ash, blood meal, fish meal, fish emulsion, algae, chitosan and molasses. Substances also include defoamers such as mineral oil, vegetable oil, paraffin wax, ester wax, silica, fatty alcohol, silicone, polyethylene glycol, polypropylene glycol copolymers and alkyl polyacrylates.

[0098] Pesticides

[0099] Most control measures are directed against inoculum of the pathogen and involve the principles of exclusion and avoidance, eradication, protection, host resistance and selection, and therapy. Control measures include the control of vectors of pathogens (insects and nematodes for example) and

chemical control (pesticides). A variety of chemicals are available that have been designed to control plant diseases by inhibiting the growth of or by killing the disease-causing pathogens. Chemicals used to control bacteria (bactericides), fungi (fungicides), and nematodes (nematicides) may be applied to seeds, foliage, flowers, fruit, or soil. Soil treatments are designed to kill soil-inhabiting nematodes, fungi, and bacteria. This eradication can be accomplished using steam or chemical fumigants. Soilborne nematodes can be killed by applying granular or liquid nematicides. Most soil is treated well before planting; however, certain fungicides can be mixed with the soil at planting time. Seeds, bulbs, corms, and tubers are frequently treated with chemicals to eradicate pathogenic bacteria, fungi, and nematodes and to protect the seeds against organisms in the soil—mainly fungi—that cause decay and damping-off. Seeds are often treated with systemic fungicides, which are absorbed and provide protection for the growing seedling. Protective sprays and dusts applied to the foliage and fruit of crops and ornamentals include a wide range of organic chemicals designed to prevent infection. Protectants are not absorbed by or translocated through the plant; thus they protect only those parts of the plant treated before invasion by the pathogen. A second application is often necessary because the chemical may be removed by wind, rain, or irrigation or may be broken down by sunlight. New, untreated growth also is susceptible to infection. New chemicals are constantly being developed.

[00100] Aside from plant-diseases caused by organisms listed above, animals like rodents and birds are responsible for important pre-harvest damage. On a global scale, it was recently estimated that almost 280 million undernourished could additionally benefit if more attention were paid to reducing pre- and post-harvest losses by rodents. Rodents are hazardous, as they can amplify pathogens from the environment and form reservoirs of (zoonotic) disease. With application of proper rodent control methods, it is possible to reduce the hazards of rodent-borne diseases in areas where humans, food

animals and rodents are living close to each other. These control measures include animal and birds repellents.

[00101] Any organism that damages crops or reduces the fertility of land can be defined as a pest. These include fungus, bacteria, virus, insects, nematodes, parasites, gastropods, arthropods, snails, slugs, vertebrates (mammal and birds), algae, etc. Chemical used to kill or repel pests are called pesticides. As reported by the EPA, here is a list of examples of pesticides :

Table 1. Examples of pesticides

Pesticide	Targeted organism (pest)
Algicides	Control algae in lakes, canals, swimming pools, water tanks, and other sites.
Antifouling agents	Kill or repel organisms that attach to underwater surfaces, such as boat bottoms
Antimicrobials	Kill microorganisms (such as bacteria and viruses).
Attractants	Attract pests (for example, to lure an insect or rodent to a trap). (However, food is not considered a pesticide when used as an attractant.)
Biocides	Kill microorganisms.
Biopesticides	Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals.
Disinfectants and sanitizers	Kill or inactivate disease-producing microorganisms on inanimate objects.
Fungicides	Kill fungi (including blights, mildews, molds, and rusts)
Fumigants	Produce gas or vapor intended to destroy pests in buildings or soil.
Herbicides	Kill weeds and other plants that grow where they are not

	wanted.
Insecticides	Kill insects and other arthropods.
Miticides (also called acaricides)	Kill mites that feed on plants and animals.
Microbial pesticides	Microorganisms that kill, inhibit, or out compete pests, including insects or other microorganisms.
Molluscicides	Kill snails and slugs.
Nematicides	Kill nematodes (microscopic, worm-like organisms that feed on plant roots).
Ovicides	Kill eggs of insects and mites.
Pheromones	Biochemicals used to disrupt the mating behavior of insects.
Repellents	Repel pests, including insects (such as mosquitoes) and birds.
Rodenticides	Control mice and other rodents.
Defoliants	Cause leaves or other foliage to drop from a plant, usually to facilitate harvest.
Desiccants	Promote drying of living tissues, such as unwanted plant tops.
Insect growth regulators	Disrupt the molting, maturity from pupal stage to adult, or other life processes of insects.
Plant growth regulators	Substances (excluding fertilizers or other plant nutrients) that alter the expected growth, flowering, or reproduction rate of plants.

[00102] Pesticides include a wide variety of substances usually targeting specific pests. Major chemical groups represented by pesticides are resumed in Table 2:

Table 2. Major Chemical Groups of pesticides

CHEMICAL GROUP	TYPE OF PESTICIDE
Acetamide	herbicide

Acylalanine + Carboxamide + Dithiocarbamate + Neonicotinoid	fungicide / insecticide
Acylalanine + Triazole	fungicide
Acylalanines	fungicide
Acylalanines + Chloronitriles	fungicide
Amide	herbicide
Amide/ Aniline	insecticide
Anilide	fungicide
Anilino Pyrimidine	fungicide
Antibiotic	fungicide
Aryloxphenoxy propionate	herbicide
Aryloxyphenoxy Acids	herbicide
Avermectin, Alcohol	miticide
Benzamide	herbicide
Benzamide + Dithiocarbamate	fungicide
Benzenamine	rodenticide
Benzimidazole	fungicide
Benzimidazole + Organophosphate + Phthalic Acid	insecticide / fungicide
Benzoic acid	herbicide
Benzothiadiazole	herbicide
Bipyridylium	herbicide
Carbamate (e.g. aldicarb, carbofuran, carbaryl, ethienocarb, fenobucarb, oxamyl, and methomyl)	Fungicide / growth regulator / insecticide / miticide / nematicide
Carbamate + Chloronitrile	fungicide
Carboxamide	fungicide
Carboxamide + Dithiocarbamate + Neonicotinoid	fungicide / insecticide
Carboxylic Acid	herbicide
Chlorinated Hydrocarbon	plant growth regulator
Chloroacetamide	herbicide
Chloro-nicotinyl	insecticide
Chloronitrile	fungicide
Chlorophenol	fungicide
Chlorophenyl	fungicide
Coumarin	rodenticide
Cyanoacetamide-	fungicide

Cyclohexanedione	Herbicide / plant growth regulator
Cyclohexanetrione	growth regulator
Dicarboximide	fungicide
Dinitroaniline	herbicide
Diphenylether	herbicide
Dithiocarbamate	fumigant, nematicide, fungicide, rodenticide, insecticide
Fatty Acid	insecticide / herbicide
Glycine	herbicide
Guanidine	fungicide
Halogenated Hydrocarbons	fumigant
Hydroxyanilide	fungicide
Hydroxycoumarin	rodenticide
Imidazolinone	herbicide
Indanedione	rodenticide & deer repellant
Inorganic	Fungicide, algicide, insecticide, rodenticide
Microbial	Bactericide, insecticide,
Morpholine	fungicide
Neonicontinoid + Triazole + Acylalanine + Phenylpyrrole	insecticide / fungicide
Nicotine	insecticide
Nitrile	herbicide
Nitro derivative	fungicide
nitroguanidine	insecticide
Organic Acid	Herbicide, plant growth regulator
Organochlorine	Insecticide, miticide
Organometallic	Fungicide, miticide
Organophosphate	insecticide / miticide / nematicide
Organophosphate + Phthalic Acid	insecticide / fungicide
Oxadiazole	herbicide
Phenoxy	herbicide
Phenyl-Carbamate + Phenyl-Carbamate	herbicide
Phenylpyrrole + Triazole + Neonicotinoid +	fungicide / insecticide

Acylalanine	
Phthalamate	herbicide
Phthalic Acid + Organophosphate + Benzimidazole	insecticide / fungicide
Phthalimide	fungicide
Piperazine	fungicide
Pyrethrins	insecticide
Pyrethroid	insecticide
Pyridazinone	insecticide / miticide
Quaternary ammonium	Algaecide, disinfectant, herbicide
Quinolineacid	herbicide
Strobilurin	fungicide
Substituted benzoylurea	insecticide
Sulfonylurea	herbicide
Synethetic pyrethroid	insecticide
Tetrazine	miticide
Thiadiazole	fungicide
Thiocarbamate	herbicide
Triazapentadiene	insecticide
Triazine	fungicide
Triazole	fungicide
Uracil	herbicide
Urea	herbicide
dichloropropene	fumigant
dichloropropene + chlorpicrin	fumigant
metam sodium	fumigant, nematicide
oxine benzoate	fungicide
formaldehyde	fungicide, fumigant
stoddard solvent	herbicide
metaldehyde	molluscicide
ancymidol	plant growth regulator
ethephon	plant growth regulator
gibberellic acid	plant growth regulator
gibberellins + benazladenine	plant growth regulator
maleic hydrazide	plant growth regulator
NAA	plant growth regulator
napthalene acetamide	plant growth regulator

paclobutrazol	plant growth regulator
putrescent whole egg solids	repellents
strychnine	rodenticide
zinc phosphide	rodenticide

[00103] It is well within the skill of the person skilled in the art to determine how much of any given pesticide may be added to the compositions of the present invention in order to obtain the pesticidal effect desired.

[00104] Fertilizers and combined use of pesticides and fertilizers

[00105] Fertilizers are defined as any material of natural or synthetic origin that is added to soil to supply one or more plant nutrients essential to the growth of plants. Fertilizers come in various forms. The most typical form is solid fertilizer in granulated or powdered forms. The next most common form is liquid fertilizer. Fertilizers typically provide, in varying proportions: six macronutrients: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S); eight micronutrients: boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn) and nickel (Ni). Fertilizers are broadly divided into organic fertilizers (composed of organic plant or animal matter), or inorganic or commercial fertilizers. Inorganic fertilizers include: ammonium nitrate, ammonium sulfate, ammonium thiosulfate, calcium ammonium nitrate, Calcium nitrate, Diammonium phosphate, monocalcium phosphate, potassium chloride, potassium nitrate, potassium sulfate and thermopotash. Organic fertilizers include: azomite, bioeffector, biofertilizer, compost, cottonseed meal, effluent spreading, feather meal, fish emulsion, fish hydrolysate, fish meal, manure, maxicrop, olive mill pomace, riverm, rockdust, seaweed fertiliser and slurry pit.

[00106] According to an embodiment, in agriculture, pesticides are used to limit damages caused by pests and stimulate growth, and can be used in combination with fertilizers.

[00107] It is well within the skill of the person skilled in the art to determine how much of any given fertilizer may be added to the compositions of the present invention in order to obtain the fertilizing effect desired.

[00108] Use and application of the composition of the present invention

[00109] In a second embodiment, there is disclosed a method of controlling pest, comprising contacting a soil, a seed, a plant, or combinations thereof, with pesticidal amount of the composition of the present invention. According to another embodiment, there is also disclosed a method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

[00110] The compositions of the present invention may be used for soil disinfection (fungicide, bactericide, virucide), as well as vegetable, plant and vegetal matter disinfection, which include as non-limiting examples seeds, grains, plants, trees, bushes, roots, foliage, weed, fruits, flowers, crops, graftings, and the likes. The compositions of the present inventions may also be used as plant growth regulator, insect repellents, arthropod repellents, pesticides, insecticides, nematicides, acaricides, ovicides, larvicides and adulticides.

[00111] Crops with which the composition of the present invention may be used include, for example, but are not limited to banana, apple, pear, potato, rice, coffee, citrus, onions, ginseng, soy, weed, tomato.

[00112] According to another embodiment, the compositions of the present invention may be used for soil fertilization to improve crop growth and health.

[00113] Thus, according to another embodiment, there is also disclosed a method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition according to the present invention. According to yet another embodiment, there is disclosed method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of:

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

[00114] Crops with which the composition of the present invention may be used include, for example, but are not limited to banana, apple, pear, potato, rice, coffee, citrus, onions, ginseng, soy, weed, tomato.

[00115] According to an embodiment, regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from the plant. According to another embodiment, regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from the plant. According to another embodiment, regulating the growth comprises an increase in the number of healthy plants. In another embodiment, regulating the growth may be of particular importance to plants whose foliage of particular interest, such as lettuce or other varieties of plants whose leaves are edible. According to another embodiment, regulating the growth comprises a stimulation of fruit ripening. According to another embodiment, regulating the growth comprises inhibition of plant and shoot growth. According to another embodiment, regulating the growth an

increase in flowering. According to another embodiment, regulating the growth comprises the regulation of leaf and fruit senescence.

[00116] According to another embodiment, the composition of the present invention may be used in improving the production of seeds. Thus, according to another embodiment, there is also disclosed a method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a composition according to the present invention. According to yet another embodiment, there is disclosed method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[00117] Crops with which the composition of the present invention may be used include, for example, but are not limited to banana, apple, pear, potato, rice, coffee, citrus, onions, ginseng, soy, weed, tomato. Particularly, the seed may be a potato tuber, and the growth regulating effect may be an increase in the length of a potato tuber sprout.

[00118] The compositions of the present invention may be applied onto a surface to be disinfected by means of a variety of techniques. In an embodiment, the compositions of the present invention may be applied using means to aerially

disperse the composition of the present invention, such as by spraying, volatilizing, sublimation, aerosol, fumigation, fogging. Suitable apparatus for such purpose include but are not limited to diffusers, mist blowers, or sprayers. According to another embodiment, the compositions of the present invention may be used for coating or soaking seeds, grains, roots, etc. According to yet another embodiment, the composition of the present invention may be spread over the soil in liquid or solid form. Further means of applying the compositions of the present invention are within the capacity of a skilled technician. The compositions of the present invention can either be applied directly or can be diluted prior to application. Dilution may be from about 1:1, to about 1:10000 (liquid:composition), in a suitable liquid such as water. Due to the substantially non-corrosive nature of the compositions of the present invention, the compositions can be readily applied without undue damage to the existing physical structure (*i.e.* surface).

[00119] According to other embodiments, the compositions of the present invention may be useful in other domains of application, such as for example as deodorizer or air freshener, as preservative in cosmetics products, as pet disinfectant, in the production of surfaces coated with biocides, in food production, for the disinfection of production plants and of food containers, the control of microbial growth in food and drinks, and the decontamination of carcasses, and as a food preservative; as a feed preservative in farming, as biocide for use in fish and shellfish farming, for example decontamination of fish eggs, ponds and equipment; as a wastewater disinfection solution; for the disinfection of cooling towers, as biocide in antifouling agents and paints in building/construction materials (including but not limited to wood, masonry, steel or other metallic materials, etc.), or marine anti-fouling paints and coatings; in fuels and plastic materials, as an animal and bird repellent, as a mole control products, as a herbicides in managing invasive species, for gardening and landscaping, and removing bracken, weed control, eg on pavements, industrial

complexes and alongside roads and railways, parks and golf courses. The present invention will be more readily understood by referring to the following examples which are given to illustrate the invention rather than to limit its scope.

EXAMPLE 1

PESTICIDE SOLUTIONS

[00120] **Chemical and Physical Characteristics of the Pesticide Solutions**

[00121] The sequestering agent (sodium citrate) was first dissolved in a predetermined amount of water and stirred until dissolution. Glycol ether PM (solvent), thymol, origanum oil and optionally citral (fragrance) were then added and stirred until dissolution. Surfactant (Sodium Lauryl Sulfate) and additional water were then added and stirred until dissolution to provide a 100 wt. % composition. The final composition was stirred until a homogeneous solution was obtained. Composition 1, obtained from Composition 2 by means of dilution with water (1:100), is considered a "ready to use" composition.

Table 3. Exemplary pesticide solutions

	Thymol Crystal	Origanum Oil / Citral	Sequestrant	Surfactant	Solvent	pH
A	0.18	0.04	0.01	0.12	-	6.9
B	0.18	0.04	0.01	-	0.18	6.7
C	0.18	0.04	-	0.12	0.18	6.5
1	0.18	0.04	0.01	0.12	0.18	6.5
D	18	4	1	12	-	8.1
E	18	4	1	-	18	7.9
2	18	4	1	12	18	8.8
3	0.18	0.03	0.09	0.12	0.76	8.0
4	6	1	3	4	25	8.2
	Solubility in Water	**Stability**	**Foaming Effect**	**Foaming Effect in Hard Water**		
A	NO	NO	YES	YES		
B	NO	NO	NO	YES		
C	YES	YES	YES	NO		
1	YES	YES	YES	YES		
D	NO	NO	YES	*n/a*		
E	NO	NO	NO	*n/a*		
2	YES	YES	YES	*n/a*		
3	YES	YES	YES	YES		
4	YES	YES	YES	*n/a*		

n/a: Not applicable this formula requires dilution before use

[00122] As illustrated hereinabove, the compositions are first formulated as a "concentrate" (Compositions **2** and **4**), dilution of which provides for the preparation of Compositions **1** and **3**. Compositions **A**, **B**, **C**, **D**, **E**, **1** and **2** comprise Origanum Oil / Citral (3:1). Compositions **3** and **4** do not comprise any fragrance (citral). The compositions have a pH ranging from about 6 to about 9. Dilution using hard water did not affect the characteristics of the composition which is indicative of the efficacy of the sequestering agent.

EXAMPLE 2

BIOLOGICAL EFFICACY OF SELECTED PHENOLIC COMPOUNDS AND ESSENTIAL OILS

[00123] The minimum concentration at which a total antimicrobial activity (bactericidal activity) could be observed was determined for selected phenolic compounds of natural origin and selected essential oils using the AOAC method 955.15 ("Phenol Coefficient Method") with minor modifications. The results are indicative of the excellent antimicrobial activity of both thymol and carvacrol.

Table 4. Antimicrobial agent inhibitory concentration

Antimicrobial Agent	Minimal Concentration (v/v %)
Thymol	**0.07**
Carvacrol	**0.07**
Eugenol	**0.4**
Citral	**> 1 %**
Thyme oil	**0.3**
Origanum oil	**0.2**
Eucalyptus oil	**> 1 %**
Lemon oil	**> 1 %**

[00124] Different concentrations of essential oils and phenolic compounds of natural origin were incorporated into composition **F** (see table herein below)

and inoculated with a 0.05 % bacterial suspension of *Staphylococcus aureus* (ATCC 6538; concentration of about 8 logs). After a contact time of 10 minutes, 0.1 ml of the inoculated solution was transferred to a broth culture with neutralizing (Difco 268110) and incubated over a period of 72 hours at 37°C. The presence of turbidity in the broth culture is indicative of the survival of the microorganism.

EXAMPLE 3

MINIMUM INHIBITORY CONCENTRATION (MIC) OF SELECTED PHENOLIC COMPOUNDS

[00125] The minimum inhibitory concentration (MIC) is the lowest concentration of an antimicrobial that will inhibit the visible growth of a microorganism after overnight incubation. Minimum inhibitory concentrations are important in diagnostic laboratories to monitor the activity of new antimicrobial agent. An MIC is generally regarded as the most basic laboratory measurement of the activity of an antimicrobial agent against an organism. The MIC of thymol and carvacrol were determined against several organisms (including geophilic fungi *Trichophyton mentagrophytes and Microsporum gypseum*) and are reported in **Table 5**. The MIC values go from 0.0006% to 0.06% depending on the tested microorganism.

Table 5. MIC of thymol and carvacrol

Domain	Specie	MIC of Thymol (v/v %)	MIC of carvacrol (v/v %)
Bacteria, gram +	*Staphylococcus aureus ATCC43300* [1]	0.06	0.015
Bacteria, gram +	*Staphylococcus aureus ATCC6538* [2]	0.014	0.0175
Bacteria, gram +	*Staphylococcus epidermidis ATCC12228*[1]	0.06	0.03
Bacteria, gram -	*Pseudomonas aeruginosa ATCC2730* [2]	0.0385	0.045
Bacteria, gram -	*Treponema phagedaenis-like* [3]	0.0006	n.d.
Yeast	*Candida albicans ATCC10231* [4]	0.016	0.016
Yeast	*Candida tropicalis ATCC13803* [4]	0.016	0.016
Fungus	*Epidermophyton floccosum FF9* [4]	0.016	0.008
Fungus	*Trichophyton rubrum FF5* [4]	0.016	0.008
Fungus	*Trichophyton mentagrophytes FF7* [4]	0.016	0.004
Fungus	*Microsporum canis FF1* [4]	0.008	0.004
Fungus	*Microsporum gypseum FF3* [4]	0.016	0.004
Fungus	*Aspergillus niger ATCC16404* [4]	0.016	0.016
Fungus	*Aspergillus fumigatus ATCC46645* [4]	0.016	0.016

[1] A. Nostro et al. FEMS Microbiology Letters 230 (2004) 191-195
[2] R.J.W. Lambert et al. Journal of Applied Microbiology 91 (2001) 453-462
[3] D. Döpfer et al. Proceedings of the 9th International Conference on Lameness in Ruminants (2013) 228-229
[4] E. pinto et al. J Med Microbiol 55 (2006) 1367-1373

EXAMPLE 4

QUANTITATIVE MICROBIAL REDUCTION ASSAY

[00126] The antimicrobial activity for selected compositions of the present invention was determined. Several compositions comprising a phenolic compound of natural origin or an essential oil (0.18%) were tested to determine their effectiveness in reducing the load of *Staphylococcus aureus* (ATCC 6538). The solutions were prepared from a concentrate and diluted with water (1:100). The results are indicative of the high efficiency of Compositions **5**, **6** and **7** in reducing the load of *Staphylococcus aureus*.

Table 6. Antimicrobial efficacy of antimicrobial agents

	Antimicrobial Agent (w/w)	Sequestrant (w/w)	Surfactant (w/w)	Solvent(w/w)	Log Reduction
F	-	0.01	0.12	0.18	**0.60**
5	Thymol	0.01	0.12	0.18	**7.63**
6	Carvacrol	0.01	0.12	0.18	**7.63**
G	Eugenol	0.01	0.12	0.18	**2.50**
H	Citral	0.01	0.12	0.18	**2.04**
I	Thyme oil	0.01	0.12	0.18	**3.06**
7	Origanum oil	0.01	0.12	0.18	**7.63**
J	Eucalyptus oil	0.01	0.12	0.18	**0.71**
K	Lemon oil	0.01	0.12	0.18	**0.64**

[00127] Different compositions of the present invention were inoculated with 0.05% of a bacterial culture of *Staphylococcus aureus* (ATCC 6538) freshly incubated over a period of 48 hours at 37°C in an optimal growth medium. After a contact time of 10 minutes, 0.1 ml of the inoculated solution was seeded at different dilutions on TSA agar (Difco 255320) with neutralizing to determine the residual microbial load. The log reduction was determined by calculating the logarithm of the residual charge obtained with the reference composition (*i.e.* water) and comparing it with the residual charge obtained using any of the compositions comprising either a phenolic compound or an essential oil.

EXAMPLE 5

BIOLOGICAL EFFICACY OF COMPOSITION 1 ON SELECTED MICROORGANISMS

[00128] The pesticide compositions of the present invention exhibit a broad spectrum of activity on a variety of microorganisms. As shown herein below, the efficacy of Composition **1** against a variety of microorganisms was determined.

Table 7. Efficacy of composition 1 on selected microorganisms

Activity	Standard Method	Group of Microorganisms	Microorganism	1
Bactericidal	AOAC[1] (Dilution Test)	Bacteria Gram -	*Salmonella cholerasuis*	**Pass**
		Bacteria Gram +	*Staphylococcus aureus*	**Pass**
Fungicide	AOAC Fungicidal Activity Test	Fungus	*Trichophyton mentagrophytes*	**Pass**
Virucidal	ASTM[2] Efficacy of Virucidal Agents	Virus	*Influenza A*	**Pass**

[1]: Association of Analytical Communities, [2]: American Society for Testing and Materials

EXAMPLE 6

TOXICITY OF THE PESTICIDE COMPOSITIONS

[00129] Toxicity tests (LD_{50}) were performed on selected ingredients of the pesticide compositions of the present invention. Composition **1** was determined as having a LD_{50} of >15 g/Kg (substantially non-toxic).

Table 8. Toxicity ingredients

Ingredient	LD_{50} Oral-rat	Specification
Thymol	980 mg/kg	USP, FCC
Origanum oil	1850 mg/kg	USP, FCC
Citral	4960 mg/kg	Oxford University
Sodium Citrate	>8g/kg	USP, FCC
Sodium Lauryl Sulfate	1288 mg/kg	USP, FCC
Glycol Ether PM	5 210 mg/kg	WHMIS

EXAMPLE 7

DEMONSTRATION THAT ALL TYPES OF SURFACTANTS CAN BE USED IN THE PESTICIDE COMPOSITION OF THE PRESENT INVENTION

[00130] Surfactants can be grouped by the charge characteristics of their polar head groups. The four groups are:

1. **Anionic:** Negative charge on the polar head group. These include surfactants like sulfates, sulfonic acids and carboxylic acids.

2. **Cationic:** Positive charge on the polar head group. These include surfactants like amines and Quaternized Ammonium Compounds (Quats).

3. **Amphoteric:** Can have both positive and negative charge. Primarily used as secondary surfactants. These include betaines and imidazolium compounds.

4. **Non-ionic:** No specific charge. By far the most frequently used surfactants. These include alcohols, alkanolamides, esters and amine oxides.

[00131] The antimicrobial efficacy of the compositions of the present invention is evaluated with all types of surfactants. The different compositions tested differ only for the surfactant. All compositions are based on the general formula presented in Table 9. The different surfactants tested are presented in Table 10. The surfactants were tested at a concentration of 0.12 % (w/w) and or/ 0.35% (w/w).

Table 9. General formula of compositions 1 to 68

Ingredient	**% (w/w)**
Thymol	0.23
Surfactant	0.12 - 0.35
Solvent	0.9
Sequestrant	0.09
Water	Q.S.

Table 10. Surfactants tested in compositions 1 to 68

#	Type	Chemical group	INCI Name	# CAS
1	Anionic	Alpha Sulfo Methyl Ester	Sodium Methyl 2-Sulfolaurate (and) Disodium 2-Sulfolaurate	149458-07-1
2	Anionic	Diphenyl Oxide Disulfonate	Sodium Dodecyl Diphenyl Ether Disulfonate	119345-04-9
3	Anionic	Diphenyl Oxide Disulfonate	Sodium Decyl Diphenyl Oxide Disulfonate	36445-71-3
4	Anionic	Dodecylbenzene Sulfonic Acid & Salts	Sodium Dodecylbenzenesulfonate	68081-81-2
5	Anionic	Dodecylbenzene Sulfonic Acid & Salts	Dodecylbenzene Sulfonic Acid	68584-22-5
6	Anionic	ether carboxylate	Capryleth-9 carboxylic acid/ hexeth-4 carboxylic acid	53563-70-5 and 105391-15-9
7	Anionic	ether carboxylate	Glycolic Acid Ethoxylate Lauryl Ether	27306-90-7
8	Anionic	Isethionate	Sodium Cocoyl Isethionate	61789-32-0
9	Anionic	Lauryl Ether Sulfates	Sodium lauryl ether sulfate	9004-82-4
10	Anionic	Lauryl Sulfates	Sodium Lauryl Sulfate	151-21-3
11	Anionic	Lauryl Sulfates	Triethanolamine Lauryl Sulfate	90583-18-9
12	Anionic	Lauryl Sulfates	Magnesium Lauryl Sulfate	3097-08-3
13	Anionic	Phosphate Esters	Nonoxynol-10 Phosphate	51609-41-7
14	Anionic	Phosphate Esters	Deceth 4 Phosphate	68921-24-4
15	Anionic	Phophanates	Amino tri (methylene phosphonic acid) pentasodium salt, Na5ATMP	20592-85-2
16	Anionic	Phophanates	1-Hydroxyethylidene -1,1,-diphosphonic acid	2809-21-4
17	Anionic	Sarcosinate	Sodium Lauroyl Sarcosinate	137-16-6
18	Anionic	Sulfosuccinates	Disodium Laureth Sulfosuccinate	68815-56-5
19	Anionic	Xylene Sulfonates	Sodium Xylene Sulfonate	1300-72-7
20	Cationic	Amine Oxides	Lauramine Oxide	1643-20-5
21	Cationic	Amine Oxides	Cocamidopropylamine Oxide	68155-09-9
22	Cationic	Amine Oxides	Lauryl/Myristyl amidopropyl amine oxide	61792-31-2 and 67806-10-4
23	Cationic	Amine Oxides	tallow amine + 2 EO	61791-46-6
24	Cationic	Amine Oxides	Myristamine Oxide	3332-27-2
25	Cationic	Onium compound	Soyethyl morpholinium ethosulfate	61791-34-2
26	Cationic	Quaternized Ammonium Compound	Dioleyloylethyl hydroxyethylmonium methosulfate	94095-35-9
27	Cationic	Quaternized Ammonium Compound	Quaternium 18 (Distearyl Dimethyl Ammonium Chloride)	61789-80-8

28	Cationic	Quaternized Ammonium Compound	Alkyl Dimethyl Benzyl Ammonium Chloride	68424-85-1
29	Cationic	Quaternized Ammonium Compound	Quaternium 12 (Didecyl Dimethyl Ammonium Chloride)	7173-51-5
30	Cationic	Quaternized Ammonium Compound	Dialkyl dimethyl ammonium chloride	68424-95-3
31	Amphoteric	Betaine	Cocamidopropyl Betaine	61789-40-0
32	Amphoteric	Betaine	Cetyl Betaine	693-33-4 and 683-10-3
33	Amphoteric	Betaine	Lauramidopropyl Betaine	4292-10-8
34	Amphoteric	Imidazolium compound	Disodium Cocoamphodipropionate	68604-71-7
35	Amphoteric	Imidazolium compound	Disodium Cocoamphodiacetate	68650-39-5
36	Amphoteric	Imidazolium compound	Sodium Cocoamphoacetate	68608-65-1
37	Amphoteric	Sultaine	Lauryl Hydroxysultaine	13197-76-7
38	Nonionic	Alcohol Ethoxylates	Linear alcohol (C11) ethoxylate, POE-7	34398-01-1
39	Nonionic	Alcohol Ethoxylates	Linear alcohol (C9-11) ethoxylate, POE-2.5	68439-46-3
40	Nonionic	Alcohol Ethoxylates	Lauryl alcohol ethoxylate, POE-8	9002-92-0
41	Nonionic	Alcohol Ethoxylates	Secondary Alcohol Ethoxylates	84133-50-7
42	Nonionic	Alkanolamides	Trideceth-2 Carboxamide MEA	107628-04-6
43	Nonionic	Alkanolamides	PEG-4 Rapeseedamide	85536-23-8
44	Nonionic	Alkanolamides	PEG 5 Cocamide	68425-44-5
45	Nonionic	Alkanolamides	Cocamide DEA	68603-42-9
46	Nonionic	Alkanolamides	Lauramide MEA	142-78-9
47	Nonionic	Alkanolamides	Cocamide MEA	68140-00-1
48	Nonionic	Alkanolamides	Lauramide DEA	120-40-1
49	Nonionic	Alkanolamides	Oleamide DEA	93-83-4
50	Nonionic	Alkyl polyglycosides	Caprylyl/ Myristyl Glucosid	68515-73-1 and 110615-47-9
51	Nonionic	Alkyl polyglycosides	Lauryl/ Myristyl Glucosid	110615-47-9
52	Nonionic	Alkyl polyglycosides	Caprylyl/ Decyl Glucoside	68515-73-1
53	Nonionic	Amide	N, N- Dimethyldecanamide	14433-76-2
54	Nonionic	Biosurfactant	Sophorolipid	-
55	Nonionic	Esters	Isopropyl Myristate	110-27-0
56	Nonionic	Esters	Isopropyl Palmitate	142-91-6
57	Nonionic	Fatty acid, natural origin	Glycereth-17 Cocoate	68201-46-7
58	Nonionic	Fatty acid, natural origin	Glycereth -6 Cocoate	68201-46-7

59	Nonionic	Fatty acid, natural origin		PEG/PPG-6/2 cocoate	Glyceryl	72245-11-5
60	Nonionic	Fatty Alcohol		Cetostearyl Alcohol		67762-27-0
61	Nonionic	Fatty Ethoxylate	Amine	PEG 2 Cocamine		61791-14-8
62	Nonionic	Fatty Ethoxylate	Amine	PEG 2 Tallow Amine		61791-26-2
63	Nonionic	Glycerol ester		Glycereth-7 Caprylate/Caprate		36145938-3
64	Nonionic	Glycerol ester		caprylic/capric triglyceride		73398-61-5
65	Nonionic	Glycerol ester		Glyceryl oleate		37220-82-9
66	Nonionic	Glycerol ester		Glyceryl stearate		123-94-4
67	Nonionic	Lactate		Lauryl Lactyl Lactate		910661-93-7
68	Nonionic	Sorbitan Ester		Polysorbate 80		9005-65-6

[00132] Antimicrobial efficacy test

[00133] 0.1 mL of bacterial culture containing *Staphylococcus aureus* is inoculated in a tube containing 10 mL of a given composition. The content of the tube is then mixed and left to stand for 2 minutes (the "contact time"). After 2 minutes, 0.01 mL of tube content is transferred to a tube containing 9 mL of a neutralizing bacterial culture media (Letheen Broth) that stops the antimicrobial action of the composition and allows microbial growth. Tubes are then checked for presence of microbial growth after 72h. For each antimicrobial efficacy test, the plating of positive controls followed by colony counting was done to establish the log reduction of *S. aureus* as a result of 2 minutes contact with compositions 1 – 68. If no growth is observed in the tested tube, the composition is considered to kill at least the bacterial load of the positive control.

[00134] Table 11 presents the results of the efficacy tests for compositions 1 – 68. The Log reduction of *S. aureus* is indicated for each composition. Each composition is formulated with the different surfactants at a concentration of 0.12 and/or 0.35% weight.

Table 11. Antimicrobial efficacy results against *Staphylococcus aureus*.

	Composition	Surfactant at 0.35% (w/w) Log reduction	Surfactant at 0.12% (w/w) Log reduction
Anionic	1	> 7.98	> 5.84
	2	> 5.04	> 5.84
	3	> 5.04	N/A
	4	> 7.98	N/A
	5	> 5.51	> 5.64
	6	> 5.76	> 5.64
	7	> 5.76	> 5.64
	8	> 5.76	> 5.64
	9	> 7.98	> 5.84
	10	> 7.98	> 5.84
	11	> 5.04	> 5.64
	12	> 5.04	> 5.64
	13	> 5.04	> 5.64
	14	> 5.04	> 5.64
	15	> 7.98	N/A
	16	> 7.98	> 5.84
	17	> 7.98	N/A
	18	> 5.04	> 5.64
	19	> 5.04	> 5.64
Cationic	20	> 4.43	N/A
	21	> 4.43	> 5.64
	22	> 5.72	> 5.64
	23	> 4.43	> 5.64
	24	N/A	N/A
	25	> 7.98	N/A
	26	> 5.76	> 5.64
	27	N/A	> 5.64
	28	> 5.04	> 5.64
	29	> 5.04	> 5.64
	30	> 7.98	> 5.84
Amphoteric	31	> 5.72	> 5.64
	32	> 4.43	> 5.64
	33	> 5.04	> 5.64
	34	> 5.04	> 5.84
	35	> 5.04	> 5.64
	36	> 5.04	> 5.64
	37	> 5.76	> 5.64

Non-ionic	38	> 4.43	> 5.64
	39	> 5.76	N/A
	40	N/A	> 5.64
	41	N/A	> 5.64
	42	N/A	> 5.64
	43	> 4.43	> 5.84
	44	> 4.43	N/A
	45	> 7.98	> 5.84
	46	> 5.04	> 5.64
	47	> 4.43	> 5.64
	48	N/A	> 5.64
	49	> 4.43	> 5.64
	50	> 7.98	> 5.84
	51	> 7.98	> 5.84
	52	> 7.98	N/A
	53	N/A	> 5.64
	54	> 6.43	> 5.64
	55	N/A	> 5.64
	56	N/A	> 5.84
	57	> 4.43	N/A
	58	> 5.76	> 5.64
	59	> 4.43	> 5.64
	60	> 4.43	> 5.64
	61	> 5.51	> 5.64
	62	N/A	> 5.64
	63	> 5.76	> 5.64
	64	> 4.43	> 5.64
	65	> 7.98	> 5.84
	66	N/A	> 5.64
	67	> 5.76	> 5.64
	68	> 4.43	> 5.64

Conclusions

[62] Each type of surfactants (anionic, cationic, amphoteric and non-ionic) was tested in the pesticide composition of the present invention. Compositions 1 – 68 covered the different types of surfactants, but also the most common chemical groups of surfactants available on the market. The composition of the present invention therefore can be formulated with any surfactant, while maintaining the antimicrobial efficacy.

[63] From the results found in Table 11, it is clear that compositions 1 – 68 of the present invention maintain antimicrobial efficacy with a contact time of 2 minutes.

EXAMPLE 8

EFFICACY AGAINST MAJOR PESTS: WEED

[64] Weed control remains a major concern in agriculture. The presence of weeds can result in a significant crop yield reduction, quality loss and harvesting difficulties. The herbicidal efficacy of compositions of the present invention was tested 1) on seed germination of two weed species and 2) the phytotoxicity effect of compositions of the present invention on seedlings of two weed species.

[65] **Compositions**

[66] The compositions are prepared with the % (w/w) of ingredients found in Table 12.

Table 12 – Compositions tested

Composition	8	9	10	11	12
Thymol %	0.23	0.46	1.15	2.30	23.00
Surfactant %	0.12	0.24	0.60	1.20	12.00
Solvent %	0.36	0.72	1.80	3.60	36.00
Water %	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

[67] Experiment 1: Composition 8, 9 and 12 efficacy was evaluated in comparison with the control treatment receiving water only. Each experimental unit consisted of a Petri dish containing a filter paper and 25 seeds per weed species. The two weed species tested were a dicotyledonous, common ragweed, and a monocotyledonous, barnyard grass. Five milliliters of each compositions

were poured into the Petri-plate containing seeds, which was subsequently sealed. There were four replicates per concentration. The Petri dishes were placed in a growth chamber at 27°C with a photoperiod of 16: 8 (day: night). Treatments were arranged in a completely randomized design. Germination was evaluated every two or three days for 21 days of incubation. At each observation date, the number of germinated seeds (with visible radicle) was counted and removed from the Petri. At the end of the test, non-germinated seeds were submitted to the tetrazolium test (Peters 2000) to assess their viability. Seed coat was incised with a scalpel and soaked in a 1% triphenyl tetrazolium chloride solution for 12 hours. Seeds were then dissected under binocular in order to reveal the embryo structure. The living tissues turned red and dead tissues did not stain. Each embryo was examined and difference in staining color on seed tissue was interpreted to determine the seed viability. Cumulative mortality was adjusted to take into account the natural mortality in the control.

[68] Results: The total germination in the control treatment was 64 and 87% for common ragweed (AMBAR) and barnyard grass (ECHCR) respectively. Seed germination was delayed when compositions 8, 9 and 12 were applied (**Fig. 1**). There was no germination of ragweed seeds with composition 12 while 9% of the seeds of barnyard grass were able to germinate. Mortality increased as concentration of thymol in the compositions increased to reach a maximum of 100% for ragweed and 90% for barnyard grass (**Fig. 2**).

[69] Experiment 2: Seedlings of two weed species (common ragweed and barnyard grass) were transplanted into 50-multi-cell trays filled with potting soil. In total, 480 seedlings were transplanted: compositions 8, 9, 10, 11, 12 x 10 plants/concentration x 2 weed species x 4 replications. After 3 days, when transplanted seedlings were well established into multi-cell trays, they were sprayed with the different compositions by using a hand pump sprayer, at a volume application rate of 225 l ha^{-1}. The growing stages of weeds at spraying time ranged from 2 to 4 leaves and 3 to 5 leaves, respectively for common

ragweed and barnyard grass. The trays were placed in a growth chamber at 25° C with a photoperiod of 16:8 (day: night) throughout the test. Treatments were arranged in a completely randomized design. Assessments of phytotoxicity were performed one week after spraying in each replicate for incidence (percentage of affected plants) and severity (affected leaf and stem area). "Weighed severity" was expressed by using a scale with five classes: (1: slight; 2: moderate; 3: high; 4: very high; 5: dead plant).

[70] Results: Visual symptoms of injury were readily apparent. Phytotoxicity severity on leaves and stems increased as concentration of thymol in the compositions increased (**Fig. 3**, **Table 13**).

Table 13. Compositions phytoxicity incidence and severity on common ragweed and barnyard grass seedlings [1].

Species	Composition	Incidence (%)	Weighed severity
AMBAR [2]	Water	0.0 c	0.00 e
	8	35.0 b	1.00 d
	9	92.5 a	2.25 c
	10	100.0 a	3.85 b
	11	100.0 a	4.78 a
	12	100.0 a	5.00 a
ECHCR [3]	Water	0.0 c	0.00 d
	8	40.0 b	1.14 c
	9	100.0 a	1.30 c
	10	100.0 a	3.58 b
	11	100.0 a	4.72 a
	12	100.0 a	5.00 a

[1] Means with the same letter are not significantly different according to Fisher's Protected LSD at P=0.05.
[2] AMBAR: common ragweed.
[3] ECHCR: barnyard grass.

[71] Conclusions: As demonstrated above, compositions of the present invention have herbicidal activity on common ragweed and barnyard grass. Weed seed germination was reduced and the aerial parts of plants were injured

significantly by compositions 8, 9, 10, 11 and 12 meaning the compositions are acting as contact herbicides when applied pre and post-emergence of weed seedlings.

EXAMPLE 9

EFFICACY AGAINST MAJOR PESTS: INSECTS AND MITES

[72] Bioassays on two biological models, major pests in fruit and vegetable production, the codling moth, Cydia pomonella (L.) and the two-spotted spider mite, Tetranychus urticae Koch were conducted. The insecticidal effect (ovicidal) of compositions of the present invention on eggs of codling moth (CM) and the acaricidal effect of compositions of the present invention on two-spotted spider mite (TSSM) were evaluated.

[73] **Compositions**

[74] The compositions are prepared with the % (w/w) of ingredients found in **Table 14**.

Table 14 – Compositions tested

Composition	8	10
Thymol %	0.23	1.15
Surfactant %	0.12	0.60
Solvent %	0.36	1.80
Water %	Q.S.	Q.S.

[75] Part I. Evaluate the insecticidal effect (ovicidal) of compositions of the present invention on eggs of the codling moth. Codling moth (CM) eggs and adults were obtained from OKSIR (Kelowna, BC) and have been used for laboratory rearing in a growth chamber. Adults were placed in plastic bags to allow egg laying. Compositions 8 and 10 were evaluated and compared to a

control composed of water. Topical application was used to evaluate insecticidal effect on CM eggs. Eggs laid less than 24 h were collected. Groups of 15 eggs were placed in Petri dishes and considered as a replicate. Ten replicates were sprayed for each composition. Petri dishes were placed under rearing condition. The effect of treatments on egg hatching was assessed 7 d after spraying (after completion of egg development). Data were analysed by a one-way analysis of variance followed by the HSD Tukey-Kramer test to compare the treatments. The critical point (α) was determined at 0.05.

[76] Results: Treatments were significantly different with higher mortality rates for compositions 8 and 10 compared to the control (**Fig. 4**). The highest mortality rate was observed for composition 10. Control eggs showed a normal development (**Fig. 5a**). Treated eggs with composition 8 seemed to have started embryogenesis but most of them did not complete it. These eggs had liquid vitellus (**Fig. 5b**). Most of the eggs treated composition 10 were dried and mortality reached 100% seven days after spraying (**Fig. 5c**).

[77] Part II. Evaluate the acaricidal effect of compositions of the present invention on the two-spotted spider mite (TSSM). The TSSM were obtained from Anatis Bioprotection (St-Jacques-le-Mineur, QC) and have been used for laboratory rearing on young bean plants (Phaseolus vulgaris (L.) cv. Gold rush). Only motile forms were used for bioassay. Compositions 8 and 10 were evaluated and compared to a control composed of water. Topical application was used to evaluate acaricidal effect on motile forms of TSSM. Fifteen TSSM were deposited on a young Lima bean leaf, underside up, resting on a 1.5 % agar in Petri dishes and considered as a replicate. Ten replicates were sprayed. Petri dishes were placed under rearing condition. Mortality was evaluated 24h after spraying. Data were analysed at each sampling date by a one-way analysis of variance followed by the HSD Tukey-Kramer test to compare the treatments. The critical point (α) was determined at 0.05.

[78] Results: Treatments were significantly different 24h after spraying (**Fig. 6**). The highest mortality rate was observed for composition 10.

[79] Conclusions: The insecticidal and acaricidal effects of compositions of the present invention were very high especially for the eggs of the codling moth and the motile forms of the TSSM. An ovicidal effect of the compositions was observed. Since the eggs of the codling moth are exposed on apples or on apple leaves during oviposition in the orchards, these results suggest that no larvae would emerge from eggs and that no damage would be caused to apple by this pest. Moreover, the high toxicity of the compositions observed 24 hours after application on motile forms of TSSM is also an important criterion for controlling promptly this pest in the presence of high population density.

EXAMPLE 10

EFFICACY AGAINST MAJOR PESTS: BACTERIA

[80] Fire blight, which causative agent is *Erwinia amylovora* is an important disease of apple, pear and some ornamental plants causing important economic losses for growers. Strategies for fire bight control include many integrated pest management practices including cultivar choice, infected parts removing, and copper sulfate or streptomycin applications. However, those treatments raise many concerns regarding toxicity (copper sulfate) and antimicrobial resistance development (streptomycin). An alternative treatment is needed and compositions of the present invention would be perfect candidates. The sensitivity of three strains of *Erwinia amylovora* to compositions of the present invention under laboratory conditions was determined and compared to the gold standard streptomycin, commonly used to control fire blight.

[81] **Composition**

[82] Composition 12 is prepared and is used to make the tested dilutions of 1, 2.5 and 5%.

Table 15 – Composition tested

Composition	12	1% dilution	2.5% dilution	5% dilution
Thymol %	23.00	0.23	0.58	1.15
Surfactant %	12.00	0.12	0.30	0.60
Solvent %	36.00	0.36	0.90	1.80
Water %	Q.S.	Q.S.	Q.S.	Q.S.

[83] Two streptomycin-sensitive (Sm^S) strains of *E. amylovora* originated from Quebec, Canada (strains 433 and 435) and one streptomycin-resistant (Sm^R) strain originated from Oregon, USA (strain 153sm5). A streptomycin-sensitive *E. coli* strain, used as control, was obtained from ATCC® (ATCC 25922TM). A sufficient quantity of composition 12 was dispensed into bottles containing King B agar medium, in order to obtain 1, 2.5 and 5% (v/v) solutions (corresponding to compositions containing thymol ranging from 0.23 to 1.15%). The 0% (v/v) concentration was obtained by adding 25 ml of ultra-pure sterile water to 475 ml of cooled medium. A volume of 20 ml of media was then distributed in 100x15 mm sterile Petri dishes. *E. amylovora* and *E. coli* strains were cultivated on King B agar medium for 72 h at 26°C and on Trypticase Soy Agar medium overnight at 37°C, respectively. Individual colonies from plates were suspended in 5 ml of sterile saline solution (0.85% w/v) and adjusted to a cell density of approximately 15 x 10^8 colony-forming units (cfu) per milliliter. Aliquots (100 µl) of a dilution series of each bacterial suspension were spread on surfaces of King B agar medium and incubated for 72 h at 26° C. Bacterial strains were tested for streptomycin sensitivity at the following concentrations: 0, 100, 250 and 500 ppm. Bacterial strains were tested for composition 12 sensitivity at the following concentrations: 0%, 1%, 2.5%, and 5%. Briefly, the four strains by plate were tested for each concentration. An aliquot of 100 µl of each bacterial suspension was dropped on one of the four quadrants agar

surface as follows: Q1) *E. amylovora* 433; Q2) *E. amylovora* 435; Q3) *E. amylovora* 153sm5; and Q4) *E. coli* ATCC 25922. Bacterial growth at the inoculation point was evaluated using a Quebec dark field colony counter after 24, 48 and 72 hours of incubation at 26°C. Sensitivity was determined from triplicate plates for each concentration.

[84] Results: The two Sm^S strains of *E. amylovora* and the *E. coli* strain were sensitive to streptomycin and did not grow on King B agar media containing streptomycin concentrations of 100, 250 and 500 ppm. In contrast, the Sm^R strain of *E. amylovora* was not inhibited by streptomycin at any concentration tested (**Fig. 7**). All strains of *E. amylovora* and *E. coli* strain showed growth on King B agar media with no streptomycin.

[85] The two Sm^S strains of *E. amylovora*, the Sm^R strain of *E. amylovora* and the *E. coli* strain were sensitive to compositions of the present invention and did not grow on King B agar media containing composition 12 at concentrations of 1, 2.5 and 5% (**Fig. 8**). All strains of *E. amylovora* and *E. coli* strain showed growth on King B agar media with no composition 12.

[86] Conclusions: Results showed the bactericidal effect of compositions of the present invention on *Erwinia amylovora*, a major bacterial pest in orchards. Moreover, compositions of the present invention had an efficacy against an antibiotic resistant strain. Antibiotic (streptomycin) is currently the most widely used substance to fight fire blight in orchards and antibiotic resistance is rising. Compositions of the present invention are not only effective against this plant disease but also present an alternative treatment.

EXAMPLE 11

AGRONOMIC IMPACT ON POTATO CULTURE

[87] Seed potato growers commonly use mineral oil-fungicide mix in their crop management practices to fight fungal diseases and against propagation of many viruses transmitted by aphids. Growers must combine or

alternate the active molecules of the fungicides to reduce the risk that pathogenic fungi develop fungicide resistance. An effective fungicide treatment must have no impact, or positive impact on agronomic variables, in other words the fungicide dosage should allow mimimal phytotoxic effect for maximum phytoprotection and productivity. In this example, impact on productivity (agronomic impact) was evaluated.

[88] Compositions of the present invention were evaluated for different agronomic variables, on potato plants. The potato cultivars Dark Red Chieftain (mid-season, round, red), Superior (mid-season, round, white) and Russet Burbank (late season, long, white) have been used in the trials. These varieties are representatives of the major markets of ware, peeled or seed potatoes. The following agronomic variables were studied: 1) phytotoxicity; 2) number and weight of tubers; 3) green plant percentage; 4) percentage of plants bearing dry leaflets; 5) percentage of plants with potato early blight.

[89] Compositions of the present invention were applied A) alone, or B) in combination with a mix of mineral oil Superior 70 (10L/ha) and one of the following fungicides: Ridomil (208mL/ha, comprising MEFENOXAM™ (Metalaxl-M) as active ingredient), Bravo 500 (2.4L/ha, containing chlorothalonil as active ingredient) or Manzate-Pro (2.24Kg/ha, a coordination product of zinc ion and manganese ethylenebisdithiocarbamate, as an activeingredient), used in alternance. The compositions were applied five times on potato plants with seven to ten days intervals. The study has been realized in a potato field in Quebec, Canada. The experimental design comprised a group of 4 blocks of 5 plots for A) and 4 blocks of 4 plots for B). These trials have been realized from July to October. The first application was done 40 days after the plantation. Tubers were harvested after 80 days of growth. The control treatment was for A) water, and for B) water, and a mix of oil and fungicide.

Table 16– Composition tested

	A: composition tested alone Control: water				B: Composition tested in combination with a mineral oil-fungicide mix (Ridomil, Bravo or Manzate-Pro, in alternance) Controls: water and mineral oil-fungicide	
Composition	9	8	13	14	15	16
Thymol %	0.46	0.23	0.12	0.02	0.46	0.12
Surfactant %	0.24	0.12	0.06	0.01	0.24	0.06
Solvent %	0.72	0.36	0.18	0.04	0.72	0.18
Applied in field with oil and fungicide	no	no	no	no	yes	yes
Water %	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

1) Phytotoxic effect of composition of the present invention:

[90] Phytotoxicity symptoms have been assessed after the spray applications of the compositions alone or combined with mineral oil and a fungicide. The results obtained after all 5 spray applications are summarized in Table 17.

[91] In summary, It was demonstrated that compositions of the present invention can be applied with no or low phytotoxic effects on potato plants. Phytotoxic effects are generally observed when the compositions of the present invention have higher concentrations of thymol (> 0.23% thymol), surfactant and solvent. The phytotoxicity is thus dose-dependent. Higher dosage of thymol, surfactant and solvent can be tolerated by other plant species.

Table 17– Evaluation of the phytotoxicity of the spray application of compositions of the present invention on potato plants

Composition applied		Observations of the sprayed leaves and plants, after 5 sprayed applications with seven to ten days intervals
A	Water	Good turgescence, green midrib and foliage, leaves without spots and chlorosis
	9	Embossment, dark green midrib and foliage, many necrotic spots localized at the puddles
	8	Light wilting, dark green midrib and foliage, few necrotic spots localized at the puddles
	13	Good turgescence, green midrib and foliage, few necrotic spots localized at the puddles
	14	Good turgescence, green midrib and foliage, leaves without spots and chlorosis
B	Water	Good turgescence, green midrib and foliage, leaves without spots and chlorosis
	Oil + Fungicide	Good turgescence, green midrib and foliage, several leaves with spots and chlorosis
	15	Dark green midrib and foliage, many leaves embossments and necrotic spots localized at the puddles, several dry stems or leaves
	16	Light embossment, dark green midrib and foliage, few necrotic spots localized at the puddles

2) Potato yield (number and weight):

[92] Figures 9A and B present the average number (A) and weight (B) of tubers harvested at the end of the trial. It has been calculated for the total number of tubers harvested by plant, by plot and by treatment. The average number and weight of tubers per plant was determined in order to evaluate the impact of compositions of the present invention, alone or in a mineral oil-fungicide mix, on the plant physiology and the plant capacity to grow tubers initiated after the flowering period.

[93] In summary, and in concordance with phytotoxicity evaluation, there is a tendency for the average number and weight of tubers per plant to decrease progressively as the concentration in thymol, surfactant and solvent increases in the compositions applied alone on the foliage of the potato plants. Composition 13 was determined as having the best impact on potato yield, when compared to the water control. In the second part of the assay, the compositions were applied in combination with mineral oil and a secondary fungicide. It was observed that for composition 16, embodiment of the present invention, the average weight of tubers was comparable to the controls, but that the number of tubers recovered / plants was unexpectedly greater than the controls. A synergistic effect between the composition of the present invention, oil and fungicide results in a positive impact on this agronomic variable.

3) Green plants.

[94] Figure 10 shows the percentage of green plants in accordance with the applied compositions. A plot with a high percentage of green plants shows plants displaying a turgid green canopy with almost no spots or necrosis and the plants are occupying all the space on the row. A plot with plants displaying spotted or dry leafs and stems has an uneven canopy. These plots will have a smaller percentage of green plants.

[95] In summary, for part A of the assay, the highest average percentage of green plants was found in the plots where composition 13 was

applied alone, compared to the water treatment. For part B of the assay, more green plants resulted from the application of composition 16 in combination with oil and fungicide, compared to water or oil + fungicide alone. From these results, and with a composition containing specifically 0.12% of thymol, we unexpectedly observe that a) composition of the present invention has positive agronomic impact on the foliage of the potato plant and b) there is a synergistic effect between the composition, oil and another fungicide on this variable.

4) Plants with dry leaflets.

[96] Figure 11 shows the percentage of plants with dry leaflets. In summary, results are in accordance with the percentage of green plants. For part A of the assay, the smallest average percentage of plants displaying dry leaflets was found in the plots where composition 13 was applied alone, compared to the water treatment. For part B of the assay, less dry leaflets resulted from the application of composition 16 in combination with oil and fungicide, compared to water or oil + fungicide alone. From these results, and with a composition containing specifically 0.12% of thymol, we observe that a) composition of the present invention has positive agronomic impact on the foliage of the potato plant and b) there is a synergistic effect between the composition, oil and another fungicide on this variable.

5) Plants with potato early blight.

[97] Plants affected by the early blight caused by the fungi *Alternaria alternata* (Fr :Fr) Keissl have leaves displaying well defined concentric brown spots. Spots from the early blight dry up progressively and when there are too many, the foliage dries up completely. Figures 12A and B shows the average percentage of plants displaying spotted leaflets per plot (A), and the average number of spot per leaflets (B), for the compositions applied in combination with oil and fungicide, compared to the controls water, and oil + fungicide.

[98] In summary, the percentage of plants presenting symptoms of the fungal infection early blight was lower in plots treated with oil + fungicide, compared to water. When compositions of the present invention were applied with oil and fungicide, there was a greater decrease in symptoms, suggesting a synergistic phytoprotective effect between compositions of the present invention and oil+ fungicide.

[99] In conclusion, some compositions of the present invention can present phytotoxic effect on potato plants, but these effects may not be observed on other plants / crops. For this reason, the compositions should not be limited to the ones presenting no phytotoxic effect in this trial. It was also found that compositions of this invention presenting low phytoxicity on potato plants were having a positive impact on different agronomic variables, particularly when the compositions were applied in combination with mineral oil and another fungicide. The synergistic effect between these components was observed on potato yield (quantity and weight of potatoes harvested, appearance of foliage) suggesting composition of the present invention can act as plant growth regulators, an unexpected result. This observation may be of particular importance to plants whose foliage of particular interest, such as lettuce or other varieties of plants whose leaves are edible. The synergistic effect was also observed on phytoprotection (protection against early blight), so the compositions of the present invention also have a fungicidal effect.

EXAMPLE 12

USAGE FOR POTATO SEED GROWING

[100] Potato seed growers use pesticides to disinfect warehouses, tubers storage bins and machinery in order to produce pathogen-free tubers for the industry. *Clavibacter michiganensis* is a pathogen that causes the bacterial ring rot of potato, and causes major concerns for the seed potato industry all around the world. In this trial, it was examined if compositions of the present invention

have a bactericidal effect on the pathogen on 1) agar plates and 2) wooden surface while 3) the phytotoxic effect of the compositions was evaluated on potato tubers with sprouts.

1) Bactericidal effect on agar plates

[101] The bacterial strain used for this test was *Clavibacter michiganensis subsp. Sepedonicus* (*Cms*, Potato bacterial ring rot). Fresh suspension of 10^9 cells/mL was prepared in sterile NaCl 0.85% using loops of an actively growing purified culture of *Cms* kept on Tryptic Soy Agar (TSA). An aliquot of 100 µL of a fresh suspension was evenly spread on a TSA plate and four replicates per pathogens assay were prepared. The plates were left to dry for 2 hours in a biological hood. Then four sterile Whatmann no1 filter disks of 1.2 cm diameter were placed at squared angles from each other to form a cross onto the surface of the inoculated TSA plate.

[102] A volume of 50 µL of water or one of the tested composition (Table 18) was deposited on a sterile filter disk. The four plates per Cms assay were incubated at 22°C for four days. After each 24 hours of a three day period, a volume of 50 µL of each composition was applied on the corresponding filter disk. The radial zone of bacterial growth inhibition was evaluated for each filter disk after the 3rd and the 4th day of incubation. Results are presented in Table 19.

[103] In summary, Compositions 8 and 13 showed bactericidal effect on Cms. The cumulative effects of three applications of these compositions have increased, over a 24 hours period, the radial zone of Cms growth inhibition from each filter disk.

Table 18– Composition tested

Composition	8	13	14
Thymol %	0.23	0.12	0.02
Surfactant %	0.12	0.06	0.01
Solvent %	0.36	0.18	0.04
Water %	Q.S.	Q.S.	Q.S.

Table 19– Bactericidal effect of three applications of compositions 8, 13 and 14 on *Clavibacter michiganensis subsp. sepedonicus (Cms)*

Composition	3 days mean (mm)			4 days mean (mm)		
Water	0.0	±	0.0	0.0	±	0.0
8	2.8	±	0.5	9.0	±	2.4
13	2.0	±	0.0	4.1	±	1.2
14	0.0	±	0.0	0.0	±	0.0

2) Bactericidal effect on wood

[104] In order to mimic warehouse conditions, composition 8 of the present invention was tested on bacterial contamination of wood surface. A fresh suspension of 10^9 cells/mL (1.0 OD 600 nm) was prepared in sterile NaCl 0.85% using loops of an actively growing purified culture of Cms kept on Tryptic Soy Agar (TSA). An aliquot of 100 µL of a fresh suspension was evenly spread on a 3 cm^2 surface of a wood stick and twelve replicates per pathogens assay were prepared. The sticks were left to dry for 2 hours in a biological hood. A volume of 4 mL of Composition 8 or 4 mL of sterile NaCl 0.85% was deposited in a tube to cover a little more than the surface of a wood stick. Four replicates of each solution were prepared. The eight wood sticks per Cms assay were incubated at 22°C for 10 min. Then, each wood stick was left to dry for at least 20 min on a

sterile filter paper in a biological hood. Then each wood stick was immersed in sterile NaCl 0.85% for 5 min under constant agitation to wash out the bacterial cells from the wood surface. As a control, four contaminated wood surface that were not immersed in Composition 8 or NaCl 0.85% were also washed in NaCl 0.85% for 5 min under constant agitation. For each resuspension, a volume of 100 µL was spread evenly on a TSA plate. Also, a volume of 100 µL of a 100 fold dilution was spread evenly on a TSA plate. For each Cms assay, the 24 inoculated TSA plates were incubated at 22°C for 4 days. The total number of bacterial colonies was determined on each TSA to assess the bactericidal effect of Composition 8 when applied to disinfect a highly contaminated wood surface.

[105] Between 3.4 x 10^7cells and 5.7 x 10^7 cells of Cms cells were washed out from wood surfaces that were not treated or treated with the negative control solution NaCl 0.85%. No viable bacterial cells of Cms were washed out from the wood sticks that were treated with Composition 8. The wood surfaces contaminated with Cms cells were efficiently disinfected with Composition 8.

3) Phytotoxic effect on potato tubers with sprouts.

[106] The phytotoxic effect of Compositions 8, 13 and 14 on potato tubers and sprouts was evaluated using Dark Red Chieftain tubers. The storage temperature was gradually increased from 8°C to 18°C to break their dormancy. The sprout length was monitored to confirm that 50 tubers showed sprout length varying between 0.5 cm and 1.5 cm (Group A), while 50 tubers showed sprout length varying between 2.0 cm and 4.5 cm (Group B). The length of each sprout of each tuber was recorded.

[107] Compositions 8, 13 and 14 were prepared, along with the water control. Ten tubers of each group (A, B) were put in a meshed basket to be immersed 5 seconds into one of the 4 solutions. The tubers were left to dry before being put in a potting mix used to grow potato plants. 4 containers suitable to sustain the growth of 20 tubers (10 tubers per group) were used, one for each

of the 4 treatments. All the tubers were covered with no more than 2 cm of potting mix. The containers were kept in a growth chamber under a 16 hours photoperiod at 22°C (day) and 18°C (night). Water was added to each container just enough to keep the soil humid.

[108] After 12 days, the tubers were carefully taken out of the potting media. For each tuber, the length of each sprout was determined. To evaluate the effect of each treatment, the increase in the total sprouts length per tuber was calculated for each tuber groups. The results are presented in Table 20.

[109] In summary, when compositions 8 and 13 were applied, an increase in the average length of sprouts was observed, compared to the water treatment. This was not observed with composition 14 that had the lowest concentration of each ingredient (thymol, surfactant and solvent). Also, very few phytotoxic effects were observed during the experiment, as only three tubers showed sprout necrosis in group A. Thus, it was herein shown that compositions of the present invention can unexpected stimulate the growth of sprouts on potato tubers. Not only some compositions of the present invention harbor low phytotoxicity on germinated potato tubers, but it is also a plant growth regulator with positive impact on the growth of sprouts of potato tubers.

Table 20– Impact of compositions 8, 13 and 14 on the average increase of sprouts length per tuber for two groups (A and B) of tubers treated.

Group	Composition	Mean increase of sprouts length/tuber (mm)		
A	Water	9.1	±	2.1
A	8	15.1	±	6.4
A	13	11.2	±	3.3
A	14	4.0	±	0.7
B	Water	15.5	±	2.9
B	8	27.6	±	7.0
B	13	24.9	±	6.2
B	14	10.4	±	2.8

[110] In conclusion, compositions of the present invention showed again their potential as a pesticide product for crop protection. Here, the compositions were effective in killing bacteria responsible for tubers infection in seed grower's installations, thus demonstrating its potential in preventing seed bacterial disease. Finally, specific compositions of the present invention presented very low phytotoxic effects on potato tubers, and they were at the same time stimulating the growth of sprouts on tubers, which is a desirable and unexpected effect for seed growers. The dual effect (bactericidal and growth stimulator) of compositions of the present invention was also unexpected.

[111] While preferred embodiments have been described above and illustrated in the accompanying drawings, it will be evident to those skilled in the art that modifications may be made without departing from this disclosure. Such modifications are considered as possible variants comprised in the scope of the disclosure.

CLAIMS:

1. A composition for regulating plant growth and/or control pests, the composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The composition of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The composition of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The composition of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The composition of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The composition of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

7. The composition of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

8. The composition of any one of claims 1 to 7, wherein said pesticide is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The composition of any one of claims 1 to 8, wherein said fertilizer is chosen from fertilizers an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The composition of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The composition of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benazladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, N-acetylaspartic acid.

12. The composition of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of any one of claims 1 to 12 to control said pest.

14. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

15. The method of claim 14, wherein antimicrobial compound is of synthetic origin.

16. The method of claim 14, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

17. The method of any one of claims 14 to 16, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

18. The composition of any one of claims 14 to 16, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

19. The composition of any one of claims 14 to 18, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

20. The composition of any one of claims 14 to 19, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

21. The method of any one of claims 13 to 20, wherein said pest is chosen from an insect, a nematode, a fungi, a bacteria, a larvae, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an algae, or combinations thereof.

22. The method of claim 21, wherein said plant is a weed.

23. The method of claim 21, wherein said arthropod is a mite.

24. The method of claim 21, wherein said insect is a moth.

25. The method of claim 21, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

26. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition according to any one of claims 1 to 12.

27. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

28. The method of claim 27, wherein antimicrobial compound is of synthetic origin.

29. The method of claim 27, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

30. The method of any one of claims 27 to 29, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

31. The method of any one of claims 27 to 29, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

32. The composition of any one of claims 27 to 31, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

33. The composition of any one of claims 27 to 32, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

34. The method of any one of claims 26 to 33, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

35. The method of any one of claims 26 to 34, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

36. The method of any one of claims 26 to 34, wherein regulating the growth comprises an increase in the number of healthy plants.

37. The method according to any one of claims 26 to 36, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

38. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition according to any one of claims 1 to 12.

39. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

40. The method of claim 39, wherein antimicrobial compound is of synthetic origin.

41. The method of claim 39, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

42. The method of any one of claims 39 to 41, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

43. The method of any one of claims 39 to 42, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

44. The composition of any one of claims 39 to 43, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

45. The composition of any one of claims 39 to 43, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

46. The method of any one of claims 38 to 45, wherein said seed is a tuber.

47. The method of claim 46, wherein said tuber is from a potato (kumara), a sweet potato, a yam, a cassava, and a dahilia.

48. The method of any one of claims 38 to 47, wherein regulating the growth comprises an increase in the length of a tuber sprout.

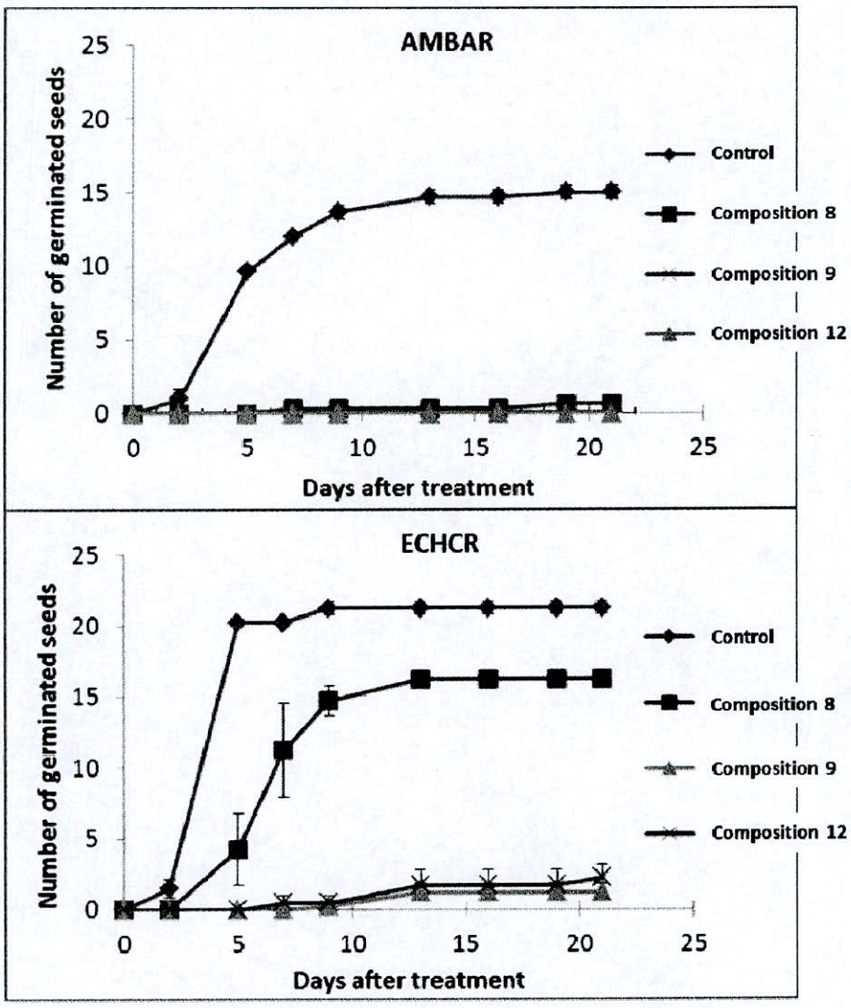

AMBAR
Number of germinated seeds
25
20
15
10
5
0
0
5
10
15
20
25
Days after treatment
Control
Composition 8
Composition 9
Composition 12
ECHCR
Number of germinated seeds
25
20
15
10
5
0
0
5
10
15
20
25
Days after treatment
Control
Composition 8
Composition 9
Composition 12

Fig. 1

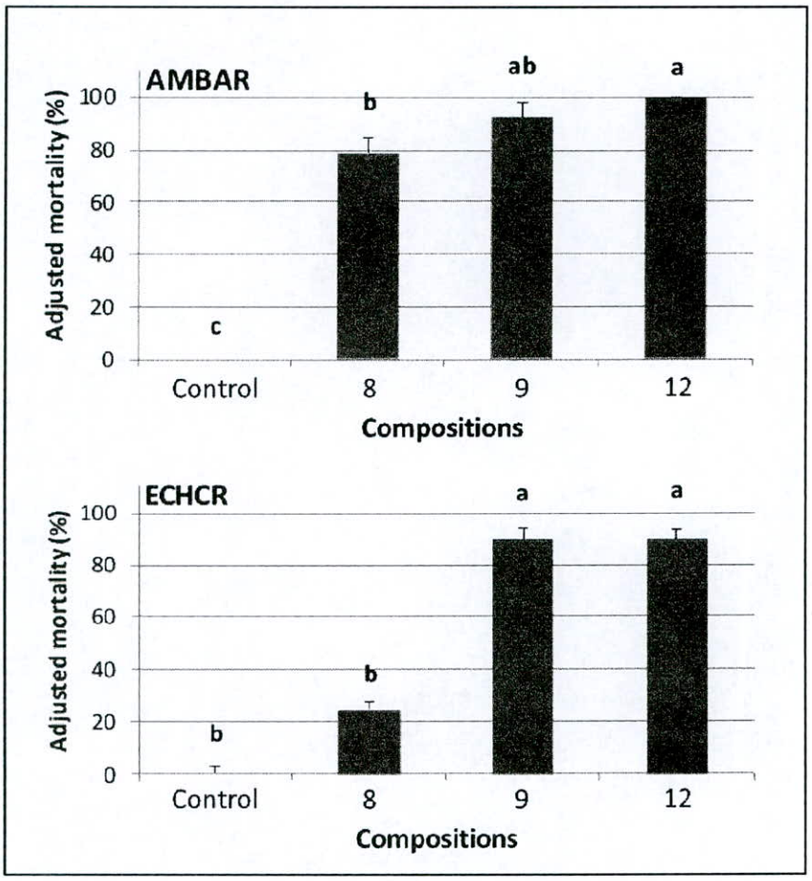

AMBAR
Adjusted mortality (%)
100
80
60
40
20
0
c
b
ab
a
Control
8
9
12
Compositions
ECHCR
Adjusted mortality (%)
100
80
60
40
20
0
b
b
a
a
Control
8
9
12
Compositions

Fig. 2

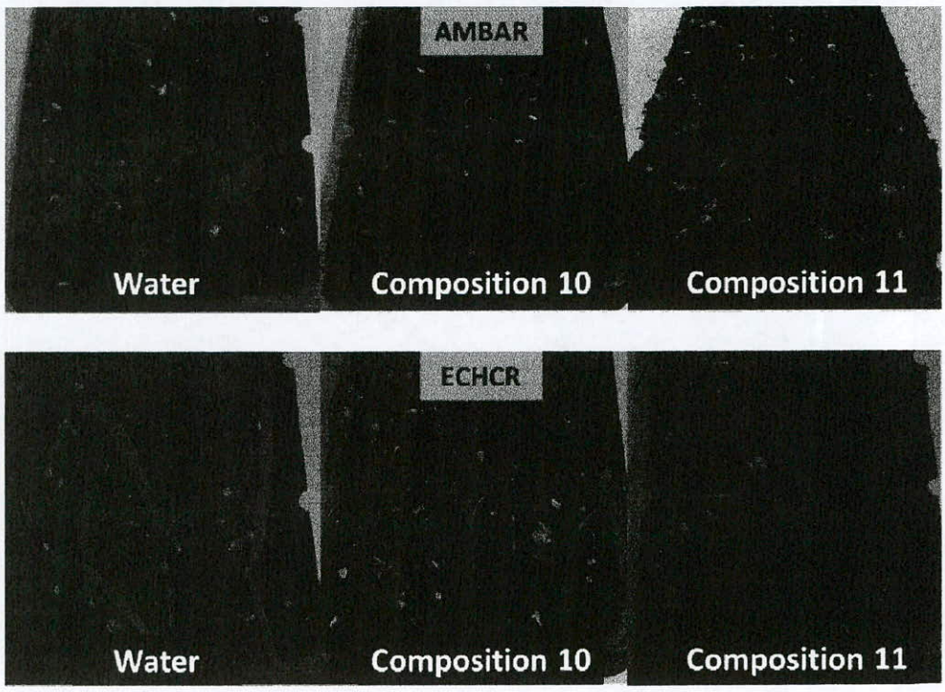

AMBAR
Water
Composition 10
Composition 11
ECHCR
Water
Composition 10
Composition 11

Fig. 3

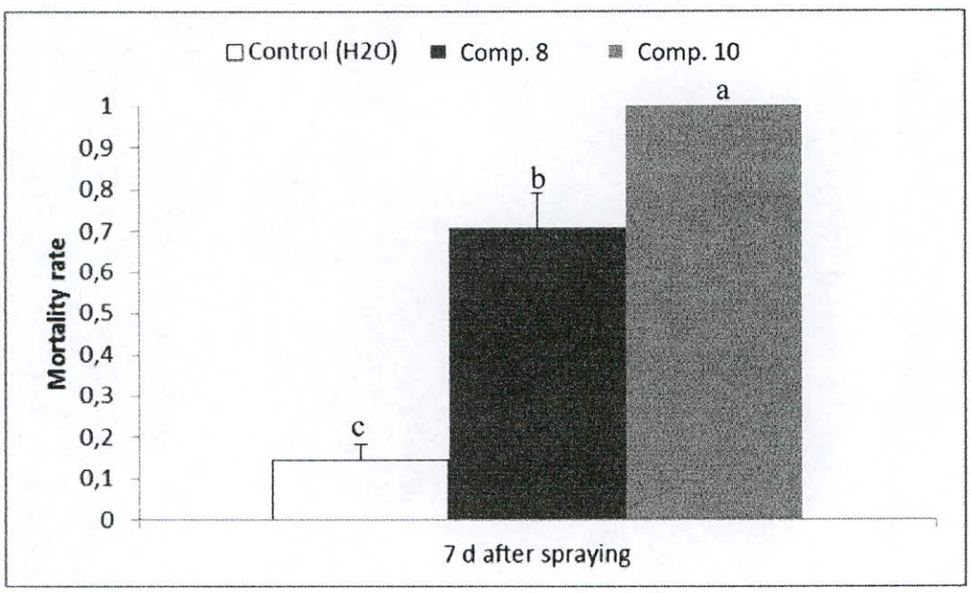

Control (H2O)
Comp. 8
Comp. 10
Mortality rate
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
a
b
c
7 d after spraying

Fig. 4


a
b
c

Fig. 5

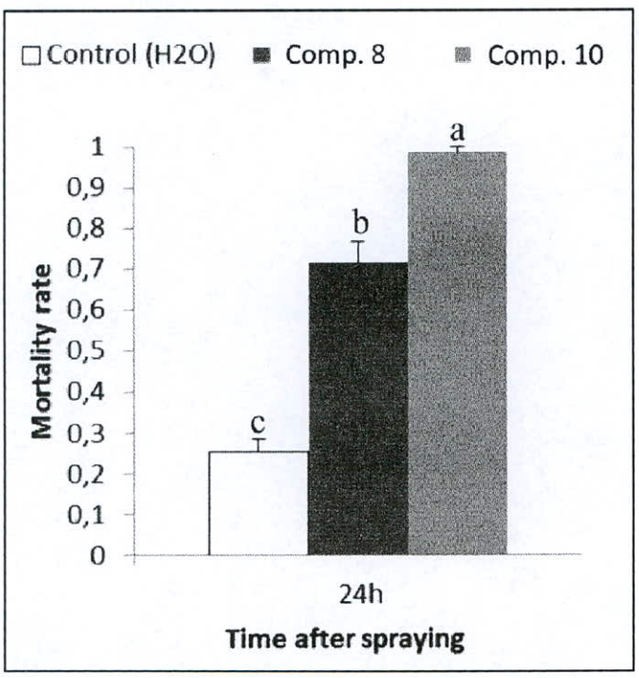

Control (H2O)
Comp. 8
Comp. 10
Mortality rate
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
a
b
c
24h
Time after spraying

Fig. 6

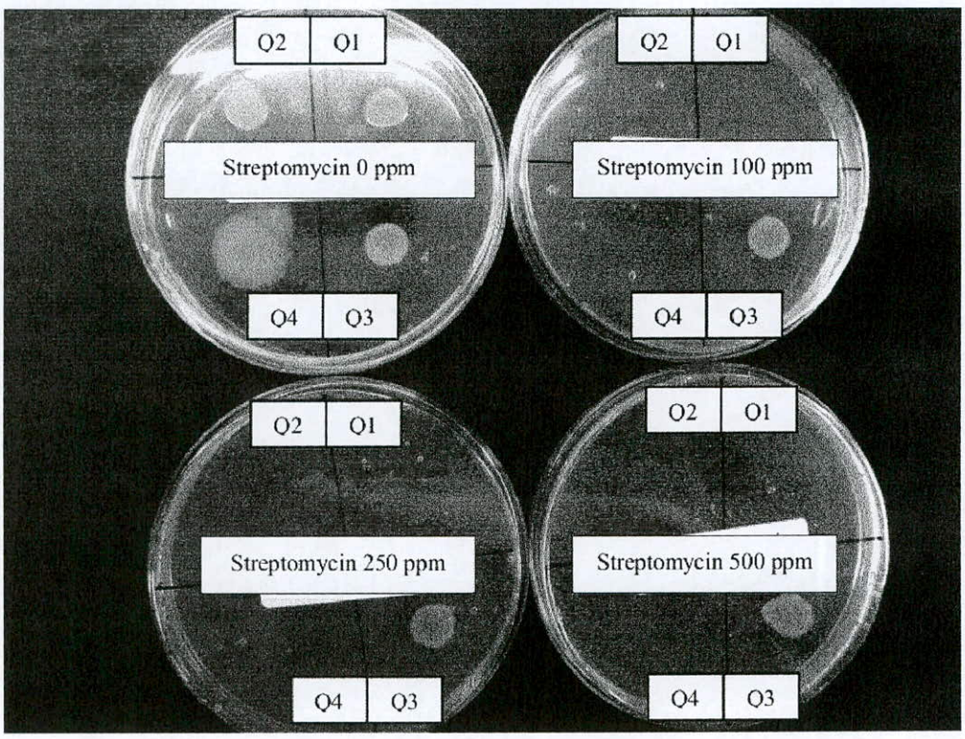

Q2
Q1
Streptomycin 0 ppm
Q4
Q3
Q2
Q1
Streptomycin 100 ppm
Q4
Q3
Q2
Q1
Streptomycin 250 ppm
Q4
Q3
Q2
Q1
Streptomycin 500 ppm
Q4
Q3

Fig. 7

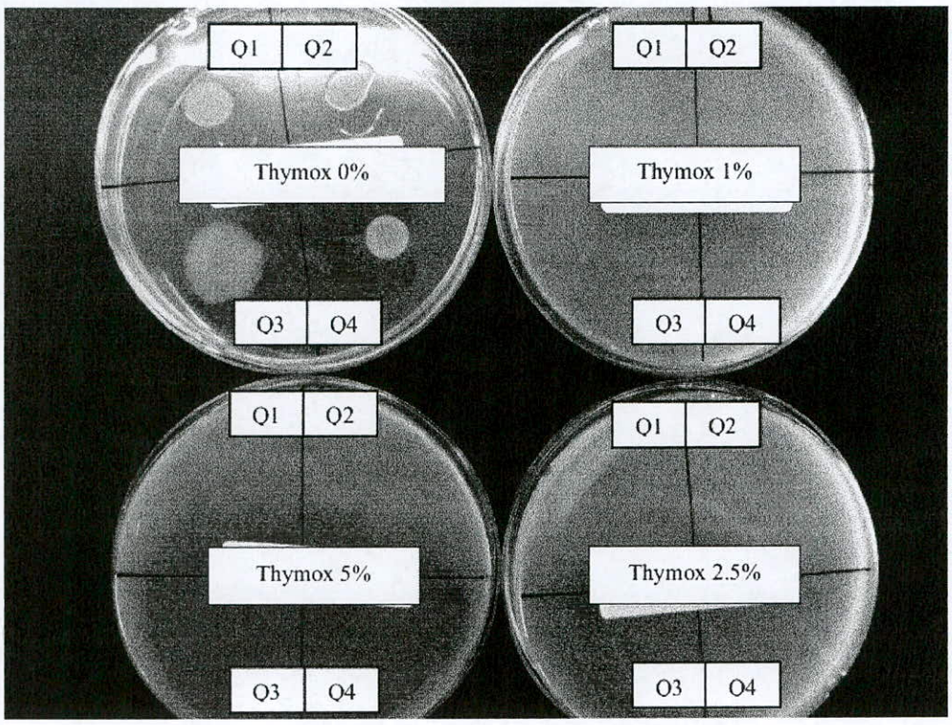

Q1
Q2
Thymox 0%
Q3
Q4
Q1
Q2
Thymox 1%
Q3
Q4
Q1
Q2
Thymox 5%
Q3
Q4
Q1
Q2
Thymox 2.5%
Q3
Q4

Fig. 8

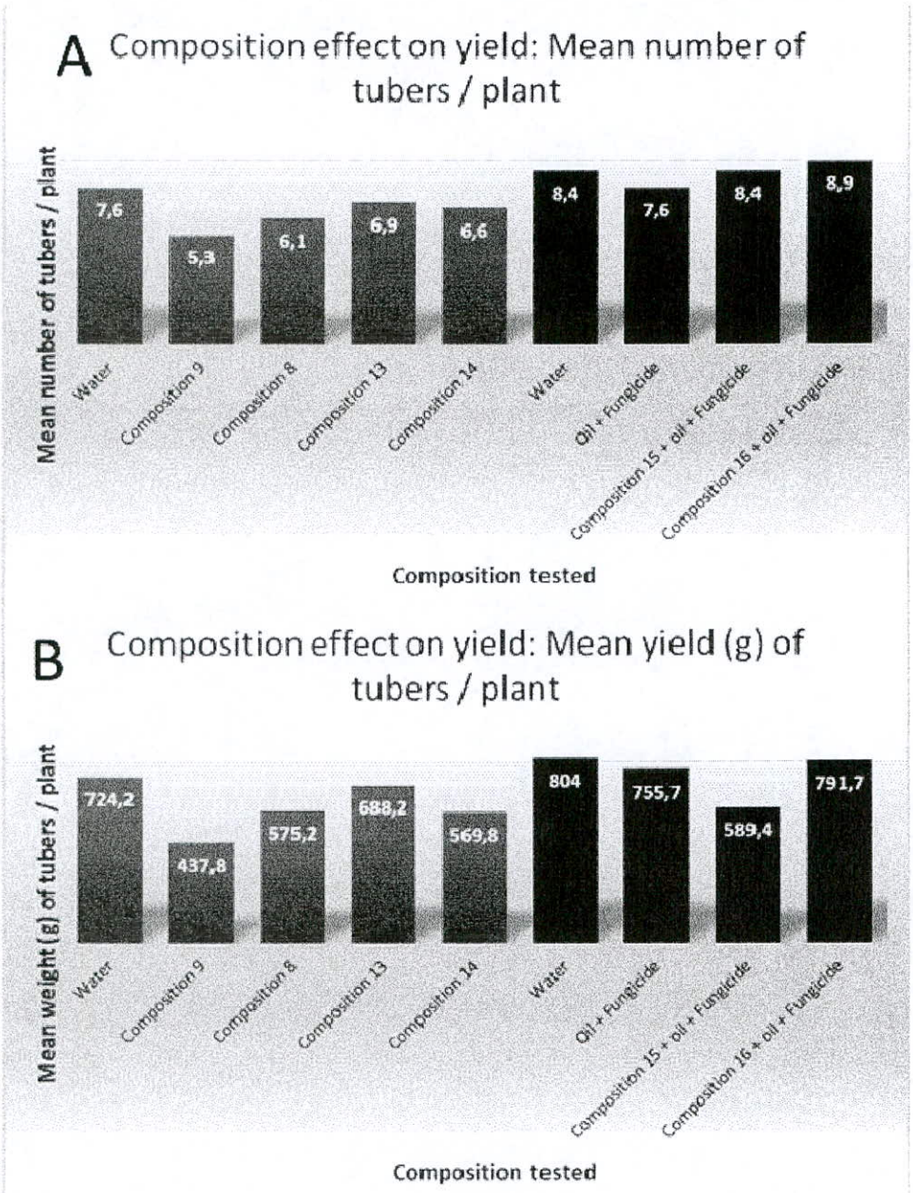

A
Composition effect on yield: Mean number of tubers / plant
Mean number of tubers / plant
7,6
5,3
6,1
6,9
6,6
8,4
7,6
8,4
8,9
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested
B
Composition effect on yield: Mean yield (g) of tubers / plant
Mean weight (g) of tubers / plant
724,2
437,8
575,2
688,2
569,8
804
755,7
589,4
791,7
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 9

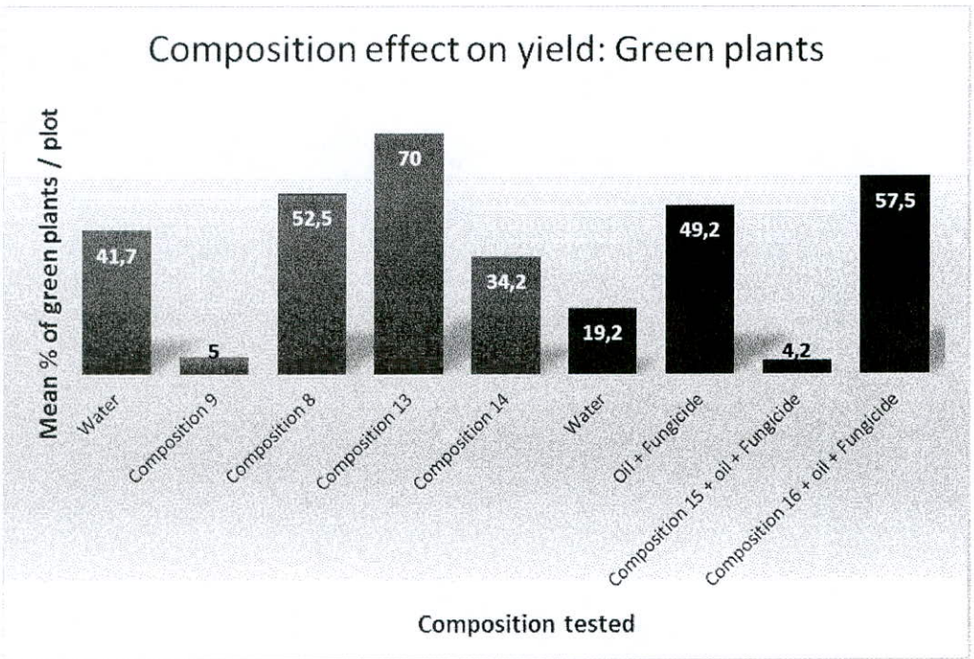

Composition effect on yield: Green plants
Mean % of green plants / plot
41,7
5
52,5
70
34,2
19,2
49,2
4,2
57,5
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 10

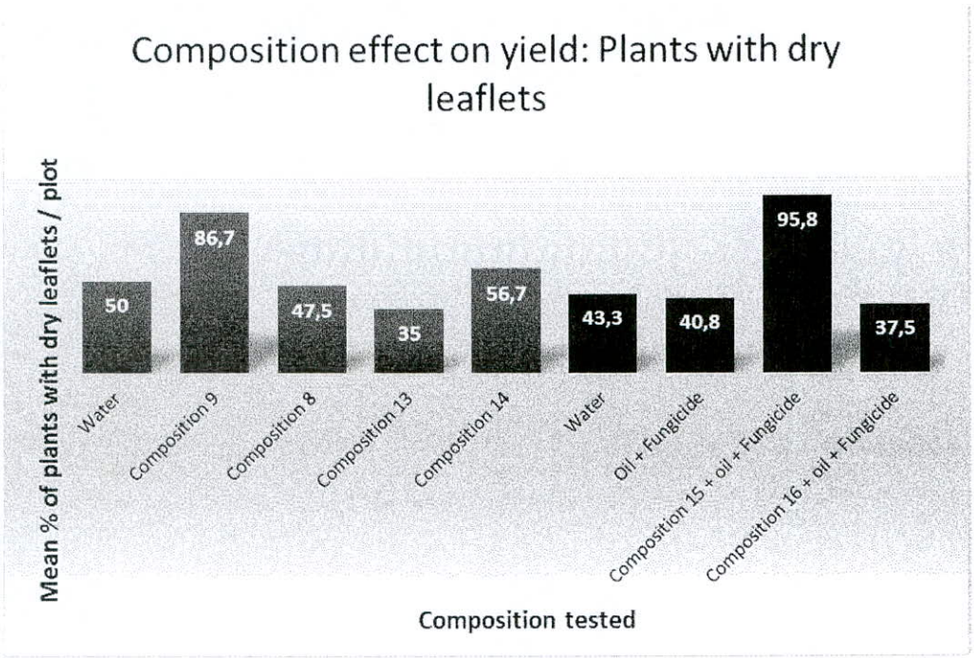

Composition effect on yield: Plants with dry leaflets
Mean % of plants with dry leaflets / plot
50
86,7
47,5
35
56,7
43,3
40,8
95,8
37,5
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 11

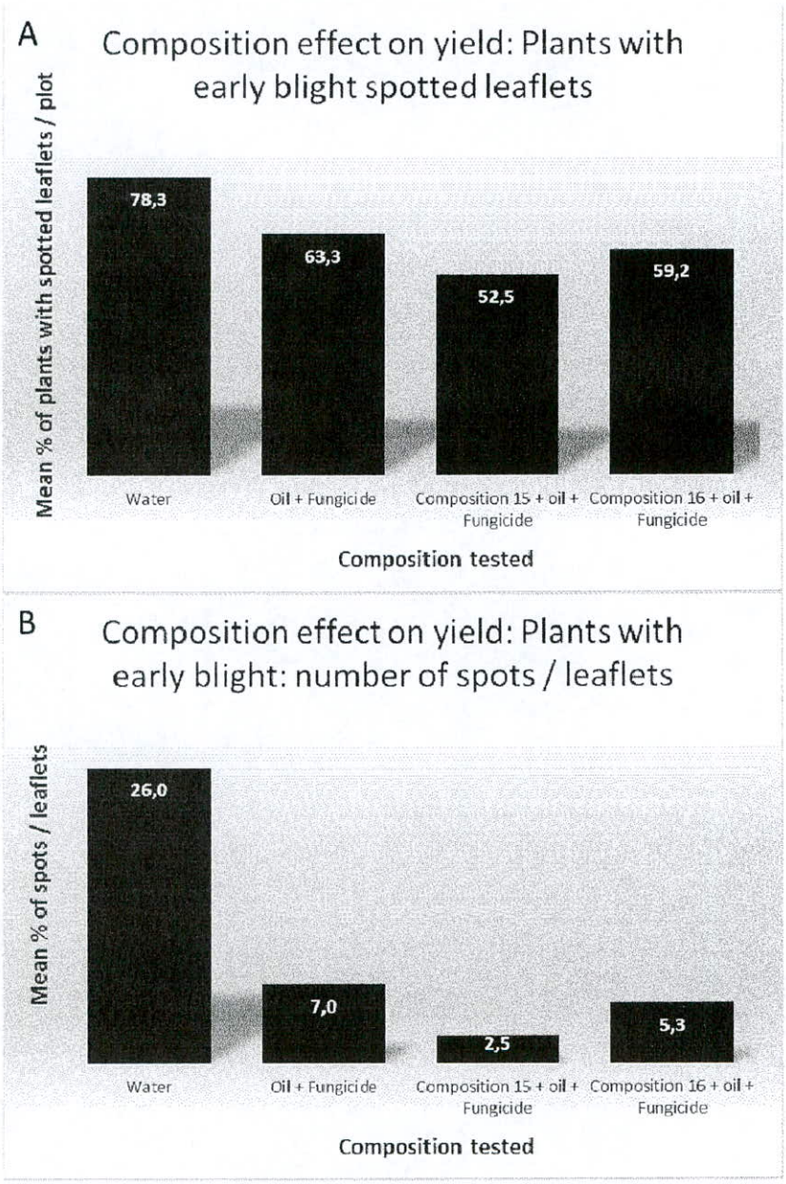

A
Composition effect on yield: Plants with early blight spotted leaflets
Mean % of plants with spotted leaflets / plot
78,3
63,3
52,5
59,2
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested
B
Composition effect on yield: Plants with early blight: number of spots / leaflets
Mean % of spots / leaflets
26,0
7,0
2,5
5,3
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 12.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/050138

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***A01N 31/08*** (2006.01), ***A01N 25/02*** (2006.01), ***A01N 25/30*** (2006.01), ***A01P 1/00*** (2006.01), ***A01P 21/00*** (2006.01), ***C05G 3/02*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***A01N 31/08*** (2006.01), ***A01N 25/02*** (2006.01), ***A01N 25/30*** (2006.01), ***A01P 1/00*** (2006.01), ***A01P 21/00*** (2006.01), ***C05G 3/02*** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Database: Questel-Orbit
Search Terms: [thymol, IPMP, thyme, thymus, T. vulgaris, thymox, 5-methyl-2-(1-methylethyl)-phenol, 5-methyl-2-isopropyl-1-phenol, 2-isopropyl-5-methylphenol, 89-83-8], [carvacrol, cymophenol, oregano, origanum, 2-methyl-5-(1-methylethyl)-phenol, 5-isopropyl-o-cresol, 5-isopropyl-2-methylphenol, 499-75-2], [surfactant, surface active, surface-active], [solvent], [water, aqueous], [plant, fruit, vegetable, cereal, seed, soil]

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO2014151449A1 (LI, J. et al.) 25 September 2014 (25-09-2014) whole document	1-7, 12 8-11
X Y	CA2720738C (DAIGLE, F. et al.) 07 October 2014 (07-10-2014) whole document, with special attention to p.4 (lines 8-9), p.5 (lines 19-29), p.6 (lines 2-4), p.10 (line 9)-p.11 (line 30), p.12 (lines 12-20)	1-8, 12 9-11
X Y	CA2326655A1 (TOMARCHIO, V. et al.) 21 October 1999 (21-10-1999) p.5 (lines 22, 24, 26, 27, 29-30, 34), p.6 (lines 1, 4, 8-12), p.7 (lines 4-9), p.11 (line 26) - p.17 (line 9), p.19 (lines 16-36), pp.24-25	1-7, 12 8-11
X Y	CN103999851A (HAO, C. et al.) 27 August 2014 (27-08-2014) English language translation as provided by Questel-Orbit	1-7, 10, 12 8, 9, 11

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier application or patent but published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 19 April 2016 (19-04-2016)	Date of mailing of the international search report 06 May 2016 (06-05-2016)
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer Charles Barabé (819) 639-6962

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/050138

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US5403587A (McCUE, K. et al.) 4 April 1995 (04-04-1995) column 1 (line 62)- column 2 (line 5), column 2 (lines 25-34 and 51-58), column 2 (line 67)-column 3 (line 37), column 3 (line 46)-column 4 (line 45)	1-8, 12 9-11
X Y	WO03037270A2 (WILLARD, D. et al.) 8 May 2003 (08-05-2003) p.3 (line 22) – p.4 (line 4), p.4 (lines 8-13), p.5 (lines 8-17), p.6 (lines 8, 16, 17, 19-20), p.7 (lines 12-14), p.7 (line 20) – p.11 (line 17), p.13	1-7, 12 8-11
X Y	WO2007133934A1 (OCHOMOGO, M. et al.) 22 November 2007 (22-11-2007) paragraphs [003], [0010], [0023], [0024], [0026], [0037], [0038]	1-7, 12 8-11
X Y	WO0184936A1 (DEATH, S. et al.) 15 November 2001 (15-11-2001) p.2 (lines 14-20), p.3 (line 10)-p.4 (line 12)	1-7, 12 8-11
X Y	CA2371925A1 (TAYLOR, T. et al.) 28 December 2000 (28-12-2000) p.9 (lines 29)-p.10 (line 2), p.11 (lines 1-22), p.29 (lines 1-4)	1-7, 12 8-11
X Y	CA2441730A1 (KONISHI, G. et al.) 10 October 2002 (10-10-2002) p.1 (lines 20-28), p.8 (lines 30)-p.9 (line 23)	1-7, 12 8-11

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2016/050138

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	ublication Date
WO2014151449A1	25 Sept 2014 (25-09-2014)	SG11201507867RA	29 October 2015 (29-10-2015)
		US2016007594A1	14 January 2016 (14-01-2016)
CA2720738C	07 October 2014 (07-10-2014)	CA2720738A1	15 October 2009 (15-10-2009)
		AU2009235913A1	15 October 2009 (15-10-2009)
		AU2009235913B2	10 April 2014 (10-04-2014)
		BRPI0911317A2	28 July 2015 (28-07-2015)
		CN102083307A	01 June 2011 (01-06-2011)
		CN105076120A	25 November 2015 (25-11-2015)
		CO6311054A2	22 August 2011 (22-08-2011)
		EP2273875A1	19 January 2011 (19-01-2011)
		EP2273875A4	24 April 2013 (24-04-2013)
		JP2011516504A	26 May 2011 (26-05-2011)
		JP5553363B2	16 July 2014 (16-07-2014)
		KR20110019359A	25 February 2011 (25-02-2011)
		US2010034907A1	11 February 2010 (11-02-2010)
		US8691292B2	08 April 2014 (08-04-2014)
		US2014142197A1	22 May 2014 (22-05-2014)
		WO2009124392A1	15 October 2009 (15-10-2009)
CA2326655A1	21 October 1999 (21-10-1999)	CA2326655C	31 August 2004 (31-08-2004)
		AR018844A1	12 December 2001 (12-12-2001)
		AU2951299A	01 November 1999 (01-11-1999)
		BR9909490A	12 December 2000 (12-12-2000)
		CO5050310A1	27 June 2001 (27-06-2001)
		EP0948892A1	13 October 1999 (13-10-1999)
		JP2002511391A	16 April 2002 (16-04-2002)
		MA24837A1	31 December 1999 (31-12-1999)
		TR200002857T2	22 January 2001 (22-01-2001)
		US6841090B1	11 January 2005 (11-01-2005)
		WO9952360A1	21 October 1999 (21-10-1999)
CN103999851A	27 August 2014 (27-08-2014)	None	
US5403587A	04 April 1995 (04-04-1995)	None	
WO03037270A2	08 May 2003 (08-05-2003)	WO03037270A3	13 November 2003 (13-11-2003)
		AU2002348122A1	12 May 2003 (12-05-2003)
		EP1450759A2	01 September 2004 (01-09-2004)
		US2003083212A1	01 May 2003 (01-05-2003)
		US6884763B2	26 April 2005 (26-04-2005)
WO2007133934A1	22 Nov 2007 (22-11-2007)	WO2007133934A8	21 August 2008 (21-08-2008)
WO0184936A1	15 Nov 2001 (15-11-2001)	AT313262T	15 January 2006 (15-01-2006)
		AU4907800A	20 November 2001 (20-11-2001)
		CA2406558A1	15 November 2001 (15-11-2001)
		DE60025045D1	26 January 2006 (26-01-2006)
		DE60025045T2	03 August 2006 (03-08-2006)
		EP1278420A1	29 January 2003 (29-01-2003)
		EP1278420B1	21 December 2005 (21-12-2005)
		US6346281B1	12 February 2002 (12-02-2002)
		US2002068101A1	06 June 2002 (06-06-2002)
		US6846498B2	25 January 2005 (25-01-2005)
CA2371925A1	28 Dec 2000 (28-12-2000)	CA2371925C	17 February 2009 (17-02-2009)
		AR024874A1	30 October 2002 (30-10-2002)
		AR044721A1	05 October 2005 (05-10-2005)

		AU777059B2	30 September 2004 (30-09-2004)
		AU5471000A	09 January 2001 (09-01-2001)
		AU5472000A	09 January 2001 (09-01-2001)
		AU2003247720A1	23 January 2004 (23-01-2004)
		AU2003247720B2	26 March 2009 (26-03-2009)
		BR0011860A	30 April 2002 (30-04-2002)
		CA2491670A1	15 January 2004 (15-01-2004)
		CN1553796A	08 December 2004 (08-12-2004)
		CN1289051C	13 December 2006 (13-12-2006)
		EP1191843A2	03 April 2002 (03-04-2002)
		EP1521569A1	13 April 2005 (13-04-2005)
		GT200000106A	21 December 2001 (21-12-2001)
		GT200000108A	21 December 2001 (21-12-2001)
		JP2003502353A	21 January 2003 (21-01-2003)
		JP2006502987A	26 January 2006 (26-01-2006)
		MXPA01013312A	04 September 2003 (04-09-2003)
		MXPA05000473A	23 March 2005 (23-03-2005)
		MY122621A	29 April 2006 (29-04-2006)
		RU2004107901A	20 March 2005 (20-03-2005)
		RU2272612C2	27 March 2006 (27-03-2006)
		TW546149B	11 August 2003 (11-08-2003)
		TWI284020B	21 July 2007 (21-07-2007)
		US6107261A	22 August 2000 (22-08-2000)
		US6136771A	24 October 2000 (24-10-2000)
		US6204230B1	20 March 2001 (20-03-2001)
		US6451748B1	17 September 2002 (17-09-2002)
		US2003125224A1	03 July 2003 (03-07-2003)
		US6861397B2	01 March 2005 (01-03-2005)
		WO0078141A1	28 December 2000 (28-12-2000)
		WO0078275A2	28 December 2000 (28-12-2000)
		WO0078275A3	27 September 2001 (27-09-2001)
		WO2004004677A1	15 January 2004 (15-01-2004)
CA2441730A1	10 October 2002 (10-10-2002)	CA2441730C	18 November 2008 (18-11-2008)
		AR035803A1	14 July 2004 (14-07-2004)
		MXPA03008869A	24 May 2004 (24-05-2004)
		US2003069317A1	10 April 2003 (10-04-2003)
		US6977082B2	20 December 2005 (20-12-2005)
		WO02078667A1	10 October 2002 (10-10-2002)

ANNOTATED

Con formato: Izquierda: 3,17 cm, Derecha: 3,17 cm, Ancho: 21,59 cm, Alto: 33,02 cm, Distancia del encabezado desde el borde: 1,25 cm, Distancia del pie de página desde el borde: 1,25 cm

1. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a composition ~~A composition for regulating plant growth and/or control pests, the composition~~ comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The method ~~composition~~ of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The method ~~composition~~ of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The method ~~composition~~ of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The method ~~composition~~ of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The method ~~composition~~ of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said ~~formulation~~ composition.

7. The method ~~composition~~ of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

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8. The method ~~composition~~ of any one of claims 1 to 7, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The method ~~composition~~ of any one of claims 1 to 8, wherein said fertilizer is chosen from ~~fertilizers~~ an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The method ~~composition~~ of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The method ~~composition~~ of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and ben[[a]]zyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

12. The method ~~composition~~ of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of any one of claims 1 to 12 to control said pest.~~

~~14~~13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~15~~14. The method of claim ~~14~~13, wherein antimicrobial compound is of synthetic origin.

~~16~~15. The method of claim ~~14~~13, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~17~~16. The method of any one of claims ~~14~~ 13 to ~~16~~15, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

~~18~~17. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~16~~15, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~19~~18. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~18~~17, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~20~~19. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~19~~18, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

~~21~~20. The method of any one of claims ~~13~~ 14 to ~~20~~19, wherein said pest is chosen from an insect, a nematode, a ~~fungi~~fungus, ~~a bacteria~~a bacterium, a ~~larvae~~a larva, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, ~~an algae~~an alga, or combinations thereof.

~~22~~21. The method of claim ~~21~~20, wherein said plant is a weed.

~~23~~22. The method of claim ~~21~~20, wherein said arthropod is a mite.

~~24~~23. The method of claim ~~21~~20, wherein said insect is a moth.

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~~25~~24. The method of claim ~~21~~20, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

~~26~~25. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof~~according to any one of claims 1 to 12~~.

26. The method of claim 25, wherein antimicrobial compound is of synthetic origin.

27. The method of claim 25, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

28. The method of any one of claims 25 to 27, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

29. The method of any one of claims 25 to 28, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

30. The method of any one of claims 25 to 29, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

31. The method of any one of claims 25 to 30, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

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32. The method of any one of claims 25 to 31, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

33. The method of any one of claims 25 to 32, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

34. The method of any one of claims 25 to 33, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

35. The method of any one of claims 25 to 34, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

36. The method of any one of claims 25 to 35, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~27~~37. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

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b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~28~~38. The method of claim ~~27~~37, wherein antimicrobial compound is of synthetic origin.

~~29~~39. The method of claim ~~27~~37, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~30~~40. The method of any one of claims ~~27~~ 37 to ~~29~~39, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

~~31~~41. The method of any one of claims ~~27~~ 37 to ~~29~~39, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~32~~42. The method ~~composition~~ of any one of claims ~~27~~ 37 to ~~31~~41, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~33~~43. The method ~~composition~~ of any one of claims ~~27~~ 37 to ~~32~~42, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

~~34~~44. The method of any one of claims ~~26~~ 37 to ~~33~~43, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

~~35~~45. The method of any one of claims ~~26~~ 37 to ~~34~~44, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

~~36~~46. The method of any one of claims ~~26~~ 37 to ~~34~~44, wherein regulating the growth comprises an increase in the number of healthy plants.

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~~37~~47. The method according to any one of claims ~~26~~ 37 to ~~36~~46, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

~~38~~48. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof~~according to any one of claims 1 to 12~~.

49. The method of claim 48, wherein antimicrobial compound is of synthetic origin.

50. The method of claim 48, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

51. The method of any one of claims 48 to 50, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

52. The method of any one of claims 48 to 51, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

53. The method of any one of claims 48 to 52, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

ANNOTATED

54. The method of any one of claims 48 to 53, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

55. The method of any one of claims 48 to 54, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

56. The method of any one of claims 48 to 55, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

57. The method of any one of claims 48 to 56, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

58. The method of any one of claims 48 to 57, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

59. The method of any one of claims 48 to 58, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~39~~60. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

ANNOTATED

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~40~~61. The method of claim ~~39~~60, wherein antimicrobial compound is of synthetic origin.

~~41~~62. The method of claim 60~~39~~, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~42~~63. The method of any one of claims 60 ~~39~~ to ~~41~~62, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

~~43~~64. The method of any one of claims 60 ~~39~~ to ~~42~~63, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~44~~65. The method ~~composition~~ of any one of claims 60 ~~39~~ to ~~43~~64, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~45~~66. The method ~~composition~~ of any one of claims 60 ~~39~~ to ~~43~~65, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

~~46~~67. The method of any one of claims 60 ~~38~~ to ~~45~~66, wherein said seed is a tuber.

~~47~~68. The method of claim ~~46~~67, wherein said tuber is chosen from any one of a potato ~~(kumara)~~, a sweet potato, a yam, a cassava, ~~and~~ or a dahilia.

~~48~~69. The method of any one of claims 60 ~~38~~ to ~~47~~68, wherein regulating the growth comprises an increase in the length of a tuber sprout.

1. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The method of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The method of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The method of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The method of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The method of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

7. The method of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

8. The method of any one of claims 1 to 7, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a

fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The method of any one of claims 1 to 8, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The method of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The method of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

12. The method of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

14. The method of claim 13, wherein antimicrobial compound is of synthetic origin.

15. The method of claim 13, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

16. The method of any one of claims 13 to 15, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

17. The method of any one of claims 13 to 15, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

18. The method of any one of claims 13 to 17, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

19. The method of any one of claims 13 to 18, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

20. The method of any one of claims 14 to 19, wherein said pest is chosen from an insect, a nematode, a fungus, a bacterium, a larva, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an alga, or combinations thereof.

21. The method of claim 20, wherein said plant is a weed.

22. The method of claim 20, wherein said arthropod is a mite.

23. The method of claim 20, wherein said insect is a moth.

24. The method of claim 20, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

25. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

26. The method of claim 25, wherein antimicrobial compound is of synthetic origin.

27. The method of claim 25, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

28. The method of any one of claims 25 to 27, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

29. The method of any one of claims 25 to 28, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

30. The method of any one of claims 25 to 29, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

31. The method of any one of claims 25 to 30, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

32. The method of any one of claims 25 to 31, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an

arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

33. The method of any one of claims 25 to 32, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

34. The method of any one of claims 25 to 33, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

35. The method of any one of claims 25 to 34, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

36. The method of any one of claims 25 to 35, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

37. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

38. The method of claim 37, wherein antimicrobial compound is of synthetic origin.

39. The method of claim 37, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

40. The method of any one of claims 37 to 39, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

41. The method of any one of claims 37 to 39, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

42. The method of any one of claims 37 to 41, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

43. The method of any one of claims 37 to 42, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

44. The method of any one of claims 37 to 43, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

45. The method of any one of claims 37 to 44, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

46. The method of any one of claims 37 to 44, wherein regulating the growth comprises an increase in the number of healthy plants.

47. The method according to any one of claims 37 to 46, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, and a tomato plant.

48. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent;

and a supplement comprising:
at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

49. The method of claim 48, wherein antimicrobial compound is of synthetic origin.

50. The method of claim 48, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

51. The method of any one of claims 48 to 50, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

52. The method of any one of claims 48 to 51, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

53. The method of any one of claims 48 to 52, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

54. The method of any one of claims 48 to 53, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

55. The method of any one of claims 48 to 54, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

56. The method of any one of claims 48 to 55, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

57. The method of any one of claims 48 to 56, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

58. The method of any one of claims 48 to 57, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

59. The method of any one of claims 48 to 58, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

60. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

61. The method of claim 60, wherein antimicrobial compound is of synthetic origin.

62. The method of claim 60, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

63. The method of any one of claims 60 to 62, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

64. The method of any one of claims 60 to 63, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

65. The method of any one of claims 60 to 64, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

66. The method of any one of claims 60 to 65, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

67. The method of any one of claims 60 to 66, wherein said seed is a tuber.

68. The method of claim 67, wherein said tuber is chosen from any one of a potato, a sweet potato, a yam, a cassava, or a dahilia.

69. The method of any one of claims 60 to 68, wherein regulating the growth comprises an increase in the length of a tuber sprout.

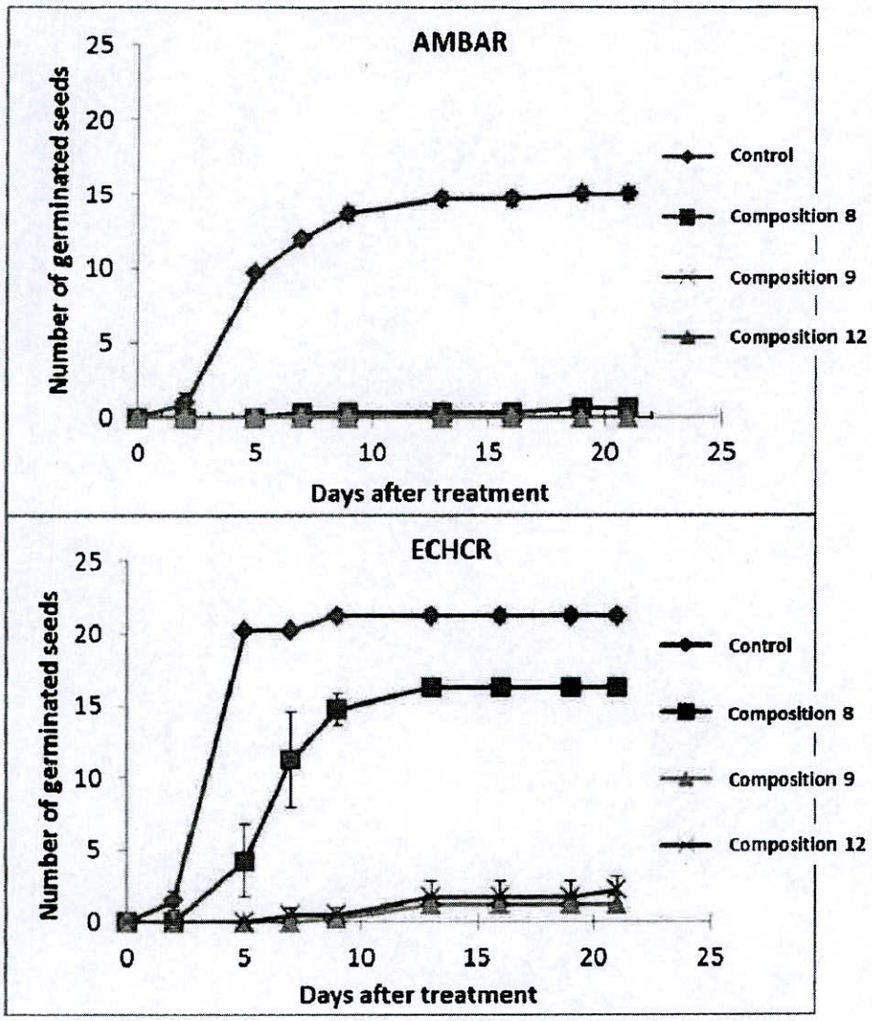

AMBAR
Number of germinated seeds
25
20
15
10
5
0
0
5
10
15
20
25
Days after treatment
Control
Composition 8
Composition 9
Composition 12
ECHCR
Number of germinated seeds
25
20
15
10
5
0
0
5
10
15
20
25
Days after treatment
Control
Composition 8
Composition 9
Composition 12

Fig. 1

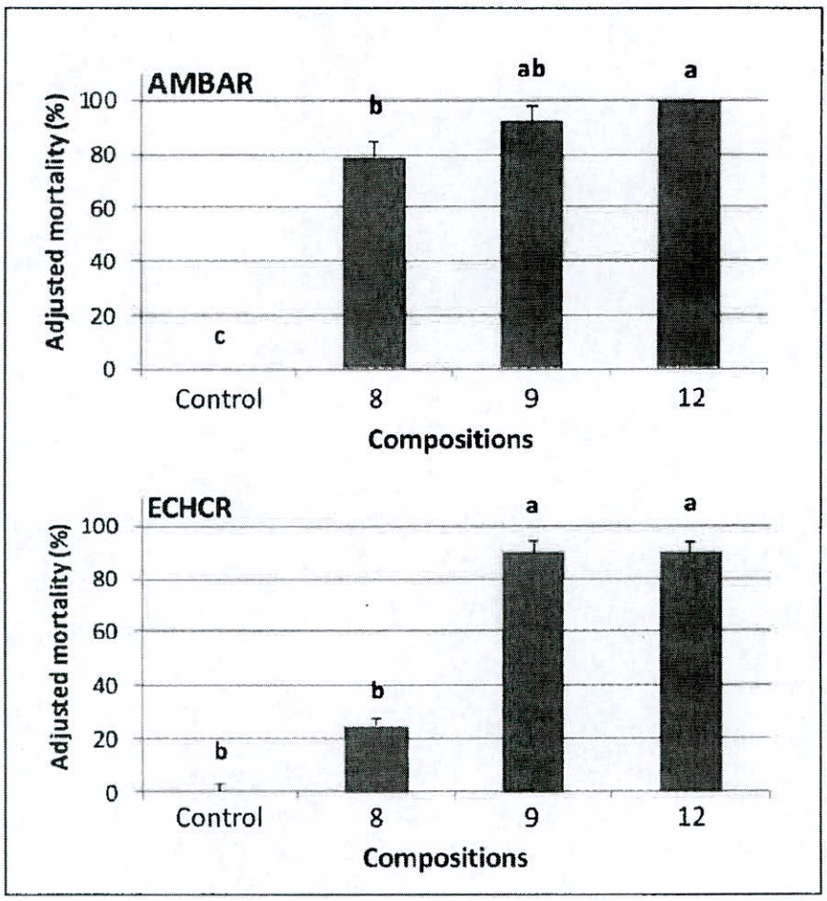

AMBAR
Adjusted mortality (%)
100
80
60
40
20
0
c
b
ab
a
Control
8
9
12
Compositions
ECHCR
Adjusted mortality (%)
100
80
60
40
20
0
b
b
a
a
Control
8
9
12
Compositions

Fig. 2

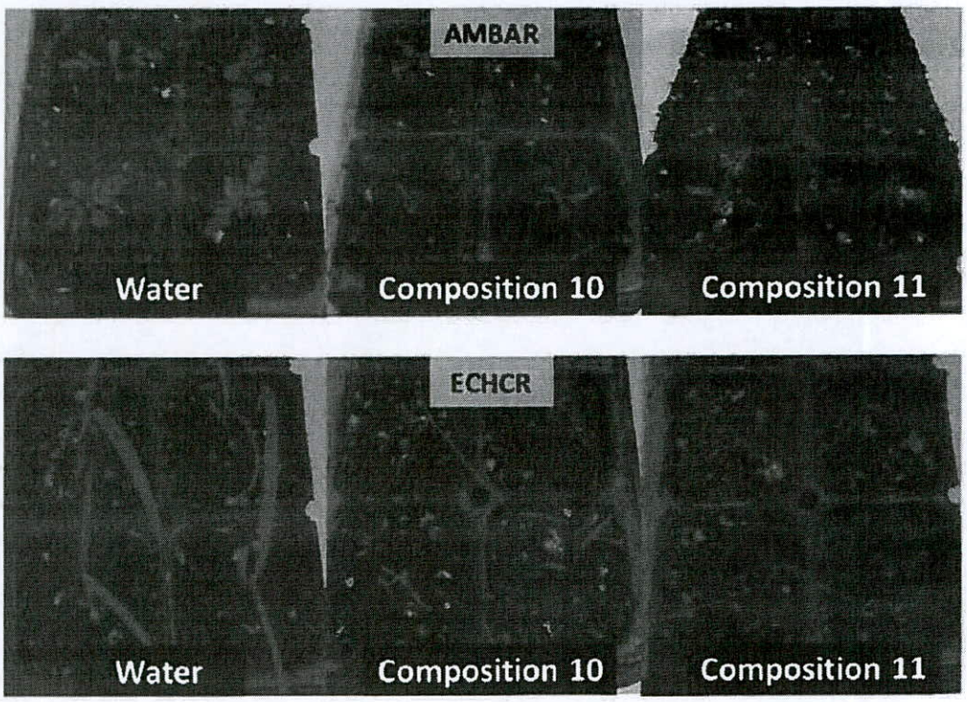

AMBAR
Water
Composition 10
Composition 11
ECHCR
Water
Composition 10
Composition 11

Fig. 3

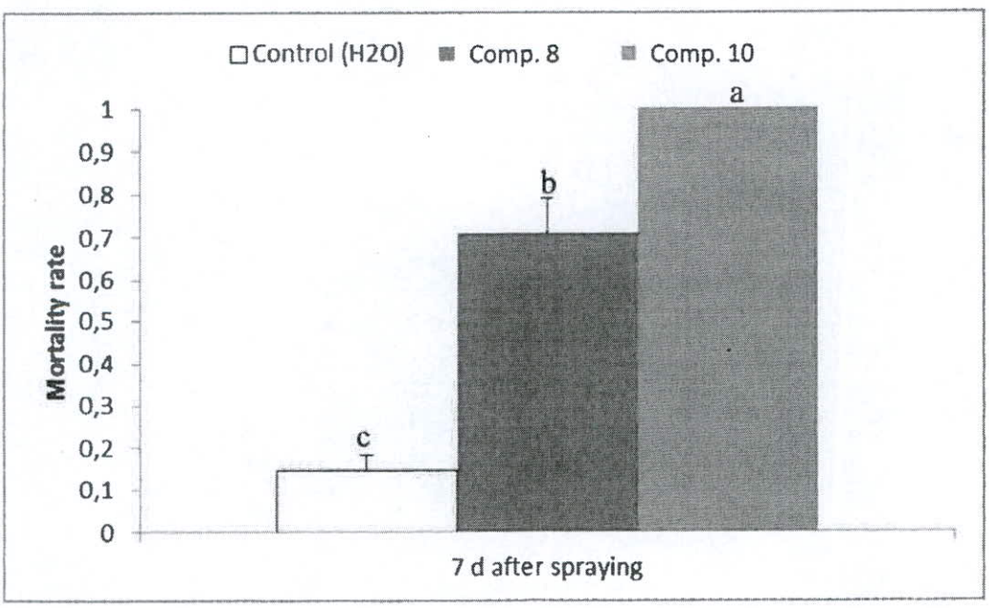

Control (H2O)
Comp. 8
Comp. 10
Mortality rate
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
a
b
c
7 d after spraying

Fig. 4


a
b
c

Fig. 5

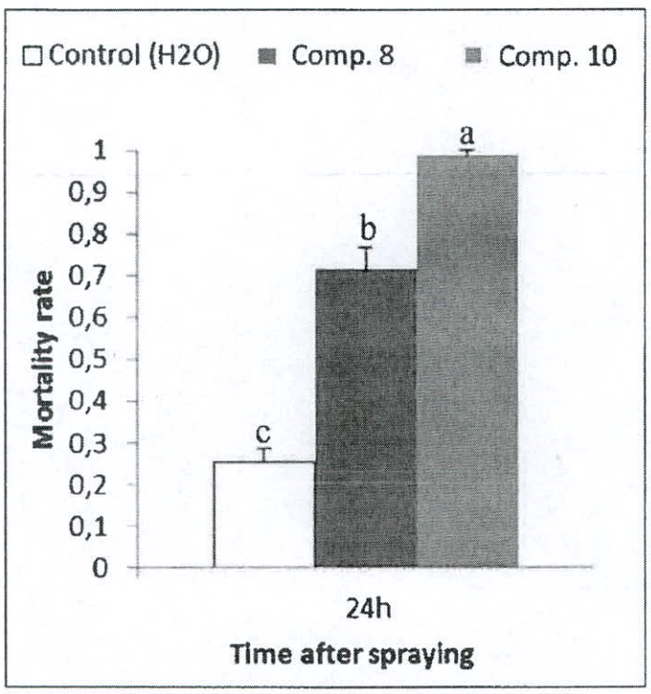

Control (H2O)
Comp. 8
Comp. 10
Mortality rate
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
a
b
c
24h
Time after spraying

Fig. 6

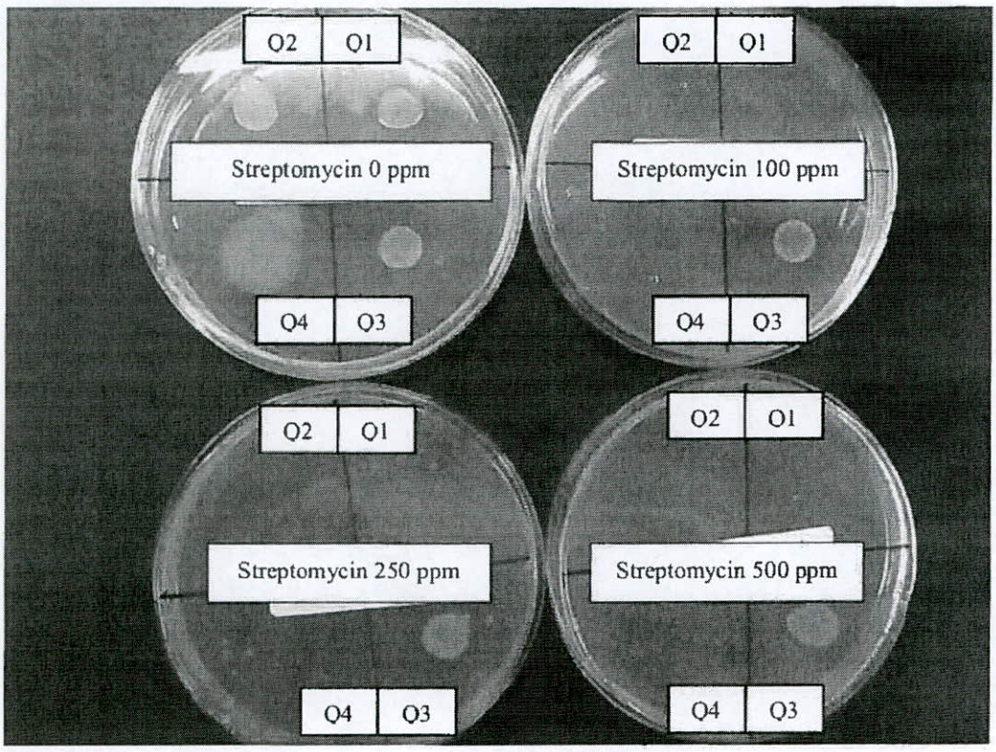

Q2
Q1
Streptomycin 0 ppm
Q4
Q3
Q2
Q1
Streptomycin 100 ppm
Q4
Q3
Q2
Q1
Streptomycin 250 ppm
Q4
Q3
Q2
Q1
Streptomycin 500 ppm
Q4
Q3

Fig. 7

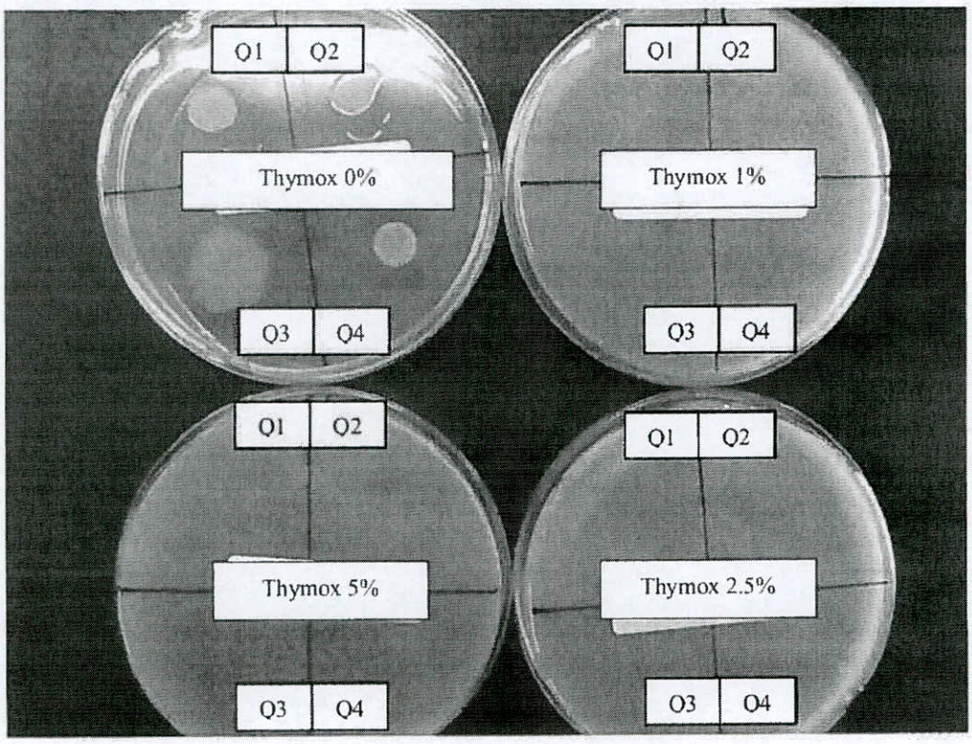

Q1
Q2
Thymox 0%
Q3
Q4
Q1
Q2
Thymox 1%
Q3
Q4
Q1
Q2
Thymox 5%
Q3
Q4
Q1
Q2
Thymox 2.5%
Q3
Q4

Fig. 8

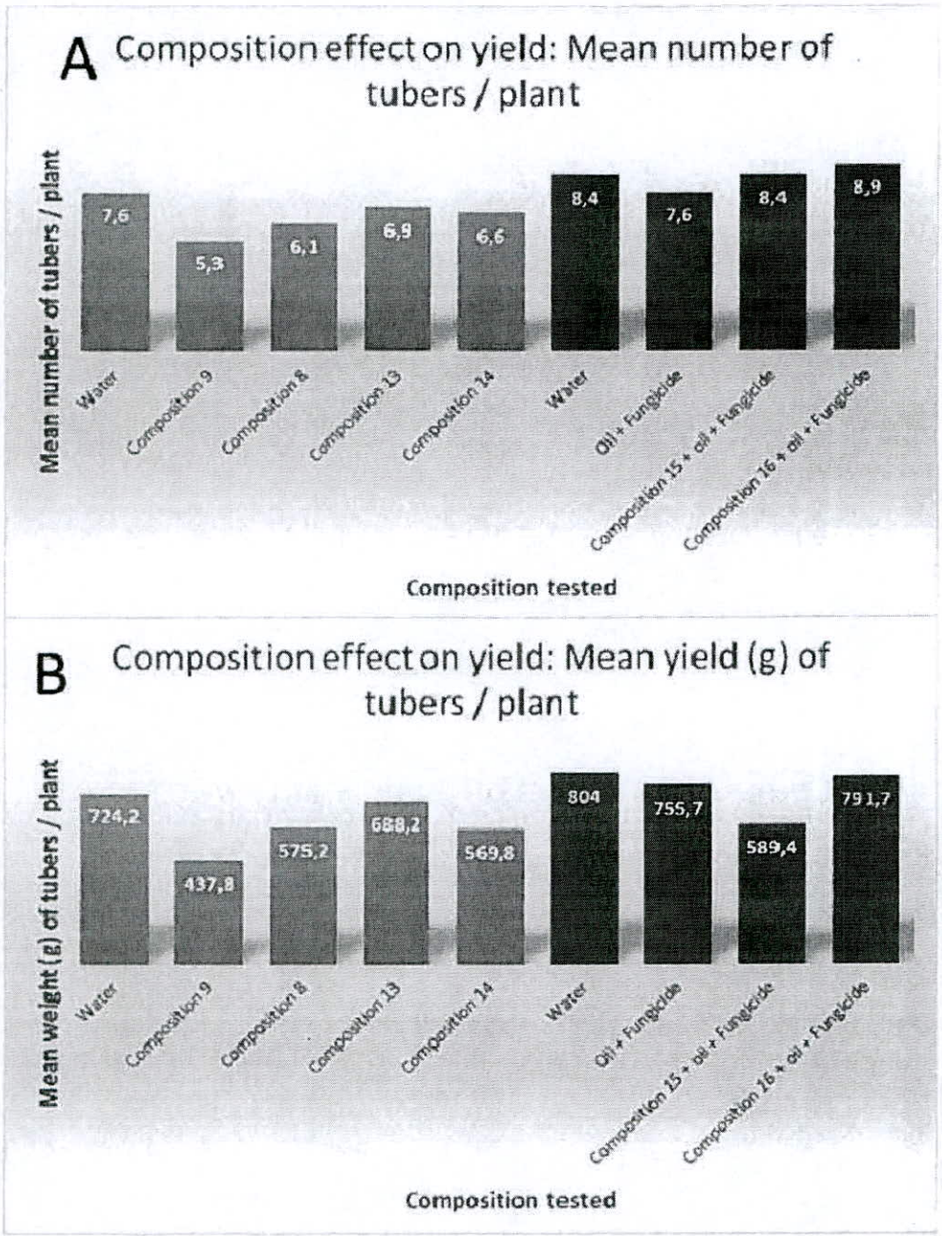

A
Composition effect on yield: Mean number of tubers / plant
Mean number of tubers / plant
7,6
5,3
6,1
6,9
6,6
8,4
7,6
8,4
8,9
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested
B
Composition effect on yield: Mean yield (g) of tubers / plant
Mean weight (g) of tubers / plant
724,2
437,8
575,2
688,2
569,8
804
755,7
589,4
791,7
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 9

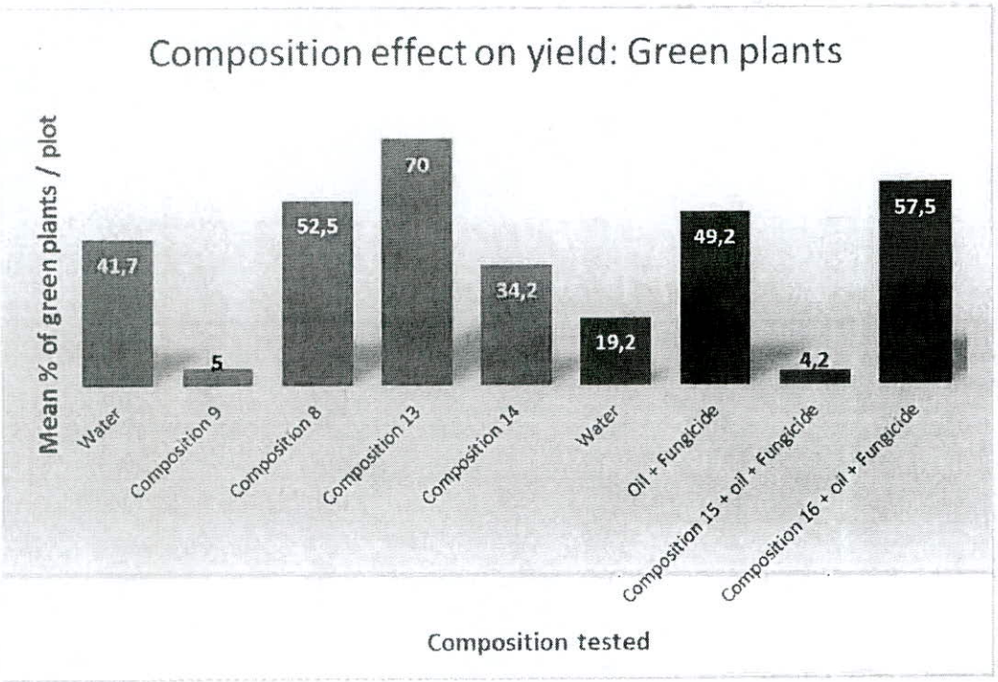

Composition effect on yield: Green plants
Mean % of green plants / plot
41,7
5
52,5
70
34,2
19,2
49,2
4,2
57,5
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 10

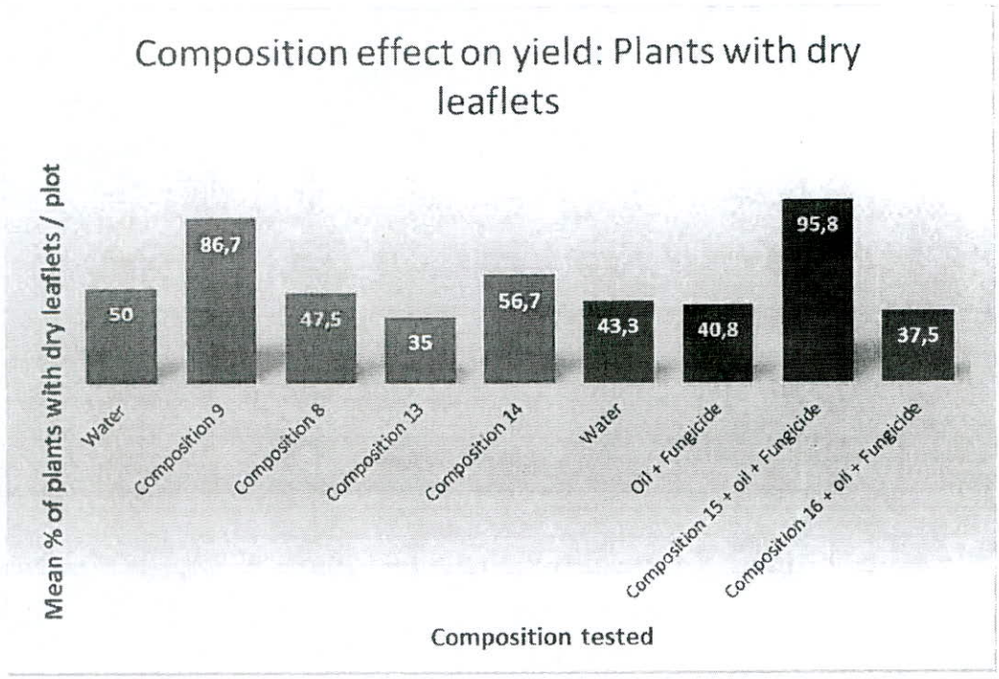

Composition effect on yield: Plants with dry leaflets
Mean % of plants with dry leaflets / plot
50
86,7
47,5
35
56,7
43,3
40,8
95,8
37,5
Water
Composition 9
Composition 8
Composition 13
Composition 14
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 11

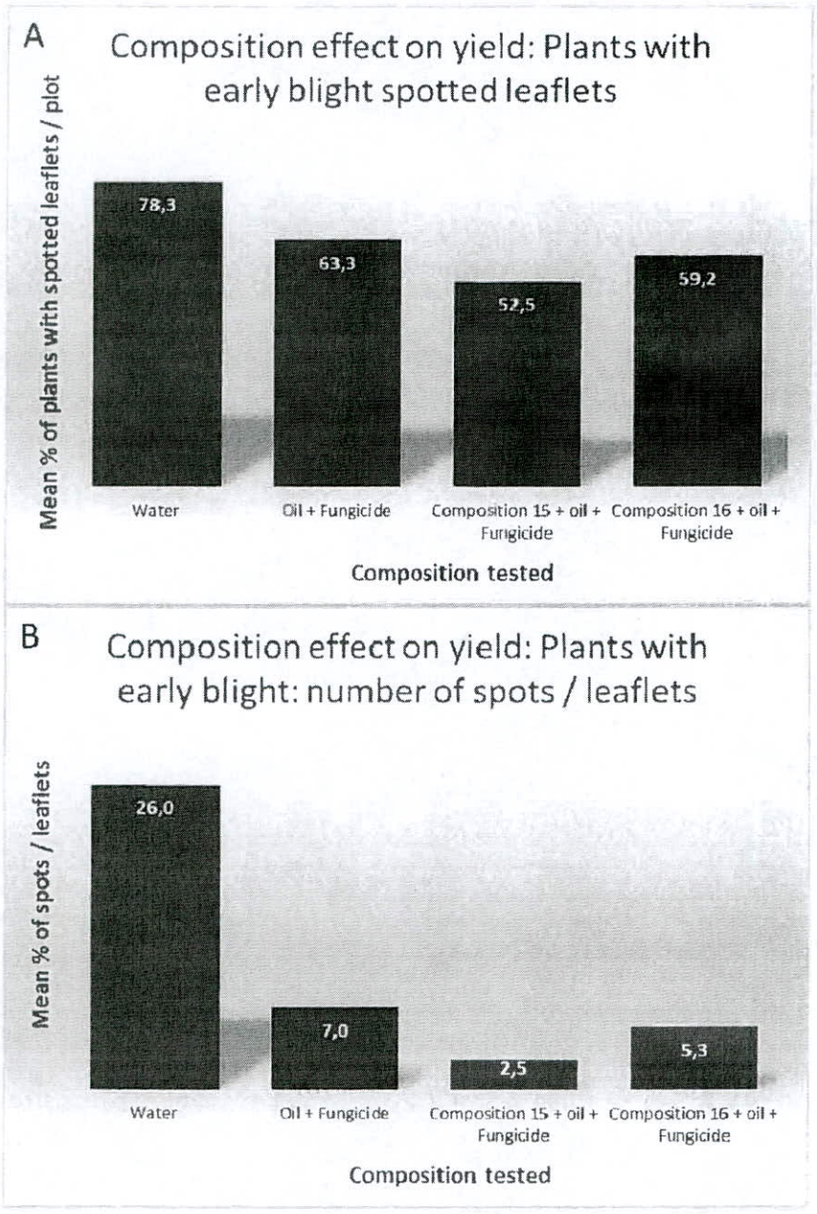

A
Composition effect on yield: Plants with early blight spotted leaflets
Mean % of plants with spotted leaflets / plot
78,3
63,3
52,5
59,2
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested
B
Composition effect on yield: Plants with early blight: number of spots / leaflets
Mean % of spots / leaflets
26,0
7,0
2,5
5,3
Water
Oil + Fungicide
Composition 15 + oil + Fungicide
Composition 16 + oil + Fungicide
Composition tested

Fig. 12.

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

BENOIT & COTE INC.
800 - 1550 Metcalfe
MONTREAL, Quebec
Canada, H3A 1X6

Benoit & Côté
Reçu le 10 MAI 2016

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)*	06 May 2016 (06-05-2016)
Applicant's or agent's file reference P2673PC00	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. **PCT/CA2016/050138**	International filing date *(day/month/year)* 16 February 2016 (16-02-2016)
Applicant LABORATOIRE M2	Demand : 16 déc. 2016

1. ☑ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith

Filing of amendments and statement under Article 19: 6 juil. 2016

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

How? Directly to the International Bureau of WIPO preferably through ePCT or on paper to, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see *PCT Applicant=s Guide*, International Phase, paragraphs 9.004 B 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

The applicant may **submit comments on an informal basis on the written opinion of the International Searching Authority** to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of **18 months from the priority date, the international application will be published** by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90*bis*.1 and 90*bis*.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for **entry into the national phase** before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see www.wipo.int/pct/en/texts/time_limits.html and the *PCT Applicant's Guide*, National Chapters.

Within **19 months from the priority date, the applicant may request that a supplementary international search be carried out** by a different International Searching Authority that offers this service (Rule 45*bis*.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer Carole St-Jean (819) 639-5209

Form PCT/ISA/220 (July 2014)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
BENOIT & COTE INC.
800 - 1550 Metcalfe
MONTREAL, Quebec
Canada, H3A 1X6

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	6 May 2016 (06-05-2016)
Applicant's or agent's file reference P2673PC00	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/CA2016/050138	16 February 2016 (16-02-2016)	16 February 2015 (16-02-2015)

International Patent Classification (IPC) or both national classification and IPC
IPC: ***A01N 31/08*** (2006.01), ***A01N 25/02*** (2006.01), ***A01N 25/30*** (2006.01), ***A01P 1/00*** (2006.01), ***A01P 21/00*** (2006.01), ***C05G 3/02*** (2006.01)

Applicant
LABORATOIRE M2

1. This opinion contains indications relating to the following items:

- ☑ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☑ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☑ Box No. VII — Certain defects in the international application
- ☑ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/CA	Date of completion of this opinion	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	27 April 2016 (27-04-2016)	Charles Barabé (819) 639-6962

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/CA2016/050138

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

☑ the international application in the language in which it was filed.

☐ a translation of the international application into which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

a. ☐ forming part of the international application as filed:

☐ in the form of an Annex C/ST.25 text file.

☐ on paper or in the form of an image file.

b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/CA2016/050138

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	9, 11, and 13-48	YES
	Claims	1-8, 10, and 12	NO
Inventive step (IS)	Claims	13-48	YES
	Claims	1-12	NO
Industrial applicability (IA)	Claims	1-48	YES
	Claims	NONE	NO

2. Citations and explanations:

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

Reference is made to the following documents:
D1: WO2014151449A1, 25 September 2014 (25-09-2014)
D2: CA2720738C, 07 October 2014 (07-10-2014)
D3: CA2326655A1, 21 October 1999 (21-10-1999)
D4: CN103999851A, 27 August 2014 (27-08-2014)
D5: US5403587A, 04 April 1995 (04-04-1995)
D6: WO03037270A2, 08 May 2003 (08-05-2003)
D7: WO2007133934A1, 22 November 2007 (22-11-2007)
D8: WO0184936A1, 15 November 2001 (15-11-2001)
D9: CA2371925A1, 28 December 2000 (28-12-2000)
D10: CA2441730A1, 10 October 2002 (10-10-2002)

The instant invention relates to compositions in which the phenolic compound thymol or carvacrol is solubilized or dispersed in water through the addition of a surfactant and a solvent. In certain embodiments is also comprised a further pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof. Also taught are methods for the control of pests of for regulating the growth of a plant through contacting plants, their seeds, or soils in which they grow with said compositions.

Stable aqueous formulations of the essential oil antimicrobial actives thymol and carvacrol have been previously disclosed, such stable aqueous formulations being attained through the addition of a surfactant and a solvent. It is to be noted that aqueous formulations comprising essential oils in which are present thymol and carvacrol as constituents effectively comprise thymol and carvacrol. A number of documents were found that conformed to the subject matter of independent claim 1, of which the following documents are representative of the state of the art:

D1 discloses antimicrobial formulations comprising:
a) 0.005-40 wt.% of an active component of which is a monoterpenoid. Thymol and carvacrol are specifically mentioned;
b) 0.0015-0.01 wt.% of a nonionic or anionic surfactant;
c) 0.2-75 wt.% of an organic co-solvent; and
d) water.
Further ingredients may be present in the formulations. The formulations based on natural antimicrobial products have improved stability and water miscibility and find use as fruit and vegetable sprays.

D2 discloses aqueous disinfectant formulations comprising:
a) 5-25 wt.% of a phenolic compound of natural origin having antimicrobial activity. Thymol and carvacrol are specifically mentioned;
b) 0.1-15 wt.% of a surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;
c) 0.1-40 wt.% of a solvent; and
d) water.
A select sequestering agent is optionally present, as are a number of additives. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds.
See Supplemental Box

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/CA2016/050138

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Clerical errors have been noted which require corrections:

- In claim 9: The plural form "cover crops" is not compatible with the article "a" associated therewith.
- In claim 11: The term "benazladine" appears to be a misspelling of "benzyladenine".

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/CA2016/050138

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 1, 6-8, 14, 19, 20, 27, 32, 33, 39, 44, and 45 do not comply with PCT Article 6. These claims are unclear in that there lacks antecedent basis for terms and expressions referred to therein.

- With respect to claims 1, 14, 27, and 39: The terminology "said phenolic compound" in defining surfactant component b) in each of said claims has no antecedent per se. The claims make reference to the thymol and carvacrol antimicrobials of component a) as phenolic compounds without having previously introduced them as such.
- Having regard to claims 6, 7, 19, 20, 32, 33, 44, and 45: Defined within independent claims 1, 14, 27, and 39 are pesticide compositions. There is no counterpart in preceding claims for the reference to "said formulation" in claims 6, 7, 19, 20, 32, 33, 44, and 45.
- With respect to claim 8: The "said pesticide" in claim 8 has unclear antecedence in claim 1 as there are two separate mentions of such a group in claim 1. The first mention of a pesticide is in context of the pesticide composition comprising thymol or carvacrol, a surfactant, a solvent, and water, and the second is found as a possibility under the supplement constituent. Clarification is necessary.

Claim 8 does not comply with PCT Article 6. The "an insect growth" entry in the pesticide listing appears to be incomplete and has unclear significance as a result. Said "an insect growth" is moreover to be separated from the "a bactericide" possibility by insertion of a comma.

Claims 11 and 37 do not comply with PCT Article 6. A conjunction is to precede the last identified plant growth regulator so as to mark the end of the enumeration.

Claims 18-20, 32, 33, 44, and 45 do not comply with PCT Article 6. Whereas the independent claims upon which said claims ultimately depend are to methods, the preamble in claims 18-20, 32, 33, 44, and 45 are directed to compositions.

Claim 47 does not comply with PCT Article 6 for the reasons that follow:

- The use of parentheses to qualify the potato attempts to give both broad and narrow meaning to the scope of the claim.
- A potato, a sweet potato, a yam, a cassava, and a dahlia are alternatives to one another. The additive conjunction "and" entails that the tuber in the claim must arise from the combination as opposed to from any one of the recited root and tuber crops.

The statement found on page 90, paragraph [111] of the description does not comply with PCT Article 6. This is a general statement which implies that the extent of protection may be expanded in some vague and imprecise way.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/CA2016/050138

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of: **Box. V**

D3 discloses aqueous disinfecting compositions which greatly reduce or even eliminate micro-organisms existing on a surface, the compositions comprising:
a) as disinfecting material 0.003-20% by weight of actives of essentials oils, of which are specifically identified thymol and carvacrol;
b) 0.01-50% by weight, preferably 0.05-20% by weight, of a surfactant;
c) up to 15% by weight of a solvent; and
d) water.
The compositions can further comprise a number of additives. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds. Exemplified at pages 24-25 are compositions I through XIX comprising 0.045-0.02 wt.% of thymol, 0.4-7.9 wt.% of C10 alkyl sulfate and/or amine oxide as surfactant(s), 2.5-10.90 wt.% of benzyl alcohol, butyl carbitol, butoxy propanol, an/or ethanol as solvent(s), and water.

D4 discloses a carvacrol emulsion in water comprising:
a) 1-20 wt.% of carvacrol;
b) 6-12 wt.% of a surfactant;
c) 6-15 wt.% of a solvent and 6-10% of a co-solvent; and
d) water.
The compositions have bactericidal and insecticidal effectiveness. The compositions can further comprise a number of additional components, of which is mentioned a defoaming agent.

D5 discloses aqueous antimicrobial compositions comprising:
a) 0.02-5 wt.% of an essential oil exhibiting antimicrobial properties when dissolved or dispersed in water. Identified as a typical essential oil is that from thyme, namely thyme oil.
b)c) 0.75-10 wt. % of a surfactant and 2.75 - 30 wt. % of an organic solvent as a solubilizing or dispersing agent; and
d) water.
Optionally further present are other ingredients, of which are additional antimicrobial agents. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds. The reference aims to formulate aqueous mixtures into which essential oils, despite their hydrophobic nature, can be incorporated.

D6 discloses aqueous disinfectant compositions comprising:
a) 0.01-25 wt. % of plant derived essential oils having antimicrobial activity. Comprised within wild oregano are polyphenolic flavanoids, of which are the potent natural antiseptics carvacrol and thymol. The essential oils are of natural origin. Specifically mentioned are thyme oil, and essential oil components carvacrol and thymol;
b) 0.5-40 wt.% a surfactant to form a gelatinous emulsion;
c) 2-70 wt. % of a solvent; and
d) 5-70 wt. % of water.
The compositions can further comprise a number of additional ingredients. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds.

D7 discloses an aqueous nanoemulsion cleaning composition based on natural ingredients comprising:
a) 0.01-5 wt.% of an essential oil. Thyme is identified as a plant from which essential oils are obtained. Thyme oil comprises phenols, with thymol as main component and carvacrol in smaller amounts;
b) at least 0.5 wt.% of a nonionic surfactant;
c) 0.1-10 wt.% of a solvent; and
d) at least 70 wt.% water.
Optionally present are a number of adjuncts. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds. The application recognizes the difficulty encountered in dissolving an essential oil into water. The composition can be a concentrate which is diluted with water to form a use solution.

D8 discloses aqueous antimicrobial compositions for disinfecting comprising:
a) 0.5-10 wt. % of a mixture of essential oils exhibiting antimicrobial properties. Of the essential oils having antimicrobial activity is thyme oil;
c) 2-12 wt. % of a solvent capable of dissolving or dispersing the essential oils in water;
d) water to make up to 100%; and
b) the composition may include 0.05-0.5% by volume of a biosurfactant to help solubilize and disperse the essential oils in water.
Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds. Acknowledged in the application is the difficulty of dissolving hydrophobic essential oils in water.

See Supplemental Box

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/CA2016/050138

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of: **Box V**

D9 discloses aqueous antimicrobial compositions comprising:
a) 0.001-5 wt.% of a phenolic antibacterial agent. Of particular relevance are the phenol derivatives of the structure represented on page 25 (lines 5-31). Thymol and carvacrol are specifically identified as being preferred phenol derivatives;
b) 0.1-40 wt. % of a surfactant;
c) 0-30 wt. % of a hydrotrope and 0-25 wt. % of a water-soluble hydric solvent, wherein the composition contains at least one of the hydrotrope and hydric solvent. The hydric solvent and hydrotrope assist in solubilizing the antibacterial agent. The hydrotrope additionally functions to suppress the formation of surfactant system micelles which would hinder the microbicidal activity of the antimicrobial agent; and
d) water.
A variety of optional ingredients can be present within the compositions. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds.

D10 discloses aqueous antimicrobial compositions comprising:
a) 0.001-10 wt. % of an active phenolic bacterial agent (carvacrol and thymol are specifically mentioned);
b) 0.1-40 wt.% of a surfactant;
c) 1-25 wt.% of a water-soluble hydric solvent; and
d) water.
A number of additional ingredients are present. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds.

Novelty – PCT Article 33(2)

The prior art as represented by D1-D10 teaches the use of a surfactant and a solvent to solubilize thymol and carvacrol, or thymol and carvacrol containing essential oils, in water. Also taught therein is the possibility for the presence of additional ingredients. Several constituents of essential oils have antimicrobial properties and are thus considered to constitute further pesticides, beyond the thymol and carvacrol antimicrobial compounds. The presence of a defoaming agent is taught in reference D4. If follows from the teachings of D1-D10 that the subject matter of claims 1-8, 10, and 12 is not novel and does not comply with Article 33(2) of the PCT.

Composition claims 9 and 11 and method claims 13-48 are recognized as being novel. With regard to claims 13-48, none of prior art references D1-D10 teach the application of compositions of thymol or carvacrol, a surfactant, and a solvent upon plants, their seeds, or soil in which they grow. It would not have been readily foreseen that such compositions upon plants would effectively control pests thereupon as well as regulate their growth.

Inventive Step – PCT Article 33(3)

Given the above objection, claims 1-8, 10, and 12 are also considered to lack an inventive step in light of the described prior art and thus fail to comply with Article 33(3) of the PCT.

While references D1-D10 do not provide for the additional presence of a fertilizer or a plant growth regulator in their compositions, the skilled person in the art would have readily have contemplated incorporating such ingredients. The subject matter of claims 9 and 11 would have been obvious to a person skilled in the art or science to which they pertain, having regard to any of the D1-D10 references in light of common general knowledge, and thus these claims do not comply with Article 33(3) of the PCT.

Method claims 13-48 are deemed to be inventive as there is no teaching in the prior art of compositions of thymol or carvacrol, a surfactant, and a solvent being applied onto plants, their seeds, or soil in which they grow and providing the benefits of controlling pests thereupon and/or regulating plant or seed growth.

Industrial Applicability – PCT Article 33(4)

The subject matter of claims 1-48 is directed to aqueous compositions comprising thymol or carvacrol, a surfactant, and a solvent, as well as to methods of using the aqueous compositions to control pests and/or for regulating plant and seed growth. Having concrete application, the subject matter of claims 1-48 is considered to be industrially applicable and thus complies with the requirements of PCT Article 33(4).

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below
P2673PC00		
International application No.	International filing date *(day/month/year)*	(Earliest)Priority date *(day/month/year)*
PCT/CA2016/050138	16 February 2016 (16-02-2016)	16 February 2015 (16-02-2015)
Applicant		
LABORATOIRE M2		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of **6** sheets.

☑ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☑ the international application in the language in which it was filed.

☐ a translation of the international application into which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

☐ the text is approved as submitted by the applicant.

☑ the text has been established by this Authority to read as follows:

AQUEOUS COMPOSITIONS FOR CONTROLLING PESTS OR REGULATING PLANT GROWTH, SAID COMPOSITIONS COMPRISING THYMOL OR CARVACROL, A SURFACTANT, AND A SOLVENT

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☑ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☑ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/050138

Box No. IV **Text of the abstract (Continuation of item 5 of the first sheet)**

The invention relates to compositions in which the phenolic compound thymol or carvacrol is solubilized or dispersed in water through the addition of a surfactant and a solvent. In certain embodiments is also comprised a further pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof. Also taught are methods for the control of pests or for regulating the growth of plants through contacting the plants, their seeds, or soil in which they grow with said compositions.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/050138

A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***A01N 31/08*** (2006.01), ***A01N 25/02*** (2006.01), ***A01N 25/30*** (2006.01), ***A01P 1/00*** (2006.01), ***A01P 21/00*** (2006.01), ***C05G 3/02*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: ***A01N 31/08*** (2006.01), ***A01N 25/02*** (2006.01), ***A01N 25/30*** (2006.01), ***A01P 1/00*** (2006.01), ***A01P 21/00*** (2006.01), ***C05G 3/02*** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Database: Questel-Orbit
Search Terms: [thymol, IPMP, thyme, thymus, T. vulgaris, thymox, 5-methyl-2-(1-methylethyl)-phenol, 5-methyl-2-isopropyl-1-phenol, 2-isopropyl-5-methylphenol, 89-83-8], [carvacrol, cymophenol, oregano, origanum, 2-methyl-5-(1-methylethyl)-phenol, 5-isopropyl-o-cresol, 5-isopropyl-2-methylphenol, 499-75-2], [surfactant, surface active, surface-active], [solvent], [water, aqueous], [plant, fruit, vegetable, cereal, seed, soil]

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	WO2014151449A1 (LI, J. et al.) 25 September 2014 (25-09-2014) whole document	1-7, 12 8-11
X Y	CA2720738C (DAIGLE, F. et al.) 07 October 2014 (07-10-2014) whole document, with special attention to p.4 (lines 8-9), p.5 (lines 19-29), p.6 (lines 2-4), p.10 (line 9)-p.11 (line 30), p.12 (lines 12-20)	1-8, 12 9-11
X Y	CA2326655A1 (TOMARCHIO, V. et al.) 21 October 1999 (21-10-1999) p.5 (lines 22, 24, 26, 27, 29-30, 34), p.6 (lines 1, 4, 8-12), p.7 (lines 4-9), p.11 (line 26) - p.17 (line 9), p.19 (lines 16-36), pp.24-25	1-7, 12 8-11
X Y	CN103999851A (HAO, C. et al.) 27 August 2014 (27-08-2014) English language translation as provided by Questel-Orbit	1-7, 10, 12 8, 9, 11

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 April 2016 (19-04-2016)	06 May 2016 (06-05-2016)
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer Charles Barabé (819) 639-6962

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/050138

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US5403587A (McCUE, K. et al.) 4 April 1995 (04-04-1995) column 1 (line 62)- column 2 (line 5), column 2 (lines 25-34 and 51-58), column 2 (line 67)-column 3 (line 37), column 3 (line 46)-column 4 (line 45)	1-8, 12 9-11
X Y	WO03037270A2 (WILLARD, D. et al.) 8 May 2003 (08-05-2003) p.3 (line 22) – p.4 (line 4), p.4 (lines 8-13), p.5 (lines 8-17), p.6 (lines 8, 16, 17, 19-20), p.7 (lines 12-14), p.7 (line 20) – p.11 (line 17), p.13	1-7, 12 8-11
X Y	WO2007133934A1 (OCHOMOGO, M. et al.) 22 November 2007 (22-11-2007) paragraphs [003], [0010], [0023], [0024], [0026], [0037], [0038]	1-7, 12 8-11
X Y	WO0184936A1 (DEATH, S. et al.) 15 November 2001 (15-11-2001) p.2 (lines 14-20), p.3 (line 10)-p.4 (line 12)	1-7, 12 8-11
X Y	CA2371925A1 (TAYLOR, T. et al.) 28 December 2000 (28-12-2000) p.9 (lines 29)-p.10 (line 2), p.11 (lines 1-22), p.29 (lines 1-4)	1-7, 12 8-11
X Y	CA2441730A1 (KONISHI, G. et al.) 10 October 2002 (10-10-2002) p.1 (lines 20-28), p.8 (lines 30)-p.9 (line 23)	1-7, 12 8-11

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2016/050138

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	ublication Date
WO2014151449A1	25 Sept 2014 (25-09-2014)	SG11201507867RA	29 October 2015 (29-10-2015)
		US2016007594A1	14 January 2016 (14-01-2016)
CA2720738C	07 October 2014 (07-10-2014)	CA2720738A1	15 October 2009 (15-10-2009)
		AU2009235913A1	15 October 2009 (15-10-2009)
		AU2009235913B2	10 April 2014 (10-04-2014)
		BRPI0911317A2	28 July 2015 (28-07-2015)
		CN102083307A	01 June 2011 (01-06-2011)
		CN105076120A	25 November 2015 (25-11-2015)
		CO6311054A2	22 August 2011 (22-08-2011)
		EP2273875A1	19 January 2011 (19-01-2011)
		EP2273875A4	24 April 2013 (24-04-2013)
		JP2011516504A	26 May 2011 (26-05-2011)
		JP5553363B2	16 July 2014 (16-07-2014)
		KR20110019359A	25 February 2011 (25-02-2011)
		US2010034907A1	11 February 2010 (11-02-2010)
		US8691292B2	08 April 2014 (08-04-2014)
		US2014142197A1	22 May 2014 (22-05-2014)
		WO2009124392A1	15 October 2009 (15-10-2009)
CA2326655A1	21 October 1999 (21-10-1999)	CA2326655C	31 August 2004 (31-08-2004)
		AR018844A1	12 December 2001 (12-12-2001)
		AU2951299A	01 November 1999 (01-11-1999)
		BR9909490A	12 December 2000 (12-12-2000)
		CO5050310A1	27 June 2001 (27-06-2001)
		EP0948892A1	13 October 1999 (13-10-1999)
		JP2002511391A	16 April 2002 (16-04-2002)
		MA24837A1	31 December 1999 (31-12-1999)
		TR200002857T2	22 January 2001 (22-01-2001)
		US6841090B1	11 January 2005 (11-01-2005)
		WO9952360A1	21 October 1999 (21-10-1999)
CN103999851A	27 August 2014 (27-08-2014)	None	
US5403587A	04 April 1995 (04-04-1995)	None	
WO03037270A2	08 May 2003 (08-05-2003)	WO03037270A3	13 November 2003 (13-11-2003)
		AU2002348122A1	12 May 2003 (12-05-2003)
		EP1450759A2	01 September 2004 (01-09-2004)
		US2003083212A1	01 May 2003 (01-05-2003)
		US6884763B2	26 April 2005 (26-04-2005)
WO2007133934A1	22 Nov 2007 (22-11-2007)	WO2007133934A8	21 August 2008 (21-08-2008)
WO0184936A1	15 Nov 2001 (15-11-2001)	AT313262T	15 January 2006 (15-01-2006)
		AU4907800A	20 November 2001 (20-11-2001)
		CA2406558A1	15 November 2001 (15-11-2001)
		DE60025045D1	26 January 2006 (26-01-2006)
		DE60025045T2	03 August 2006 (03-08-2006)
		EP1278420A1	29 January 2003 (29-01-2003)
		EP1278420B1	21 December 2005 (21-12-2005)
		US6346281B1	12 February 2002 (12-02-2002)
		US2002068101A1	06 June 2002 (06-06-2002)
		US6846498B2	25 January 2005 (25-01-2005)
CA2371925A1	28 Dec 2000 (28-12-2000)	CA2371925C	17 February 2009 (17-02-2009)
		AR024874A1	30 October 2002 (30-10-2002)
		AR044721A1	05 October 2005 (05-10-2005)

		AU777059B2	30 September 2004 (30-09-2004)
		AU5471000A	09 January 2001 (09-01-2001)
		AU5472000A	09 January 2001 (09-01-2001)
		AU2003247720A1	23 January 2004 (23-01-2004)
		AU2003247720B2	26 March 2009 (26-03-2009)
		BR0011860A	30 April 2002 (30-04-2002)
		CA2491670A1	15 January 2004 (15-01-2004)
		CN1553796A	08 December 2004 (08-12-2004)
		CN1289051C	13 December 2006 (13-12-2006)
		EP1191843A2	03 April 2002 (03-04-2002)
		EP1521569A1	13 April 2005 (13-04-2005)
		GT200000106A	21 December 2001 (21-12-2001)
		GT200000108A	21 December 2001 (21-12-2001)
		JP2003502353A	21 January 2003 (21-01-2003)
		JP2006502987A	26 January 2006 (26-01-2006)
		MXPA01013312A	04 September 2003 (04-09-2003)
		MXPA05000473A	23 March 2005 (23-03-2005)
		MY122621A	29 April 2006 (29-04-2006)
		RU2004107901A	20 March 2005 (20-03-2005)
		RU2272612C2	27 March 2006 (27-03-2006)
		TW546149B	11 August 2003 (11-08-2003)
		TWI284020B	21 July 2007 (21-07-2007)
		US6107261A	22 August 2000 (22-08-2000)
		US6136771A	24 October 2000 (24-10-2000)
		US6204230B1	20 March 2001 (20-03-2001)
		US6451748B1	17 September 2002 (17-09-2002)
		US2003125224A1	03 July 2003 (03-07-2003)
		US6861397B2	01 March 2005 (01-03-2005)
		WO0078141A1	28 December 2000 (28-12-2000)
		WO0078275A2	28 December 2000 (28-12-2000)
		WO0078275A3	27 September 2001 (27-09-2001)
		WO2004004677A1	15 January 2004 (15-01-2004)
CA2441730A1	10 October 2002 (10-10-2002)	CA2441730C	18 November 2008 (18-11-2008)
		AR035803A1	14 July 2004 (14-07-2004)
		MXPA03008869A	24 May 2004 (24-05-2004)
		US2003069317A1	10 April 2003 (10-04-2003)
		US6977082B2	20 December 2005 (20-12-2005)
		WO02078667A1	10 October 2002 (10-10-2002)

Benoît & Côté
Reçu le 31 MARS 2017

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P2673PC00	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. **PCT/CA2016/050138**	International filing date *(day/month/year)* 16 February 2016 (16-02-2016)	Priority date *(day/month/year)* 16 February 2015 (16-02-2015)
International Patent Classification (IPC) or national classification and IPC IPC: ***A01N 31/08*** (2006.01), ***A01N 25/02*** (2006.01), ***A01N 25/30*** (2006.01), ***A01P 1/00*** (2006.01), ***A01P 21/00*** (2006.01), ***C05G 3/02*** (2006.01)		
Applicant LABORATOIRE M2		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☑ *(sent to the applicant and to the International Bureau)* a total of 26 sheets, as follows:
      - ☑ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions).
      - ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4*bis*, 70.2(e), 70.16 and 91.2).
      - ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)).
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3*ter* of Annex C of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☑ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☑ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☑ Box No. VIII Certain observations on the international application

Date of submission of the demand 22 June 2016 (22-06-2016)	Date of completion of this report 28 March 2017 (28-03-2017)
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 819-953-2476	Authorized officer Charles Barabé (819) 639-6962

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2016/050138

Box No. I Basis of the report

1. With regard to the **language,** this report is based on:
   - ☑ the international application in the language in which it was filed.
   - ☐ translation of the international application into ____ which is the language of a translation furnished for the purposes of:
     - ☐ international search (Rules 12.3(a) and 23.1(b)).
     - ☐ publication of the international application (Rule 12.4(a)).
     - ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
   - ☐ the international application as originally filed/furnished, or
   - ☑ the description: pages 1-90 as originally filed/furnished.
     pages* received by this Authority on
     pages* received by this Authority on
   - ☑ the claims: pages as originally filed/furnished.
     pages* as amended (together with any statement) under Article 19
     pages* 91-101 received by this Authority on 22 June 2016 (22-06-2016)
   - ☑ the drawings: pages 1/9 - 9/9 as originally filed/furnished
     pages* received by this Authority on
     pages* received by this Authority on
   - ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs.
   - ☐ the sequence listing (specify):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-*bis*)):
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing (specify):

5. ☐ This report has been established:
   - ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-*bis*) and 70.2(e)).
   - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4*bis* and 70.2(e)).

6. With regard to top-up searches (Rules 66.1*ter* and 70.2(f)):
   - ☑ A top-up search was carried out by this Authority on 10 January 2017 (10-01-2017)
     - ☐ Additional relevant documents have been discovered during the top-up search
   - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.

7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45*bis*.8(b) and (c)).

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2016/050138

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-69	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1-69	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1-69	YES
	Claims	NONE	NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:
D1: WO2014151449A1, 25 September 2014 (25-09-2014)
D2: CA2720738C, 07 October 2014 (07-10-2014)
D3: CA2326655A1, 21 October 1999 (21-10-1999)
D4: CN103999851A, 27 August 2014 (27-08-2014)
D5: US5403587A, 04 April 1995 (04-04-1995)
D6: WO03037270A2, 08 May 2003 (08-05-2003)
D7: WO2007133934A1, 22 November 2007 (22-11-2007)
D8: WO0184936A1, 15 November 2001 (15-11-2001)
D9: CA2371925A1, 28 December 2000 (28-12-2000)
D10: CA2441730A1, 10 October 2002 (10-10-2002)

The instant application relates to methods for the control of pests or for regulating the growth of a plant through contacting plants, their seeds, or soils in which they grow with compositions in which the phenolic compound thymol or carvacrol is solubilized or dispersed in water through the addition of a surfactant and a solvent. In certain embodiments is also comprised a further pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

Novelty and Inventive Step - PCT Articles 33(2) and 33(3)

Stable aqueous formulations of the essential oil antimicrobial actives thymol and carvacrol have been previously disclosed, such stable aqueous formulations being attained through the addition of a surfactant and a solvent. However, none of prior art references D1-D10 teach the application of compositions of thymol or carvacrol, a surfactant, and a solvent upon plants, their seeds, or soil in which they grow. It would not have been readily foreseen that such compositions upon plants would effectively control pests thereupon as well as regulate their growth. Method claims 1-69 thus meet the requirements of novelty and inventiveness under PCT Articles 33(2) and 33(3).

The aforementioned documents D1-D10 are considered to be relevant with regard to the subject-matter of the present application, and to be representative of the state of the art:

D1 discloses antimicrobial formulations comprising:
a) 0.005-40 wt.% of an active component of which is a monoterpenoid. Thymol and carvacrol are specifically mentioned;
b) 0.0015-0.01 wt.% of a nonionic or anionic surfactant;
c) 0.2-75 wt.% of an organic co-solvent; and
d) water.
Further ingredients may be present in the formulations. The formulations based on natural antimicrobial products have improved stability and water miscibility and find use as fruit and vegetable sprays [Reference is made to page 4 (lines 16-18)].

See Supplemental Box

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CA2016/050138

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The statement found on page 90, paragraph [111] of the description does not comply with PCT Article 6. This is a general statement which implies that the extent of protection may be expanded in some vague and imprecise way.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of: **Box. V**

Documents D2 through D10 disclose compositions comprising each of the components of the present composition, that is the phenolic antimicrobial compound thymol or carvacrol, a surfactant, a solvent, and water, and in overlapping proportions and amounts. Said compositions overcome the difficulty encountered in attempting to solubilize hydrophobic essential oils in water.

The subject matter in the present application is differentiated from that in the closest prior art reference D1, and the remainder of D2-D10, through the method step limitation that the plants, their seeds, or soils in which they grow are to be contacted with a composition of thymol or carvacrol, a surfactant, and a solvent. This contacting step provides the control of pests upon plants and/or regulates the growth of the plant. Comparatively, document D1 only mentions fruits and vegetables in passing as embodiments of food which its antimicrobial formulations could disinfect. There is effectively no teaching therein of the antimicrobial formulations being amenable to being applied to plants, and thus no reason to presume the formulations would not be detrimental thereto.

The subject matter of claims 1-69 is recognized as being both novel and inventive, and thus as complying with PCT Articles 33(2) and 33(3).

Industrial Applicability – PCT Article 33(4)

The subject-matter of claims 1-69 is directed to methods wherein plants, their seeds, or soils in which they grow are contacted with compositions comprising thymol or carvacrol, a surfactant, and a solvent so as to control pests and/or regulate the growth of a plant. Having concrete application, the subject-matter of claims 1-69 is considered to be industrially applicable and thus complies with the requirements of PCT Article 33(4).

BENOÎT&CÔTÉ

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June 22, 2016

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2016/06/22
179- 16
E002317288

Dear Sir:

Re : PCT/CA2016/050138
Title : COMPOSITION FOR USE AS PESTICIDE, FERTILIZER, OR BOTH, AND USES THEREOF
Owner: LABORATOIRE M2
Our Ref : P2673PC00

A Demand is being filed concurrently.

In response to the Written Opinion dated April 27, 2016, the set of claims currently on file has been amended. Annotated pages showing the amendments are also provided herewith for the examiner's convenience.

Claims

Please replace pages containing claims 1 through 48 currently on record with the enclosed replacement pages bearing amended and/or renumbered claims 1 through 69 submitted herewith.

- REMARKS -

Claims 1 to 69 are now in the application

Article 33(2) and 33(3) PCT – Novelty and Inventive step

The Examiner has rejected claims 1-8, 10 and 12 as being anticipated by any one of D1 to D10. The Examiner has also rejected claims 9 and 11 as lacking an inventive step having regards to any one of the D1 to D10 references. Indeed, the Examiner is of the view that while none of D1 to D10 provide for the additional presence of a fertilizer or a plant growth regulator in their compositions, the skilled person in the art would have readily contemplated incorporating such ingredients. These rejections have been considered and reconsideration by the Examiner is respectfully requested on the following grounds.

The claims have been amended as follows:

The preamble of claim 13 currently on file has now been combined into amended claim 1 submitted herewith. Claim 13 has been deleted. Claim 1 now reads as a method claim based on original claim 13, which was considered novel and inventive by the Examiner.

Claims 26 and 38 (now claim 25 and 48) have been amended to introduce the subject matter of claim 1 with respect to the composition. Also, the subject matter of claims 2 to 12 has been reproduced as dependent claims 26 to 36 (dependent upon claim 25) and 49 to 59 (dependent upon claim 48). No new matter has been introduced by these amendments.

The remaining claims have been renumbered and their dependencies adjusted accordingly.

The Applicant respectfully submits that the subject matter of claims 1 to 69 as currently amended is based on subject matter which is considered novel, inventive and industrially applicable by the Examiner. It is respectfully submitted that these claims are therefore patentable.

In view of the above amendments and arguments, the invention as presently claimed is therefore patentable.

Reconsideration by the Examiner and withdrawal of these rejections is therefore respectfully requested.

Clerical errors

The Examiner has identified clerical errors in claims 9 and 11. These objections have been considered and reconsideration by the Examiner is respectfully requested on the following grounds.

Claim 9 has been amended to refer to "*a cover crop*" (singular).

Claim 11 has been amended to refer to "*benzyladenine*", as suggested by the Examiner.

Article 6 PCT

The Examiner has rejected claims 1, 6-8, 14, 19, 20, 27, 32, 33, 39, 44 and 45 as being unclear. These rejections have been considered and reconsideration by the Examiner is respectfully requested on the following grounds.

Regarding claims 1, 14, 27 and 39, the terminology "*said phenolic compound*" has been replaced by "*said at least one antimicrobial compound*". Support for this amendment can be found in step a) of each of these claims. Corresponding language is also used in current claims 25 and 48.

Regarding claims 6, 7, 19, 20, 32, 33, 44 and 45, the expression "*said formulation*" in each of these claims has been replaced with "*said composition*", to provide proper antecedent basis.

Regarding claim 8, the Examiner alleges that it is unclear to refer to "*said pesticide*" since the base claim refers to both "*a pesticide composition*" and "*a pesticide*" (in the supplement). This rejection has been considered and claim 8 has been amended to recite "... *wherein said pesticide in said supplement is* ..."

Claim 8 has also been amended to recite "*an insect growth regulator*", and a comma after "*regulator*". Support for the term "*insect growth regulator*" can be found in table 1, page 51, second to last item of the table. No new matter has been introduced by this amendment.

Regarding the rejection of claims 11 and 37, the conjunction "and" has been added before the last item of the enumeration of claim 11 and 37 (now claim 47).

Claims 18-20, 32-33 and 44-45 are rejected for being compositions claims dependent upon methods claims. This rejection has been considered and these claims have been amended to recite method claims.

Regarding the rejection of claim 47, the term "kumara" has been deleted and the claim has been amended to recite "*wherein said tuber is chosen from any one of a potato, a sweet potato, a yam, a cassava, or a dahilia*", as each element are alternative to one another.

In view of the above amendments, reconsideration by the Examiner and withdrawal of these rejections is respectfully requested.

Lastly, regarding the rejection of the statement on page 90, paragraph [111] of the specification, the Applicant elects to maintain this statement in the present application in view of national phases in countries where such statements are allowed.

Voluntary amendment

Claim 9 has been amended to deleted the term "*fertilizer*" in the expression "... *wherein said fertilizer is chosen from ~~fertilizer~~ an inorganic* ..."

Claim 20 has been amended to refer to "*a fungus*", "*a bacterium*", "*a larva*" and "*an alga*" (each singular).

No new matter has been introduced by these amendments.

In view of the above, the claims on file are now believed to be in condition for allowance, and prompt and favorable action is respectfully requested.

We look forward to a revised Opinion confirming that the revised claim set submitted herewith complies with the relevant articles of the PCT and are novel and inventive over the identified prior art.

Respectfully submitted,

LABORATOIRE M2

Mathieu Miron
Patent Agent

/AD
Encl. - Amended claims (clean and annotated version)
- Demand

P208PC

ANNOTATED

1. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a composition ~~A composition for regulating plant growth and/or control pests, the composition~~ comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The method ~~composition~~ of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The method ~~composition~~ of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The method ~~composition~~ of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The method ~~composition~~ of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The method ~~composition~~ of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said ~~formulation~~ composition.

7. The method ~~composition~~ of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

8. The method ~~composition~~ of any one of claims 1 to 7, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The method ~~composition~~ of any one of claims 1 to 8, wherein said fertilizer is chosen from ~~fertilizers~~ an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The method ~~composition~~ of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The method ~~composition~~ of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and ben[[a]]zyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

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12. The method ~~composition~~ of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of any one of claims 1 to 12 to control said pest.~~

~~14~~13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~15~~14. The method of claim ~~14~~13, wherein antimicrobial compound is of synthetic origin.

~~16~~15. The method of claim ~~14~~13, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~17~~16. The method of any one of claims ~~14~~ 13 to ~~16~~15, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

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~~18~~17. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~16~~15, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~19~~18. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~18~~17, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~20~~19. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~19~~18, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

~~21~~20. The method of any one of claims ~~13~~ 14 to ~~20~~19, wherein said pest is chosen from an insect, a nematode, a ~~fungi~~fungus, ~~a bacteria~~a bacterium, ~~a larvae~~a larva, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, ~~an algae~~an alga, or combinations thereof.

~~22~~21. The method of claim ~~21~~20, wherein said plant is a weed.

~~23~~22. The method of claim ~~21~~20, wherein said arthropod is a mite.

~~24~~23. The method of claim ~~21~~20, wherein said insect is a moth.

~~25~~24. The method of claim ~~21~~20, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

~~26~~25. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof~~according to any one of claims 1 to 12~~.

26. The method of claim 25, wherein antimicrobial compound is of synthetic origin.

27. The method of claim 25, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

28. The method of any one of claims 25 to 27, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

29. The method of any one of claims 25 to 28, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

30. The method of any one of claims 25 to 29, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

31. The method of any one of claims 25 to 30, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

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32. The method of any one of claims 25 to 31, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

33. The method of any one of claims 25 to 32, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

34. The method of any one of claims 25 to 33, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

35. The method of any one of claims 25 to 34, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

36. The method of any one of claims 25 to 35, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

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~~27~~37. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~28~~38. The method of claim ~~27~~37, wherein antimicrobial compound is of synthetic origin.

~~29~~39. The method of claim ~~27~~37, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~30~~40. The method of any one of claims ~~27~~ 37 to ~~29~~39, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

~~31~~41. The method of any one of claims ~~27~~ 37 to ~~29~~39, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~32~~42. The method ~~composition~~ of any one of claims ~~27~~ 37 to ~~31~~41, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~33~~43. The method ~~composition~~ of any one of claims ~~27~~ 37 to ~~32~~42, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

~~34~~44. The method of any one of claims ~~26~~ 37 to ~~33~~43, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

~~35~~45. The method of any one of claims ~~26~~ 37 to ~~34~~44, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

~~36~~46. The method of any one of claims ~~26~~ 37 to ~~34~~44, wherein regulating the growth comprises an increase in the number of healthy plants.

~~37~~47. The method according to any one of claims ~~26~~ 37 to ~~36~~46, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

~~38~~48. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof~~according to any one of claims 1 to 12~~.

49. The method of claim 48, wherein antimicrobial compound is of synthetic origin.

50. The method of claim 48, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

51. The method of any one of claims 48 to 50, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

52. The method of any one of claims 48 to 51, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

53. The method of any one of claims 48 to 52, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

54. The method of any one of claims 48 to 53, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

55. The method of any one of claims 48 to 54, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

56. The method of any one of claims 48 to 55, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a

phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

57. The method of any one of claims 48 to 56, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

58. The method of any one of claims 48 to 57, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

59. The method of any one of claims 48 to 58, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~39~~60. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

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4061. The method of claim 3960, wherein antimicrobial compound is of synthetic origin.

4162. The method of claim 6039, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4263. The method of any one of claims 60 39 to 4162, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

4364. The method of any one of claims 60 39 to 4263, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

4465. The method composition of any one of claims 60 39 to 4364, wherein said surfactant is from about 0.1% to about 15% (w/w) of said compositionformulation.

4566. The method composition of any one of claims 60 39 to 4365, wherein said solvent is from about 0.1% to about 40% (w/w) of said compositionformulation.

4667. The method of any one of claims 60 38 to 4566, wherein said seed is a tuber.

4768. The method of claim 4667, wherein said tuber is chosen from any one of a potato (kumara), a sweet potato, a yam, a cassava, and or a dahlia.

4869. The method of any one of claims 60 38 to 4768, wherein regulating the growth comprises an increase in the length of a tuber sprout.

1. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The method of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The method of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The method of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The method of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The method of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

7. The method of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

8. The method of any one of claims 1 to 7, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The method of any one of claims 1 to 8, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The method of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The method of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

12. The method of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

14. The method of claim 13, wherein antimicrobial compound is of synthetic origin.

15. The method of claim 13, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

16. The method of any one of claims 13 to 15, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

17. The method of any one of claims 13 to 15, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

18. The method of any one of claims 13 to 17, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

19. The method of any one of claims 13 to 18, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

20. The method of any one of claims 14 to 19, wherein said pest is chosen from an insect, a nematode, a fungus, a bacterium, a larva, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an alga, or combinations thereof.

21. The method of claim 20, wherein said plant is a weed.

22. The method of claim 20, wherein said arthropod is a mite.

23. The method of claim 20, wherein said insect is a moth.

24. The method of claim 20, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

25. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent;

and a supplement comprising:
at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

26. The method of claim 25, wherein antimicrobial compound is of synthetic origin.

27. The method of claim 25, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

28. The method of any one of claims 25 to 27, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

29. The method of any one of claims 25 to 28, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

30. The method of any one of claims 25 to 29, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

31. The method of any one of claims 25 to 30, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

32. The method of any one of claims 25 to 31, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

33. The method of any one of claims 25 to 32, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

34. The method of any one of claims 25 to 33, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

35. The method of any one of claims 25 to 34, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

36. The method of any one of claims 25 to 35, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

37. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

38. The method of claim 37, wherein antimicrobial compound is of synthetic origin.

39. The method of claim 37, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

40. The method of any one of claims 37 to 39, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

41. The method of any one of claims 37 to 39, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

42. The method of any one of claims 37 to 41, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

43. The method of any one of claims 37 to 42, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

44. The method of any one of claims 37 to 43, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

45. The method of any one of claims 37 to 44, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

46. The method of any one of claims 37 to 44, wherein regulating the growth comprises an increase in the number of healthy plants.

47. The method according to any one of claims 37 to 46, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, and a tomato plant.

48. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent;

and a supplement comprising:
at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

49. The method of claim 48, wherein antimicrobial compound is of synthetic origin.

50. The method of claim 48, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

51. The method of any one of claims 48 to 50, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

52. The method of any one of claims 48 to 51, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

53. The method of any one of claims 48 to 52, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

54. The method of any one of claims 48 to 53, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

55. The method of any one of claims 48 to 54, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

56. The method of any one of claims 48 to 55, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

57. The method of any one of claims 48 to 56, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a

fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

58. The method of any one of claims 48 to 57, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

59. The method of any one of claims 48 to 58, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

60. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

61. The method of claim 60, wherein antimicrobial compound is of synthetic origin.

62. The method of claim 60, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

63. The method of any one of claims 60 to 62, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

64. The method of any one of claims 60 to 63, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

65. The method of any one of claims 60 to 64, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

66. The method of any one of claims 60 to 65, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

67. The method of any one of claims 60 to 66, wherein said seed is a tuber.

68. The method of claim 67, wherein said tuber is chosen from any one of a potato, a sweet potato, a yam, a cassava, or a dahilia.

69. The method of any one of claims 60 to 68, wherein regulating the growth comprises an increase in the length of a tuber sprout.

BENOÎT&CÔTÉ

Mathieu Miron
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mathieu@benoit-cote.com

June 22, 2016

COMMISSIONER OF PATENTS
Canadian Receiving Office
Box PCT
Gatineau - Québec - K1A 0C9
CANADA

Dear Sir:

Re :	PCT/CA2016/050138
Title :	COMPOSITION FOR USE AS PESTICIDE, FERTILIZER, OR BOTH, AND USES THEREOF
Owner:	LABORATOIRE M2
Our Ref :	P2673PC00

A Demand is being filed concurrently.

In response to the Written Opinion dated April 27, 2016, the set of claims currently on file has been amended. Annotated pages showing the amendments are also provided herewith for the examiner's convenience.

Claims

Please replace pages containing claims 1 through 48 currently on record with the enclosed replacement pages bearing amended and/or renumbered claims 1 through 69 submitted herewith.

- REMARKS -

Claims 1 to 69 are now in the application

Article 33(2) and 33(3) PCT – Novelty and Inventive step

The Examiner has rejected claims 1-8, 10 and 12 as being anticipated by any one of D1 to D10. The Examiner has also rejected claims 9 and 11 as lacking an inventive step having regards to any one of the D1 to D10 references. Indeed, the Examiner is of the view that while none of D1 to D10 provide for the additional presence of a fertilizer or a plant growth regulator in their compositions, the skilled person in the art would have readily contemplated incorporating such ingredients. These rejections have been considered and reconsideration by the Examiner is respectfully requested on the following grounds.

The claims have been amended as follows:

The preamble of claim 13 currently on file has now been combined into amended claim 1 submitted herewith. Claim 13 has been deleted. Claim 1 now reads as a method claim based on original claim 13, which was considered novel and inventive by the Examiner.

Claims 26 and 38 (now claim 25 and 48) have been amended to introduce the subject matter of claim 1 with respect to the composition. Also, the subject matter of claims 2 to 12 has been reproduced as dependent claims 26 to 36 (dependent upon claim 25) and 49 to 59 (dependent upon claim 48). No new matter has been introduced by these amendments.

The remaining claims have been renumbered and their dependencies adjusted accordingly.

The Applicant respectfully submits that the subject matter of claims 1 to 69 as currently amended is based on subject matter which is considered novel, inventive and industrially applicable by the Examiner. It is respectfully submitted that these claims are therefore patentable.

In view of the above amendments and arguments, the invention as presently claimed is therefore patentable.

Reconsideration by the Examiner and withdrawal of these rejections is therefore respectfully requested.

Clerical errors

The Examiner has identified clerical errors in claims 9 and 11. These objections have been considered and reconsideration by the Examiner is respectfully requested on the following grounds.

Claim 9 has been amended to refer to "*a cover crop*" (singular).

Claim 11 has been amended to refer to "*benzyladenine*", as suggested by the Examiner.

Article 6 PCT

The Examiner has rejected claims 1, 6-8, 14, 19, 20, 27, 32, 33, 39, 44 and 45 as being unclear. These rejections have been considered and reconsideration by the Examiner is respectfully requested on the following grounds.

Regarding claims 1, 14, 27 and 39, the terminology "*said phenolic compound*" has been replaced by "*said at least one antimicrobial compound*". Support for this amendment can be found in step a) of each of these claims. Corresponding language is also used in current claims 25 and 48.

Regarding claims 6, 7, 19, 20, 32, 33, 44 and 45, the expression "*said formulation*" in each of these claims has been replaced with "*said composition*", to provide proper antecedent basis.

Regarding claim 8, the Examiner alleges that it is unclear to refer to "*said pesticide*" since the base claim refers to both "*a pesticide composition*" and "*a pesticide*" (in the supplement). This rejection has been considered and claim 8 has been amended to recite "*... wherein said pesticide in said supplement is ...*"

Claim 8 has also been amended to recite "*an insect growth regulator*", and a comma after "*regulator*". Support for the term "*insect growth regulator*" can be found in table 1, page 51, second to last item of the table. No new matter has been introduced by this amendment.

Regarding the rejection of claims 11 and 37, the conjunction "and" has been added before the last item of the enumeration of claim 11 and 37 (now claim 47).

Claims 18-20, 32-33 and 44-45 are rejected for being compositions claims dependent upon methods claims. This rejection has been considered and these claims have been amended to recite method claims.

Regarding the rejection of claim 47, the term "kumara" has been deleted and the claim has been amended to recite "*wherein said tuber is chosen from any one of a potato, a sweet potato, a yam, a cassava, or a dahilia*", as each element are alternative to one another.

In view of the above amendments, reconsideration by the Examiner and withdrawal of these rejections is respectfully requested.

Lastly, regarding the rejection of the statement on page 90, paragraph [111] of the specification, the Applicant elects to maintain this statement in the present application in view of national phases in countries where such statements are allowed.

Voluntary amendment

Claim 9 has been amended to deleted the term "*fertilizer*" in the expression "*... wherein said fertilizer is chosen from ~~fertilizer~~ an inorganic ...*"

Claim 20 has been amended to refer to "*a fungus*", "*a bacterium*", "*a larva*" and "*an alga*" (each singular).

No new matter has been introduced by these amendments.

In view of the above, the claims on file are now believed to be in condition for allowance, and prompt and favorable action is respectfully requested.

We look forward to a revised Opinion confirming that the revised claim set submitted herewith complies with the relevant articles of the PCT and are novel and inventive over the identified prior art.

Respectfully submitted,

LABORATOIRE M2

Mathieu Miron
Patent Agent

/AD
Encl. - Amended claims (clean and annotated version)
- Demand

P208PC

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ CA

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference: P2673PC00

International application No.	International filing date *(day/month/year)*	(Earliest) Priority date *(day/month/year)*
PCT/CA2016/050138	16 February 2016 (16/02/2016)	16 February 2015 (16/02/2015

Title of invention: COMPOSITION FOR USE AS PESTICIDE, FERTILIZER, OR BOTH, AND USES THEREOF

Box No. II APPLICANT(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

LABORATOIRE M2
4005-A, rue de la Garlock
Sherbrooke, Quebec, J1L 1W9
Canada

Telephone No.

Facsimile No.

Applicant's registration No. with the Office

E-mail authorization: Marking one of the check-boxes below authorizes the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send notifications issued in respect of this international application if those offices are willing to do so.

☐ as advance copies followed by paper notifications; or ☒ exclusively in electronic form (no paper notifications will be sent).

E-mail address: docket@benoit-cote.com

State *(that is, country)* of nationality:	State *(that is, country)* of residence:

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:	State *(that is, country)* of residence:

☐ Further applicants are indicated on a continuation sheet.

Sheet No. 2

International application No.
PCT/CA2016/050138

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative

and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.

☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.

☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Mathieu Miron
BENOIT & COTE INC.
880 - 1550 Melcalfe
Montréal, Québec H3A 1X6
Canada

Telephone No.
514-658-4844

Facsimile No.
514-448-4607

Agent's registration No. with the Office
11754

E-mail authorization: Marking one of the check-boxes below authorizes the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send notifications issued in respect of this international application if those offices are willing to do so.

☐ as advance copies followed by paper notifications: or ☒ exclusively in electronic form (no paper notifications will be sent).

E-mail address: mathieu@benoit-cote.com

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination **to start on the basis of:**

the description
- ☒ as originally filed, or
- ☐ as amended under Article 34

the sequence listing (if any)
- ☐ as originally filed, or
- ☐ as amended under Article 34:
  - ☐ in the form of an Annex C/ST.25 text file
  - ☐ on paper or in the form of an image file

the claims
- ☐ as originally filed, or
- ☐ as amended under Article 19, and/or
- ☒ as amended under Article 34

the drawings (if any)
- ☐ as originally filed, or
- ☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ Where the IPEA wishes to start the international preliminary examination at the same time as the international search in accordance with Rule 69.1(b), the applicant requests the IPEA **to postpone** the start of the international preliminary examination until the expiration of the applicable time limit under Rule 69.1(d).

4. ☐ The applicant expressly wishes the international preliminary examination **to start earlier** than at the expiration of the applicable time limit under Rule 54*bis*.1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

- ☒ which is the language in which the international application was filed.
- ☐ which is the language of a translation furnished for the purposes of international search.
- ☐ which is the language of publication of the international application.
- ☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT.

Sheet No. 3

International application No.
PCT/CA2016/050138

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

				For International Preliminary Examining Authority use only	
				received	not received
1. translation of international application	:		sheets	☐	☐
2. amendments under Article 34	:	11	sheets	☐	☐
3. letter accompanying the amendments under Article 34 (Rule 66.8)	:	4	sheets	☐	☐
4. copy (or, where required, translation) of amendments under Article 19	:		sheets	☐	☐
5. copy of the letter accompanying the amendments under Article 19 (Rules 46.5(b) and 53.9)	:		sheets	☐	☐
6. copy (or, where applicable, translation) of any statement under Article 19 (Rule 62.1(ii))	:		sheets	☐	☐
7. other *(specify)*	:		sheets	☐	☐

The demand is also accompanied by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ original separate power of attorney
3. ☐ original general power of attorney
4. ☐ copy of general power of attorney; reference number, if any:
5. ☐ sequence listing in the form of an Annex C/ST.25 text file
6. ☐ other *(specify)*: _____

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

Mathieu Miron, Reg.11754

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.
   ☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.
6. ☐ The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54*bis*.1(a) and item 7 or 8, below, does not apply.
7. ☐ The date of receipt of the demand is WITHIN the time limit under Rule 54*bis*.1(a) as extended by virtue of Rule 80.5.
8. ☐ Although the date of receipt of the demand is after the expiration of the time limit under Rule 54*bis*.1(a), the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

CHAPTER II

PCT

FEE CALCULATION SHEET

Annex to the Demand

International application No. PCT/CA2016/050138	For International Preliminary Examining Authority use only
Applicant's or agent's file reference P2673PC00	Date stamp of the IPEA

Applicant
LABORATOIRE M2

CALCULATION OF PRESCRIBED FEES

(Applicants may be entitled to a reduction of certain fees as indicated in the PCT Fee Tables (http://www.wipo.int/pct/en/fees.pdf))

1. PRELIMINARY EXAMINATION FEE	800.00 P	
2. HANDLING FEE	268.00 H	
3. TOTAL OF PRESCRIBED FEES Add the amounts entered at P and H and enter total in the TOTAL box	1068.00 TOTAL	

MODE OF PAYMENT

(Not all modes of payment may be available at all IPEAs)

- ☒ credit card *(details should not be included on this sheet)*
- ☐ authorization to charge deposit or current account with the IPEA (see below)
- ☐ bank transfer
- ☐ cash
- ☐ postal money order
- ☐ check
- ☐ revenue stamps
- ☐ other *(specify)*: _____

AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT OR CURRENT ACCOUNT

(This mode of payment may not be available at all IPEAs)

IPEA/ CA

- ☒ Authorization to charge the total fees indicated above.
- ☐ *(This check-box may be marked only if the conditions for deposit or current accounts of the IPEA so permit)* Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.

Deposit or Current Account No.: _____

Date: 22 June 2016

Name: Mathieu Miron

Signature: Mathieu Miron

See Notes to the fee calculation sheet

ANNOTATED

1. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a composition ~~A composition for regulating plant growth and/or control pests, the composition~~ comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The method ~~composition~~ of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The method ~~composition~~ of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The method ~~composition~~ of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The method ~~composition~~ of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

ANNOTATED

6. The method ~~composition~~ of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said ~~formulation~~ composition.

7. The method ~~composition~~ of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

8. The method ~~composition~~ of any one of claims 1 to 7, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The method ~~composition~~ of any one of claims 1 to 8, wherein said fertilizer is chosen from ~~fertilizers~~ an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The method ~~composition~~ of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The method ~~composition~~ of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and ben[~~[a]~~]zyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

ANNOTATED

12. The method ~~composition~~ of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of any one of claims 1 to 12 to control said pest.~~

~~14~~13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~15~~14. The method of claim ~~14~~13, wherein antimicrobial compound is of synthetic origin.

~~16~~15. The method of claim ~~14~~13, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~17~~16. The method of any one of claims ~~14~~ 13 to ~~16~~15, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

ANNOTATED

~~18~~17. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~16~~15, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~19~~18. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~18~~17, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~20~~19. The method ~~composition~~ of any one of claims ~~14~~ 13 to ~~19~~18, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

~~21~~20. The method of any one of claims ~~13~~ 14 to ~~20~~19, wherein said pest is chosen from an insect, a nematode, a ~~fungi~~fungus, ~~a bacteria~~a bacterium, ~~a larvae~~a larva, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, ~~an algae~~an alga, or combinations thereof.

~~22~~21. The method of claim ~~21~~20, wherein said plant is a weed.

~~23~~22. The method of claim ~~21~~20, wherein said arthropod is a mite.

~~24~~23. The method of claim ~~21~~20, wherein said insect is a moth.

~~25~~24. The method of claim ~~21~~20, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

~~26~~25. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

ANNOTATED

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof~~according to any one of claims 1 to 12~~.

26. The method of claim 25, wherein antimicrobial compound is of synthetic origin.

27. The method of claim 25, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

28. The method of any one of claims 25 to 27, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

29. The method of any one of claims 25 to 28, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

30. The method of any one of claims 25 to 29, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

31. The method of any one of claims 25 to 30, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

ANNOTATED

32. The method of any one of claims 25 to 31, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

33. The method of any one of claims 25 to 32, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

34. The method of any one of claims 25 to 33, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

35. The method of any one of claims 25 to 34, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

36. The method of any one of claims 25 to 35, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

ANNOTATED

~~27~~37. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

~~28~~38. The method of claim ~~27~~37, wherein antimicrobial compound is of synthetic origin.

~~29~~39. The method of claim ~~27~~37, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

~~30~~40. The method of any one of claims ~~27~~ 37 to ~~29~~39, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

~~31~~41. The method of any one of claims ~~27~~ 37 to ~~29~~39, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

~~32~~42. The method ~~composition~~ of any one of claims ~~27~~ 37 to ~~31~~41, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition~~formulation~~.

~~33~~43. The method ~~composition~~ of any one of claims ~~27~~ 37 to ~~32~~42, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition~~formulation~~.

ANNOTATED

3444. The method of any one of claims ~~26~~ 37 to ~~33~~43, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

3545. The method of any one of claims ~~26~~ 37 to ~~34~~44, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

3646. The method of any one of claims ~~26~~ 37 to ~~34~~44, wherein regulating the growth comprises an increase in the number of healthy plants.

3747. The method according to any one of claims ~~26~~ 37 to ~~36~~46, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

3848. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof~~according to any one of claims 1 to 12~~.

ANNOTATED

49. The method of claim 48, wherein antimicrobial compound is of synthetic origin.

50. The method of claim 48, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

51. The method of any one of claims 48 to 50, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

52. The method of any one of claims 48 to 51, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

53. The method of any one of claims 48 to 52, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

54. The method of any one of claims 48 to 53, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

55. The method of any one of claims 48 to 54, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

56. The method of any one of claims 48 to 55, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a

ANNOTATED

phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

57. The method of any one of claims 48 to 56, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

58. The method of any one of claims 48 to 57, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

59. The method of any one of claims 48 to 58, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

~~39~~60. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial ~~phenolic~~ compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

ANNOTATED

4061. The method of claim 3960, wherein antimicrobial compound is of synthetic origin.

4162. The method of claim 6039, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4263. The method of any one of claims 60 39 to 4162, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

4364. The method of any one of claims 60 39 to 4263, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

4465. The method composition of any one of claims 60 39 to 4364, wherein said surfactant is from about 0.1% to about 15% (w/w) of said compositionformulation.

4566. The method composition of any one of claims 60 39 to 4365, wherein said solvent is from about 0.1% to about 40% (w/w) of said compositionformulation.

4667. The method of any one of claims 60 38 to 4566, wherein said seed is a tuber.

4768. The method of claim 4667, wherein said tuber is chosen from any one of a potato (kumara), a sweet potato, a yam, a cassava, and or a dahilia.

4869. The method of any one of claims 60 38 to 4768, wherein regulating the growth comprises an increase in the length of a tuber sprout.

1. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a composition comprising:

a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The method of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The method of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The method of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The method of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The method of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

7. The method of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

8. The method of any one of claims 1 to 7, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The method of any one of claims 1 to 8, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The method of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The method of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

12. The method of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

14. The method of claim 13, wherein antimicrobial compound is of synthetic origin.

15. The method of claim 13, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

16. The method of any one of claims 13 to 15, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

17. The method of any one of claims 13 to 15, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

18. The method of any one of claims 13 to 17, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

19. The method of any one of claims 13 to 18, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

20. The method of any one of claims 14 to 19, wherein said pest is chosen from an insect, a nematode, a fungus, a bacterium, a larva, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an alga, or combinations thereof.

21. The method of claim 20, wherein said plant is a weed.

22. The method of claim 20, wherein said arthropod is a mite.

23. The method of claim 20, wherein said insect is a moth.

24. The method of claim 20, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

25. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent;

and a supplement comprising:
at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

26. The method of claim 25, wherein antimicrobial compound is of synthetic origin.

27. The method of claim 25, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

28. The method of any one of claims 25 to 27, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

29. The method of any one of claims 25 to 28, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

30. The method of any one of claims 25 to 29, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

31. The method of any one of claims 25 to 30, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

32. The method of any one of claims 25 to 31, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

33. The method of any one of claims 25 to 32, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

34. The method of any one of claims 25 to 33, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

35. The method of any one of claims 25 to 34, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

36. The method of any one of claims 25 to 35, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

37. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

38. The method of claim 37, wherein antimicrobial compound is of synthetic origin.

39. The method of claim 37, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

40. The method of any one of claims 37 to 39, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

41. The method of any one of claims 37 to 39, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

42. The method of any one of claims 37 to 41, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

43. The method of any one of claims 37 to 42, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

44. The method of any one of claims 37 to 43, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

45. The method of any one of claims 37 to 44, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

46. The method of any one of claims 37 to 44, wherein regulating the growth comprises an increase in the number of healthy plants.

47. The method according to any one of claims 37 to 46, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, and a tomato plant.

48. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent;

and a supplement comprising:
at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

49. The method of claim 48, wherein antimicrobial compound is of synthetic origin.

50. The method of claim 48, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

51. The method of any one of claims 48 to 50, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

52. The method of any one of claims 48 to 51, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

53. The method of any one of claims 48 to 52, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

54. The method of any one of claims 48 to 53, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

55. The method of any one of claims 48 to 54, wherein said pesticide in said supplement is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth regulator, a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

56. The method of any one of claims 48 to 55, wherein said fertilizer is chosen from an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crop, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

57. The method of any one of claims 48 to 56, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a

fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

58. The method of any one of claims 48 to 57, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benzyladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, and N-acetylaspartic acid.

59. The method of any one of claims 48 to 58, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

60. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said at least one antimicrobial compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

61. The method of claim 60, wherein antimicrobial compound is of synthetic origin.

62. The method of claim 60, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

63. The method of any one of claims 60 to 62, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

64. The method of any one of claims 60 to 63, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

65. The method of any one of claims 60 to 64, wherein said surfactant is from about 0.1% to about 15% (w/w) of said composition.

66. The method of any one of claims 60 to 65, wherein said solvent is from about 0.1% to about 40% (w/w) of said composition.

67. The method of any one of claims 60 to 66, wherein said seed is a tuber.

68. The method of claim 67, wherein said tuber is chosen from any one of a potato, a sweet potato, a yam, a cassava, or a dahilia.

69. The method of any one of claims 60 to 68, wherein regulating the growth comprises an increase in the length of a tuber sprout.

COMPOSICIONES ACUOSAS PARA CONTROLAR PLAGAS O REGULAR EL CRECIMIENTO DE PLANTAS, DICHAS COMPOSICIONES COMPRENDIENDO TIMOL O CARVACROL, UN SURFACTANTE, Y UN SOLVENTE

REFERENCIA CRUZADA CON SOLICITUDES RELACIONADAS

Esta solicitud reivindica la prioridad de la solicitud de patente provisional de Estados Unidos 62/116,630, presentada el 16 de febrero de 2015, cuya especificación se incorpora a través del presente por referencia.

ANTECEDENTES

(a) Campo

El asunto materia descrito de manera general trata sobre el control de plagas y/o las composiciones de fertilizantes, y los usos de los mismos.

(b) Técnica Anterior relacionada

El suelo es un reservorio para una variedad de enfermedades en plantas y animales. Éstas incluyen enfermedades ocasionadas por microrganismos (hongos, bacterias, actinomicetos, fitoplasmas, protozoarios y virus), y organismos del suelo más grandes tales como nemátodos, así como también insectos (por ejemplo, hormigas, pulgones) y animales pequeños (por ejemplo, babosas, caracoles, roedores). Los patógenos de plantas y animales también pueden transmitirse a través de insectos vectores o por animales del suelo tales como los nemátodos. La enfermedad más común causada por patógenos provenientes del suelo son podredumbre que afecta por abajo las partes a nivel del suelo de la planta, y marchitamientos

vasculares como un resultado de las infecciones de las raíces. Algunos patógenos transmitidos por el suelo también causan enfermedades en las partes de la planta que se encuentran a nivel de la superficie (como en el follaje).

El grupo de patógenos más importante que ocasiona enfermedades trasmitidas por el suelo son los organismos multicelulares, hongos. En general, una infección micótica puede ocasionar necrosis local o considerable. También puede inhibir el crecimiento normal (hipotrofia) o inducir el excesivo crecimiento anormal (hipertrofia o hiperplasia) en una porción de o en toda una planta. Los síntomas asociados con la necrosis incluyen manchas en las hojas, roya, sarna, podredumbres, podredumbre de semillas, antracnosis, secarse o acronecrosis muerte forestal periférica o la muerte descendente y cancro. Los síntomas asociados con la hiperplasia incluyen la hernia de la col, las agallas, las verrugas y las lisaduras de las hojas. Las principales medidas de control incluyen el uso de semillas libres de enfermedad y la propagación de injerto, la destrucción de todos los materiales de la planta que albergan hongos patógenos, la rotación de cultivos, el desarrollo y el uso de variedades de plantas resistentes y el uso de fungicidas químicos y biológicos.

Muchas especies de bacterias pueden ocasionar enfermedades en las plantas, animales y humanos. Los géneros principales de bacterias patógenas de plantas son *Agrobacterium, Clavibacter, Erwinia, Pseudomonas, Xantomonas, Streptomyces,* y *Xylella.* Las enfermedades bacterianas pueden agruparse en cuatro categorías generales que se basan en la extensión del daño causado al tejido vegetal y los síntomas que estos ocasionan, los cuales podrán incluir marchitamiento vascular, necrosis, pudrición blanda, y tumores. Con el fin de que una bacteria

produzca una enfermedad en una planta, la bacteria primero debe invadir el tejido vegetal y multiplicarse. Los patógenos bacterianos ingresan a las plantas a través de lesiones magulladuras producidas principalmente por condiciones climáticas adversas, los seres humanos, herramientas y maquinaria, insectos, y nematodos, o través de cortes o grietas naturales tales como los estomas, lenticelas, hidatodos, glándulas productoras de néctar, y cicatrices foliares. Las perdidas debido a enfermedades bacterianas se reducen por el uso de semillas libres de patógenos. Los compuestos de semillas bactericidas controlan algunas enfermedades bacterianas, tales como la mancha foliar angular del algodón, la sarna del gladiolo, y la podrición blanda de las plantas ornamentales. Los aerosoles bactericidas de protección se utilizan contra el tizón bacteriano de frijoles y apio, el fuego bacteriano, agalla de la corona, carbunco del delfinio, y la roya o tizón del avellano y el nogal.

Los virus y los viroides son los agentes infecciosos más pequeños. Tanto los virus como los viroides son parásitos obligados ya que pueden multiplicarse o replicarse solamente dentro de una célula viva de un hospedero concreto. Una sola especie de plantas podrá ser susceptible a infección por varios virus o viroides diferentes. La mayoría de los virus causantes de enfermedades son transportados y trasmitidos de manera natural por insectos y ácaros, los cuales se denominan vectores del virus. Los síntomas de las enfermedades virales y viroides de plantas caen en cuatro grupos: (1) cambio de color: moteado amarillento, verde y amarillo, y aclaramiento de nervaduras; (2) malformaciones: deformación de las hojas y flores, agrupamiento anormal de hojas, proliferación y escobas de bruja (proliferación anormal de brotes), y poco o ningún desarrollo de hojas entre las venas; (3) necrosis: manchas en las hojas,

manchas anulares, rayas, defoliación prematura o languidez, y muerte interna, en especial del tejido conductor (conducción de nutrientes); y (4) atrofia o crecimiento reducido de las hojas, tallos, o de las plantas completas. El control se lleva a cabo a través de varios métodos, tal como, cultivar especies resistentes y variedades de plantas u obtener semillas libres de virus, esquejes o plantas. Otras medidas de control incluyen regular los insectos vectores a través de rociar las plantas con insecticidas de contacto o fumigar el suelo para exterminar los insectos, nemátodos y otros posibles vectores. También incluye rociar las hojas de las plantas con aceites como el aceite mineral y la parafina, que ayudan a prevenir la propagación vírica durante la infestación de insectos o el crecimiento de las plantas.

Una gran cantidad de formulaciones actuales para el control de plagas, contienen agentes antimicrobianos que no tienen origen natural. Los agentes microbianos típicos incluyen a los desinfectantes químicos tales como los compuestos fenólicos, los compuestos de amonio cuaternario, compuestos que contienen formaldehido y halógenos. Tales materiales no tienen origen natural (es decir, no se encuentran en la naturaleza) y se preparan a través de procesamiento químico y síntesis. Una gran cantidad de estos desinfectantes "sintéticos" causan efectos indeseables tanto en el medio ambiente como en la salud de los seres humanos. La interacción de cualquiera de los desinfectantes químicos, por no hablar de un numero de esos químicos con el medio ambiente siempre trae consecuencias inesperadas.

La forma no selectiva en que los desinfectantes químicos sintéticos controlan las plagas también hace que sean no recomendables. Los químicos a menudo pueden tener efectos

nocivos inesperados y graves en insectos o animales recomendados, así como también en los insectos o animales de plaga.

Debido a los frecuentes efectos nocivos de los desinfectantes químicos sintéticos, se ha propuesto e investigado varias alternativas. Una de esas alternativas es el uso de desinfectantes o pesticidas naturales. Los desinfectantes o pesticidas naturales son compuestos que existen en la naturaleza (por ejemplo, en plantas, animales, u otros insectos) y tienen propiedades que les permiten ser usados como están combinados, o modificados para ser usados como desinfectantes o pesticidas.

Aunque anteriormente se han utilizado pesticidas naturales, sigue existiendo la necesidad de pesticidas naturales eficaces que no tengan efectos indeseables que con frecuencia muestran los pesticidas químicos sintéticos.

Por lo tanto, existe la necesidad de composiciones que controlen las plagas, para regulación de plantas, o ambos, que reduzcan o por lo menos mitiguen los inconvenientes de la técnica anterior.

SUMARIO

De acuerdo con una forma de realización, se proporción una composición para regular el crecimiento de las plantas que comprende:

una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% de peso de al menos un compuesto fenólico antimicrobiano aislado

o sintético de origen natural seleccionado del grupo que comprende timol y/o carvacrol;

b) desde más o menos 0.001% a más o menos 15% de peso de un surfactante aniónico, uno catiónico, uno anfotérico, uno no iónico o combinaciones de los mismos, suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% de peso de un disolvente;

d) agua suficiente para preparar 100 por ciento de peso, y un suplemento que comprende

al menos uno de un pesticida, un fertilizante, un despumador, un regulador de crecimiento de planta, o combinaciones de los mismos.

El compuesto antimicrobiano podrá ser de origen sintético.

El surfactante podrá ser seleccionado del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

El por lo menos un compuesto antimicrobiano podrá ser desde más o menos 0.12% a más o menos 1.15% p/p de la composición.

El por lo menos un compuesto antimicrobiano podrá ser desde más o menos 0.12% p/p, o más o menos 0.23% p/p, o más o menos 0.46% p/p, o más o menos 1.15% p/p de la composición.

El surfactante podrá ser desde o más o menos 0.1% a o más o menos 15% (p/p) de la formulación.

El disolvente podrá ser desde o más o menos 0.1 o más o menos 40% (p/p) de la formulación.

El pesticida podrá ser elegido de un alguicida, un agente anti incrustante, un desinfectante, un fungicida, un producto fumigante, un herbicida, molusquicida, un ovicida, un raticida, contra la proliferación de insectos, un bactericida, un virucida, un repelente de insectos, un repelente de artrópodos, un nematicida, un insecticida, un acaricida, un herbicida, y un regulador del crecimiento de las plantas.

El fertilizante podrá ser elegido de fertilizantes como un fertilizante inorgánico, un fertilizante de nitrógeno, un fertilizante de potasio, un fertilizante de fosfato, un fertilizante orgánico, un abono, una composta, una fosforita, una harina de huesos, una alfalfa, un troceado de madera, una langbeinita, un cultivo de cobertura, sulfato de potasio, un polvo estéril, ceniza, una harina de sangre, una harina de pescado, una emulsión de pescado, un alga, un quitosano, y una molasa.

El despumador podrá ser elegido a partir de un aceite mineral, un aceite vegetal, una cera de parafina, una cera de éster, una sílice, un alcohol graso, una silicona, un polietilenglicol, un polipropilenglicol, copolímero, y un alquilpolicrilato.

El regulador del crecimiento de plantas podrá ser elegido a partir de un carbamato, un hidrocarburo clorinado, ciclohexadiona, un ácido orgánico, ancimidol, etefon, ácido giberélico, giberelinas y benciladenina, hidracida maleica, NAA, naftaleno acetamida, paclobutrazol, acido N-acetilaspartico.

El suplemento también comprende un colorante, un agente ajustador de pH, un agente secuestrante, y combinaciones de los mismos.

De acuerdo con otra forma de realización, se ha proporcionado un método para el control de plagas, el método comprende poner en contacto un suelo, una semilla, una planta, o combinaciones de los mismos, con una cantidad de pesticidas de la composición de la presente invención para controlar la plaga.

De acuerdo con otra forma de realización, podrá proporcionarse un método para el control de plagas, el método comprende poner en contacto un suelo, una semilla, una planta, o combinaciones de los mismos, con una cantidad de pesticida de una composición de pesticida que consiste en:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado a partir del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.01% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

El compuesto antimicrobiano podrá ser de origen sintético.

El surfactante podrá ser seleccionado a partir del grupo que conste de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico y combinaciones de los mismos.

El por lo menos un compuesto antimicrobiano podrá ser desde más o menos 0.12% a más o menos 1.15% p/p de la mezcla.

El por lo menos un compuesto antimicrobiano podrá ser desde más o menos 0.12% p/p, o más o menos 0.23% p/p, o más o menos 0.46% p/p, o más o menos 1.15% p/p de la mezcla.

La formulación podrá contener desde más o menos 0.1% a más o menos 15% (p/p) del surfactante.

La formulación podrá contener desde más o menos 0.1% a más o menos 40% (p/p) del disolvente.

La plaga podrá ser elegida a partir de un insecto, un nemátodo, un hongo, una bacteria, una larva, una planta, un animal, un virus, un parasito, un gasterópodo, un artrópodo, un caracol, una babosa, un alga o combinaciones de los mismos.

La planta podrá ser una maleza. el artrópodo podrá ser un acaro. El insecto podrá ser una polilla. Las bacterias podrán

ser elegidas de una *E. amylovora,* una *E. coli* o combinaciones de las mismas.

De acuerdo con otra forma de realización, se establece un método para regular el crecimiento de una planta, el método comprende poner en contacto un suelo, una semilla, una planta, o combinaciones de los mismos, con una cantidad de una composición reguladora del crecimiento de una composición de acuerdo con la presente invención.

De acuerdo con otra forma de realización, se establece un método para regular el crecimiento de una planta, el método comprende poner en contacto un suelo, una semilla, una planta, o combinaciones de los mismos, con una cantidad reguladora de crecimiento de una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

El compuesto antimicrobiano podrá ser de origen sintético.

El surfactante podrá ser seleccionado del grupo que consta de un surfactante aniónico, un surfactante catiónico un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

La mezcla podrá contener desde más o menos 0.12% a más o menos 1.15% p/p del al menos un compuesto antimicrobiano.

La mezcla podrá estar compuesta desde más o menos 0.12% p/p, o más o menos 0.23% p/p, o más o menos 0.46% p/p, o más o menos 1.15% p/p del al menos un compuesto antimicrobiano.

La formulación podrá contener desde más o menos 0.1% a más o menos 15% (p/p) del surfactante.

La formulación podrá contener desde más o menos 0.1% a más o menos 40% (p/p) del disolvente.

La regulación del crecimiento podrá comprender un incremento en el número de fruta, vegetal, bulbo, o tubérculo de la planta.

La regulación del crecimiento podrá constar de un incremento del tamaño de la fruta, vegetal, bulbo, o tubérculo de la planta.

La regulación del crecimiento podrá constar de un incremento en el número de plantas sanas.

La planta podrá ser elegida a partir de una planta de plátanos, un manzano, un árbol de peras, una planta de papa, una planta de arroz, una planta de café, un árbol de fruto cítrico, una cebolla, ginseng, soja, una maleza, o una planta de tomate.

De acuerdo con otra forma de realización, se establece un método para regular el crecimiento de una semilla, el método consta de poner en contacto una semilla o un suelo que contiene la semilla en el mismo, con una cantidad reguladora de crecimiento de una mezcla conforme a la presente invención.

De acuerdo con otra forma de realización, se establece un método para regular el crecimiento de una semilla, el método consta de poner en contacto una semilla o un suelo que contiene la semilla en el mismo, con una cantidad reguladora de crecimiento de una composición pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

El compuesto antimicrobiano podrá ser de origen sintético.

El surfactante podrá ser seleccionado del grupo que consta de un surfactante aniónico, un surfactante catiónico un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

La mezcla podrá contener desde más o menos 0.12% a más o menos 1.15% p/p del al menos un compuesto antimicrobiano.

La mezcla podrá estar compuesta desde más o menos 0.12% p/p, o más o menos 0.23% p/p, o más o menos 0.46% p/p, o más o menos 1.15% p/p del al menos un compuesto antimicrobiano.

La formulación podrá contener desde más o menos 0.1% a más o menos 15% (p/p) del surfactante.

La formulación podrá contener desde más o menos 0.1% a más o menos 40% (p/p) del disolvente.

La semilla podrá ser un tubérculo.

El tubérculo podrá ser una papa (kumara), un camote, un boniato, una yuca, y una dalia.

La regulación del crecimiento podrá comprender un incremento en la longitud de un brote de tubérculo.

A continuación, se definen los siguientes términos.

Antes de describir la presente invención en detalle, se definirán varios términos. Tal como se usa en el presente, las formas del singular "un", "unos", y "el/la/lo" incluyen los referentes en plural, salvo que el contexto lo indique claramente en contrario.

El uso de la palabra "un" o "uno" cuando se usa junto con el término "comprender" en las reivindicaciones y/o la especificación podrá significar "uno", aunque también es consistente con el significado de "uno o más", "al menos uno", y

"uno o más de uno". De manera similar la palabra "otro" podrá significar al menos un segundo o más.

Como se usa en esta especificación y las reivindicaciones, las palabras "comprende" (y cualquier forma de comprender, tal como, "comprenden" y "comprende"), "tiene" (y cualquier forma de tener, por ejemplo, "tienen" y "tiene"), "incluyendo" (y cualquier forma de incluir, tal como, "incluyen" y "incluye") o "contiene" (y cualquier forma de contener, tal como, "contienen" y "contiene"), son incluyentes o abiertos y no excluyen elementos o etapas de proceso adicionales, no indicados.

El término "más o menos" se utiliza para indicar que un valor incluye una variación inherente de error para el dispositivo o el método que se está empleando para determinar el valor.

El porcentaje de peso, porcentaje por peso, % por peso, p %, y similares son sinónimos que hacen referencia a la concentración de una sustancia según el peso de esa sustancia dividido entre el peso de la composición y multiplicado por 100.

Se indica que los términos como "preferiblemente", "comúnmente", y "típicamente" no se utilizan en el presente para limitar el alcance de la invención revindicada o para insinuar que ciertas características son críticas, esenciales, o incluso importantes para la estructura o la función de la invención reivindicada. Más bien, estos términos simplemente sirven para resaltar características alternativas o adicionales que pueden o no ser utilizadas en una forma de realización concreta de la presente invención.

Con la finalidad de describir y definir la presente invención se indica que el término "sustancialmente" se utiliza en la presente para declarar el grado inherente de incertidumbre que puede ser atribuido a cualquier comparación, valor, medición, u otra representación cuantitativa. El término "sustancialmente" también se utiliza en el presente para expresar el grado en el que una representación cuantitativa puede variar a partir de una referencia declarada sin dar como resultado un cambio en la función básica del asunto materia en cuestión.

El término «composición» se utiliza en el presente para abarcar un producto que comprende los ingredientes especificados en las cantidades especificadas, así como, también cualquier producto que resulta, de manera directa o indirecta, de la combinación de los ingredientes especificados en las cantidades especificadas. Este término con relación a la composición farmacéutica u otras composiciones en general, se usa para abarcar un producto que comprende a los principios activos y los ingredientes inertes que constituyen el portador, así como, cualquier producto que resulta de manera directa o indirecta, de la combinación, o complejación o agregación de cualquiera de dos o más de los ingredientes, o de la disociación de uno o más de los ingredientes, o de otros tipos de reacciones o interacciones de uno o más de los ingredientes. En consecuencia, las composiciones farmacéuticas u otras composiciones en general de la presente invención abarcan la composición hecha mezclando un compuesto de la presente invención y un portador farmacéuticamente aceptable. Por "farmacéuticamente aceptable" o "aceptable" se quiere dar a entender el portador, diluyente o excipiente que debe ser compatible con los otros ingredientes de la formulación y no perjudiciales para el destinatario de los mismos.

Los términos "regulación del crecimiento de las plantas" y "cantidad de regulación de crecimiento" significan que el método y la composición de la presente invención regulan por lo menos un aspecto del crecimiento de una planta. La regulación de crecimiento no necesita ser acerca de todos los aspectos del crecimiento de la planta. Por ejemplo, la composición de la presente invención podrá regular el crecimiento de cualquiera de uno del follaje, las hojas, las flores, los tallos, las ramas, los frutos, los vegetales, el bulbo, los tubérculos, o cualquier otra parte de la planta, independientemente de las otras partes de la planta. Como se usa en le presente el término "cantidad reguladora de crecimiento" quiere decir una cantidad de la composición de la presente invención que causa al menos uno de los aspectos del crecimiento de una planta que va a ser regulado como se define anteriormente. La regulación del crecimiento de la planta también podrá incluir un incremento general en el crecimiento de la planta. La regulación del crecimiento de planta también podrá mostrarse como un incremento en el número de plantas sanas en un cultivo de plantas que comprende de varios especímenes individuales.

La regulación del crecimiento de planta también podrá incluir la estimulación de la maduración de la fruta. La regulación del crecimiento de planta también podrá incluir la inhibición del crecimiento de planta y el crecimiento del brote. La regulación del crecimiento de planta también podrá incluir un incremento en la floración. La regulación del crecimiento de planta también podrá incluir la regulación del envejecimiento de la fruta. La cantidad reguladora de crecimiento podrá abarcar un margen de concentración sobre la cual podrá observarse el efecto, y cada efecto regulador de crecimiento podrá ser

observado en el detrimento de crecimiento de otras partes de la planta. De preferencia, el efecto regulador del crecimiento podrá obtenerse sin efectos fitotóxicos para el resto de las plantas, aunque en algunas formas de realización esto no podrá ser posible.

El término "cantidad de pesticida" significa una cantidad de la composición de la presente invención que será suficiente para controlar una plaga determinada. Esta cantidad podrá variar de acuerdo con la plaga objetivo lo que supone que una concentración inferior podría ser suficiente para controlar una plaga y que podría requerirse una mayor concentración para controlar otra plaga.

Los términos "fruta" y "vegetal" significan el uso común en el lenguaje de "fruta" y "vegetal" que normalmente significa las estructuras carnosas asociadas con la semilla de una planta que son dulces o amargas, y comestibles en estado crudo, por ejemplo, las manzanas, los plátanos, las uvas, los limones, las naranjas, y las fresas. También incluye el uso botánico de "fruta" y "vegetal" como, por ejemplo, ejotes, granos de maíz, tomates, y granos de trigo.

El término "tubérculo" las estructuras alargadas de algunas especies de plantas utilizadas como órganos de almacenamiento para nutrientes. Estos se usan para la perennación de las plantas (supervivencia en el invierno o los meses secos), para dar energía y nutrientes para el rebrote durante la siguiente estación de cultivo, como un medio de reproducción asexual. Los tallos tuberosos se formas de rizomas gruesos (tallos subterráneos) o estolones (conexiones horizontales entre los organismos). Las especies comunes de plantas con tallos tuberosos incluyen a la papa y el boniato.

Algunas fuentes también tratan raíces laterales modificadas, (raíces tuberosas) bajo la definición; estos se encuentran en el camote, yuca y dalia.

Las características y beneficios del asunto materia de presente serán más evidentes a la luz de la siguiente descripción detallada de formas de realización seleccionadas, según se ilustra en las figuras acompañantes. Tal como se pondrá de manifiesto, descrito y revindicado tiene posibilidad de modificaciones en varios sentidos, todos sin salirse del alcance de las reivindicaciones. En consecuencia, los dibujos y la descripción deben considerase de naturaleza ilustrativa, y no restrictiva y el alcance del asunto materia se establece en las reivindicaciones.

BREVE DESCRIPCIÓN DE LOS DIBUJOS

Otras características y beneficios de la presente descripción serán evidentes a partir de la siguiente descripción detallada, tomada en combinación con los dibujos anexados en los cuales:

La Fig. 1. ilustra la germinación acumulada de la ambrosia común (AMBAR)y arrocillo (ECHCR) para las diferentes composiciones durante 21 días en cajas de Petri. Las barras verticales representan ± SE.

La Fig. 2. ilustra la mortalidad de la semilla ajustada de la ambrosia común (AMBAR)y el arrocillo (ECHCR) para las diferentes composiciones, después de 21 días en cajas de Petri. Las columnas con la misma letra no son considerablemente diferentes de acuerdo con LSD protegido de Fisher en $\alpha=0.05$. Las barras verticales representan ± SE.

La Fig. 3. ilustra síntomas visuales del agua, de fitotoxicidad 10 y 11 observadas composiciones en ambrosia común (AMBAR)y el arrocillo (ECHCR).

La Fig. 4. Ilustra los índices promedio (± SE) de la mortalidad del huevo de la polilla del manzano observada 7 días después rociada. Los tratamientos con diferentes letras son diferentes considerablemente (ANOVA, prueba HSD Tukey-Kramer, α=0.05).

La Fig. 5. Ilustra los huevos de polilla del manzano siete días después de la rociada con agua (control)(a), composición 8 (b) y composición 10 (c).

La Fig. 6. Ilustra los índices promedio (± SE) de la mortalidad de los ácaros araña de dos manchas, 24 horas después de la rociada. Los tratamientos con diferentes letras son considerablemente diferentes (ANOVA, prueba HSD Tukey-Kramer, α=0.05).

La Fig. 7. Ilustra el medio agar King B que contiene estreptomicina inoculada con suspensiones bacterianas para prueba de sensibilidad. Cuadrante 1 (Q1), *E. amylovora* 433; Cuadrante 2 (Q2), *E. amylovora* 435; Cuadrante 3 (Q3), *E. amylovora* 153sm5; Cuadrante 4 (Q4), *E. coli* ATCC25922.

La Fig. 8. Ilustra el medio agar King B que contiene la composición 12 en diferentes diluciones inoculadas con suspensiones bacterianas para prueba de sensibilidad. Cuadrante 1 (Q1), *E. amylovora* 433; Cuadrante 2 (Q2), *E. amylovora* 435; Cuadrante 3 (Q3), *E. amylovora* 153sm5; Cuadrante 4 (Q4), *E. coli* ATCC25922.

La Fig. 9. Ilustra el efecto de la composición de la presente invención en la producción de tubérculos de papa recolectados al final del ensayo este efecto se mide como la media de los tubérculos/plantas (A) totales y el peso promedio de los tubérculos/plantas (B). las barras claras representan el ensayo A donde las composiciones de la presente invención se aplican solas y las barras obscuras representan el ensayo B donde las composiciones de la presente invención se aplican en combinación con aceite y fungicida.

La Fig. 10. Ilustra el % promedio de las plantas verdes después de la aplicación de las composiciones de la presente invención. Las barras claras representan el ensayo A donde las composiciones de la presente invención se aplican solas, las barras obscuras representan el ensayo B donde las composiciones de la presente invención se aplican en combinación con aceite y fungicida.

La Fig. 11. Ilustra el % promedio de las plantas con foliolos secos después de la aplicación de las composiciones de la presente invención. Las barras claras representan el ensayo A donde las composiciones de la presente invención se aplican solas, las barras obscuras representan el ensayo B donde las composiciones de la presente invención se aplican en combinación con aceite y fungicida.

La Fig. 12. ilustra el % promedio de las plantas con síntomas tempranos de roya (foliolos manchados, panel A) y la magnitud de los síntomas (número de manchas/foliolos, panel B) después de la aplicación de las composiciones de la presente invención, en combinación con aceite y fungicida.

DESCRIPCIÓN DETALLADA

En una primera forma de realización se describe una composición para regular el crecimiento de las plantas que comprende:

una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto fenólico antimicrobiano aislado o sintético de origen natural seleccionado del grupo que consta de timol y/o carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante aniónico, uno catiónico, uno anfotérico, uno no iónico, o combinaciones de los mismos, suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente;

d) suficiente agua para preparar 100 por ciento por peso.

y un suplemento que comprende:

por lo menos uno de un pesticida, un fertilizante, un despumador, un regulador del crecimiento de plantas, o combinaciones de los mismos.

Composiciones de la presente invención

Los compuestos fenólicos de origen natural como se usan en la presente invención pueden fabricarse sintéticamente a través de métodos conocidos dentro de la capacidad de un experto en la técnica o pueden ser obtenidos de extractos de aceites vegetales. En una forma de realización de la presente invención, los compuestos fenólicos de origen natural se obtienen de extractos de las plantas. En otra forma de realización de la presente invención, los compuestos fenólicos de origen natural pueden conseguirse comercialmente. En otra forma de realización más de la presente invención, los compuestos fenólicos de origen natural comprenden carvacrol y timol.

En una forma de realización, las composiciones de pesticida de la presente invención comprenden timol, carvacrol o mezclas de los mismos. En otra forma de realización, las composiciones de pesticida de la presente invención comprenden uno o más aceites esenciales naturales enriquecidos en timol, carvacrol o mezclas de timol o carvacrol.

En una forma de realización, las composiciones de pesticidas de la presente invención además comprenden un surfactante. Un surfactante funcional en el presente comprende un compuesto no iónico, aniónico, catiónico, o anfotérico soluble en agua o dispersable en agua. En otra forma de realización, las composiciones de pesticidas de la presente invención comprenden uno o más de los surfactantes aniónicos convencionales conocidos en la técnica. Un listado representativo de los surfactantes y de las propiedades de los mismos se detalla en Remington's Pharmaceutical Sciences, 17 edición (Mack Publishing Company). Ejemplos no limitantes de surfactantes no limitantes de acuerdo con una forma de realización de la presente invención incluyen al lauril sulfato

de sodio, estarato de sorbitan, esteres de sorbitan, lauril éter sulfato de sodio, sarcosil (lauroil sarcosinato de sodio), cocamidopropil betaina (CAPB), lauril éter sulfonato de sodio, alquilbenceno sulfonatos, nonilfenol etoxilato, éter etoxilato, así como también los surfactantes enlistados en la Tabla 9, más adelante. Se entiende que uno o más surfactantes adicionales podrán incluirse en las composiciones de pesticidas de la presente invención. Por lo general, un surfactante (agente tensioactivo) hace referencia a una sustancia que, al disolverse en agua, u otro sistema acuoso, reduce la tensión superficial o interfacial entre la misma y otra sustancia o material. En una forma de realización de la presente invención, el surfactante ayuda a la dispersión o emulsificación de los aceites esenciales dentro del portador acuoso. De acuerdo con una forma de realización, la dispersión no necesariamente es una dispersión homogénea. Es posible que la dispersión requiera ser agitada o sacudida. De acuerdo con otra forma de realización, la dispersión es una dispersión homogénea. En otra forma de realización de la presente invención, el surfactante aniónico ayuda a separar la estructura de biopelículas a través de la desnaturalización. En otra forma de realización más el surfactante actúa como un agente "humectante". Los humectantes típicamente reducen la tensión superficial de las moléculas del agua, permitiendo una mayor extensión de la solución y una penetración más profunda en grietas y fisuras pequeñas de la superficie que va a ser tratada.

En las formas de realización, la composición de la presente invención comprende surfactante desde más o menos 0.1% a más o menos 15% p/p de surfactante, o desde más o menos 0.5% a más o menos 15% p/p, o desde más o menos 1% a más o menos 15% p/p, o desde más o menos 2% a más o menos 15% p/p, o desde más o menos 3% a más o menos 15% p/p, o desde más o menos 4% a más o

menos 15% p/p, o desde más o menos 5% a más o menos 15% p/p, o desde más o menos 7.5% a más o menos 15% p/p, o desde más o menos 10% a más o menos 15% p/p, o desde más o menos 12.5% a más o menos 15% p/p, o desde más o menos 0 1% a más o menos 12.5% p/p de surfactante, o desde más o menos 0.5% a más o menos 12.5% p/p, o desde más o menos 1% a más o menos 12.5% p/p, o desde más o menos 2% a más o menos 12.5% p/p, o desde más o menos 3% a más o menos 12.5% p/p, o desde más o menos 4% a más o menos 12.5% p/p, o desde más o menos 5% a más o menos 12 5% p/p, o desde más o menos 7.5% a más o menos 12.5% p/p, o desde más o menos 10% a más o menos 12 5% p/p, 0.1% a más o menos 10% p/p de surfactante, o desde más o menos 0.5% a más o menos 10% p/p, o desde más o menos 1% a más o menos 10% p/p, o desde más o menos 2% a más o menos 10% p/p, o desde más o menos 3% a más o menos 10% p/p, o desde más o menos 4% a más o menos 10% p/p, o desde más o menos 5% a más o menos 10% p/p, o desde más o menos 7.5% a más o menos 10% p/p, 0.1% a más o menos 7.5% p/p de surfactante, o desde más o menos 0.5% a más o menos 7.5% p/p, o desde más o menos 1% a más o menos 7.5% p/p, o desde más o menos 2% a más o menos 7.5% p/p, o desde más o menos 3% a más o menos 7.5% p/p, o desde más o menos 4% a más o menos 7.5% p/p, o desde más o menos 5% a más o menos 7.5% p/p, 0.1% a más o menos 5% p/p de surfactante, o desde más o menos 0.5% a más o menos 5% p/p, o desde más o menos 1% a más o menos 5% p/p, o desde más o menos 2% a más o menos 5% p/p, o desde más o menos 3% a más o menos 5% p/p, o desde más o menos 4% a más o menos 5% p/p, 0.1% a más o menos 4% p/p de surfactante, o desde más o menos 0.5% a más o menos 4% p/p, o desde más o menos 1 % a más o menos 4% p/p, o desde más o menos 2% a más o menos 4% p/p, o desde más o menos 3% a más o menos 4% p/p, 0.1 % a más o menos 3% p/p de surfactante, o desde más o menos 0.5% a más o menos 3% p/p, o desde más o menos 1% a más o menos 3% p/p, o desde más o menos 2% a más o menos 3% p/p, 0.1% a más o menos 2% p/p de

surfactante, o desde más o menos 0.5% a más o menos 2% p/p, o desde más o menos 1% a más o menos 2% p/p, 0.1% a más o menos 1% p/p de surfactante, o desde más o menos 0.5% a más o menos 1% p/p, 0.1% a más o menos 0.5% p/p de surfactante.

Los compuestos fenólicos (*por ejemplo,* carvacrol, timol) de manera regular no son suficientemente solubles en un medio acuoso. Las composiciones de pesticidas de la presente invención comprenden por ello de manera regular un disolvente. Los disolventes podrán ser de naturaleza hidrofílica, hidrofóbica, o anfifilica. En una forma de realización las composiciones de pesticidas de la presente invención comprenden un disolvente anfifilico. Los disolventes anfifilicos son capaces de solubilizar los compuestos fenólicos de origen natural y/o los aceites esenciales en el portador acuoso. Ejemplos no limitantes de disolventes de acuerdo con una forma de realización de la presente invención incluyen metanol, etanol, hexadecano, propilenglicol, propilenglicol *n*-butil éter, propilenglicol metil éter acetato, propilenglicol metil éter, dipropilenglicol n-propil éter, etilenglicol metil éter y hexilenglicol. La adición de una cantidad importante de disolvente a las soluciones de pesticidas de la presente invención permite que las soluciones al sean usadas en temperaturas ligeramente inferiores a 0°C. El experto en la técnica tiene la capacidad para determinar esas cantidades de disolvente. En las formas de realización, la composición de la presente invención comprende desde más o menos 0.1% a más o menos 40% p/p de disolvente, o desde más o menos 0.5% a más o menos 40% p/p, o desde más o menos 1% a más o menos 40% p/p, o desde más o menos 5% a más o menos 40% p/p, o desde más o menos 10% a más o menos 40% p/p, o desde más o menos 15% a más o menos 40% p/p, o desde más o menos 20% a más o menos 40% p/p, o desde más o menos 25% a más o menos 40% p/p, o desde más o menos 30% a

más o menos 40% p/p, o desde más o menos 35% a más o menos 40% p/p, o desde más o menos 0.1% a más o menos 35% p/p de disolvente, o desde más o menos 0.5% a más o menos 35% p/p, o desde más o menos 1% a más o menos 35% p/p, o desde más o menos 5% a más o menos 35% p/p, o desde más o menos 10% a más o menos 35% p/p, o desde más o menos 15% a más o menos 35% p/p, o desde más o menos 20% a más o menos 35% p/p, o desde más o menos 25% a más o menos 35% p/p, o desde más o menos 30% a más o menos 35% p/p, o desde más o menos 0.1% a más o menos 30% p/p de disolvente, o desde más o menos 0.5% a más o menos 30% p/p, o desde más o menos 1% a más o menos 30% p/p, o desde más o menos 5% a más o menos 30% p/p, o desde más o menos 10% a más o menos 30% p/p, o desde más o menos 15% a más o menos 30% p/p, o desde más o menos 20% a más o menos 30% p/p, o desde más o menos 25% a más o menos 30% p/p, o desde más o menos 0.1 % a más o menos 25% p/p de disolvente, o desde más o menos 0.5% a más o menos 25% p/p, o desde más o menos 1% a más o menos 25% p/p, o desde más o menos 5% a más o menos 25% p/p, o desde más o menos 10% a más o menos 25% p/p, o desde más o menos 15% a más o menos 25% p/p, o desde más o menos 20% a más o menos 25% p/p, o desde más o menos 0.1% a más o menos 20% p/p de disolvente, o desde más o menos 0.5% a más o menos 20% p/p, o desde más o menos 1% a más o menos 20% p/p, o desde más o menos 5% a más o menos 20% p/p, o desde más o menos 10% a más o menos 20% p/p, o desde más o menos 15% a más o menos 20% p/p, o desde más o menos 0.1% a más o menos 15% p/p de disolvente, o desde más o menos 0.5% a más o menos 15% p/p, o desde más o menos 1% a más o menos 15% p/p, o desde más o menos 5% a más o menos 15% p/p, o desde más o menos 10% a más o menos 15% p/p, o desde más o menos 0.1% a más o menos 10% p/p de disolvente, o desde más o menos 0.5% a más o menos 10% p/p, o desde más o menos 1% a más o menos 10% p/p, o desde más o menos 5% a más o menos 10% p/p, o desde más o menos 0.1% a más o menos 5% p/p de disolvente, o desde más o menos 0.5% a más o menos 5%

p/p, o desde más o menos 1 % a más o menos 5% p/p, o desde más o menos 0.1 % a más o menos 1 % p/p de disolvente, o desde más o menos 0.5% a más o menos 1 % p/p, o desde más o menos 0.1 % a más o menos 0.5% p/p de disolvente.

Debido a que las composiciones de desinfectantes de manera regular se preparan en el sitio a partir de mezclas de ingredientes en solución concentrada, se utiliza agua corriente para la dilución. Por lo general, el agua corriente tiene cierta cantidad de dureza. Como la presencia de minerales disueltos (por ejemplo, Ca^{++}, Mg^{++}) pueden afectar de manera adversa el rendimiento y las propiedades de la composición del desinfectante, en la composición se incluye un agente secuestrante para quelar los minerales disueltos en la forma de un complejo soluble en agua. Los secuestrantes son muy conocidos en la técnica. Ejemplos no limitantes incluyen sal sódica del ácido etilendiaminotetraacético (EDTA), gluconato de sodio, citrato de sodio, etilenodiamina disuccionato trisodico, ácido cítrico, NTA trisodico, fosfato sódico y coleato sódico. Los secuestrantes, de manera típica, previenen que los minerales disueltos se fijen a las moléculas del surfactante. Es más, los secuestrantes podrán remover los minerales de la superficie que va a ser desinfectada.

En una forma de realización, las composiciones de pesticidas de la presente invención comprenden uno o más compuestos fenólicos de origen natural. En una forma de realización de la presente invención, los compuestos fenólicos son seleccionados a partir del grupo que consta de timol y carvacrol. En otra forma de realización las composiciones de pesticidas de la presente invención comprenden carvacrol. En otra forma de realización las composiciones de pesticidas de la presente invención comprenden timol. En otra forma de

realización las composiciones de pesticidas de la presente invención comprenden carvacrol y timol.

En las formas de realización, la composición de la presente invención comprende desde más o menos 0.01% a más o menos 25% p/p, o desde más o menos 0.02% a más o menos 25%, o desde más o menos 0.03% a más o menos 25%, o desde más o menos 0.04% a más o menos 25%, o desde más o menos 0.05% a más o menos 25%, o desde más o menos 0.06% a más o menos 25%, o desde más o menos 0.07% a más o menos 25%, o desde más o menos 0.08% a más o menos 25%, o desde más o menos 0.09% a más o menos 25%, o desde más o menos 0.10% a más o menos 25%, o desde más o menos 0.11% a más o menos 25%, o desde más o menos 0.12% a más o menos 25%, o desde más o menos 0.13% a más o menos 25%, o desde más o menos 0.14% a más o menos 25%, o desde más o menos 0.15% a más o menos 25%, o desde más o menos 0.16% a más o menos 25%, o desde más o menos 0.17% a más o menos 25%, o desde más o menos 0.18% a más o menos 25%, o desde más o menos 0.19% a más o menos 25%, o desde más o menos 0.20% a más o menos 25%, o desde más o menos 0.21% a más o menos 25%, o desde más o menos 0.22% a más o menos 25%, o desde más o menos 0.23% a más o menos 25%, o desde más o menos 0.24% a más o menos 25%, o desde más o menos 0.25% a más o menos 25%, o desde más o menos 0.26% a más o menos 25%, o desde más o menos 0.27% a más o menos 25%, o desde más o menos 0.28% a más o menos 25%, o desde más o menos 0.29% a más o menos 25%, o desde más o menos 0.30% a más o menos 25%, o desde más o menos 0.31% a más o menos 25%, o desde más o menos 0.32% a más o menos 25%, o desde más o menos 0.33% a más o menos 25%, o desde más o menos 0.34% a más o menos 25%, o desde más o menos 0.35% a más o menos 25%, o desde más o menos 0.36% a más o menos 25%, o desde más o menos 0.37% a más o menos 25%, o desde más o menos 0.38% a más o menos 25%, o desde más o menos 0.39% a más o menos 25%, o desde más o menos 0.40% a más o menos 25%, o desde más o menos 0.41% a

más o menos 25%, o desde más o menos 0.42% a más o menos 25%, o desde más o menos 0.43% a más o menos 25%, o desde más o menos 0.44% a más o menos 25%, o desde más o menos 0.45% a más o menos 25%, o desde más o menos 0.46% a más o menos 25%, o desde más o menos 0.50% a más o menos 25%, o desde más o menos 0.55% a más o menos 25%, o desde más o menos 0.60% a más o menos 25%, o desde más o menos 0.65% a más o menos 25%, o desde más o menos 0.70% a más o menos 25%, o desde más o menos 0.75% a más o menos 25%, o desde más o menos 0.80% a más o menos 25%, o desde más o menos 0.85% a más o menos 25%, o desde más o menos 0.90% a más o menos 25%, o desde más o menos 0.95% a más o menos 25%, o desde más o menos 1.0% a más o menos 25%, o desde más o menos 1.05% a más o menos 25%, o desde más o menos 1.10% a más o menos 25%, o desde más o menos 1.15% a más o menos 25%, o desde más o menos 1.20% a más o menos 25%, o desde más o menos 1.25% a más o menos 25%, o desde más o menos 1.50% a más o menos 25%, o desde más o menos 3% a más o menos 25%, o desde más o menos 5% a más o menos 25%, o desde más o menos 10% a más o menos 25%, o desde más o menos 15% a más o menos 25%, o desde más o menos 20% a más o menos 25%, desde más o menos 0.01% a más o menos 20% p/p, o desde más o menos 0.02% a más o menos 20%, o desde más o menos 0.03% a más o menos 20%, o desde más o menos 0.04% a más o menos 20%, o desde más o menos 0.05% a más o menos 20%, o desde más o menos 0.06% a más o menos 20%, o desde más o menos 0.07% a más o menos 20%, o desde más o menos 0.08% a más o menos 20%, o desde más o menos 0.09% a más o menos 20%, o desde más o menos 0.10% a más o menos 20%, o desde más o menos 0.11% a más o menos 20%, o desde más o menos 0.12% a más o menos 20%, o desde más o menos 0.13% a más o menos 20%, o desde más o menos 0.14% a más o menos 20%, o desde más o menos 0.15% a más o menos 20%, o desde más o menos 0.16% a más o menos 20%, o desde más o menos 0.17% a más o menos 20%, o desde más o menos 0.18% a más o menos 20%, o desde más o menos 0.19% a más o menos 20%, o desde más o menos 0.20% a más o

menos 20%, o desde más o menos 0.21% a más o menos 20%, o desde más o menos 0.22% a más o menos 20%, o desde más o menos 0.23% a más o menos 20%, o desde más o menos 0.24% a más o menos 20%, o desde más o menos 0.25% a más o menos 20%, o desde más o menos 0.26% a más o menos 20%, o desde más o menos 0.27% a más o menos 20%, o desde más o menos 0.28% a más o menos 20%, o desde más o menos 0.29% a más o menos 20%, o desde más o menos 0.30% a más o menos 20%, o desde más o menos 0.31% a más o menos 20%, o desde más o menos 0.32% a más o menos 20%, o desde más o menos 0.33% a más o menos 20%, o desde más o menos 0.34% a más o menos 20%, o desde más o menos 0.35% a más o menos 20%, o desde más o menos 0.36% a más o menos 20%, o desde más o menos 0.37% a más o menos 20%, o desde más o menos 0.38% a más o menos 20%, o desde más o menos 0.39% a más o menos 20%, o desde más o menos 0.40% a más o menos 20%, o desde más o menos 0.41% a más o menos 20%, o desde más o menos 0.42% a más o menos 20%, o desde más o menos 0.43% a más o menos 20%, o desde más o menos 0.44% a más o menos 20%, o desde más o menos 0.45% a más o menos 20%, o desde más o menos 0.46% a más o menos 20%, o desde más o menos 0.50% a más o menos 20%, o desde más o menos 0.55% a más o menos 20%, o desde más o menos 0.60% a más o menos 20%, o desde más o menos 0.65% a más o menos 20%, o desde más o menos 0.70% a más o menos 20%, o desde más o menos 0.75% a más o menos 20%, o desde más o menos 0.80% a más o menos 20%, o desde más o menos 0.85% a más o menos 20%, o desde más o menos 0.90% a más o menos 20%, o desde más o menos 0.95% a más o menos 20%, o desde más o menos 1.0% a más o menos 20%, o desde más o menos 1.05% a más o menos 20%, o desde más o menos 1.10% a más o menos 20%, o desde más o menos 1.15% a más o menos 20%, o desde más o menos 1.20% a más o menos 20%, o desde más o menos 1.25% a más o menos 20%, o desde más o menos 1.50% a más o menos 20%, o desde más o menos 3% a más o menos 20%, o desde más o menos 5% a más o menos 20%, o desde más o menos 10% a más o menos 20%, o desde más o menos 15% a más o menos 20%,

desde más o menos 0.01% a más o menos 15% p/p, o desde más o menos 0.02% a más o menos 15%, o desde más o menos 0.03% a más o menos 15%, o desde más o menos 0.04% a más o menos 15%, o desde más o menos 0.05% a más o menos 15%, o desde más o menos 0.06% a más o menos 15%, o desde más o menos 0.07% a más o menos 15%, o desde más o menos 0.08% a más o menos 15%, o desde más o menos 0.09% a más o menos 15%, o desde más o menos 0.10% a más o menos 15%, o desde más o menos 0.11% a más o menos 15%, o desde más o menos 0.12% a más o menos 15%, o desde más o menos 0.13% a más o menos 15%, o desde más o menos 0.14% a más o menos 15%, o desde más o menos 0.15% a más o menos 15%, o desde más o menos 0.16% a más o menos 15%, o desde más o menos 0.17% a más o menos 15%, o desde más o menos 0.18% a más o menos 15%, o desde más o menos 0.19% a más o menos 15%, o desde más o menos 0.20% a más o menos 15%, o desde más o menos 0.21% a más o menos 15%, o desde más o menos 0.22% a más o menos 15%, o desde más o menos 0.23% a más o menos 15%, o desde más o menos 0.24% a más o menos 15%, o desde más o menos 0.25% a más o menos 15%, o desde más o menos 0.26% a más o menos 15%, o desde más o menos 0.27% a más o menos 15%, o desde más o menos 0.28% a más o menos 15%, o desde más o menos 0.29% a más o menos 15%, o desde más o menos 0.30% a más o menos 15%, o desde más o menos 0.31% a más o menos 15%, o desde más o menos 0.32% a más o menos 15%, o desde más o menos 0.33% a más o menos 15%, o desde más o menos 0.34% a más o menos 15%, o desde más o menos 0.35% a más o menos 15%, o desde más o menos 0.36% a más o menos 15%, o desde más o menos 0.37% a más o menos 15%, o desde más o menos 0.38% a más o menos 15%, o desde más o menos 0.39% a más o menos 15%, o desde más o menos 0.40% a más o menos 15%, o desde más o menos 0.41% a más o menos 15%, o desde más o menos 0.42% a más o menos 15%, o desde más o menos 0.43% a más o menos 15%, o desde más o menos 0.44% a más o menos 15%, o desde más o menos 0.45% a más o menos 15%, o desde más o menos 0.46% a más o menos 15%, o desde más o menos 0.50% a más o menos 15%, o

desde más o menos 0.55% a más o menos 15%, o desde más o menos 0.60% a más o menos 15%, o desde más o menos 0.65% a más o menos 15%, o desde más o menos 0.70% a más o menos 15%, o desde más o menos 0.75% a más o menos 15%, o desde más o menos 0.80% a más o menos 15%, o desde más o menos 0.85% a más o menos 15%, o desde más o menos 0.90% a más o menos 15%, o desde más o menos 0.95% a más o menos 15%, o desde más o menos 1.0% a más o menos 15%, o desde más o menos 1.05% a más o menos 15%, o desde más o menos 1.10% a más o menos 15%, o desde más o menos 1.15% a más o menos 15%, o desde más o menos 1.20% a más o menos 15%, o desde más o menos 1.25% a más o menos 15%, o desde más o menos 1.50% a más o menos 15%, o desde más o menos 3% a más o menos 15%, o desde más o menos 5% a más o menos 15%, o desde más o menos 10% a más o menos 15%, desde más o menos 0.01% a más o menos 10% p/p, o desde más o menos 0.02% a más o menos 10%, o desde más o menos 0.03% a más o menos 10%, o desde más o menos 0.04% a más o menos 10%, o desde más o menos 0.05% a más o menos 10% p/p, o desde más o menos 0.06% a más o menos 10%, o desde más o menos 0.07% a más o menos 10%, o desde más o menos 0.08% a más o menos 10%, o desde más o menos 0.09% a más o menos 10%, o desde más o menos 0.10% a más o menos 10%, o desde más o menos 0.11% a más o menos 10%, o desde más o menos 0.12% a más o menos 10%, o desde más o menos 0.13% a más o menos 10%, o desde más o menos 0.14% a más o menos 10%, o desde más o menos 0.15% a más o menos 10%, o desde más o menos 0.16% a más o menos 10%, o desde más o menos 0.17% a más o menos 10%, o desde más o menos 0.18% a más o menos 10%, o desde más o menos 0.19% a más o menos 10%, o desde más o menos 0.20% a más o menos 10%, o desde más o menos 0.21% a más o menos 10%, o desde más o menos 0.22% a más o menos 10%, o desde más o menos 0.23% a más o menos 10%, o desde más o menos 0.24% a más o menos 10%, o desde más o menos 0.25% a más o menos 10%, o desde más o menos 0.26% a más o menos 10%, o desde más o menos 0.27% a más o menos 10%, o desde más o menos 0.28% a más o menos 10%, o

desde más o menos 0.29% a más o menos 10%, o desde más o menos 0.30% a más o menos 10%, o desde más o menos 0.31% a más o menos 10%, o desde más o menos 0.32% a más o menos 10%, o desde más o menos 0.33% a más o menos 10%, o desde más o menos 0.34% a más o menos 10%, o desde más o menos 0.35% a más o menos 10%, o desde más o menos 0.36% a más o menos 10%, o desde más o menos 0.37% a más o menos 10%, o desde más o menos 0.38% a más o menos 10%, o desde más o menos 0.39% a más o menos 10%, o desde más o menos 0.40% a más o menos 10%, o desde más o menos 0.41% a más o menos 10%, o desde más o menos 0.42% a más o menos 10%, o desde más o menos 0.43% a más o menos 10%, o desde más o menos 0.44% a más o menos 10%, o desde más o menos 0.45% a más o menos 10%, o desde más o menos 0.46% a más o menos 10%, o desde más o menos 0.50% a más o menos 10%, o desde más o menos 0.55% a más o menos 10%, o desde más o menos 0.60% a más o menos 10%, o desde más o menos 0.65% a más o menos 10%, o desde más o menos 0.70% a más o menos 10%, o desde más o menos 0.75% a más o menos 10%, o desde más o menos 0.80% a más o menos 10%, o desde más o menos 0.85% a más o menos 10%, o desde más o menos 0.90% a más o menos 10%, o desde más o menos 0.95% a más o menos 10%, o desde más o menos 1.0% a más o menos 10%, o desde más o menos 1.05% a más o menos 10%, o desde más o menos 1.10% a más o menos 10%, o desde más o menos 1.15% a más o menos 10%, o desde más o menos 1.20% a más o menos 10%, o desde más o menos 1.25% a más o menos 10%, o desde más o menos 1.50% a más o menos 10%, o desde más o menos 3% a más o menos 10%, o desde más o menos 5% a más o menos 10%, desde más o menos 0.01% a más o menos 5% p/p, o desde más o menos 0.02% a más o menos 5%, o desde más o menos 0.03% a más o menos 5%, o desde más o menos 0.04% a más o menos 5%, o desde más o menos 0.05% a más o menos 5%, o desde más o menos 0.06% a más o menos 5%, o desde más o menos 0.07% a más o menos 5%, o desde más o menos 0.08% a más o menos 5%, o desde más o menos 0.09% a más o menos 5%, o desde más o menos 0.10% a más o menos 5%, o desde

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menos 0.26% a más o menos 0.40%, o desde más o menos 0.27% a más o menos 0.40%, o desde más o menos 0.28% a más o menos 0.40%, o desde más o menos 0.29% a más o menos 0.40%, o desde más o menos 0.30% a más o menos 0.40%, o desde más o menos 0.31% a más o menos 0.40%, o desde más o menos 0.32% a más o menos 0.40%, o desde más o menos 0.33% a más o menos 0.40%, o desde más o menos 0.34% a más o menos 0.40%, o desde más o menos 0.35% a más o menos 0.40%, desde más o menos 0.01% a más o menos 0.35% p/p, o desde más o menos 0.02% a más o menos 0.35%, o desde más o menos 0.03% a más o menos 0.35%, o desde más o menos 0.04% a más o menos 0.35%, o desde más o menos 0.05% a más o menos 0.35% p/p, o desde más o menos 0.06% a más o menos 0.35%, o desde más o menos 0.07% a más o menos 0.35%, o desde más o menos 0.08% a más o menos 0.35%, o desde más o menos 0.09% a más o menos 0.35%, o desde más o menos 0.10% a más o menos 0.35%, o desde más o menos 0.11% a más o menos 0.35%, o desde más o menos 0.12% a más o menos 0.35%, o desde más o menos 0.13% a más o menos 0.35%, o desde más o menos 0.14% a más o menos 0.35%, o desde más o menos 0.15% a más o menos 0.35%, o desde más o menos 0.16% a más o menos 0.35%, o desde más o menos 0.17% a más o menos 0.35%, o desde más o menos 0.18% a más o menos 0.35%, o desde más o menos 0.19% a más o menos 0.35%, o desde más o menos 0.20% a más o menos 0.35%, o desde más o menos 0.21% a más o menos 0.35%, o desde más o menos 0.22% a más o menos 0.35%, o desde más o menos 0.23% a más o menos 0.35%, o desde más o menos 0.24% a más o menos 0.35%, o desde más o menos 0.25% a más o menos 0.35%, o desde más o menos 0.26% a más o menos 0.35%, o desde más o menos 0.27% a más o menos 0.35%, o desde más o menos 0.28% a más o menos 0.35%, o desde más o menos 0.29% a más o menos 0.35%, o desde más o menos 0.30% a más o menos 0.35%, desde más o menos 0.01% a más o menos 0.30% p/p, o desde más o menos 0.02% a más o menos 0.30%, o desde más o menos 0.03% a más o menos 0.30%, o desde más o menos 0.04% a más o

menos 0.30%, o desde más o menos 0.05% a más o menos 0.30% p/p, o desde más o menos 0.06% a más o menos 0.30%, o desde más o menos 0.07% a más o menos 0.30%, o desde más o menos 0.08% a más o menos 0.30%, o desde más o menos 0.09% a más o menos 0.30%, o desde más o menos 0.10% a más o menos 0.30%, o desde más o menos 0.11% a más o menos 0.30%, o desde más o menos 0.12% a más o menos 0.30%, o desde más o menos 0.13% a más o menos 0.30%, o desde más o menos 0.14% a más o menos 0.30%, o desde más o menos 0.15% a más o menos 0.30%, o desde más o menos 0.16% a más o menos 0.30%, o desde más o menos 0.17% a más o menos 0.30%, o desde más o menos 0.18% a más o menos 0.30%, o desde más o menos 0.19% a más o menos 0.30%, o desde más o menos 0.20% a más o menos 0.30%, o desde más o menos 0.21% a más o menos 0.30%, o desde más o menos 0.22% a más o menos 0.30%, o desde más o menos 0.23% a más o menos 0.30%, o desde más o menos 0.24% a más o menos 0.30%, o desde más o menos 0.25% a más o menos 0.30%, desde más o menos 0.01% a más o menos 0.25% p/p, o desde más o menos 0.02% a más o menos 0.25%, o desde más o menos 0.03% a más o menos 0.25%, o desde más o menos 0.04% a más o menos 0.25%, o desde más o menos 0.05% a más o menos 0.25% p/p, o desde más o menos 0.06% a más o menos 0.25%, o desde más o menos 0.07% a más o menos 0.25%, o desde más o menos 0.08% a más o menos 0.25%, o desde más o menos 0.09% a más o menos 0.25%, o desde más o menos 0.10% a más o menos 0.25%, o desde más o menos 0.11% a más o menos 0.25%, o desde más o menos 0.12% a más o menos 0.25%, o desde más o menos 0.13% a más o menos 0.25%, o desde más o menos 0.14% a más o menos 0.25%, o desde más o menos 0.15% a más o menos 0.25%, o desde más o menos 0.16% a más o menos 0.25%, o desde más o menos 0.17% a más o menos 0.25%, o desde más o menos 0.18% a más o menos 0.25%, o desde más o menos 0.19% a más o menos 0.25%, o desde más o menos 0.20% a más o menos 0.25%, desde más o menos 0.05% a más o menos 0.25% p/p, o desde más o menos 0.06% a más o menos 0.25%, o desde más o menos

0.07% a más o menos 0.25%, o desde más o menos 0.08% a más o menos 0.25%, o desde más o menos 0.09% a más o menos 0.25%, o desde más o menos 0.10% a más o menos 0.25%, o desde más o menos 0.11% a más o menos 0.25%, o desde más o menos 0.12% a más o menos 0.25%, o desde más o menos 0.13% a más o menos 0.25%, o desde más o menos 0.14% a más o menos 0.25%, o desde más o menos 0.15% a más o menos 0.25%, o desde más o menos 0.16% a más o menos 0.25%, o desde más o menos 0.17% a más o menos 0.25%, o desde más o menos 0.18% a más o menos 0.25%, o desde más o menos 0.19% a más o menos 0.25%, o desde más o menos 0.20% a más o menos 0.25%, desde más o menos 0.01% a más o menos 0.2% p/p, o desde más o menos 0.02% a más o menos 0.2%, o desde más o menos 0.03% a más o menos 0.2%, o desde más o menos 0.04% a más o menos 0.2%, o desde más o menos 0.05% a más o menos 0.2% p/p, o desde más o menos 0.06% a más o menos 0.2%, o desde más o menos 0.07% a más o menos 0.2%, o desde más o menos 0.08% a más o menos 0.2%, o desde más o menos 0.09% a más o menos 0.2%, o desde más o menos 0.10% a más o menos 0.2%, o desde más o menos 0.11% a más o menos 0.2%, o desde más o menos 0.12% a más o menos 0.2%, o desde más o menos 0.13% a más o menos 0.2%, o desde más o menos 0.14% a más o menos 0.2%, o desde más o menos 0.15% a más o menos 0.2%, desde más o menos 0.01% a más o menos 0.15% p/p, o desde más o menos 0.02% a más o menos 0.15%, o desde más o menos 0.03% a más o menos 0.15%, o desde más o menos 0.04% a más o menos 0.15%, o desde más o menos 0.05% a más o menos 0.15% p/p, o desde más o menos 0.06% a más o menos 0.15%, o desde más o menos 0.07% a más o menos 0.15%, o desde más o menos 0.08% a más o menos 0.15%, o desde más o menos 0.09% a más o menos 0.15%, o desde más o menos 0.10% a más o menos 0.15%, desde más o menos 0.01% a más o menos 0.10% p/p, o desde más o menos 0.02% a más o menos 0.10%, o desde más o menos 0.03% a más o menos 0.10%, o desde más o menos 0.04% a más o menos 0.10%, o desde más o menos 0.05% a más o menos 0.10% p/p del compuesto

fenólico. En una forma de realización concreta las composiciones de pesticidas de la presente invención comprenden 0.18% (p/p) de timol o carvacrol. En otra forma de realización, las composiciones de pesticidas de la presente invención comprenden 0.23% (p/p) de timol o carvacrol. En otra forma de realización, las composiciones de pesticidas de la presente invención comprenden 0.12% (p/p) de timol o carvacrol. En otra forma de realización, las composiciones de pesticidas de la presente invención comprenden 0.46% (p/p) de timol o carvacrol. En otra forma de realización, las composiciones de pesticidas de la presente invención comprenden 1.15% (p/p) de timol o carvacrol.

Los compuestos fenólicos tienen de manera típica un olor acre asociado, lo cual impide de manera importante su uso a gran escala. En una forma de realización, las composiciones de pesticidas de la presente invención pueden comprender además de uno o más agentes que tienen la función dual de mejorar aún más las propiedades desinfectantes de las composiciones mientras que imparten un olor más placentero a las mismas. Todavía en una forma de realización adicional de la presente invención, las composiciones de pesticidas de la presente invención pueden comprender además uno o más agentes que proporcionan un olor placentero a las mismas (agente aromático). Algunos ejemplos no limitantes de agentes que proporcionan un olor placentero y/o que mejoran las propiedades desinfectantes constan de carvacrol, cimeno, cineol, eugenol, timol, mentol, citral y limoneno. Otros ejemplos apropiados de tales agentes se encuentran dentro del conocimiento de un técnico experto.

Las composiciones de pesticidas de la presente invención pueden incluir de manera opcional un amplio rango de ingredientes adicionales, que pueden agregarse al presente suplemento, presente en algunas formas de realización de la

presente invención. Algunos ejemplos no limitantes de éstos incluyen a los colorantes, agente de ajuste de pH, y agentes secuestrantes. Esos ingredientes adicionales se encuentran dentro del conocimiento de un técnico experto.

En una forma de realización, las composiciones de pesticidas de la presente invención constan de uno o más aceites esenciales enriquecidos con timol y/o carvacrol. El timol y carvacrol son pesticidas que ocurren de manera natural y que se encuentran degradados en el medio ambiente. Como tal, existe poca o nula acumulación en el medio ambiente o en organismos vivos, incluso después de la aplicación repetida de las composiciones de pesticida de la presente invención.

Algunas composiciones de la presente invención pueden incluir cierto número de combinaciones de ingredientes mencionados a lo largo de esta especificación (por ejemplo, compuestos fenólicos de origen natural, aceites esenciales, tensoactivos, disolventes, agentes secuestrantes, agua, etc.). También se contempla que las concentraciones de los ingredientes pueden variar. En formas de realización no limitantes, por ejemplo, las composiciones pueden incluir en su forma final, por ejemplo, al menos alrededor de más o menos 0.0001%, 0.0002%, 0.0003%, 0.0004%, 0.0005%, 0.0006%, 0.0007%, 0.0008%, 0.0009%, 0.0010%, 0.0011%, 0.0012%, 0.0013%, 0.0014%, 0.0015%, 0.0016%, 0.0017%, 0.0018%, 0.0019%, 0.0020%, 0.0021%, 0.0022%, 0.0023%, 0.0024%, 0.0025%, 0.0026%, 0.0027%, 0.0028%, 0.0029%, 0.0030%, 0.0031%, 0.0032%, 0.0033%, 0.0034%, 0.0035%, 0.0036%, 0.0037%, 0.0038%, 0.0039%, 0.0040%, 0.0041%, 0.0042%, 0.0043%, 0.0044%, 0.0045%, 0.0046%, 0.0047%, 0.0048%, 0.0049%, 0.0050%, 0.0051%, 0.0052%, 0.0053%, 0.0054%, 0.0055%, 0.0056%, 0.0057%, 0.0058%, 0.0059%, 0.0060%, 0.0061%, 0.0062%, 0.0063%, 0.0064%, 0.0065%, 0.0066%, 0.0067%, 0.0068%, 0.0069%, 0.0070%, 0.0071%, 0.0072%,

0.0073%, 0.0074%, 0.0075%, 0.0076%, 0.0077%, 0.0078%, 0.0079%, 0.0080%, 0.0081%, 0.0082%, 0.0083%, 0.0084%, 0.0085%, 0.0086%, 0.0087%, 0.0088%, 0.0089%, 0.0090%, 0.0091%, 0.0092%, 0.0093%, 0.0094%, 0.0095%, 0.0096%, 0.0097%, 0.0098%, 0.0099%, 0.0100%, 0.0200%, 0.0250%, 0.0275%, 0.0300%, 0.0325%, 0.0350%, 0.0375%, 0.0400%, 0.0425%, 0.0450%, 0.0475%, 0.0500%, 0.0525%, 0.0550%, 0.0575%, 0.0600%, 0.0625%, 0.0650%, 0.0675%, 0.0700%, 0.0725%, 0.0750%, 0.0775%, 0.0800%, 0.0825%, 0.0850%, 0.0875%, 0.0900%, 0.0925%, 0.0950%, 0.0975%, 0.1000%, 0.1250%, 0.1500%, 0.1750%, 0.2000%, 0.2250%, 0.2500%, 0.2750%, 0.3000%, 0.3250%, 0.3500%, 0.3750%, 0.4000%, 0.4250%, 0.4500%, 0.4750%, 0.5000%, 0.5250%, 0.0550%, 0.5750%, 0.6000%, 0.6250%, 0.6500%, 0.6750%, 0.7000%, 0.7250%, 0.7500%, 0.7750%, 0.8000%, 0.8250%, 0.8500%, 0.8750%, 0.9000%, 0.9250%, 0.9500%, 0.9750%, 1.0%, 1.1%, 1.2%, 1.3%, 1.4%, 1.5%, 1.6%, 1.7%, 1.8%, 1.9%, 2.0%, 2.1%, 2.2%, 2.3%, 2.4%, 2.5%, 2.6%, 2.7%, 2.8%, 2.9%, 3.0%, 3.1%, 3.2%, 3.3%, 3.4%, 3.5%, 3.6%, 3.7%, 3.8%, 3.9%, 4.0%, 4.1%, 4.2%, 4.3%, 4.4%, 4.5%, 4.6%, 4.7%, 4.8%, 4.9%, 5.0%, 5.1%, 5.2%, 5.3%, 5.4%, 5.5%, 5.6%, 5.7%, 5.8%, 5.9%, 6.0%, 6.1%, 6.2%, 6.3%, 6.4%, 6.5%, 6.6%, 6.7%, 6.8%, 6.9%, 7.0%, 7.1%, 7.2%, 7.3%, 7.4%, 7.5%, 7.6%, 7.7%, 7.8%, 7.9%, 8.0%, 8.1%, 8.2%, 8.3%, 8.4%, 8.5%, 8.6%, 8.7%, 8.8%, 8.9%, 9.0%, 9.1%, 9.2%, 9.3%, 9.4%, 9.5%, 9.6%, 9.7%, 9.8%, 9.9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, 20%, 21%, 22%, 23%, 24%, 25%, 26%, 27%, 28%, 29%, 30%, 35%, 40%, 45%, 50%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, o 99% o más, o cualquier rango o integral que pueda derivar de los mismos, de al menos uno de los ingredientes mencionados a lo largo de la especificación y/o reivindicaciones. En aspectos no limitantes, el porcentaje puede calcularse por peso o volumen de la composición total. Una persona de habilidades normales en la técnica entendería que las concentraciones pueden variar dependiendo de la composición y/o en el producto en el que se incorporará la composición.

La composición de pesticidas de la presente invención puede usarse sola o en combinación con una o más sustancias que se usan en entornos agrícolas, como parte de suplementos. Algunos ejemplos de sustancias incluyen, pero no se limitan a pesticidas, como lo son los desinfectantes, fungicidas, bactericidas, virucidas, repelentes de insectos, repelentes de artrópodos, nematicidas, insecticidas, acaricidas, herbicidas y reguladores de crecimiento de plantas. Algunas sustancias también incluyen fertilizantes, como lo es el fertilizante inorgánico, fertilizante de nitrógeno, fertilizante de potasio, fertilizante de fosfato, fertilizante orgánico, composta, abono, fosforita, harina de huesos, alfalfa, troceados de madera, langbeinita, cultivos de cobertura, sulfato de potasio, polvo estéril, cenizas, harina de sangre, harina de pescado emulsión de pescado, algas, quitosano y molasas. Algunas sustancias también incluyen agentes antiespumantes como lo son el aceite mineral, aceite vegetal, cera parafina, cera éster, sílice, alcohol graso, silicón, polietilenglicol, copolímeros de polietilenglicol y alquilpoliacrilatos.

Pesticidas

La mayoría de las medidas de control se toman para contrarrestar el inóculo del patógeno e involucra los principios de exclusión y elusión, erradicación, protección, resistencia y selección al hospedero y terapia. Algunas medidas de control incluyen el control de vectores de patógenos (insectos y nemátodos, por ejemplo) y control químico (pesticidas). Hay disponibilidad de una variedad de químicos que se han diseñado para controlar enfermedades de plantas al inhibir el crecimiento de o al matar a los patógenos que causan la enfermedad. Los químicos usados para controlar bacterias (bactericidas), hongos

(fungicidas) y nemátodos (nematicidas) pueden aplicarse a semillas, hojas, flores, frutos o tierra. Los tratamientos de tierra fértil están diseñados para matar nemátodos, hongos y bacterias que viven en la tierra. Esta erradicación puede lograrse usando fumigantes químicos o en forma de gas. Los nemátodos que se trasmiten por tierra pueden eliminarse al aplicar nematicidas líquidos o granulares. La mayor parte de la tierra se trata bien antes de cultivar; sin embargo, ciertos fungicidas pueden mezclarse con la tierra durante el cultivo. Con frecuencia, las semillas, brotes, bulbos y tubérculos se tratan con químicos para erradicar las bacterias, hongos y nematodos patógenos y para proteger las semillas contra organismos en la tierra - en especial hongos - que causen descomposición y podredumbre. Algunas semillas se tratan con regularidad con fungicidas sistémicos que se absorben y proporcionan protección para las semillas en crecimiento. Se aplican aerosoles protectores y polvos a las hojas y frutos de cultivos y ornamentales incluidos en un amplio rango de químicos orgánicos diseñados para prevenir la infección. Los protectores no se absorben ni se trasladan a través de la planta; así protegen solo aquellas partes de la planta tratada antes de la invasión por el patógeno. Una segunda aplicación es necesaria, por lo general, porque el químico puede quitarse mediante el viento, la lluvia, o irrigación o puede dispersarse por medio de la luz solar. El crecimiento nuevo y sin tratar también es susceptible a la infección. De manera constante se desarrollan nuevos químicos.

Además de las enfermedades de plantas causadas por los organismos enlistados con anterioridad, los animales como roedores y aves son responsables de importantes daños previos a la cosecha. A una escala global, se estimó de manera reciente que casi 280 millones de desnutridos podrían beneficiarse de

manera adicional si se pusiera mayor atención a reducir las pérdidas previas y posteriores a la cosecha provocadas por roedores. Los roedores son peligrosos, ya que pueden amplificar los patógenos del medio ambiente y formar focos de enfermedades (zoonóticas). Con una aplicación apropiada de métodos de control de roedores, es posible reducir los peligros de las enfermedades transmitas por roedores en áreas donde los humanos, alimentos animales y roedores viven cerca unos de otros. Estas medidas de control incluyen repelentes contra animales y aves.

Cualquier organismo que pueda dañar cultivos o reducir la fertilidad de la tierra puede definirse como peste. Esto incluye los hongos, bacterias, virus, insectos, nemátodos, parásitos, gasterópodos, artrópodos, caracoles, babosas, vertebrados (mamíferos y aves), algas, etc. Los químicos usados para matar o repeler pestes se llaman pesticidas. Como lo reporta EPA, a continuación, hay una lista de ejemplos de pesticidas:

Tabla 1. Ejemplos de pesticidas

Pesticidas	**Organismos blanco (plaga)**
Alguicida	Control de algas en lagos, canales, albercas, tanques de agua y otros sitios.
Agentes antiincrustantes	Matan o repelen organismos que se incrustan a superficies submarinas, como lo es la parte inferior de un bote.
Antimicrobianos	Matan organismos (como bacterias y virus).
Atrayentes	Atraen pestes (por ejemplo, para atraer un insecto o roedor a una trampa). (Sin embargo, la comida no se considera un pesticida cuando se usa como atrayente.)

Miticidas (también llamados acaricidas)	Matan ácaros que se alimentan de plantas y animales.
Pesticidas microbianos	Microorganismos que matan, inhiben, o superan a las pestes incluyendo insectos u otros microorganismos.

Defoliantes	Causan que las hojas y otro follaje de una planta se caiga, por lo general facilitan la cosecha.
Desecantes	Promueven el secado de tejidos vivos, como lo son las partes superiores no deseadas de las plantas.
Reguladores del crecimiento de insectos	Interrumpe la descamación, a madurez de la etapa de pupa a adulta u otros procesos de vida de insectos.
Reguladores del crecimiento de plantas	Sustancias (excluyendo fertilizantes u otros nutrientes) de planta que alteran el crecimiento, la floración, o velocidad de reproducción comunes de las plantas.

Los pesticidas incluyen una gran variedad de sustancias cuyo objetivo es, por lo general, una peste específica. Los grupos químicos más grandes representados por los pesticidas se resumen en la Tabla 2:

Tabla 2. Grupos químicos más importantes de pesticidas

GRUPO QUIMICO	TIPO DE PESTICIDA
Acetamida	herbicida
Acilalanina + Carboxamida +	fungicida/insecticida
Ditiocarbamato+ Neonicotinoide	fungicida/insecticida
Acilalanine + Triazol	fungicida
Acilalaninas	fungicida
Acilalaninas + Cloronitrilos	fungicida
Amida	herbicida
Amida/Anilina	insecticida
Anilida	fungicida
Anilino Pyrimidina	Fungicida
Antibiótico	fungicida
Ariloxfenoxi propionato	herbicida
Ariloxfenoxi ácidos	herbicida
Avermectin, Alcohol	miticida
Bensamida	herbicida
Bensamida + Ditiocarbamato	fungicida
Bensenamina	rodenticida
Bensimidazol	fungicida
Bensimidazol + Oganofosfato + Acido Ftálico	insecticida/fungicida
Acido Benzoico	herbicida
Benzotiadiazol	herbicida
	herbicida

Carboxiamida	fungicida
Carboxiamida + Ditiocarbamato + Neonicotinoide	fungicida / insecticida
Acido Carboxilico	herbicida
Hidrocarburo Clorinatado	regulador de crecimiento de plantas
Cloroacetamida	herbicida
Cloro-nicotinilo	insecticida
Cloronitrilo	fungicida
Clorofenol	fungicida
Clorofenilo	fungicida
Comarin	rodenticida
Cianoacetamida-	fungicida
Ciclohexanodiona	Herbicida / regulador de crecimiento de plantas
Ciclohexanotriona	regulador de crecimiento
Dicarboximida	fungicida
Dinitroanilina	herbicida
Difenileter	herbicida
Ditiocarbamato	fumigante, nematicida, fungicida, rodenticida, insecticida

Acidos Grasos	insecticida, herbicida
Glicina	herbicida
Guanidina	fungicida
Hidrocarburos Halogenados	fumigante
Hidroxianilida	fungicida
Hidroxicomarin	rodenticida
Imidazolinona	herbicida
Indanediona	rodenticida y repelente de venados
Inorgànico	fungicida, alguicida, insecticida, rodenticida
Microbiano	bactericida, insecticida
Morfolina	fungicida
Neonicotinoide + Triazol + Acilalanina + Fenilpirrol	insecticida / fungicida
Nicotina	insecticida
Nitrilo	herbicida
Nitro Derivado	fungicida
Nitroguanidina	insecticida
Acido Orgànico	herbicida, regulador de crecimiento de plantas
Oganoclorado	insecticida, miticida
Organometàlico	fungicida, miticida
Oganofosfato	insecticida / miticida / nematicida
Oganofosfato + Acido Ftàlico	insecticida / fungicida
Oxadiazol	herbicida
Fenoxi	herbicida
Fenil-Carbamato + Fenil-Carbamato	herbicida

Tiocarbamato	herbicida
Triazapentadieno	insecticida
Triazina	fungicida
Triazol	fungicida
Uracil	herbicida
Urea	herbicida
Dicloropropeno	fumigante
Dicloropropeno + Cloropicrina	fumigante
Metam sodio	fumigante, nematicida
Oxina benzoato	fungicida
Formaldehido	fungicida, fumigante
Solvente Stoddard	herbicida

	crecimiento de plantas
Paclobutrazol	**regulador de**
	crecimiento de plantas
Solidos de huevo entero putrefactos	**repelentes**
Estricnina	**rodenticida**
Fosfuro de zinc	**rodenticida**

Muy bien se encuentra dentro de las capacidades de una persona experta en la técnica determinar cuánto de cualquier pesticida proporcionado puede agregarse a los compuestos de la presente invención para poder obtener el efecto de pesticida deseado.

Fertilizantes y usos combinados de pesticidas y fertilizantes

Se define a los fertilizantes como cualquier material de origen natural o sintético que se agrega a la tierra para proporcionar uno o más nutrientes de plantas esenciales para el crecimiento de las plantas. Los fertilizantes vienen en varias formas. La forma más típica es el fertilizante solido en forma granulada o en polvo. La siguiente forma más común es el fertilizante líquido. Los fertilizantes que se proporcionan de manera típica, en varias proporciones son: seis macronutrientes: nitrógeno (N), fosforo (P), potasio (K), calcio (Ca), magnesio (Mg), y azufre (S); ocho micronutrientes: boro (B), cloro (Cl), cobre (Cu), hierro (Fe), manganeso (Mn), molibdeno (Mo), zinc (Zn), y níquel (Ni). Los fertilizantes se dividen de manera amplia en fertilizantes orgánicos (compuesto de plantas orgánicas o restos animales), o inorgánicos o fertilizantes comerciales. Los fertilizantes inorgánicos incluyen: nitrato de amonio, sulfato de amonio, tiosulfato de amonio, nitrato de calcio amonio, nitrato de calcio, sulfato de diamonio, fosfato de monocalcio, cloruro de potasio, nitrato de potasio, sulfato de potasio y termopotasa. Los fertilizantes orgánicos incluyen: Azomite, bioefector, biofertilizante, composta, harina de semilla de algodón, distribución de efluente, harina de plumas, emulsión de pescado, hidrolizato de pescado, harina de pescado, abono, maxicrop, orujo de oliva, riverm, harina de roca, fertilizante de algas y una fosa de composta.

De acuerdo con una forma de realización, en la agricultura se usan los pesticidas para limitar los daños causados por pestes y estimular el crecimiento y puede usarse en combinación con fertilizantes.

Se encuentra dentro de las capacidades de la persona experta en la técnica determinar cuánto de cualquier fertilizante dado puede agregarse a las composiciones de la

presente invención para poder obtener el efecto de fertilizante deseado.

Uso y aplicación de la composición presente invención

En una segunda forma de realización, se divulga un método de control de pestes, que comprende el hacer que la tierra, una semilla, una planta o la combinación de estos entren en contacto con la cantidad de pesticida de la composición de la presente invención. De acuerdo con otra forma de realización, también se divulga un método que consta de que la tierra, una semilla, una planta, una combinación de los mismos entren en contacto con una cantidad de pesticida de una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

Las composiciones de la presente invención pueden usarse para desinfectar la tierra (fungicida, bactericida, virucida), así como también vegetales, plantas y la desinfección de la materia vegetal, que incluye como ejemplos no limitantes a las semillas, granos, plantas, árboles, arbustos, raíces, follaje, maleza, frutos, flores, cultivos, injertos y similares. Las composiciones de las presentes invenciones pueden también usarse como reguladores de crecimiento de plantas, repelentes insecticidas, repelentes de artrópodos, pesticidas, insecticidas, nematicidas, acaricidas, ovicidas, larbicidas y adulticidas.

Los cultivos con los que la composición de la presente invención puede utilizarse incluyen, por ejemplo, pero no se limitan a plátanos, manzanas, peras, papas, arroz, café, cítricos, cebollas, ginseng, soja, maleza, tomate.

De acuerdo con otra forma de realización, las composiciones de la presente invención pueden usarse para la fertilización de tierra que mejora el crecimiento y salud del cultivo.

Por lo tanto, de acuerdo con otra forma de realización, se divulga un método para regular el crecimiento de una planta, el método consta de que la tierra, una semilla, una planta o la combinación de las mismas entre en contacto con una cantidad de regulador de crecimiento de una composición de acuerdo con la presente invención. De acuerdo con todavía otra forma de realización, se divulga un método para regular el crecimiento de una planta, el método consta de que la tierra, una semilla, una planta, o la combinación de las mismas entren en contacto con una cantidad de regulador de crecimiento de una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

Los cultivos con el que se puede usar la composición de la presente invención incluyen, por ejemplo, pero no se limitan a plátanos, manzanas, peras, papas, arroz, café, cítricos, cebollas, ginseng, soja, maleza, tomate.

De acuerdo con una forma de realización, regular el crecimiento consta de un aumento en la cantidad de frutos, vegetales, bulbos o tubérculos de la planta. De acuerdo con otra forma de realización, regular el crecimiento consta de un aumento en el tamaño del frutos, vegetales, bulbos o tubérculos de la planta. De acuerdo con otra forma de realización, regular el crecimiento consta de un aumento en la cantidad de plantas sanas. En otra forma de realización, regular el crecimiento puede ser de particular importancia para plantas cuyo follaje es de particular interés como lo son la lechuga y otras variantes de plantas cuyas hojas son comestibles. De acuerdo con otra forma de realización, regular el crecimiento consta de un estímulo de la maduración de las frutas. De acuerdo con otra forma de realización, regular el crecimiento consta de la

inhibición de crecimiento de plantas y brotes. De acuerdo con otra forma de realización regular el crecimiento consta es un aumento de floración. De acuerdo con otra forma de realización, regular el crecimiento consta de la regulación del envejecimiento de hojas y frutos.

De acuerdo con otra forma de realización la composición de la presente invención puede usarse para mejorar la producción de semillas. Así, de acuerdo con otra forma de realización, también se divulga un método para regular el crecimiento de una semilla, el método consta de que una semilla o un pedazo de tierra que contiene la semilla entre en contacto con una cantidad de regulador de crecimiento de una composición de acuerdo con la presente invención. De acuerdo con todavía otra forma de realización, se divulga un método para regular el crecimiento de una semilla, el método consta de que una semilla o la tierra que contiene a la semilla entre en contacto con una cantidad de regulador de crecimiento de una composición pesticida que consiste en:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión del compuesto fenólico en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

Los cultivos con el que se puede usar la composición de la presente invención incluyen, por ejemplo, pero no se limitan a plátano, manzana, pera, papa, arroz, café, cítricos, cebolla, ginseng, soja, maleza, tomate. En particular la semilla puede ser un tubérculo de papa, y el efecto de regulación del crecimiento puede ser un aumento en la longitud de un brote de tubérculo de papa.

Las composiciones de la presente invención pueden aplicarse a una superficie que será desinfectada por medio de una variedad de técnicas. En una forma de realización las composiciones de la presente invención pueden aplicarse usando medios para dispersar de manera aérea la composición de la presente invención, como lo son la aspersión, volatilización, sublimación, aerosol, fumigación, formando neblina. Algunos aparatos apropiados para tal propósito incluyen, pero no se limitan a, difusores, sopladores de niebla, o rociadores. De acuerdo con otra forma de realización, las composiciones de la presente invención pueden usarse para revestir o remojar semillas, granos, raíces, etc. De acuerdo con todavía otra forma de realización, la composición de la presente invención puede rociarse sobre la tierra en forma líquida o sólida. Otros medios de aplicación de composiciones de la presente invención se encuentran dentro de las capacidades de un técnico experto. Las composiciones de la presente invención pueden aplicarse ya sea de manera directa o pueden diluirse antes de la aplicación. La dilución puede ser de entre 1:1 a alrededor de 1:10000 (líquido: composición), en un líquido apropiado como lo es el agua. Debido a la naturaleza no corrosiva de manera sustancial de las composiciones de la presente invención, las composiciones pueden aplicarse de inmediato sin daño excesivo a la estructura física existente (es decir la superficie).

De acuerdo con las formas de realización, las composiciones de la presente invención puedan ser útiles en otros campos de aplicación, como por ejemplo, desodorantes o aromatizantes de aire, como conservador en productos cosméticos, como desinfectante de mascotas, en la producción de superficies recubiertas con biocidas, en la producción de alimentos, para la desinfección de plantas de producción y de contenedores de alimentos, el control del crecimiento microbiano en alimentos y bebidas, y la descontaminación de carcasas y como un conservador de alimentos; como un conservador de pienso de animales en granjas, como biocida para el uso en cultivo de peces y moluscos, por ejemplo, la descontaminación de huevos de pescado, estanques y equipo; como una solución de desinfección de aguas sucias; para la desinfección de torres de enfriamiento, como biocida en agentes antiolores y pinturas en materiales de construcción/edificación (incluye, pero no se limita a: madera, albañilería, acero u otros materiales metálicos, etc.), o pinturas y recubrimientos antiolores marinos; en materiales plásticos y combustibles, como repelente de animales y aves, como productos para control de topos, como herbicidas en el manejo de especies invasiva, para jardinería y paisajismo, y remoción de helechos, control de maleza, por ejemplo, en pavimentos, complejos industriales y a lo largo de caminos y carreteras, parques y campos de golf. La presente invención se entenderá con mayor claridad al hacer referencia a los siguientes ejemplos que se proporciona para ilustrar la invención más que para alimentar su campo.

Ejemplo 1

SOLUCIONES DE PESTICIDA

Características físicas y químicas de las soluciones de pesticida

El agente secuestrante (citrato de sodio) se disolvió primero en una cantidad predeterminada de agua y se agitó hasta que diluyó. Después, se agregaron glicol éter PM (disolvente), timol, aceite de organium y cítrico de manera opcional (fragancia) y se agitaron hasta su disolución. Después, se agregó el surfactante (Lauril Sulfato de Sodio) y agua adicional y se agitaron hasta su disolución para proporcionar un 100% del peso de composición. La composición final se agitó hasta que se obtuvo una solución homogénea. La composición 1, obtenida de la composición 2 por medio de la dilución con agua (1:100) se consideró como una composición "lista para usarse".

Tabla 3. Soluciones de pesticida ejemplares

	Cristal de Timol	Aceite	Secuestrante	Surfactante	Disolvente	pH
A	0.18	0.04	0.01	0.12	-	6.9
B	0 18	0.04	0.01	-	0.18	6.7
C	0 18	0.04	-	0 12	0.18	6.5
1	0.18	0.04	0.01	0.12	0.18	6.5
D	18	4	1	12	-	8.1
E	18	4	1	-	18	7.9
2	18	4	1	12	18	8.8
3	0.18	0.03	0.09	0 12	0.76	8.0
4	6	1	3	4	25	8 2
	Solubilidad en agua	Estabilidad	Efecto de	Efecto de Espuma en Agua		
A	NO	NO	SI	SI		
B	NO	NO	NO	SI		
C	SI	SI	SI	NO		
1	SI	SI	SI	SI		
D	NO	NO	SI	n/a		
E	NO	NO	NO	n/a		
2	SI	SI	SI	n/a		
3	SI	SI	SI	SI		
4	SI	SI	SI	n/a		

n/a: no aplica esta fórmula requiere su dilución antes de usarse

Cómo se ilustró con anterioridad, las composiciones se formulan primero como un "concentrado" (composiciones **2** y **4**), su dilución se proporciona para la preparación de las composiciones **1** y **3**. Las composiciones **A**, **B**, **C**, **D**, **E**, **1** y **2** constan de aceite

de organum/cítricos (3:1). Las composiciones **3** y **4** no constan de ninguna fragancia (cítricos). Las composiciones tienen un rango de pH de entre alrededor de 6 a alrededor de 9. La disolución usando agua dura no afectó las características de la composición que es indicativo de la eficacia del agente secuestrante.

La concentración mínima en la que se puede observar una actividad antimicrobiana total (actividad bacteriana) se determinó para los compuestos fenólicos seleccionados de origen natural y aceites esenciales seleccionados utilizando el método AOAC 955.15 ("Método de Coeficiente de Fenól") con modificaciones menores. Los resultados son indicativos de la actividad antimicrobiana excelente tanto del timol como del carvacrol.

Tabla 4. Concentración inhibitoria del agente antimicrobiano

Agente Antimicrobiano	Concentración Mínima
Timol	**0.07**
Carvacrol	**0.07**
Eugenol	**0.4**
Cítrico	**> 1 %**
Aceite de tomillo	**0.3**
Aceite organum	**0.2**
Aceite de eucalipto	**> 1 %**
Aceite de limón	**> 1 %**

Se incorporaron diferentes concentraciones de aceites esenciales y compuestos fenólicos de origen natural en la

composición **F** (véase la Tabla más adelante) y se inóculo con un 0.05% de suspensión bacteriana de *Staphylococcus aureus* (ATCC 6538; concentración de alrededor de ocho logs). Después de un tiempo de contacto de 10 minutos, se transfirió 0.1 ml de la solución inoculada a un cultivo en caldo neutralizante (Difco 268110) y se incubó por un periodo de 72 horas a 37 °C. La presencia de turbidez en el caldo de cultivo es indicativo de la supervivencia del microorganismo.

EJEMPLO 3

CONCENTRACIÓN INHIBITORIA MÍNIMA (MIC) DE LOS COMPUESTOS FENÓLICOS SELECCIONADOS

La concentración inhibitoria mínima (MIC) es la concentración más baja de un antimicrobiano que inhibirá el posible crecimiento de un microorganismo después de la incubación que dura una noche. Las concentraciones inhibitorias mínimas son importantes en laboratorios de diagnóstico para monitorear la actividad de nuevos agentes antimicrobianos. Una MIC se considera, por lo general, la medida de laboratorio más básica de la actividad de un agente antimicrobiano contra un organismo. La MIC de timol y carvacrol se determinó contra diversos organismos (incluyendo hongos geofílicos Trichophyton mentagrophytes y Microsporum gypseum) y se reportaron en la **Tabla 5**. Los valores MIC van de 0.0006% a 0.06% dependiendo del microorganismo que se sometió a la prueba.

Tabla 5. MIC de timol y carvacrol

Campo	Especie	MIC de Timol (v/v %)	MIC de carvacrol (v/v
Bacteria, Gram +	*Staphylococcus aureus ATCC43300* [1]	0.06	0.015
Bacteria, Gram +	*Staphylococcus aureus A TCC6538*[2]	0.014	0.0175
Bacteria, Gram +	*Staphylococcus epidermidls ATCC12228*'	0.06	0.03
Bacteria, Gram -	*Pseudomonas aeruginosa* ATCC2730 [2]	0.0385	0.045
Bacteria, Gram -	*Treponema phagedaenis-like*[3]	0.0006	n.d.
Levadura	*Candida albicans ATCC10231*[4]	0.016	0.016
Levadura	*Candida tropicalis ATCC13803*[4]	0.016	0.016
Hongo	*Epidermophyan floccosum FF9*[4]	0.016	0.008
Hongo	*Trichophyan rubrum FF5*[4]	0.016	0.008
Hongo	*Trichophyan mentagrophytes FF7*[4]	0.016	0.004
Hongo	*Microspoum canis FF1*[4]	0.008	0.004
Hongo	*Microspoum gypseum FF3*[4]	0.016	0.004
Hongo	*Aspergillus niger ATCC16404* [4]	0.016	0.016
Fungus	*Aspergillus fumigatus ATCC46645*[4]	0.016	0.016

[1] A. Nostro et al. FEMS Microbiology Letters 230 (2004) 191-195

[2] R.J.W. Lambert et al. Journal of Applied Microbiology 91 (2001) 453-462

[3] E. Pinto et al. J Med Microbiol 55 (2006) 1367-1373

Ejemplo 4

ENSAYO DE REDUCCIÓN MICROBIANA CUANTITATIVA

Se determinó la actividad antimicrobiana para composiciones seleccionadas de la presente invención. Se realizaron pruebas a diversas composiciones que constan de un compuesto fenólico de origen natural o un aceite esencial (0.18%) para determinar su efectividad al reducir la carga de *Staphylococcus aureus* (ATCC 6538). Se prepararon las soluciones

de un concentrado y se diluyeron con agua (1:100). Los resultados son indicativos de la alta eficiencia de las Composiciones **5, 6** y **7** para reducir la carga de *Staphylococcus aureus*.

Tabla 6. Eficacia antimicrobiana de los agentes antimicrobianos

	Agente antimicrobiano	Secuestrante	Surfactante	Disolvente	Reducción
F		0.01	0.12	0.18	0.60
5	Timol	0.01	0.12	0.18	7.63
6	Carvacrol	0.01	0.12	0.18	7.63
G	Eugenol	0.01	0.12	0.18	2.50
H	Citricos	0.01	0.12	0.18	2.04
I	Aceite de tomillo	0.01	0.12	0.18	3.06
7	Aceite origanum	0.01	0.12	0.18	7.63
J	Aceite de eucalipto	0.01	0.12	0.18	0.71
K	Aceite de limón	0.01	0.12	0.18	0.64

Se inocularon distintas composiciones de la presente invención con 0.05% de un cultivo bacteriano de *Staphylococcus aureus* (ATCC 6538) recién incubado durante un periodo de 48 horas a 37 °C en un medio de crecimiento óptimo. Después de un tiempo de contacto de 10 minutos, se implantó 0.1 ml de la solución inoculada en diferentes disoluciones en agar TSA (Difco 255320) con neutralizante para determinar la carga microbiana residual. Se determinó la reducción Log al calcular el logaritmo de la carga residual obtenida con la composición de referencia (es decir, agua) y al compararla con la carga residual obtenida usando cualquiera de las composiciones que constan ya sea de compuestos fenólico o un aceite esencial.

Ejemplo 5

EFICACIA BIOLÓGICA DE LA COMPOSICIÓN 1 EN MICROORGANISMOS SELECCIONADOS

Las composiciones de pesticida de la presente invención muestran un espectro amplio de actividad en una variedad de microorganismos. Como se muestra en adelante, se determinó la eficacia de la composición 1 contra una variedad de microorganismos.

Tabla 7. Eficacia de la composición 1 en microorganismos seleccionados

Actividad	Método estándar	Grupo de	Microrganismo	1
Bactericida	AO AC[1] (Prueba de disolución)	Bacteria Gram -	*Salmonella*	**Paso**
		Bacteria Gram +	*Staphylococcus*	**Paso**
Fungicida	AOAC Prueba de actividades	Hongo	*Trichophyan*	**Paso**
Virucida	ASTM[2] eficacia de agentes de	Virus	*Influenza A*	**Paso**

[1] *Asociación de Comunidades Analíticas,* [2] *Sociedad Americana para Pruebas y Materiales*

EJEMPLO 6

TOXICIDAD DE LAS COMPOSICIONES DE PESTICIDAS

Se realizaron pruebas de toxicidad (LD_{50}) en ingredientes seleccionados de las composiciones de pesticidas de la presente invención. Se determinó la composición **1** como que tenía un LD_{50} >15 g/Kg (sustancialmente no tóxico).

Tabla 8. Ingredientes de toxicidad

Ingrediente	LD_{50} Oral en rata	Especificación
Timol	980 mg/kg	USP, FCC
Aceite de origanum	1850 mg/kg	USP, FCC
Cítricos	4960 mg/kg	Universidad de Oxford
Citrato de sodio	>8g/kg	USP, FCC
Lauril sulfato de sodio	1288 mg/kg	USP, FCC
Glicol éter PM	5 210 mg/kg	WHMIS

EJEMPLO 7

DEMOSTRACIÓN DE QUE TODOS LOS TIPOS DE SURFACTANTE PUEDEN USARSE EN LA COMPOSICIÓN DE PESTICIDAS DE LA PRESENTE INVENCIÓN

Los surfactantes pueden agruparse por medio de características de carga de sus grupos de cabeza polares. Los cuatro grupos son:

1. **Aniónico:** carga negativa en el grupo de cabeza polar. Estos incluyen surfactantes como los sulfatos, ácidos sulfónicos y ácidos carboxílicos.

2. **Catiónico:** carga positiva en el grupo de cabeza polar. Estos incluyen surfactantes como aminas y compuestos de amonio cuaternario (Quats).

3. **Anfotérico:** puede tener cargas tanto positivas como negativas. Se usa de manera principal como surfactantes secundarios. Estos incluyen las betainas y compuestos de imidazol.

4. No iónicos: sin carga especifica. Por mucho,los surfactantes más usados. Estos incluyen alcoholes, alcanolamidas, esteres y aninoxidos.

5.

La eficacia antimicrobiana de las composiciones de la presente invención se evalúan con todos los tipos de surfactantes. Las distintas composiciones que se probaron difieren sólo por el surfactante. Todas las composiciones se basan en la fórmula general presentado en la Tabla 9. Se presentaron los diferentes surfactantes probados en la Tabla 10. Los surfactantes se probaron en una concentración de 0.12% (p/p) y/o 035% (p/p).

Tabla 9. Fórmula general de las composiciones 1 a 68

Ingrediente	%(p/p)
Timol	0.23
Surfactante	0.12-0.35
Disolvente	0.9
Secuestrante	0.09
Agua	Cant. Suf.

Tabla 10. Surfactantes probados en las composiciones 1 a 68

#	Tipo	Grupo químico	Nombre INCI	# CAS
1	Aniónico	Alfa Sulfo Metil Ester	Sodio Metil 2-Sulfo laurato (y) Disodio 2-	149458-07-1
2	Aniónico	Oxido Difenil Disulfonato	Difenil Eter Dodecil Disulfonato de Sodio	119345-04-9
3	Aniónico	Oxido Difenil Disulfonato	Oxido Decil Difenil Disulfonato de Sodio	36445-71-3
4	Aniónico	Ácido Sulfonico de	Dodecilbenzenesulfonato de Sodio	68081-81-2
5	Aniónico	Ácido Sulfonico de	Ácido Sulfonico de Dodecilbenzeno	68584-22-5
6	Aniónico	éter carboxilato	Ácido Caprileth-9 Carboxílico / Ácido	53563-70-5 and
7	Aniónico	éter carboxilato	Ácido Glicolico Etoxilato Lauril Eter	27306-90-7
8	Aniónico	Isetionato	Cocoil Isetionato de Sodio	61789-32-0
9	Aniónico	Lauril Éter-Sulfatos	Lauril Éter Sulfato de Sodio	9004-82-4
10	Aniónico	Lauril Sulfatos	Lauril Sulfato de Sodio	151-21-3
11	Aniónico	Lauril Sulfatos	Trietanolamina Lauril Sulfato	90583-18-9
12	Aniónico	Lauril Sulfatos	Lauril Sulfato de Magnesio	3097-08-3
13	Aniónico	Fosfato Esteres	Nonoxinol-10 Fosfato	51609-41-7

19	Aniónico	Xileno Sulfonatos	Xileno Sulfonato de Sodio	1300-72-7
20	Catiónico	Oxidos de Amina	Oxidos de Lauramina	1643-20-5
21	Catiónico	Oxidos de Amina	Oxidos de Cocamidopropilamina	68155-09-9
22	Catiónico	Oxidos de Amina	Oxidos de Lauril/Miristil amidopropil	61792-31-2 and
23	Catiónico	Oxidos de Amina	tallow amina + 2 EO	61791-46-6
24	Catiónico	Oxidos de Amina	Oxidos de Miristamina	3332-27-2
25	Catiónico	Compuesto Onium	Soietil mofolinio etosulfato	61791-34-2
26	Catiónico	Compuesto de Amonio Cuaternario	Dioleiloiletil Hidroxietilmonio	94095-35-9
27	Catiónico	Compuesto de Amonio Cuaternario	Cuaternium 18 (Cloruro de Distearil Dimetil Amonio)	61789-80-8
28	Catiónico	Compuesto de Amonio Cuaternario	Cloruro de Alkil Dimetil Benzil Amonio	68424-85-1
29	Catiónico	Compuesto de Amonio Cuaternario	Cuaternium 12 (Cloruro Didecil Dimetil Amonio)	7173-51-5
30	Catiónico	Compuesto de Amonio Cuaternario	Cloruro de Dialkil Dimetil Amonio	68424-95-3
31	Anfotérico	Betaina	Cocamidopropil Betaina	61789-40-0
32	Anfotérico	Betaina	Cetil Betaina	693-33-4 y 683-10-3
33	Anfotérico	Betaina	Lauramidopropil Betaina	4292-10-8
34	Anfotérico	Compuesto Imidazolium	Disodio Cocoamfodipropionato	68604-71-7
35	Anfotérico	Compuesto Imidazolium	Disodio Cocoamfodiacetato	68650-39-5
36	Anfotérico	Compuesto Imidazolium	Sodio Cocoamfoacetate	68608-65-1
37	Anfotérico	Sultaina	Lauril Hidroxisultaina	13197-76-7
38	No iónico	Alcohol Etoxilatos	Etoxilato de Alcohol lineal (C11), POE-7	34398-01-1
39	No iónico	Alcohol Etoxilatos	Etoxilato de Alcohol lineal (C9-11), POE-	68439-46-3
40	No iónico	Alcohol Etoxilatos	Lauril alcohol etoxilato, POE-8	9002-92-0
41	No iónico	Alcohol Etoxilatos	Etoxilatos de Alcohol Secundarios	84133-50-7
42	No iónico	Alcanolamidas	Tridecet-2 Carboxamida MEA	107628-04-6
43	No iónico	Alcanolamidas	Rapesedamida PEG-4	85536-23-8
44	No iónico	Alcanolamidas	Cocamida PEG 5	68425-44-5
45	No iónico	Alcanolamidas	Cocamida DEA	68603-42-9
46	No iónico	Alcanolamidas	Lauramida MEA	142-78-9
47	No iónico	Alcanolamidas	Cocamida MEA	68140-00-1
48	No iónico	Alcanolamidas	Lauramida DEA	120-40-1
49	No iónico	Alcanolamidas	Oleamida DEA	93-83-4
50	No iónico	Alquil poliglicosidos	Capolil/ Miristil Glucosido	68515-73-1 y 110615-
51	No iónico	Alquil poliglicosidos	Lauril/ Miristil Glucosido	110615-47-9

52	No iónico	Alquil poliglicosidos	Caprilil/ Decil Glucosido	68515-73-1
53	No iónico	Amida	N, N- Dimetildecanamida	14433-76-2
54	No iónico	Biosurfactante	Soforolípidos	-
55	No iónico	Esteres	Isopropil Miristato	110-27-0
56	No iónico	Esteres	Isopropil Palmitato	142-91-6
57	No iónico	Acido Graso, Origen Natural	Gliceret-17 Cocoato	68201-46-7
58	No iónico	Acido Graso, Origen Natural	Gliceret -6 Cocoato	68201-46-7
59	No iónico	Acido Graso, Origen Natural	PEG/PPG-6/2 Gliceril cocoato	72245-11-5
60	No iónico	Alcohol Graso	Ceastearil Alcohol	67762-27-0
61	No iónico	Etoxilato Amina Graso	PEG 2 Cocamina	61791-14-8
62	No iónico	Etoxilato Amina Graso	PEG 2 Tallow Amina	61791-26-2
63	No iónico	Glicerol éster	Gliceret-7	36145938-3
64	No iónico	Glicerol éster	Triglicérido caprilic/capric	73398-61-5
65	No iónico	Glicerol éster	Gliceril oleato	37220-82-9
66	No iónico	Glicerol éster	Gliceril stearato	123-94-4
67	No iónico	Lactato	Lauril Lactil Lactato	910661-93-7
68	No iónico	Ester de Sobitan	Polisobato 80	9005-65-6

Se inocula 0.1 mL de cultivo bacteriano que contiene *Staphylococcus aureus* en un tubo que contiene 10 mL de una composición dada. El contenido del tubo se mezcla entonces y se deja reposar por 2 minutos (el "tiempo de contacto"). Después de 2 minutos se transfiere 0.01 mL del contenido del tubo aún tuvo que contiene 9mL de un medio de cultivo bacteriano neutralizante (Letheen Broth) que detiene la acción antimicrobiana de la composición que permite el crecimiento microbiano. Después, se revisan los tubos por la presencia de crecimiento microbiano después de 72 h. Para cada prueba de eficacia antimicrobiana, se realizó la colocación en placas de controles positivos seguido del conteo de colonias para establecer la reducción del *S. aureus* como resultado del contacto por 2 minutos con composiciones 1-68. Si no se observó crecimiento en el tubo sometido a prueba, se consideró que la composición mató al menos la carga bacteriana del control positivo.

La Tabla 11 presenta los resultados de las pruebas de eficacia para las composiciones 1-68. La reducción Log de *S.*

aureus se indica para cada composición. Se formuló cada composición con los diferentes surfactantes en una concentración de 0.12 y/o 0.35% de peso.

Tabla 11. Resultados de la eficacia antimicrobiana contra *Staphylococcus aureus*

COMPOSICIÓN		SURFACTANTE AT 0.35% (P/P) REDUCCIÓN	SURFACTANTE AT 0.12% (P/P) REDUCCIÓN
Aniónico	1	>7.98	> 5.84
	2	> 5.04	> 5.84
	3	>5.04	N/A
	4	>7.98	N/A
	5	>5.51	> 5.64
	6	> 5.76	> 5.64
	7	>5.76	>5.64
	8	>5.76	> 5.64
	9	>7.98	> 5.84
	10	> 7.98	> 5.84
	11	>5.04	> 5.64
	12	> 5.04	> 5.64
	13	>5.04	> 5.64
	14	>5.04	>5.64
	15	>7.98	N/A
	16	>7.98	>5.84
	17	>7.98	N/A
	18	>5.04	> 5.64
	19	>5.04	> 5.64
Catiónico	20	>4.43	N/A
	21	>4.43	> 5.64
	22	>5.72	>5.64
	23	>4.43	>5.64
	24	N/A	N/A
	25	>7.98	N/A
	26	> 5.76	> 5.64
	27	N/A	>5.64
	28	>5.04	> 5.64
	29	>5.04	> 5.64
	30	> 7.98	> 5.84
Anfotérico	31	>5.72	>5.64
	32	>4.43	> 5.64
	33	> 5.04	> 5.64
	34	> 5.04	> 5.84
	35	>5.04	>5.64
	36	>5.04	> 5.64
	37	> 5.76	> 5.64
	38	>4.43	>5.64
	39	>5.76	N/A
	40	N/A	> 5.64
	41	N/A	> 5.64
	42	N/A	> 5.64
	43	>4.43	> 5.84
	44	>4.43	N/A

Conclusiones

Cada tipo de surfactante (aniónico, catiónico, anfotérico y no iónico) se probó en la composición de pesticidas de la presente invención. Las composiciones 1-68 cubrieron los diferentes tipos de surfactantes y también los grupos químicos más comunes de surfactantes disponibles en el mercado. La composición de la presente invención puede formularse, de esa manera, con cualquier surfactante, mientras que mantiene su eficacia antimicrobiana.

Para los resultados descubiertos en la Tabla 11, es evidente que las composiciones 1-68 de la presente invención mantienen la eficacia antimicrobiana con un tiempo de contacto de 2 minutos.

EJEMPLO 8

EFICACIA CONTRA PLAGAS MAYORES: MALEZA

El control de maleza sigue siendo una preocupación muy grande en la agricultura. La presencia de maleza puede resultar en una reducción significativa de la producción de cosecha, pérdida de calidad y dificultades al cosechar. La eficacia herbicida de las composiciones de la presente invención se probó 1) en la germinación de semillas de dos especies de maleza y 2) el efecto fitotóxico de las composiciones de la presente invención en plántulas de dos especies de maleza.

Composiciones

Las composiciones se prepararon con el % (p/p) de ingredientes que se encuentran en la Tabla 12.

Tabla 12-Composiciones probadas

Composición	8	9	10	11	12
% Timol	0.23	0.46	1.15	2.30	23.00
% Surfactante	0.12	0.24	0.60	1.20	12.00
% Solvente	0.36	0.72	1.80	3.60	36.00
% Agua	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

Experimento 1: Se evaluó la eficacia de las composiciones 8, 9 y 12 en comparación con el tratamiento de control que recibe solo agua. Cada unidad experimental consistió en una caja de Petri que contenía un papel filtrado y 25 semillas por especie de maleza. Las dos especies de maleza probadas fueron una dicotiledónea, ambrosía común y una monocotiledónea, pasto de corral. Se vertieron 5 mililitros de cada composición en las semillas contenidas en la caja de Petri, que ese sello de manera subsiguiente. Hubo cuatro réplicas por

concentración. Las cajas de Petri se colocaron en una cámara de crecimiento a 27 °C con un fotoperiodo de 16:8 (día: noche). Se colocaron los tratamientos en una manera completamente aleatoria. Se evaluó la germinación cada dos o tres días por cada 21 días de incubación. En cada fecha de observación, la cantidad de semillas germinadas (con radícula visible) se contabilizó y se retiró de la caja de Petri. Al final de la prueba, se enviaron las semillas que no germinaron a la prueba de tolerancia al tetrazolio (Peters 2000) para evaluar su viabilidad. Se realizó una incisión a la vaina de la semilla con un escalpelo y se remojo en 1% de una solución de cloruro de trifenil tetrazolio por 12 horas. Después, las semillas se diseccionaron con microscopio binocular para poder revelar la estructura del embrión. Los tejidos vivientes se tornan de color rojo y los tejidos muertos no se tiñeron. Se examinó cada embrión y se interpretó la diferencia en color de teñido en el tejido de la semilla para determinar la viabilidad de la semilla. La mortalidad acumulativa se ajustó para tomar en cuenta la mortalidad natural en el control.

Resultados: La germinación total en el tratamiento de control fue de 64 en el 87% para la ambrosía común (AMBAR) y pasto de corral (ECHCR) respectivamente. Se retrasó la germinación de semillas cuando se aplicaron las composiciones 8, 9 y 12 (**Fig. 1**). No hubo germinación de semillas de ambrosía con la composición 12 mientras que el 9% de las semillas de pasto de corral pudieron germinar. Aumentó la mortalidad conforme la concentración de timol aumento en las composiciones para alcanzar un máximo de 100 por ciento para la ambrosía y 90% para el pasto de corral (**Fig. 2**).

Experimento 2: Se trasplantaron los vástagos de dos especies de maleza (la ambrosía común y el pasto de corral) en

bandejas de 50 pocillos múltiples llenas con tierra orgánica. En total, se trasplantaron 480 vástagos: las composiciones 8, 9, 10, 11, 12 x 10 plantas/concentración x 2 especies de maleza x 4 réplicas. Después de tres días, cuando se establecieron bien los vástagos trasplantados en las bandejas composiciones múltiples se rociaron con las diferentes composiciones mediante el uso de un rociador de bomba manual a una velocidad de aplicación de volumen de 225 l ha^{-1}. Las etapas de crecimiento de la maleza en el tiempo de rociado variaron de entre 2 a 4 hojas y 3 a 5 hojas, de manera respectiva para la ambrosía común y el pasto de corral. Se colocaron las bandejas en una cámara de crecimiento 25 °C con un fotoperiodo de 16:8 (día: noche) a lo largo de la prueba. Los tratamientos se colocaron en una forma completamente aleatoria. Se realizaron evaluaciones de fitotoxicidad una semana después de rociar en cada réplica para la incidencia (porcentaje de plantas afectadas) y gravedad (hoja y área del tallo afectadas). Se expresó "gravedad ponderada" al usar una escala de cinco clases: (1: ligera; 2: moderada; 3: alta; 4: muy alta; 5: planta muerta).

Resultados: Los síntomas visuales de lesión fueron aparentes de manera inmediata. La gravedad de fitotoxicidad en hojas y tallos aumentó conforme aumentó la concentración de timol en las composiciones (**Fig. 3 Tabla 13**).

Tabla 13. Incidencia de fitotoxicidad de las composiciones y gravedad en vainas de ambrosía común y pasto de corral[1].

ESPECIES	COMPOSICIÓN	INCIDENCIA (%)	GRAVEDAD PONDERADA
AMBAR[2]	Agua	0.0 c	0.00 e
	8	35.0 b	1.00 d
	9	92.5 a	2.25 c
	10	100.0 a	3.85 b
	11	100.0 a	4.78 a
	12	100.0 a	5.00 a
ECHCR[3]	Agua	0.0 c	0.00 d
	8	40.0 b	1.14 c
	9	100.0 a	1.30 c
	10	100.0 a	3.58 b
	11	100.0 a	4.72 a

Conclusiones: como se demostró arriba, las composiciones de la presente invención tienen actividad herbicida en ambrosía común y pasto de corral. Se redujo la germinación de semillas de maleza y las partes aéreas de las plantas se lesionaron de manera significativa mediante las composiciones 8, 9, 10, 11 y 12 lo que significa que las composiciones actúan como herbicida de contacto cuando se aplican antes y después de que emergen las vainas de maleza.

EJEMPLO 9

EFICACIA CONTRA PLAGAS DE GRAN CONCENTRACIÓN: INSECTOS Y ÁCAROS

Se condujeron bioensayos en dos modelos biológicos, plagas de mayor cantidad en la producción de frutas y vegetales, la polilla del manzano, *Cydia pomonella* (L.) y el ácaro araña de dos manchas, *Tetranychus urticae* Koch. Se evaluó el efecto insecticida (ovicida) de las composiciones de la presente invención en huevos de la polilla del manzano(CM) y el efecto acaricida de las composiciones de la presente invención en el ácaro araña de dos manchas (TSSM).

Composiciones

Se prepararon las composiciones con el % (p/p) de los ingredientes que se encuentran en la **Tabla 14.**

Tabla 14- Composiciones probadas

% Composición	8	10
% Timol	0.23	1.15
% Surfactante	0.12	0.60
% Solvente	0.36	1.80
% Agua	Q.S.	Q.S.

Parte I. Evaluar el efecto insecticida (ovicida) de las composiciones de la presente invención en huevos de la polilla del manzano. Se obtuvieron huevos y adultos de la polilla del manzano (CM) de OKASIR (Kelowna, BC) y se usaron para crear en laboratorio en una cámara de crecimiento. Se colocaron adultos en las bolsas de plástico para permitir que pusieran huevos. Se evaluaron y compararon las composiciones 8 y 10 con un control compuesto de agua. Se usó la aplicación tópica para evaluar el efecto insecticida en huevos de CM. Se recolectaron huevos puestos en menos de 24 h. Se colocaron grupos de 15 huevos en cajas de Petri y se consideraron una réplica. Se rociaron diez réplicas para cada composición. Se colocaron las cajas de Petri bajo condición de cría. El efecto de los tratamientos en la salida de huevo se evaluó 7 d después del rocío (después de completar el desarrollo del huevo). Se analizaron los datos mediante un análisis de una sola vía de varianza seguida de la prueba HSD Tukey-Kramer para comparar los tratamientos. Se determinó el punto crítico (α) en 0.5.

Resultados: Los tratamientos fueron significativamente diferentes con mayores volúmenes de mortalidad para las composiciones 8 y 10 en comparación con el control (**Fig. 4**). La proporción de mortalidad más alta se observó para la composición 10. Los huevos de control mostraron un desarrollo normal (**Fig.**

5a). Los huevos tratados con la composición 8 parecieron empezar la embriogénesis, pero la mayoría de ellos no la completo. Estos huevos tuvieron yema líquida (**Fig. 5b**). La mayoría de los huevos tratados con la composición 10 se secaron y se alcanzó el 100% de mortalidad siete días después del rociado (**Fig. 5c**).

Parte II. Evaluar el efecto acaricida de las composiciones de la presente invención en los ácaros de dos puntos o arañas rojas (TSSM). El TSSM se obtuvo de Anatis bioproteccion (St-Jacques-le-Mineur, QC) y se usaron para su cría en el laboratorio en plantas jóvenes de frijol (*Phaseolus vulgaris* (L.) cv. Gold rush). Sólo se usaron las formas móviles para el bioensayo. Las composiciones 8 y 10 se evaluaron y compararon con el control compuesto de agua. La aplicación tópica se usó para evaluar el efecto acaricida en las formas móviles de TSSM. Se depositaron 15 TSSM en una hoja joven de frijol Lima, con la parte inferior hacia arriba descansa en 1.5% de agar en cajas de Petri y se consideró como una réplica. Se rociaron diez réplicas. Se colocaron las cajas de Petri en condición de crianza. Se evaluó la mortalidad a las 24 h después del rocío. Se analizaron los datos en cada fecha demuestra mediante un análisis de una sola vía de varianza seguido de la prueba HSD Tukey-Kramer para comparar los tratamientos. Se determinó el punto crítico (α) en 0.05.

Resultados: Los tratamientos fueron diferentes de manera significativa 24 h después del rociado (**Fig. 6**). Se observó la proporción de mortalidad más alta en la composición 10.

Conclusiones: Los efectos insecticida y acaricida de las composiciones de la presente invención fueron muy altos en

especial para los huevos de la polilla del manzano y de las formas móviles del TSSM. Se observó un efecto ovicida de las composiciones. Como se expusieron los huevos de la polilla del manzano en manzanas o en hojas del manzano durante la oviposición en los manzanares, estos resultados sugieren que no hubo larvas que emergieron de los huevos y que no hubo daño causado en la manzana por esta plaga. Además, se observó la alta toxicidad de las composiciones 24 horas después de la aplicación en formas móviles de TSSM, que es un criterio importante para controlar de manera pronta esta plaga en la presencia de una alta densidad poblacional.

EJEMPLO 10

EFICACIA CONTRA PLAGAS DE GRAN CONCENTRACIÓN: BACTERIAS

El fuego bacteriano, cuyo agente causal es *Erwinia amylovora* es una enfermedad importante del Manzano, peral y algunas plantas ornamentales que provoca grandes pérdidas económicas para los agricultores. Las estrategias para el control del fuego bacteriano pueden incluir muchas prácticas de gestión contra plagas integrales lo que incluye selección de cultivos, remoción de partes infectadas, y aplicación de sulfato de cobre o estreptomicina. Sin embargo, dichos tratamientos crearon muchas preocupaciones con respecto a la toxicidad (el sulfato de cobre) y el desarrollo de resistencia antimicrobiana (estreptomicina). Se necesita un tratamiento alternativo y las composiciones de la presente invención serían perfectos candidatos. La sensibilidad de tres cepas de *Erwinia amylovora* a las composiciones de la presente invención bajo condiciones de laboratorio se determinaron y compararon con la estreptomicina dorada estándar, usada de manera común para el control del fuego bacteriano.

Composición

La composición 12 se preparó y se usó para hacer las disoluciones probadas 1, 2.5 y 5%.

Tabla 15-Composición probadas

Composición	12	Disolución 1%	Disolución 2.5%	Disolución 5%
% Timol	23.00	0.23	0.58	1.15
% Surfactante	12.00	0.12	0.30	0.60
% Solvente	36.00	0.36	0.90	1.80
% Agua	Q.S.	Q.S.	Q.S.	Q.S.

Las dos cepas sensibles a la estreptomicina (Sm^S) de *E. amylovora* originaria de Quebec, Canadá (cepas 433 y 435) y una cepa resistente a la estreptomicina (Sm^R) originaria de Oregón, USA (cepa 153sm5). Se obtuvo una cepa de *E. coli* sensible a la estreptomicina, usada como control, obtenida de ATCC® (ATCC 25922TM). Se colocó una cantidad suficiente de la composición 12 en botellas que contienen un medio de agar King B, para poder obtener soluciones de 1, 2.5 y 5% (v/v) (que corresponde a las composiciones que contienen timol en un rango de 0.23 a 1.15%). Se obtuvo la concentración de 0% (v/v) al agregar 25 ml de agua estéril ultra pura a 475 ml del medio enfriado. Después, se distribuyó un volumen de 20 ml del medio en 100x15 mm de cajas de Petri estériles. Se cultivaron cepas de *E. amylovora* y *E. coli* en un medio de agar King B por 72 h a 26 °C y en un medio de agar Trypticasa de soja durante la noche a 37 °C, de manera respectiva. Se suspendieron colonias individuales de las cajas en 5 ml de solución salina estéril (0.85% p/v) y se ajustó a una densidad celular de aproximadamente 15 x 10^8 unidades formadoras de colonias (ufc)

por milímetro de alícuotas (100µl) de una serie de disolución de cada suspensión bacteriana se esparcieron en superficies del medio agar King B e incubaron por 72 h a 26 °C. Se probaron las cepas bacterianas para la sensibilidad de estreptomicina en las siguientes concentraciones: 0, 100.250 y 500 ppm. Se probaron las cepas bacterianas para la sensibilidad de la composición 12 en las siguientes concentraciones: 0%, 1%, 2.5%, y 5%. De manera breve, las cuatro cepas por caja de Petri se probaron para cada concentración. Una alícuota de 100 µl de cada suspensión bacteriana se dejaron caer en uno de los cuatro cuadrantes de la superficie de agar como sigue: Q1) *E. amylovora* 433; Q2) *E. amylovora* 435; Q3) *E. amylovora* 153sm5; y Q4) *E. coli* ATCC 25922. Se evaluó el crecimiento bacteriano en el punto de inoculación usando un contador de colonias de campo oscuro Quebec después de 24, 48 y 72 horas de incubación a 26 °C. Se determinó la sensibilidad de las cajas por triplicado para cada concentración.

Resultados: Las dos cepas Sm^S de *E. amylovora* y la separa de *E. coli* fueron sensibles a la estreptomicina y no crecieron en el medio de agar King B que contiene concentraciones de estreptomicina de 100, 250 y 500 ppm. Al contrario, la cepa Sm^R de *E. amylovora* no se inhibió mediante la estreptomicina en ninguna concentración de prueba (**Fig. 7**). Todas las cepas de *E. amylovora* y la cepa *E. coli* mostraron crecimiento en el medio de agar King B sin estreptomicina.

Las dos cepas Sm^s de *E. amylovora*, y la cepa de Sm^R de *E. amylovora* y la cepa de *E. coli* fueron sensibles a las composiciones de la presente invención y no crecieron en el medio de agar King B que contiene la composición 12 en concentraciones de 1, 2.5 y 5% (**Fig. 8**). Todas las cepas de *E.*

amylovora y la cepa de *E. coli* mostraron crecimiento en el medio de agar King B sin la composición 12.

Conclusiones: Los resultados muestran el efecto bactericida de las composiciones de la presente invención en *Erwinia amylovora*, una plaga bacteriana importante en huertos. Además, las composiciones de la presente invención tuvieron una eficacia contra una cepa resistente a los antibióticos. El antibiótico (estreptomicina) es el más usado de manera amplia actualmente para combatir el fuego bacteriano en huertos y la resistencia antibiótica está aumentando. Las composiciones de la presente invención no sólo son efectivas contra esta enfermedad de plantas, sino que también presenta un tratamiento alternativo.

EJEMPLO 11

IMPACTO AGRONÓMICO EN CULTIVOS DE PAPAS

De manera común, los agricultores de Papa usan una mezcla de aceite mineral con fungicida en sus prácticas de manejo de cultivos para combatir con las enfermedades fúngicas y contra la propagación de muchos virus transmitidos por afidios. Los agricultores deben combinar o alternar las moléculas activas de los fungicidas para reducir el riesgo de que los hongos patógenos desarrollan resistencia a los fungicidas. Un tratamiento fungicida efectivo no debe tener impacto, o debe impactar de manera positiva en variables agronómicas. En otras palabras, la dosis de fungicida deberá permitir un efecto fitotóxicos mínimo para una fitoprotección y productividad máxima. En este ejemplo, se evaluó el impacto en la productividad (impacto agronómico).

Las composiciones de la presente invención se evaluaron para diferentes variables agronómicas, en plantas de papa. En las pruebas, se usaron la variedad cultivada de papas Dark Red Chieftain (de media temporada, redonda, roja), superior (de media temporada, redonda, blanca) y Russet Burbank (de fin de temporada, alargada, blanca). Estas variedades son representativas de los mercados más grandes de papas minoristas, peladas o semillas. Después, se estudiaron las variables agronómicas: 1) fitotoxicidad; 2) cantidad y peso de tubérculos; 3) porcentaje de plantas verdes; 4) porcentaje de plantas que tienen valvas secas; 5) porcentaje de plantas con tizón temprano de Papa.

Se aplicaron las composiciones de la presente invención A) solas, o de B) en combinación con una mezcla de aceites minerales superior 70 (10L/ha) y uno de los siguientes fungicidas: Ridomil (208mL/ha, que consta de MEFENOXAM™ (Metalaxl-M) como ingrediente activo), Bravo 500 (2.24L/ha, que contiene clorotalonil como ingrediente activo) o Manzanate-Pro (2.24Kg/ha, un producto de coordinación de ion de zinc y etilenobisditiocarbamato de manganeso, como un ingrediente activo), usados de manera alternativa. Las composiciones se aplicaron cinco veces en plantas de papa con intervalos de siete a diez días. Se realizó el estudio en un campo de papas en Quebec, Canadá. El diseño experimental consta de un grupo de 4 bloques de 5 parcelas para A) y 4 bloques de 4 parcelas para B). Estos ensayos se realizaron de julio a octubre. Se realizó la primera aplicación 40 días después del cultivo. Los tubérculos se cosecharon después de 80 días de crecimiento. El tratamiento de control fue de A) agua, y B) agua, y una mezcla de aceite y fungicida.

Tabla 16- Composición probada

	A: Composición sola probada Control: agua				B: composición probada en combinación con un aceite mineral y una mezcla de fungicida (Ridomil, Bravo o ManzanatoPro, en alternancia) controles: agua y aceite mineral-fungicida	
Composición	9	8	13	14	15	16
% Timol	0.46	0.23	0.12	0.02	0.46	0.12
% Surfactante	0.24	0.12	0.06	0.01	0.24	0.06
% Disolvente	0.72	0.36	0.18	0.04	0.72	0.18
Aplicado en campo con aceite y fungicida	No	No	No	No	Si	Si
% Agua	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

1) Efecto fitotóxico de la composición de la presente invención:

Se evaluaron los síntomas de fitotoxicidad después de rociar las composiciones solas o combinadas con aceite mineral y un fungicida. Los resultados se obtuvieron después de las 5 aplicaciones rociadas y se resumen en la Tabla 17.

En resumen, se demostró que las composiciones de la presente invención pueden aplicarse con efectos fitotóxicos bajos o nulos en las plantas de papa. Se observaron por lo general efectos fitotóxicos cuando las composiciones de la presente invención tuvieron concentraciones más altas de timol (> 0.23% timol), surfactante y disolvente. Por lo tanto, la fitotoxicidad es dependiente de la dosis. La mayor la dosis de timol, surfactante y disolvente puede ser tolerada por otras especies de plantas.

Tabla 17- Evaluación de la fitotoxicidad de la aplicación por aspersión de composiciones de la presente invención en plantas de papa

Composición aplicada		Observaciones de las hojas y plantas rociadas, después de 5 aplicaciones por aspersión con intervalos de siete a diez días
A	Agua	Buena turgencia, nervadura central y follaje verde, hoja sin manchas y clorosis
	9	Realce, nervadura central y follaje verde
		oscuro, muchos puntos necróticos localizados en el barro de las raíces
	8	Ligero marchitamiento, nervadura central y follaje verde obscuro, algunos puntos necróticos localizados en el barro de las raices
	13	Buena turgencia, nervadura central y follaje verde, algunos puntos necróticos localizados en los charcos
	14	Buena turgencia, nervadura central y follaje verde, hojas sin manchas y clorosis
	Agua	Buena turgencia, nervadura central y follaje verde, hojas sin manchas y clorosis

Las Figuras 9A y B presentan la cantidad promedio (A) y el peso (B) de los tubérculos cosechados al final de la prueba. Se calculó la cantidad total de tubérculos cosechados por planta, por parcela y por tratamiento. La cantidad y peso promedio de los tubérculos por planta se determinó para poder evaluar el impacto de las composiciones de la presente invención, solas o en una mezcla de aceite mineral-fungicida, en la fisiología de la planta y la capacidad de crecimiento de la planta de los tubérculos iniciada después del periodo de floración.

En resumen, y en concordancia con la evaluación fitotóxica, hay una tendencia para que la cantidad y peso promedio de los tubérculos por planta disminuya de manera progresiva conforme la concentración de timol, surfactante y disolvente incrementa en las composiciones aplicadas solas en el follaje de las plantas de papa. Se determinó que la composición 13 tuvo el mejor impacto en el campo de papas, cuando se le comparó con el control de agua. En la segunda parte del ensayo,

las composiciones se aplicaron en combinación con aceite mineral y un fungicida secundario. Se observó que para la composición 16, la forma de realización de la presente invención, el peso promedio de los tubérculos se comparó con los controles, pero la cantidad de tubérculos recuperados/plantas fue mucho mayor de la esperada incluso que en los controles. Un efecto cinegético entre la composición de la presente invención, el aceite y el fungicida resulta en un impacto positivo en esta variable agronómica.

3) Plantas verdes

La Figura 10 muestra el porcentaje de plantas verdes de acuerdo con las composiciones aplicadas. Una parcela con un alto porcentaje de plantas verdes muestra plantas que demuestran un dosel arbóreo verde casi sin manchas o necrosis y las plantas ocupan todo el espacio en la fila. Una parcela con plantas que muestran manchas u hojas y tallos secos tiene un dosel arbóreo disparejo. Estas parcelas tendrán un menor porcentaje de plantas verdes.

En resumen, para la parte A del ensayo, el porcentaje promedio más alto de plantas verdes se descubrió en las parcelas donde la composición 13 sola fue aplicada, en comparación con el tratamiento con agua. Para la parte B del ensayo hubo como resultado, mayor cantidad de plantas verdes de la aplicación de la composición 16 en combinación con aceite y fungicida, comparado con el agua o con aceite + fungicida sólo. Para estos resultados, y con una composición que contiene de manera específica 0.12% de timol, observamos de manera inesperada que a) la composición de la presente invención tuvo un impacto agronómico positivo en el follaje de la planta de papa y b) hay

un efecto cinegético entre la composición, el aceite y otros fungicidas en esta variable.

4) Plantas con hojas secas

La Figura 11 muestra el porcentaje de plantas con hojas secas. En resumen, los resultados están de acuerdo con los porcentajes de las plantas con hojas verdes. Para la parte A del ensayo, el porcentaje promedio más bajo de plantas que mostraron hojas secas se descubrió en las parcelas donde se aplicó la composición 13 sola, comparada con el tratamiento con agua. Para la parte B del ensayo, las hojas menos secas resultaron de la aplicación de la composición 16 en combinación con aceite y fungicida, comparado con agua o aceite + fungicidas sólidos. De estos resultados, y con una composición que contiene de manera específica 0.12% de timol, nosotros observamos que a) la composición de la presente invención tiene un impacto agronómico positivo en el follaje de la planta de papa y b) hay un efecto cinegético entre la composición, el aceite y otro fungicida en esta variable.

5) Plantas con tizón temprano en papa

Las plantas afectadas por el tizón temprano causado por el hongo *Alternaria alternata* (FR:FR) Keissl tienen hojas que muestran manchas cafés concéntricas bien definidas. Las manchas del tizón temprano se secan de manera progresiva y cuando hay muchas, el follaje se seca por completo. Las Figuras 12A y B muestran el porcentaje promedio de plantas que demuestran hojas manchadas por parcela (A), y la cantidad promedio de manchas por hoja (B), por las composiciones aplicadas en combinación con aceite y fungicida, en comparación con los controles de agua, y aceite + fungicida.

En resumen, el porcentaje de plantas que presentan síntomas de la infección fúngica de tizón temprano fue menor en las parcelas tratadas con aceite + fungicida, en comparación con el agua. Cuando se aplicaron las composiciones de la presente invención con aceite y fungicida, hubo una mayor disminución en los síntomas, lo que sugiere un efecto fitoprotector cinegético entre las composiciones de la presente invención y el aceite + fungicida.

En conclusión, algunas composiciones de la presente invención pueden presentar un efecto fitotóxico en plantas de papa, pero estos efectos pueden no observarse en otras plantas/cultivos. Por esta razón, las composiciones no deben limitarse a las que no presentan un efecto fitotóxico en esta prueba. También se descubrió que las composiciones de esta invención presentan baja fitotoxicidad en plantas de papa lo que indica un impacto positivo en diferentes variables agronómicas, en particular, cuando las composiciones se aplicaron en combinación con aceite mineral y otros fungicidas. El efecto cinegético entre estos componentes se observó en el campo de papas (la cantidad y el peso de las papas cosechadas, la apariencia del follaje sierras paréntesis lo que sugiere que la composición de la presente invención puede actuar como regulador de crecimiento de plantas, el cual es un resultado inesperado. Esta observación puede ser de particular importancia para las plantas cuyo follaje es de particular interés, como lo es la lechuga u otras variantes de plantas cuyas hojas son comestibles. Se observó el efecto cinegético en la fitoprotección (protección contra el tizón temprano), por lo que las composiciones de la presente invención también tienen un efecto fungicida.

EJEMPLO 12

USO PARA EL CRECIMIENTO DE SEMILLAS DE PAPA

Los agricultores de semilla de papa usan pesticidas para desinfectar sus almacenes, botes de bodegas de tubérculos y maquinaria para poder producir tubérculos libres de patógenos para la industria. El *Clavibacter michiganensis* es un patógeno que causa la podrición anular bacteriana de la de la papa, y provoca mayores preocupaciones para la industria de la semilla de papa en todo el mundo. En esta prueba se examinó si las composiciones de la presente invención tienen un efecto bactericida en el patógeno en 1) placas de agar y 2) una superficie de madera mientras que 3) se evaluó el efecto fitotóxico de las composiciones en los tubérculos de Papa con brotes.

1) Efecto bactericida en placas de agar

La cepa bacteriana usada para esta prueba fue *Clavibacter michiganensis subespecie Sepedonicus* (*Cms*, putrefacción anular bacteriana de la papa). Se preparó una suspensión fresca de 10^9 células/mL en NaCl 0.85% estéril usando aros de un cultivo purificado de crecimiento activo de *Cms* guardado en agar de soja triplicasa (TSA). Se diseminó de manera pareja una alícuota de 100 µL de una suspensión fresca en una placa de TSA y se prepararon cuatro réplicas por prueba de patógeno. Se dejó que las placas se secaran por 2 horas en una campana de extracción. Se colocaron entonces cuatro discos de filtro No 1 Whatmann estériles de 1.2 cm de diámetro en ángulos cuadrados una con respecto al otro para formar una cruz en la superficie de la placa de TSA inoculada.

Se depositó un volumen de 50 µL de agua o una de las composiciones probadas (Tabla 18) en un disco de filtro estéril. Las cuatro placas por ensayo Cms se incubaron a 22 °C por cuatro días. Después de 24 horas de un periodo de tres días, se aplicó un volumen de 50 µL de cada composición en el disco de filtro correspondiente. Se evaluó la zona radial de la inhibición de crecimiento bacteriano para cada disco de filtro después del tercer y del cuarto día de incubación. Los resultados se presentaron en la Tabla 19.

En resumen, las composiciones 8 y 13 mostraron un efecto bactericida en Cms. Los efectos acumulativos de tres aplicaciones de estas composiciones aumentaron, durante un período de 24 horas, la zona radial de la inhibición de crecimiento de Cms de cada disco de filtro.

Tabla 18-Composición probada

Composición	8	13	14
% Timol	0.23	0.12	0.02
% Surfactante	0.12	0.06	0.01
% Disolvente	0.36	0.18	0.04
Agua	Q.S.	Q.S.	Q.S.

Tabla 19- Efecto bactericida de tres aplicaciones de las composiciones 8, 13 y 14 en *Clavibacter michiganensis subsp. Sepedonicus (Cms)*

Composición	Media de 3 días (mm)			Media de 4 días (mm)		
Agua	0.0	±	0.0	0.0	±	0.0
8	2.8	±	0.5	9.0	±	2.4
13	2.0	±	0.0	4.1	±	1.2
14	0.0	±	0.0	0.0	±	0.0

2) Efecto bactericida en madera

Para poder imitar las condiciones de un almacén, se probó la composición 8 de la presente invención en una contaminación bacteriana de una superficie de madera. Se preparó una suspensión fresca de 10^9 de células/mL (1.0 OD 600 nm) en NaCl 0.85% estéril usando aros de un cultivo purificado de crecimiento activo de Cms guardado en agar de soja Tríptica (TSA). Se diseminó de manera pareja una alícuota de 100 µL de una suspensión fresca en una superficie de 3 cm^2 de una varita de madera y se prepararon doce réplicas por prueba de patógenos. Las varitas se dejaron secar por 2 horas en una campana de extracción. Se depositó un volumen de 4 mL de composición 8 o 4 mL de 0.85% NaCl estéril en un tubo para cubrir un poco más de la superficie de una varita de madera. Se prepararon cuatro réplicas de cada solución. Las ocho varitas de madera por prueba de Cms se incubaron a 22 °C por 10 min. Después, se dejó secar cada varita de madera por al menos 20 minutos en un papel filtro estéril en una campana de extracción. Después, cada varita de madera se sumergió en 0.85% de NaCl estéril por 5 min bajo una agitación constante para lavar las células bacterianas de la superficie de madera. Como un control, también se lavaron cuatro superficies de madera contaminadas que no se sumergieron en composición 8 o en 0.85% de NaCl y se lavaron en 0.85% de NaCl por 5 minutos bajo agitación constante. Para cada resuspensión se dispersó un volumen de 100 µL de manera pareja en una placa de TSA. También, se diseminó un volumen de 100 µL de una disolución con un factor de disolución de 100 de manera pareja en una placa de TSA. Para cada prueba de Csm, se incubaron las 24 placas de TSA inoculadas a 22 °C por 4 días. La cantidad total de colonias bacterianas se determinó para cada prueba de TSA para evaluar el efecto bactericida de la composición 8

cuando se aplicó para desinfectar una superficie de madera altamente contaminada.

Se lavaron entre 3.4 x 10^7 células y 5.7 x 10^7 células de células Cms de las superficies de madera que no se trataron o que se trataron con la solución de control negativa 0.85% de NaCl. No se lavaron células bacterianas viables de Cms de las varitas de madera que se trataron con la composición 8. Las superficies de madera contaminadas con células Cms se desinfectaron de manera eficiente con la composición 8.

3) Efecto fitotóxico en tubérculos de papa con brotes.

El efecto fitotóxico en las composiciones 8, 13 y 14 en tubérculos de Papa y brotes se evaluó usando tubérculos Dark Red Chieftain. La temperatura de almacenamiento se aumentó de manera gradual de 8 °C a 18 °C para romper su estado latente. Se monitoreo la longitud del brote para confirmar que 50 tubérculos mostraron la longitud del brote variable entre 0.5 cm y 1.5 cm (Grupo A), mientras que 50 tubérculos mostraron una longitud de brote que varió entre 2.0 cm y 4.5 cm (Grupo B). Se registró la longitud de cada brote de cada tubérculo.

Las composiciones 8, 13 y 14 se prepararon, junto con el control de agua. Se pusieron diez tubérculos de cada grupo (A, B) en una canasta tejida para sumergirla 5 segundos en una de las 4 soluciones. Se dejó que los tubérculos se secaran antes de ponerlos en una mezcla orgánica usada para que crezcan las plantas de papa. Se usaron 4 contenedores apropiados para sustentar el crecimiento de 20 tubérculos (10 tubérculos por grupo), uno de cada uno de los 4 tratamientos. Todos los tubérculos se cubrieron con no más de 2 cm de mezcla orgánica. Los contenedores se mantuvieron en una cámara de crecimiento bajo un fotoperiodo de 16 horas a 22 °C (día) y 18 °C (noche).

Se agregó a cada contenedor la suficiente agua para mantener la tierra húmeda.

Después de 12 días, se sacaron los tubérculos con cuidado del medio orgánico. Para cada tubérculo, se determinó la longitud de cada brote. Para evaluar el efecto de cada tratamiento, el aumento en la longitud total de brotes por tubérculo se calculó para cada uno de los grupos de tubérculos. Se presentaron los resultados en la Tabla 20.

En resumen, cuando se aplicaron las composiciones 8 y 13, se observó un aumento en la longitud promedio de los brotes, en comparación con el tratamiento con agua esto no se observó con la composición 14 que tuvo la menor concentración de cada ingrediente (timol, surfactante y disolvente). También, se observaron muy pocos efectos fitotóxicos durante el experimento, ya que sólo tres tubérculos mostraron necrosis en brote en el grupo A. Por lo tanto, se muestra en el presente que las composiciones de la presente invención pueden estimular de manera inesperada el crecimiento de los brotes de los tubérculos de papa. No sólo algunas composiciones de la presente invención albergan baja fitotoxicidad en tubérculos de Papa germinados, sino que también es un regulador de crecimiento de planta con un impacto positivo en el crecimiento de brotes de tubérculos de papa.

Tabla 20-Impacto de las composiciones 8, 13 y 14 en el aumento promedio de la longitud de brotes por tubérculo para los dos grupos (A y B) de los tubérculos tratados.

Grupo	Composición	Aumento medio de longitud de brotes/tubérculos (mm)		
A	Agua	9.1	±	2.1
A	8	15.1	±	6.4
A	13	11.2	±	3.3
A	14	4.0	±	0.7

En conclusión, las composiciones de la presente invención mostraron otra vez su potencial como un producto pesticida para la protección de cosechas. En la presente, las composiciones fueron efectivas para matar bacterias responsables por la infección de tubérculos en instalaciones agrícolas de semillas, lo que demuestra su potencial para evitar las enfermedades bacterianas en semillas. Finalmente, las composiciones específicas de la presente invención que presentaron muy bajos efectos fitotóxicos en los tubérculos de Papa, y fueron al mismo tiempo estimulantes del crecimiento de los brotes en tubérculos, lo que se desea y es un efecto inesperado para los agricultores de semillas. El efecto dual (bactericida y estimulante de crecimiento) de las composiciones de la presente invención fue inesperado también.

Aunque las formas de realización preferidas son las descritas e ilustradas anteriormente en los dibujos adjuntos, es evidente para los expertos en la técnica que se pueden realizar modificaciones sin apartarse de esta descripción. Esas modificaciones se consideran como posibles variantes que se encuentran dentro del campo de la divulgación.

REIVINDICACIONES

1. Método para el control de plagas, el método consta de poner en contacto tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad de pesticida de una composición que consta de:

Una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

y un suplemento que consta de:

al menos uno de un pesticida, un fertilizante, un antiespumante, un regulador del crecimiento de plantas o la combinación de las mismas.

2. El método de la reivindicación 1, donde el compuesto antimicrobiano es de origen sintético.

3. El método de la reivindicación 1, donde el surfactante se seleccionó del grupo que consta de un surfactante

aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

4. El método de acuerdo con cualquiera de las reivindicaciones 1 a 3, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

5. El método de acuerdo con cualquiera de las reivindicaciones 1 a 4, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

6. El método de acuerdo con cualquiera de las reivindicaciones 1 a 5, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la composición.

7. El método de acuerdo con cualquiera de las reivindicaciones 1 a 6, el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la composición.

8. El método de acuerdo con cualquiera de las reivindicaciones 1 a 7, donde el pesticida en el suplemento se elige de un alguicida, un agente antiincrustante, un desinfectante, un fungicida, un fumigante, un herbicida, un molusquicida, un ovicida, un rodenticida, un regulador de crecimiento de insectos, un bactericida, un virucida, un repelente de insectos, un repelente de artrópodos, un nematicida, un insecticida, un acaricida, un herbicida y un regulador de crecimiento de plantas.

9. El método de acuerdo con cualquiera de las reivindicaciones 1 a 8, donde el fertilizante se elige de un

fertilizante inorgánico, un fertilizante de nitrógeno, un fertilizante de potasio, un fertilizante de fosfato, un fertilizante orgánico, un abono, una composta, una fosforita, una harina de huesos, una alfalfa, un troceado de madera, una langbeinita, un cultivo de cobertura, sulfato de potasio, un polvo estéril, ceniza, una harina de sangre, una harina de pescado, una emulsión de pescado, un alga, un quitosano, y una molasa.

10. El método de acuerdo con cualquiera de las reivindicaciones 1 a 9, donde el antiespumante se elige de entre un aceite mineral, un aceite vegetal, una cera de parafina, una cera de éster, una sílice, un alcohol graso, una silicona, un polietilenglicol, un polipropilenglicol, copolímero, y un alquilpolicrilato.

11. El método de acuerdo con cualquiera de las reivindicaciones 1 a 10, donde el regulador del crecimiento de plantas podrá ser elegido a partir de un carbamato, un hidrocarburo clorinado, ciclohexadiona, un ácido orgánico, ancimidol, etefón, ácido giberélico, giberelinas y benciladenina, hidracida maleica, NAA, naftaleno acetamida, paclobutrazol, acido N-acetilaspartico.

12. El método de acuerdo con cualquiera de las reivindicaciones 1 a 11, donde el suplemento también comprende de un colorante, un agente ajustador de pH, un agente secuestrante, y combinaciones de los mismos.

13. Un método para el control de plagas, el método consta de poner en contacto tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad de pesticida de una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

14. El método de acuerdo con la reivindicación 13, donde el compuesto antimicrobiano es de origen sintético.

15. El método de la reivindicación 13 donde el surfactante se seleccionó del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

16. El método de acuerdo con cualquiera de las reivindicaciones 13 a 15, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

17. El método de acuerdo con cualquiera de las reivindicaciones 13 a 16, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

18. El método de acuerdo con cualquiera de las reivindicaciones 13 a 17, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la composición.

19. El método de acuerdo con cualquiera de las reivindicaciones 13 a 18, el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la composición.

20. El método de acuerdo con cualquiera de las reivindicaciones 14 a 19, donde la plaga puede ser seleccionada de un insecto, un nemátodo, un hongo, una bacteria, una larva, una planta, un animal, un virus, un parasito, un gasterópodo, un artrópodo, un caracol, una babosa, un alga o combinaciones de los mismos.

21. El método de acuerdo con la reivindicación 20, donde la planta es maleza.

22. El método de acuerdo con la reivindicación 20, donde el artrópodo es un ácaro.

23. El método de acuerdo con la reivindicación 20, donde el insecto es una polilla.

24. El método de acuerdo con la reivindicación 20, donde la bacteria se elige de entre una *E. amylovora*, una *E. coli* o la combinación de las mismas.

25. Un método para regular el crecimiento de una planta, el método consta de entrar en contacto con tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad reguladora de crecimiento de una composición que consta de:

una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

y un suplemento que consta de:

al menos uno de un pesticida, un fertilizante, un antiespumante, un regulador del crecimiento de plantas o la combinación de las mismas.

26. El método de la reivindicación 25, donde el compuesto antimicrobiano es de origen sintético.

27. El método de la reivindicación 25, donde el surfactante se seleccionó del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

28. El método de acuerdo con cualquiera de las reivindicaciones 25 a 27, donde el al menos un compuesto

antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

29. El método de acuerdo con cualquiera de las reivindicaciones 25 a 28, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

30. El método de acuerdo con cualquiera de las reivindicaciones 25 a 29, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la composición.

31. El método de acuerdo con cualquiera de las reivindicaciones 25 a 30, el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la composición.

32. El método de acuerdo con cualquiera de las reivindicaciones 25 a 31, donde el pesticida en el suplemento se elige de un alguicida, un agente antiincrustante, un desinfectante, un fungicida, un fumigante, un herbicida, un molusquicida, un ovicida, un rodenticida, un regulador de crecimiento de insectos, un bactericida, un virucida, un repelente de insectos, un repelente de artrópodos, un nematicida, un insecticida, un acaricida, un herbicida y un regulador de crecimiento de plantas.

33. El método de acuerdo con cualquiera de las reivindicaciones 25 a 32, donde el fertilizante se elige de un fertilizante inorgánico, un fertilizante de nitrógeno, un fertilizante de potasio, un fertilizante de fosfato, un fertilizante orgánico, un abono, una composta, una fosforita, una harina de huesos, una alfalfa, un troceado de madera, una langbeinita, un cultivo de cobertura, sulfato de potasio, un

polvo estéril, ceniza, una harina de sangre, una harina de pescado, una emulsión de pescado, un alga, un quitosano, y una molasa.

34. El método de acuerdo con cualquiera de las reivindicaciones 25 a 33, donde el antiespumante se elige de entre un aceite mineral, un aceite vegetal, una cera de parafina, una cera de éster, una sílice, un alcohol graso, una silicona, un polietilenglicol, un polipropilenglicol, copolímero, y un alquilpolicrilato.

35. El método de acuerdo con cualquiera de las reivindicaciones 25 a 34, donde el regulador del crecimiento de plantas podrá ser elegido a partir de un carbamato, un hidrocarburo clorinado, ciclohexadiona, un ácido orgánico, ancimidol, etefon, ácido giberélico, giberelinas y benciladenina, hidracida maleica, NAA, naftaleno acetamida, paclobutrazol, acido N-acetilaspartico.

36 El método de acuerdo con cualquiera de las reivindicaciones 25 a 35, donde el suplemento también comprende de un colorante, un agente ajustador de pH, un agente secuestrante, y combinaciones de los mismos.

37. Un método para regular el crecimiento de una planta, el método consta de poner en contacto tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad regulador de crecimiento de una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

38. El método de acuerdo con la reivindicación 37, donde el compuesto antimicrobiano es de origen sintético.

39. El método de la reivindicación 37 donde el surfactante se seleccionó del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

40. El método de acuerdo con cualquiera de las reivindicaciones 37 a 39, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

41. El método de acuerdo con cualquiera de las reivindicaciones 37 a 40, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

42. El método de acuerdo con cualquiera de las reivindicaciones 37 a 41 donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la composición.

43. El método de acuerdo con cualquiera de las reivindicaciones 37 a 42, el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la composición.

44. El método de acuerdo con cualquiera de las reivindicaciones 37 a 43, donde regular el crecimiento consta de un aumento en la cantidad de frutas, vegetales, bulbos o tubérculos de la planta.

45. El método de acuerdo con cualquiera de las reivindicaciones 37 a 44, donde regular el crecimiento consta de un aumento en el tamaño de frutas, vegetales, bulbos o tubérculos de la planta.

46. El método de acuerdo con cualquiera de las reivindicaciones 37 a 45, donde regular el crecimiento consta de un aumento en la cantidad de plantas sanas.

47. El método de acuerdo con cualquiera de las reivindicaciones 37 a 46, donde la planta se elige de una planta de plátanos, un manzano, un árbol de peras, una planta de papa, una planta de arroz, una planta de café, un árbol de fruto cítrico, una cebolla, ginseng, soja, una maleza, o una planta de tomate.

48. Un método para regular el crecimiento de una semilla, el método consta de entrar en contacto con una semilla o tierra orgánica, que contiene una semilla en ella, con una cantidad reguladora de crecimiento de una composición que consta de:

una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

y un suplemento que consta de:

al menos uno de un pesticida, un fertilizante, un antiespumante, un regulador del crecimiento de plantas o la combinación de las mismas.

49. El método de la reivindicación 48, donde el compuesto antimicrobiano es de origen sintético.

50. El método de la reivindicación 48, donde el surfactante se seleccionó del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

51. El método de acuerdo con cualquiera de las reivindicaciones 48 a 50, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

52. El método de acuerdo con cualquiera de las reivindicaciones 48 a 51, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

53. El método de acuerdo con cualquiera de las reivindicaciones 48 a 52, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la composición.

54. El método de acuerdo con cualquiera de las reivindicaciones 48 a 53, el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la composición.

55. El método de acuerdo con cualquiera de las reivindicaciones 48 a 54, donde el pesticida en el suplemento se elige de un alguicida, un agente antiincrustante, un desinfectante, un fungicida, un fumigante, un herbicida, un molusquicida, un ovicida, un rodenticida, un regulador de crecimiento de insectos, un bactericida, un virucida, un repelente de insectos, un repelente de artrópodos, un nematicida, un insecticida, un acaricida, un herbicida y un regulador de crecimiento de plantas.

56. El método de acuerdo con cualquiera de las reivindicaciones 48 a 55, donde el fertilizante se elige de un fertilizante inorgánico, un fertilizante de nitrógeno, un fertilizante de potasio, un fertilizante de fosfato, un fertilizante orgánico, un abono, una composta, una fosforita, una harina de huesos, una alfalfa, un troceado de madera, una langbeinita, un cultivo de cobertura, sulfato de potasio, un polvo estéril, ceniza, una harina de sangre, una harina de

pescado, una emulsión de pescado, un alga, un quitosano, y una molasa.

57. El método de acuerdo con cualquiera de las reivindicaciones 48 a 56, donde el antiespumante se elige de entre un aceite mineral, un aceite vegetal, una cera de parafina, una cera de éster, una sílice, un alcohol graso, una silicona, un polietilenglicol, un polipropilenglicol, copolímero, y un alquilpolicrilato.

58. El método de acuerdo con cualquiera de las reivindicaciones 48 a 57, donde el regulador del crecimiento de plantas podrá ser elegido a partir de un carbamato, un hidrocarburo clorinado, ciclohexadiona, un ácido orgánico, ancimidol, etefon, ácido giberélico, giberelinas y benciladenina, hidracida maleica, NAA, naftaleno acetamida, paclobutrazol, acido N-acetilaspartico.

59. El método de acuerdo con cualquiera de las reivindicaciones 48 a 58, donde el suplemento también comprende de un colorante, un agente ajustador de pH, un agente secuestrante, y combinaciones de los mismos.

60. Un método para regular el crecimiento de una semilla, el método consta de poner en contacto una semilla o tierra orgánica que contiene a la semilla con una cantidad regulador de crecimiento de una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

61. El método de acuerdo con la reivindicación 60, donde el compuesto antimicrobiano es de origen sintético.

62. El método de la reivindicación 60, donde el surfactante se seleccionó del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

63. El método de acuerdo con cualquiera de las reivindicaciones 60 a 62, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

64. El método de acuerdo con cualquiera de las reivindicaciones 60 a 63, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

65. El método de acuerdo con cualquiera de las reivindicaciones 60 a 64 donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la composición.

66. El método de acuerdo con cualquiera de las reivindicaciones 60 a 65, el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la composición.

67. El método de acuerdo con cualquiera de las reivindicaciones 60 a 66, donde la semilla es un tubérculo.

68. El método de acuerdo con la reivindicación 67, donde el tubérculo se elige de cualquiera de entre una papa, un camote, un boniato, una yuca, o una dalia.

69. El método de acuerdo con cualquiera de las reivindicaciones 60 a 68, donde el regulador de crecimiento consta de un aumento en la longitud de un brote de tubérculo.

Resumen

La invención trata sobre las composiciones en las que se solubilizan o dispersan en agua el compuesto fenólico timol o carvacrol a través de la adición de un surfactante y un disolvente. En ciertas formas de realización, también consta de un pesticida, un fertilizante, un antiespumante, un regulador de crecimiento de plantas o combinaciones de los mismos de manera adicional. También se muestran métodos para el control de plagas o para regular el crecimiento de las plantas a través del contacto con las plantas, sus semillas o la tierra orgánica en la que crecen junto con esas composiciones.

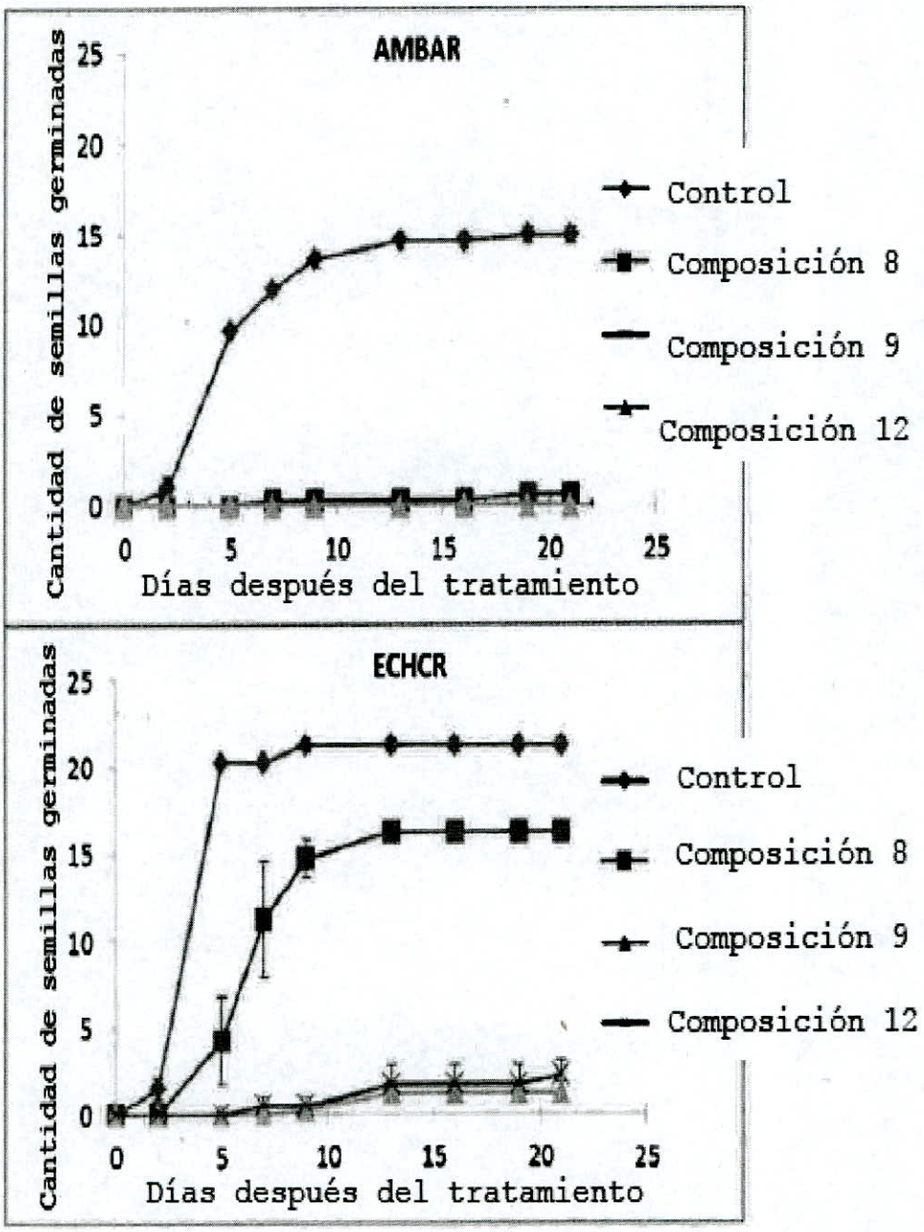

AMBAR
Cantidad de semillas germinadas
25
20
15
10
5
0
0
5
10
15
20
25
Días después del tratamiento
Control
Composición 8
Composición 9
Composición 12
ECHCR
Cantidad de semillas germinadas
25
20
15
10
5
0
0
5
10
15
20
25
Días después del tratamiento
Control
Composición 8
Composición 9
Composición 12

Fig. 1

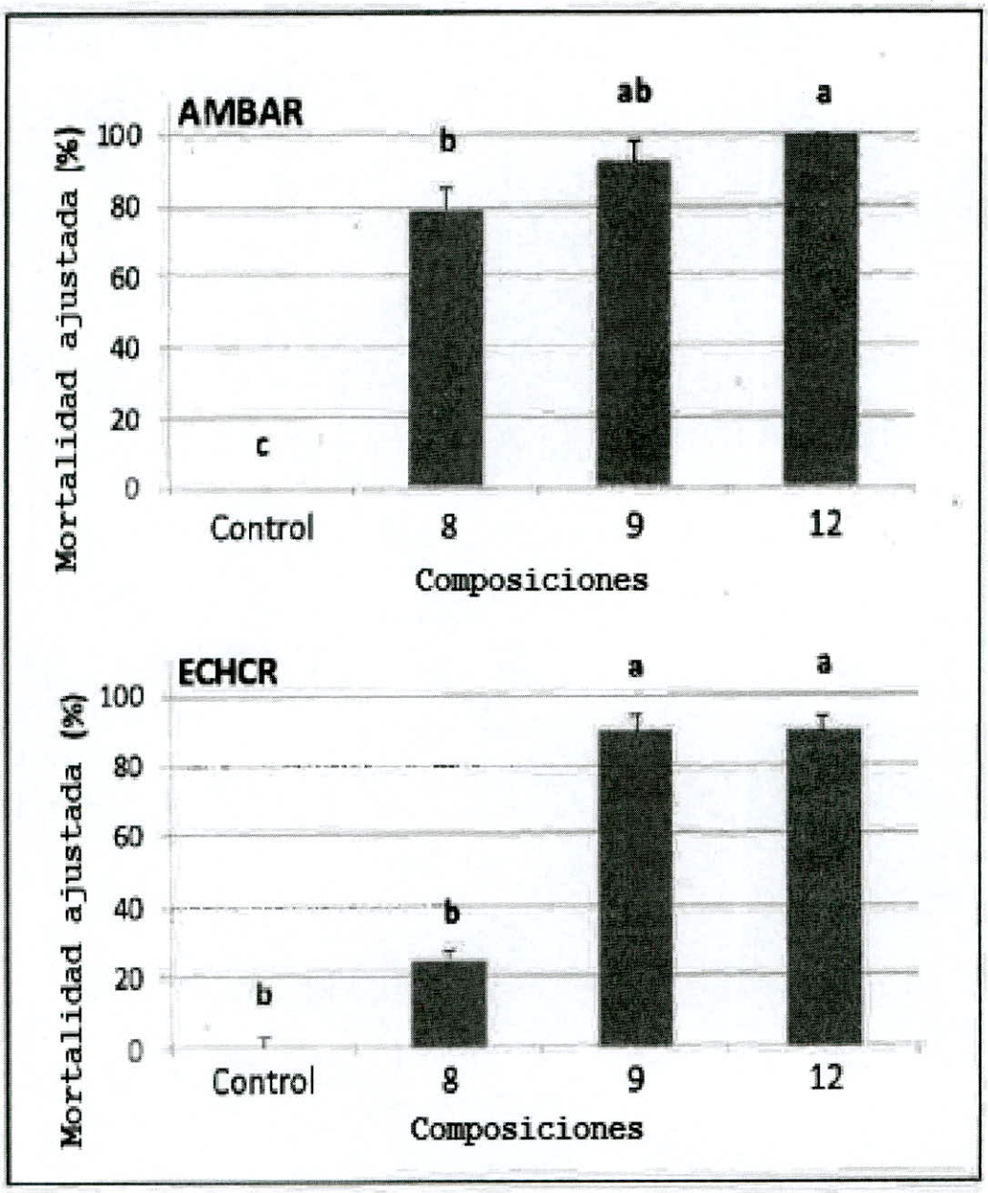

AMBAR
Mortalidad ajustada (%)
100
80
60
40
20
0
c
b
ab
a
Control
8
9
12
Composiciones
ECHCR
Mortalidad ajustada (%)
100
80
60
40
20
0
b
b
a
a
Control
8
9
12
Composiciones

Fig. 2

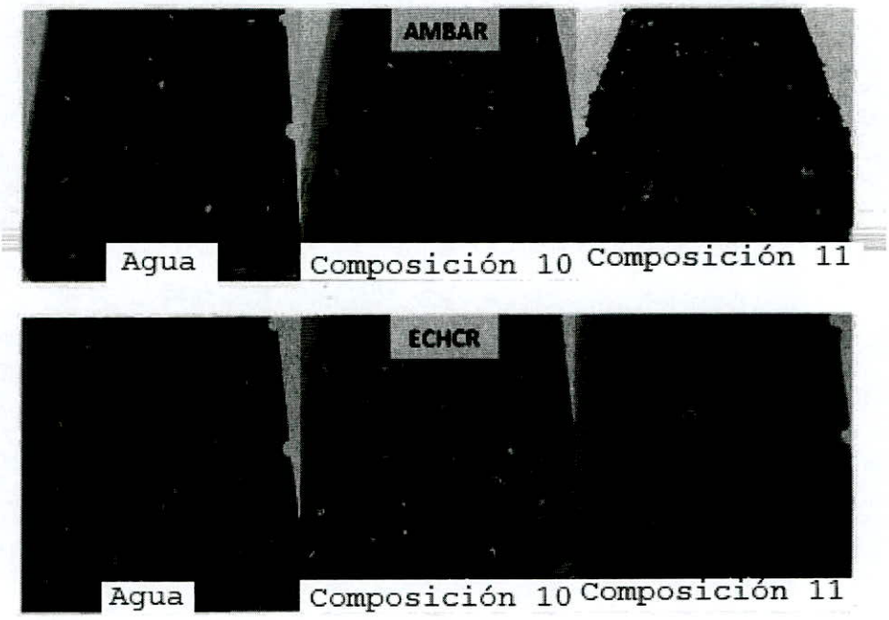

AMBAR
Agua
Composición 10
Composición 11
ECHCR
Agua
Composición 10
Composición 11

Fig. 3

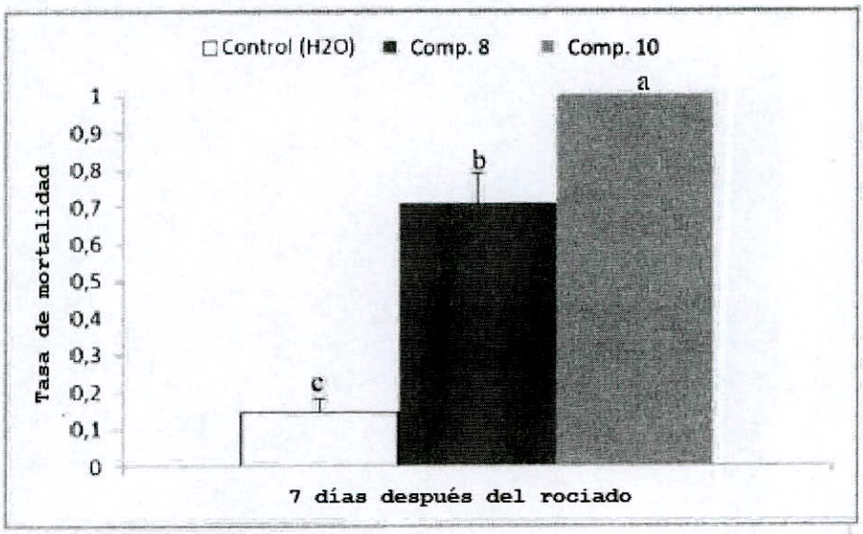

Control (H2O)
Comp. 8
Comp. 10
Tasa de mortalidad
1
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
a
b
c
7 días después del rociado

Fig. 4

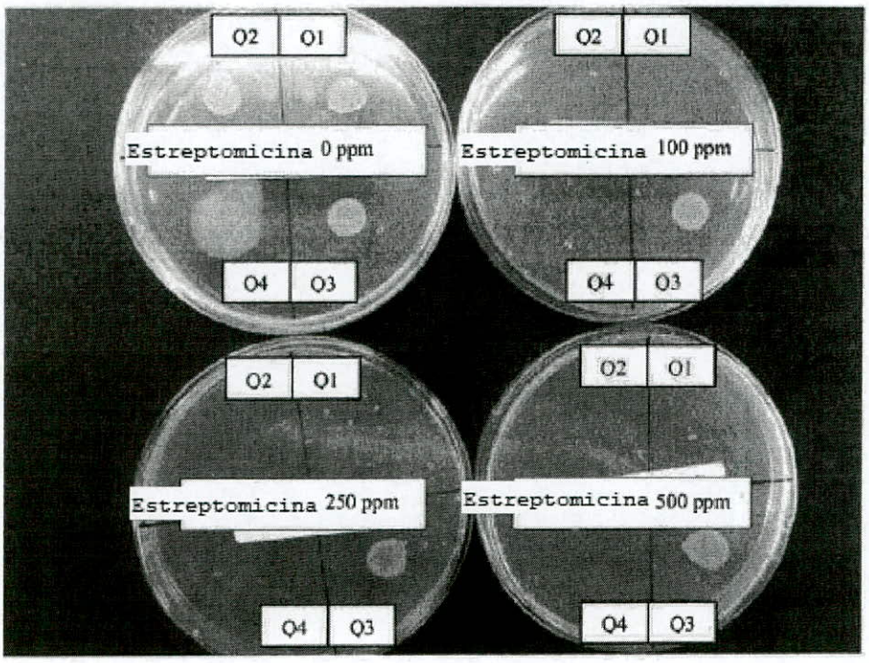

Q2
Q1
Estreptomicina 0 ppm
Q4
Q3
Q2
Q1
Estreptomicina 100 ppm
Q4
Q3
Q2
Q1
Estreptomicina 250 ppm
Q4
Q3
Q2
Q1
Estreptomicina 500 ppm
Q4
Q3

Fig. 7

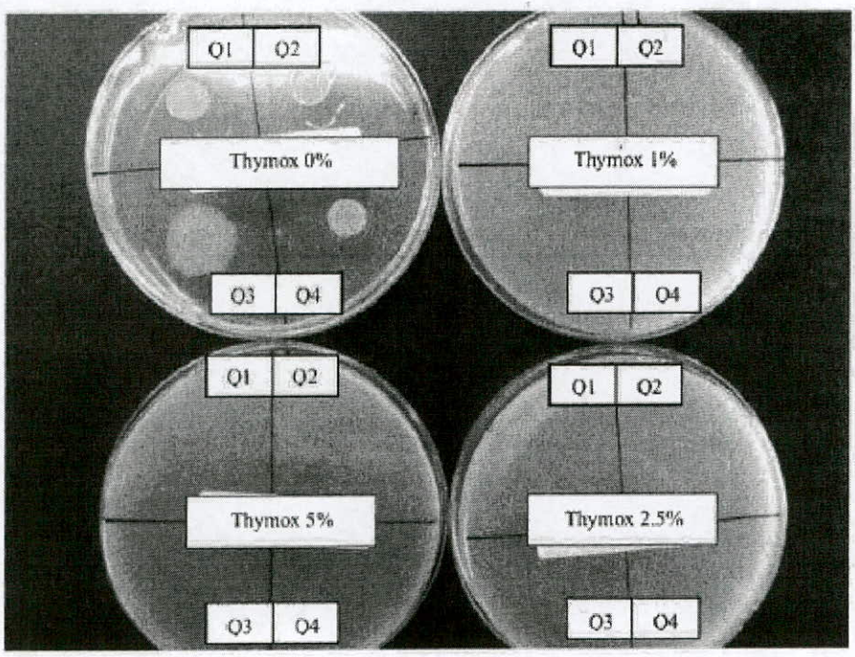
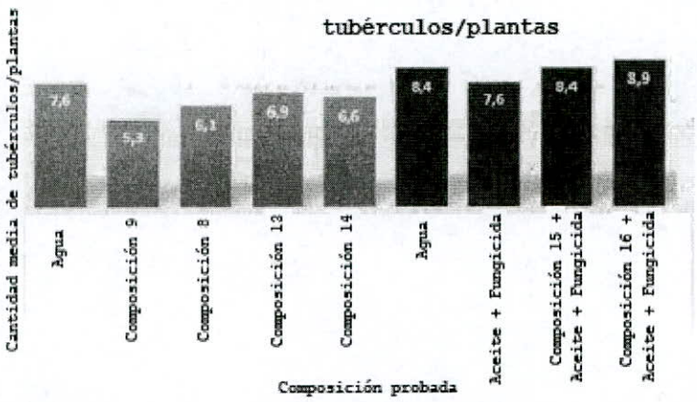

Q1
Q2
Thymox 0%
Q3
Q4
Q1
Q2
Thymox 1%
Q3
Q4
Q1
Q2
Thymox 5%
Q3
Q4
Q1
Q2
Thymox 2.5%
Q3
Q4

Fig. 8

A Efecto de la composición en rendimiento: Cantidad media de tubérculos/plantas



B Efecto de la composición en rendimiento: rendimiento medio (g) de tubérculos/plantas

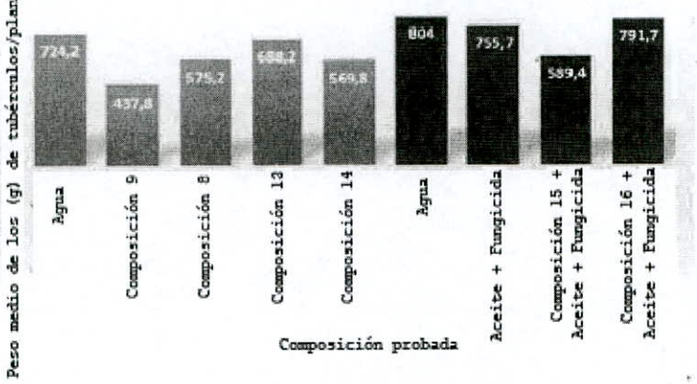


Fig. 9

Efecto de la composición en rendimiento: Plantas verdes

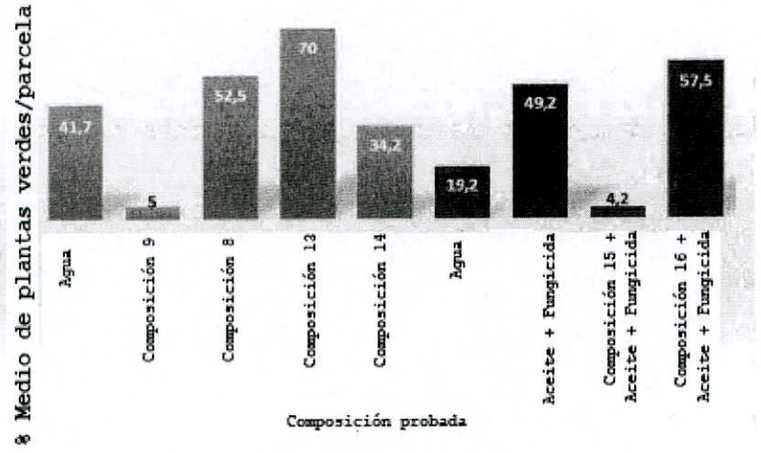


Fig. 10

Efecto de la composición en rendimiento: plantas con hojas secas

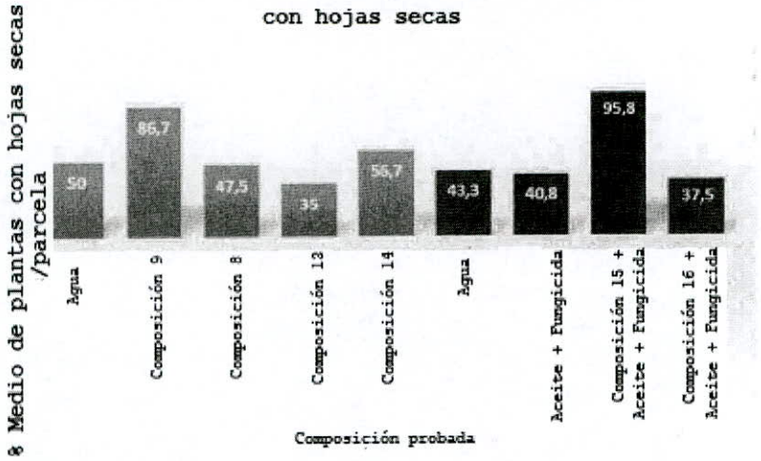
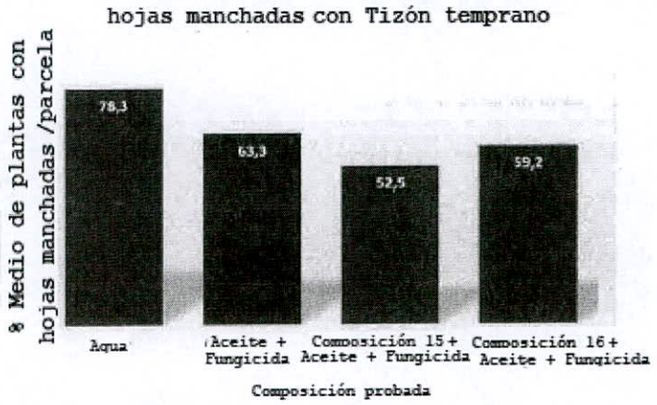


Fig. 11

A Efecto de composición en rendimiento: Plantas con hojas manchadas con Tizón temprano



B Efecto de la composición en rendimiento plantas con Tizón temprano: Cantidad plantas/hojas

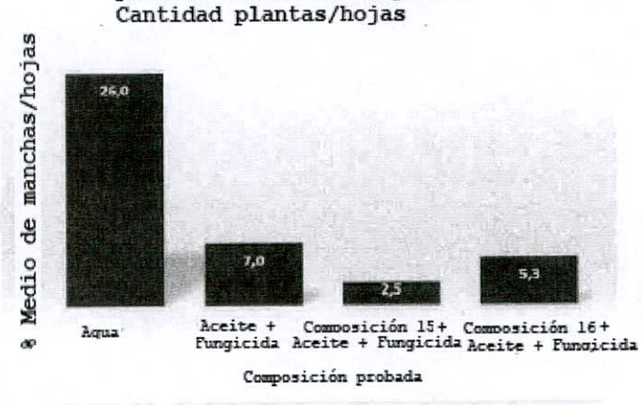


Fig. 12.

REIVINDICACIONES

1. Una composición para regular el crecimiento de las plantas y/o control de plagas, donde la composición consta de:

Una composición de pesticidas que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso;

y un suplemento que consta de:

al menos uno de un pesticida, un fertilizante, un antiespumante, un regulador del crecimiento de plantas o la combinación de las mismas.

2. La composición de la reivindicación 1, donde el compuesto antimicrobiano es de origen sintético.

3. La composición de la reivindicación 1, donde el surfactante se selecciona del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

4. La composición de acuerdo con cualquiera de las reivindicaciones 1 a 3, donde el al menos un compuesto antimicrobiano es de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

5. La composición de cualquiera de las reivindicaciones 1 a 4, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

6. La composición de cualquiera de las reivindicaciones 1 a 5, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la fórmula.

7. La composición de cualquiera de las reivindicaciones 1 a 6, donde el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la fórmula.

8. La composición de cualquiera de las reivindicaciones 1 a 7, donde el pesticida en el suplemento se elige de un alguicida, un agente antiincrustante, un desinfectante, un fungicida, un fumigante, un herbicida, un molusquicida, un ovicida, un rodenticida, un regulador de crecimiento de insectos, un bactericida, un virucida, un repelente de insectos, un repelente de artrópodos, un nematicida, un insecticida, un acaricida, un herbicida y un regulador de crecimiento de plantas.

9. La composición de cualquiera de las reivindicaciones 1 a 8, donde el fertilizante se elige de un fertilizante inorgánico, un fertilizante de nitrógeno, un fertilizante de potasio, un fertilizante de fosfato, un fertilizante orgánico, un abono, una composta, una fosforita, una harina de huesos, una alfalfa, un troceado de madera, una langbeinita, un cultivo de cobertura, sulfato de potasio, un polvo estéril, ceniza, una harina de sangre, una harina de pescado, una emulsión de pescado, un alga, un quitosano, y una molasa.

10. La composición de cualquiera de las reivindicaciones 1 a 9, donde el antiespumante se elige de entre un aceite mineral, un aceite vegetal, una cera de parafina, una cera de éster, una sílice, un alcohol graso, una silicona, un polietilenglicol, un polipropilenglicol, copolímero, y un alquilpolicrilato.

11. La composición de cualquiera de las reivindicaciones 1 a 10, donde el regulador del crecimiento de plantas se elige de un carbamato, un hidrocarburo clorinado, ciclohexadiona, un ácido orgánico, ancimidol, etefón, ácido giberélico, giberelinas y benciladenina, hidracida maleica, NAA, naftaleno acetamida, paclobutrazol, acido N-acetilaspartico.

12. La composición de cualquiera de las reivindicaciones 1 a 11, donde el suplemento también comprende de un colorante, un agente ajustador de pH, un agente secuestrante, y combinaciones de los mismos.

13. Un método para el control de plagas, el método consta de poner en contacto tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad de pesticida de la composición de cualquiera de las reivindicaciones 1 a 12 para controlar las plagas.

14. Un método para el control de plagas, el método consta de poner en contacto tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad de pesticida de la composición que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

15. El método de la reivindicación 14, donde el compuesto antimicrobiano es de origen sintético.

16. El método de la reivindicación 14 donde el surfactante se seleccionó del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante

anfotérico, un surfactante no iónico, y combinaciones de los mismos.

17. El método de cualquiera de las reivindicaciones 14 a 16, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

18. La composición de cualquiera de las reivindicaciones 14 a 16, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

19. La composición de cualquiera de las reivindicaciones 14 a 18, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la fórmula.

20. La composición de cualquiera de las reivindicaciones 14 a 19, donde el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la fórmula.

21. El método de acuerdo con cualquiera de las reivindicaciones 13 a 20, donde la plaga puede ser seleccionada de un insecto, un nemátodo, un hongo, una bacteria, una larva, una planta, un animal, un virus, un parasito, un gasterópodo, un artrópodo, un caracol, una babosa, un alga o combinaciones de los mismos.

22. El método de acuerdo con la reivindicación 21, donde la planta es maleza.

23. El método de acuerdo con la reivindicación 21, donde el artrópodo es un ácaro.

24. El método de acuerdo con la reivindicación 21, donde el insecto es una polilla.

25. El método de la reivindicación 21, donde la bacteria se elige de entre una *E. amylovora*, una *E. coli* o una combinación de las mismas.

26. Un método para regular el crecimiento de una planta, el método consta de entrar en contacto con tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad reguladora de crecimiento de una composición de acuerdo con cualquiera de las reivindicaciones 1 a 12.

27. Un método para regular el crecimiento de una planta, el método consta de entrar en contacto con tierra, una semilla, una planta, o combinaciones de los mismos, con una cantidad reguladora de crecimiento de una composición que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

28. El método de la reivindicación 27, donde el compuesto antimicrobiano es de origen sintético.

29. El método de la reivindicación 27, donde el surfactante se selecciona del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

30. El método de acuerdo con cualquiera de las reivindicaciones 27 a 29, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

31. El método de acuerdo con cualquiera de las reivindicaciones 27 a 29, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

32. El método de acuerdo con cualquiera de las reivindicaciones 27 a 31, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la fórmula.

33. El método de acuerdo con cualquiera de las reivindicaciones 27 a 32, donde el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la fórmula.

34. El método de cualquiera de las reivindicaciones 26 a 33, donde regular el crecimiento consta de un aumento en la cantidad de frutas, vegetales, bulbos o tubérculos de la planta.

35. El método de cualquiera de las reivindicaciones 26 a 34, donde regular el crecimiento consta de un aumento en el tamaño de frutas, vegetales, bulbos o tubérculos de la planta.

36. El método de cualquiera de las reivindicaciones 26 a 34, donde regular el crecimiento consta de un aumento en la cantidad de plantas sanas.

37. El método de acuerdo con cualquiera de las reivindicaciones 26 a 36, donde la planta se elige de una planta de plátanos, un manzano, un árbol de peras, una planta de papa, una planta de arroz, una planta de café, un árbol de fruto cítrico, una cebolla, ginseng, soja, una maleza, o una planta de tomate.

38. Un método para regular el crecimiento de una semilla, el método consta de entrar en contacto con una semilla o tierra orgánica que contiene una semilla en ella, con una cantidad reguladora de crecimiento de una composición de acuerdo con cualquiera de las reivindicaciones 1 a 12.

39. Un método para regular el crecimiento de una semilla, el método consta de entrar en contacto con una semilla o tierra orgánica que contiene una semilla en ella, con una cantidad reguladora de crecimiento de una composición de pesticidas que consta de:

una composición de pesticida que consta de:

a) desde más o menos 0.01% a más o menos 25% por peso de al menos un compuesto antimicrobiano seleccionado del grupo que consta de timol y carvacrol;

b) desde más o menos 0.001% a más o menos 15% por peso de un surfactante suficiente para formar una solución o dispersión de al menos un compuesto antimicrobiano en un portador acuoso;

c) desde más o menos 0.001% a más o menos 40% por peso de un disolvente; y

d) suficiente agua para preparar 100 por ciento por peso.

40. El método de la reivindicación 39, donde el compuesto antimicrobiano es de origen sintético.

41. El método de la reivindicación 39, donde el surfactante se selecciona del grupo que consta de un surfactante aniónico, un surfactante catiónico, un surfactante anfotérico, un surfactante no iónico, y combinaciones de los mismos.

42. El método de acuerdo con cualquiera de las reivindicaciones 39 a 41, donde el al menos un compuesto antimicrobiano de alrededor de 0.12% a alrededor de 1.15% p/p de la composición.

43. El método de acuerdo con cualquiera de las reivindicaciones 39 a 42, donde el al menos un compuesto antimicrobiano es de 0.12% p/p, o alrededor de 0.23% p/p o

alrededor de 0.46% p/p, o alrededor de 1.15% p/p de la composición.

44. El método de acuerdo con cualquiera de las reivindicaciones 39 a 43, donde el surfactante es de entre 0.1% a alrededor de 15% (p/p) de la fórmula.

45. El método de acuerdo con cualquiera de las reivindicaciones 39 a 43, donde el solvente es de alrededor de 0.1% a alrededor de 40% (p/p) de la fórmula.

46. El método de cualquiera de las reivindicaciones 38 a 45, donde la semilla es un tubérculo.

47. El método de la reivindicación 46, donde el tubérculo es de una papa (kumara), un camote, un boniato, una yuca, o una dalia.

48. El método de cualquiera de las reivindicaciones 38 a 47, donde el regulador de crecimiento consta de un aumento en la longitud de un brote de tubérculo.

P2673PC00

UNIVERSAL ASSIGNMENT

WHEREAS I / we François DAIGLE, Ann LETELLIER, Sylvain QUESSY, Serge AURAY, whose full address is / are:

François Daigle: 214, rue du Chêne Rouge, Canton de Hatley, Quebec, J0B 2C0 Canada;

Ann Letellier: 895, rue Royale, Massueville, Quebec, J0G 1K0 Canada;

Sylvain Quessy: 1035, Chenal du Moine, Ste-Anne-de-Sorel, Quebec, J3P 5N3 Canada;

Serge Auray: 4005-A, rue de la Garlock, Sherbrooke, Quebec, J1L 1W9 Canada;

have invented certain new and useful improvements in an invention entitled "COMPOSITION FOR USE AS PESTICIDE, FERTILIZER, OR BOTH, AND USES THEREOF" for which a patent application(s) was / were filed as listed on Schedule A attached hereto.

AND WHEREAS, Laboratoire M2, a corporation of Canada, of 4005-A, rue de la Garlock, Sherbrooke, Quebec, J1L 1W9 Canada, has acquired from me / us the whole right, title and interest for the United States of America, Canada and all other countries in and to the said invention and in and to any Letters Patent that may be obtained therefore, and in and to said application(s).

NOW THEREFORE, in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of all of which is hereby acknowledged, I / we, François DAIGLE, Ann LETELLIER, Sylvain QUESSY, Serge AURAY, by these presents confirm that I / we have sold, assigned and transferred and do hereby sell, assign and transfer unto the said Laboratoire M2, the full and exclusive right to the said invention in the United States of America, Canada and all other countries and the entire right, title and interest in and to any and all Letters Patent which may be granted therefore, and the entire right, title and interest in and to said application(s), and in and to any divisions, continuations, continuations–in–part and extensions of said application(s), together with the right to claim the benefit of the right of priority provided by the International Convention for the Protection of Industrial Property based on said patent application(s), the right to take any legal action concerning the rights granted by any such patents or patent applications including the right to sue for any past or previous infringements.

I / we agree that I / we will without further consideration do all such things and execute all such documents as may be necessary or desirable to obtain and maintain patents for said invention and for additions and modifications thereto in any and all countries, and to vest title thereto in said assignee, its successors, assigns and legal representatives or nominees.

I / we hereby authorize and request the Commissioner of Patents and Trademarks to issue said Letters Patent to said Laboratoire M2, the assignee of the entire right, title and interest in and to the same, for its sole use and benefit, and for the use and benefit of its successors and assigns, to the full end of the term for which Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made.

The undersigned hereby grant(s) the firm of **Benoît & Côté Inc.** whose address is 560, Crémazie Blvd. East, Suite 300, Montreal, Quebec, Canada H2P 1E8, the power to insert on this assignment any further identification which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office or other Patent Offices in the world.

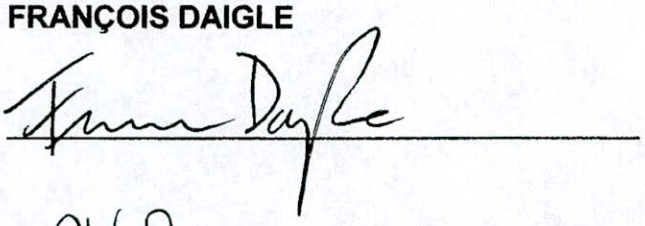
This assignment supersedes any previous assignments.

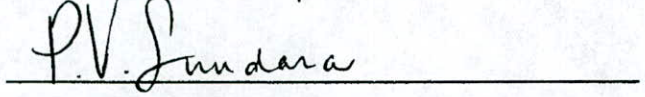
Le(s) soussigné(s) désire(nt) que la présente cession soit en anglais. The undersigned request(s) that the present assignment be in English.

SIGNED this ____ day of _____, 20___, at _____

(City, Country)

FRANÇOIS DAIGLE





Signature of Witness

PATHOUM VIENG SUNDARA

Name of Witness

SIGNED this 31 day of July, 2017, at Sherbrooke . CAN

(City, Country)

ANN LETELLIER

_____

_____ _____

Signature of Witness Name of Witness

SIGNED this ____ day of _____, 20___, at _____

(City, Country)

SYLVAIN QUESSY

_____

_____ _____

Signature of Witness Name of Witness

I / we hereby authorize and request the Commissioner of Patents and Trademarks to issue said Letters Patent to said Laboratoire M2, the assignee of the entire right, title and interest in and to the same, for its sole use and benefit, and for the use and benefit of its successors and assigns, to the full end of the term for which Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made.

The undersigned hereby grant(s) the firm of **Benoit & Côté Inc.** whose address is 660, Crémazie Blvd. East, Suite 300, Montreal, Quebec, Canada H2P 1E8, the power to insert on this assignment any further identification which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office or other Patent Offices in the world.

This assignment supersedes any previous assignments.

Le(s) soussigné(s) désire(nt) que la présente cession soit en anglais. The undersigned request(s) that the present assignment be in English.

SIGNED this ____ day of _____, 20___ at _____
(City, Country)

FRANÇOIS DAIGLE

_____

_____ _____
Signature of Witness Name of Witness

SIGNED this ____ day of _____, 20___ at _____
(City, Country)

ANN LETELLIER

_____

_____ _____
Signature of Witness Name of Witness

SIGNED this ____ day of _____, 20___ at _____
(City, Country)

SYLVAIN QUESSY

_____

_____ _____
Signature of Witness Name of Witness

SIGNED this ____ day of _____, 20___, at _____
(City, Country)

FRANÇOIS DAIGLE

_____

_____ _____
Signature of Witness Name of Witness

SIGNED this ____ day of _____, 20___, at _____
(City, Country)

ANN LETELLIER

_____

_____ _____
Signature of Witness Name of Witness

SIGNED this 19 day of July, 2017, at Sherbrooke
(City, Country)

SYLVAIN QUESSY

_____

_____ Frédéric Picard-Tessier
Signature of Witness Name of Witness

P2673

SIGNED this 14 day of august, 2017, at Sherbrooke
(City, Country)

SERGE AURAY

Signature of Witness

Frederic Picard-Jean
Name of Witness

SCHEDULE A

Country	Serial Number	Filing Date
United States	61939956	2014-02-14
United States	62116630	2015-02-16
United States	15547151	2017-07-28
Canada	2973671	2017-07-12

National phase:
Europe
Brazil
China
Colombia
Mexico
OAPI
Phlippines
Vietnam

TRIANA, URIBE & MICHELSEN

REPRESENTATION AND POWER OF ATTORNEY

I (we), the undersigned SERGE AURAY in representation of LABORATOIRE M2 domiciled in QUÉBEC, CANADA.

in due compliance with the terms of paragraph 1st. of article 543 of the Commercial Code, do hereby appoint **FERNANDO TRIANA**, tpa. No. 45.265 c.c. No. 79.154.036; **LAURA MICHELSEN**, tpa. No. 67.897 c.c. No. 39.783.287; **JUAN CARLOS URIBE**, tpa. No. 54.493 c.c. No. 79.159.313 and **JUAN PABLO TRIANA**, tpa. 63.077 c.c. No. 79.487.222; domiciled at Calle 93 B No. 12-48 P. 4, Bogotá, D.C., Colombia, the first as principal and the others as alternates, in the order of their appointment, as our representatives for all industrial property matters with faculty to receive notifications and to appoint attorneys in and out of Court. The first alternate shall replace the principal in case of his absence or of temporal or definitive impediment. The same rule will apply when the second or third alternate representative is to replace the first or second one, or when the second or third is to replace the principal one. In such cases, the principal representative, shall state his intention not to act as representatives through a declaration given before a Notary Public in Colombia, or before a Notary or another Public Official or a Colombian Consul abroad; and in cases of impediment, the appropriate certificate shall suffice. If any of the appointees were to be definitely absent, the following alternate shall take his place. When the absence or impediment of the principal representative, or of the first or second or third alternate in their turn ceases, the representation can be taken again in their sequence, by the principal, the first or second or third alternate depending on case, and the mere fact or its exercise will suffice. The exercise of the representation by the first or second or third alternates in their turn shall end at such time.

REPRESENTACIÓN Y PODER

Yo (nosotros), abajo suscrito(s) SERGE AURAY en representación de LABORATOIRE M2 domiciliado(s) en QUÉBEC, CANADA.

por el presente nombro (nombramos) a **FERNANDO TRIANA**, tpa. No. 45.265 c.c. No. 79.154.036; **LAURA MICHELSEN**, tpa. No. 67.897 c.c. No. 39.783.287; **JUAN CARLOS URIBE**, tpa. No. 54.493 c.c. No. 79.159.313 y **JUAN PABLO TRIANA**, tpa. 63.077 c.c. No. 79.487.222; domiciliados en la Calle 93 B No. 12-48 P. 4, Bogotá, D.C., Colombia, en obedecimiento a lo dispuesto en el parágrafo 1ro. del Artículo 543 del Código de Comercio, el primero como principal y los demás como suplentes, en su orden, como mis (nuestros) representantes en todos los asuntos de propiedad industrial con facultad para recibir notificaciones y nombrar apoderados judiciales o extrajudiciales. El primer representante suplente reemplazará al principal en caso de ausencia o impedimento temporal o definitivo de aquel. La misma regla se aplicará cuando el segundo y tercer representantes suplentes hayan de reemplazar al primero, al segundo o al principal. En tales casos, el representante principal, o el primero, o segundo suplente, o tercer suplente en su caso, o todos ellos, declararán su intención de no ejercer la representación mediante declaración autenticada por Notario Público en Colombia, o por Notario u otro Funcionario Público, o Cónsul de Colombia, en el extranjero; y si tratare de impedimento, con el certificado respectivo. Si alguno de los nombrados faltare definitivamente, el siguiente tomará su lugar. Cuando cesare la ausencia o impedimento del representante principal, o de su primero o segundo o tercer suplente, en su caso, podrán ejercer la representación, en su orden, uno u otros según el caso, asumiéndola por el solo

TRIANA, URIBE & MICHELSEN

hecho de ejercerla, cesando en ese momento el ejercicio de la representación por el primero o segundo o tercer suplente en su caso.

In addition, I (we) grant a Power of Attorney in favor of the above named attorneys-at-law so that they may obtain the protection of my (our) intellectual property and against the unfair competition, for which purpose I (we) authorize the said attorneys to represent me (us) before any authorities or persons, with or without jurisdiction, specially those administrative, administrative contentious and judicial, as well as before national and/or international arbitration tribunals in all matters concerning the following: a) Obtainment of patents, layout–designs of integrated circuits, utility models and industrial designs; the registration of marks and trade slogans; the deposit of commercial names and trade emblems; the obtainment of the declaration and authorization of denominations of origin; renewal, payment of the annuity fees, assignment, license, change of name or domicile, voluntary cancellation; and the registration of commercialization agreements and licenses of use of the above rights; b) Protection of trade secrets; c) Obtainment of plant variety protection; d) Obtainment of functioning licenses, health registrations and sale licenses and any other petition before the sanitary or administrative authorities; e) Actions against protection to the consumers, restrictive commercial practices and competence promotion; f) Obtainment of copyright registrations for any type of artistic, literary, scientific, musical, video, films, video games, choreography works, software or any other production in the artistic, scientific or literary fields capable of being reproduced or expressed by any means known now or in the future; Registration of agreements related with the execution or transfer of intellectual property rights; Obtention of reduced postal tariff; g) Registration of domain names; their renewal, assignment, change of name, change of domicile, cancellation and any other acts related with their management. h) Actions of repossession, of opposition, cancellation, nullity, infringement of rights,

Además, confiero (conferimos) poder a los abogados arriba nombrados, para obtener la protección de mi (nuestra) propiedad intelectual y contra la competencia desleal, a cuyo efecto autorizo(amos) a los dichos apoderados para que me (nos) representen ante cualesquiera entidades o personas, ejerzan o no jurisdicción, especialmente ante las del orden administrativo, contencioso-administrativo y judicial, así como los tribunales de arbitramento nacionales y/o internacionales en todo lo concerniente a los siguientes asuntos: a) Obtención de patentes de invención, de los esquemas de trazado de circuitos integrados, modelos de utilidad y diseños industriales; el registro de marcas y de lemas comerciales; el depósito de nombres comerciales y enseñas; la obtención de la declaración y de la autorización de denominaciones de origen; su renovación, pago de anualidades de mantenimiento, traspaso, licencia, cambio de nombre o domicilio, cancelación voluntaria; y el registro de acuerdos de comercialización y de licencias de uso de esos derechos; b) Protección de secretos empresariales c) Obtención de la protección para variedades vegetales; d) Obtención y tramitación de todo lo relacionado con licencias de funcionamiento, registros sanitarios, licencias de venta y cualquier otra petición ante las autoridades sanitarias o administrativas; e) Acciones por protección al consumidor, por prácticas comerciales restrictivas y promoción de la competencia; f) Obtención del registro del derecho de autor para cualquier tipo de obra artística, literaria, científica, musical, videográfica, cinematográfica, coreográficas, soporte lógico o cualquier otra producción, en el campo artístico, científico, o literario capaz de ser reproducido o expresado por cualquier medio conocido ahora o por conocer en el futuro; Registro de contratos relacionados con la ejecución o transferencia de derechos intelectuales; Obtención de tarifa postal reducida; g) Registro de nombres de dominio, su renovación, traspaso,

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cambio de nombre, cambio de domicilio, cancelación y demás actos relacionados con su administración. h) Las acciones reivindicatorias, de oposición, de cancelación, de nulidad, de infracción de derechos, de medidas cautelares, de medidas en frontera, de tutela, de competencia desleal, de concesión de licencias.

In general, all the civil, constitutional, criminal and administrative suits relating to all rights and matters; actions and suits instituted by me (us) or against me (us). And that in all the matters they may substitute this Power of Attorney, compromise, execute license agreements, settlement agreements, assignment agreements, file extraordinary remedies such as nullification and/or revision and/or supplication of court decisions, conciliate, admit the facts of the case, to bid in public auction and allocate on behalf of an existing credit, desist, cancel, assign, receive, resign, notify and ratify acts done by representatives without a Power of Attorney.

En general todos los procesos civiles, constitucionales, penales, administrativos o contencioso-administrativos relacionados con todos los derechos y asuntos; acciones y procesos que promovamos o se nos promuevan; y para que en todos los asuntos, puedan sustituir este mandato, transigir, suscribir contratos de licencia, contratos de transacción, contratos de cesión, presentar recursos extraordinarios de casación y/o revisión y/o suplica, conciliar, admitir los hechos del proceso, rematar o licitar por cuenta del crédito, desistir, cancelar, ceder, recibir, renunciar, notificarse y ratificar los actos de agentes oficiosos.

Given and Signed this/Dado y firmado hoy Sherbrooke, Quebec, CANADA
in/en July 12th, 2017
Signature/Firma Jorge Uribe

File No. P2673PC00

Title: COMPOSITION FOR USE AS PESTICIDE, PLANT GROWTH REGULATOR, OR BOTH, AND USES THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority of US provisional patent application 62/116,630, filed on February 16, 2015, the specification of which is hereby incorporated by reference.

BACKGROUND

(a) Field

[0002] The subject matter disclosed generally relates to pest control and/or fertilizer compositions, and uses thereof.

(b) Related Prior Art

[0003] Soil is a reservoir for a variety of plant and animal diseases. These include diseases caused by microorganisms (fungi, bacteria, actinomyces, phytoplasmas, protozoa and viruses), and larger soil organisms such as nematodes as well as insects (e.g. ants, aphids) and small animals (e.g. slugs, snails, rodents). Plant and animal pathogens may also be spread via insect vectors or by soil animals such as nematodes. The most common disease caused by soil-borne pathogen are rots that affect below the ground plant parts, and vascular wilts as a result of root infections. Some soil-borne pathogens also cause diseases on the aboveground parts of the plants (like on the foliage).

[0004] The most important pathogen group causing soil-borne disease are the multicellular organism fungi. In general, a fungal infection can cause local or extensive necrosis. It can also inhibit normal growth (hypotrophy) or induce excessive abnormal growth (hypertrophy or hyperplasia) in a portion of or throughout an entire plant. Symptoms associated with necrosis include leaf spots, blight, scab, rots, damping-off, anthracnose, dieback, and canker. Symptoms associated with hyperplasia include clubroot, galls, warts, and leaf curls. The principal control measures include the use of disease-free seed and propagating stock, the destruction of all plant materials that may harbor pathogenic fungi, crop rotation, the development and use of resistant plant varieties, and the use of chemical and biological fungicides.

[0005] Many species of bacteria can cause disease in plants, animals and humans. The principal genera of plant pathogenic bacteria are *Agrobacterium, Clavibacter*, *Erwinia*, *Pseudomonas*, *Xanthomonas*, *Streptomyces*, and *Xylella*.

Bacterial diseases can be grouped into four broad categories based on the extent of damage to plant tissue and the symptoms that they cause, which may include vascular wilt, necrosis, soft rot, and tumors. In order for a bacterium to produce a disease in a plant, the bacterium must first invade the plant tissue and multiply. Bacterial pathogens enter plants through wounds, principally produced by adverse weather conditions, humans, tools and machinery, insects, and nematodes, or through natural openings such as stomates, lenticels, hydathodes, nectar-producing glands, and leaf scars. Losses from bacterial diseases are reduced by the use of pathogen-free seed. Bactericidal seed compounds control some bacterial diseases, such as angular leaf spot of cotton, gladiolus scab, and soft rot of ornamentals. Protective bactericidal sprays are used against bacterial blights of beans and celery, fire blight, crown gall, blackleg of delphinium, and filbert and walnut blights.

[0006] Viruses and viroids are the smallest of the infectious agents. Both viruses and viroids are obligate parasites, as they are able to multiply or replicate only within a living cell of a particular host. A single plant species may be susceptible to infection by several different viruses or viroids. Most disease-causing viruses are carried and transmitted naturally by insects and mites, which are called vectors of the virus. The symptoms of viral and viroid plant diseases fall into four groups: (1) change in color : yellowing, green and yellow mottling, and vein clearing; (2) malformations : distortion of leaves and flowers, rosetting, proliferation and witches'-brooms (abnormal proliferation of shoots), and little or no leaf development between the veins; (3) necrosis: leaf spots, ring spots, streaks, wilting or drooping, and internal death, especially of phloem (food-conducting) tissue; and (4) stunting or dwarfing of leaves, stems, or entire plants. Control is accomplished by several methods, such as growing resistant species and varieties of plants or obtaining virus-free seed, cuttings, or plants. Further control measures include controlling insect vectors by spraying plants with contact insecticides or fumigating soil to kill insects, nematodes, and other possible vectors. It also includes spraying leaves of plants with oils like mineral oil and paraffin, which helps to prevent viral propagation during insect infestation of growing plants.

[0007] A great many of the current pest control formulations, contain antimicrobial agents which are not naturally occurring. Typical antimicrobial agents include chemical disinfectants such as phenolic compounds, quaternary ammonium compounds, formaldehyde and halogen containing compounds.

Such materials are not of natural origin (i.e. not found in nature) and are prepared through chemical processing and synthesis. A great many of these "synthetic" disinfectants cause undesirable effects on both the environment and on human health. The interaction of any synthetic chemical disinfectants, let alone a number of such chemicals with the environment always comes with unexpected consequences.

[0008] The non-selective way in which synthetic chemical disinfectants control pests also makes them undesirable. The chemicals can often have unexpected and serious detrimental effects on desirable insects or animals as well as the pest insect or animal.

[0009] Because of the often detrimental effects of synthetic chemical disinfectants a number of alternatives have been proposed and researched. One such alternative is the use of natural disinfectants or pesticides. Natural disinfectants or pesticides are compounds that exist in nature (e.g. in plants, animals, or other insects) and have properties that allow them to be used as is, combined, or modified to be used as disinfectants or pesticides.

[0010] Although natural pesticides have previously been utilized, there still remains a need for effective natural pesticides that do not have the undesirable effects often exhibited by synthetic chemical pesticides.

[0011] There is therefore a need for compositions for controlling pests, for plant regulation, or both, that reduce or at least mitigate the drawbacks of the prior art.

SUMMARY

[0012] According to an embodiment, there is provided a composition for regulating plant growth comprising :

a pesticide composition consisting of :

a) from about 0.01% to about 25% weight of at least one antimicrobial isolated or synthetic phenolic compound of natural origin selected from the group consisting of thymol and/or carvacrol;
b) from about 0.001% to about 15% weight of an anionic, a cationic, an amphoteric, an non-ionic surfactant, or combinations thereof, sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% weight of a solvent;
d) sufficient water to make 100 weight percent,

and a supplement comprising

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

[0013] The antimicrobial compound may be of synthetic origin.

[0014] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0015] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0016] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0017] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0018] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0019] The pesticide may be chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

[0020] The fertilizer may be chosen from fertilizers an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

[0021] The defoamer may be chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

[0022] The plant growth regulator may be chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benazladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, N-acetylaspartic acid.

[0023] The supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

[0024] According to another embodiment, there is provided a method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of the present invention to control the pest.

[0025] According to another embodiment, there may be provided a method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[0026] The antimicrobial compound may be of synthetic origin.

[0027] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0028] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0029] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0030] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0031] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0032] The pest may be chosen from an insect, a nematode, a fungi, a bacteria, a larvae, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an algae, or combinations thereof.

[0033] The plant may be a weed. The arthropod may be a mite. The insect may be a moth. The bacteria may be chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

[0034] According to another embodiment, there is provided a method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition according to the present invention.

[0035] According to another embodiment, there is provided a method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[0036] The antimicrobial compound may be of synthetic origin.

[0037] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0038] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0039] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0040] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0041] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0042] The regulating the growth may comprise an increase in the number of fruit, vegetable, bulb or tuber from the plant.

[0043] The regulating the growth may comprise an increase in the size of fruit, vegetable, bulb or tuber from the plant.

[0044] The regulating the growth may comprise an increase in the number of healthy plants.

[0045] The plant may be chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

[0046] According to another embodiment, there is provided a method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a composition according to the present invention.

[0047] According to another embodiment, there is provided a method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[0048] The antimicrobial compound may be of synthetic origin.

[0049] The surfactant may be selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

[0050] The at least one antimicrobial compound may be from about 0.12% to about 1.15% w/w of the composition.

[0051] The at least one antimicrobial compound may be from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of the composition.

[0052] The surfactant may be from about 0.1% to about 15% (w/w) of the formulation.

[0053] The solvent may be from about 0.1% to about 40% (w/w) of the formulation.

[0054] The seed may be a tuber.

[0055] The tuber may be from a potato (kumara), a sweet potato, a yam, a cassava, and a dahilia.

[0056] The regulating the growth may comprise an increase in the length of a tuber sprout.

[0057] The following terms are defined below.

[0058] Before describing the present invention in detail, a number of terms will be defined. As used herein, the singular forms "a", "an", and "the" include plural referents unless the context clearly dictates otherwise.

[0059] The use of the word "a" or "an" when used in conjunction with the term "comprising" in the claims and/or the specification may mean "one", but it is also consistent with the meaning of "one or more", "at least one", and "one or more than one". Similarly, the word "another" may mean at least a second or more.

[0060] As used in this specification and claim(s), the words "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including, such as "include" and "includes") or "containing" (and any form of containing, such as "contain" and "contains"), are inclusive or open-ended and do not exclude additional, unrecited elements or process steps.

[0061] The term "about" is used to indicate that a value includes an inherent variation of error for the device or the method being employed to determine the value.

[0062] Weight percent, percent by weight, % by weight, wt %, and the like are synonyms that refer to the concentration of a substance as the weight of that substance divided by the weight of the composition and multiplied by 100.

[0063] It is noted that terms like "preferably", "commonly", and "typically" are not utilized herein to limit the scope of the claimed invention or to imply that certain features are critical, essential, or even important to the structure or function of the claimed invention. Rather, these terms are merely intended to highlight alternative or additional features that can or cannot be utilized in a particular embodiment of the present invention.

[0064] For the purposes of describing and defining the present invention it is noted that the term "substantially" is utilized herein to represent the inherent degree of uncertainty that can be attributed to any quantitative comparison, value, measurement, or other representation. The term "substantially" is also utilized herein to represent the degree by which a quantitative representation can vary from a stated reference without resulting in a change in the basic function of the subject matter at issue.

[0065] The term « composition » as used herein is intended to encompass a product comprising the specified ingredients in the specified amounts, as well as any product which results, directly or indirectly, from combination of the specified ingredients in the specified amounts. Such term in relation to pharmaceutical composition or other compositions in general, is intended to encompass a product comprising the active ingredient(s) and the inert ingredient(s) that make up the carrier, as well as any product which results, directly or indirectly, from combination, complexation or aggregation of any two or more of the ingredients, or from dissociation of one or more of the ingredients, or from other types of reactions or interactions of one or more of the ingredients. Accordingly, the pharmaceutical compositions or other compositions in general of the present invention encompass any composition made by admixing a compound of the present invention and a pharmaceutically acceptable carrier. By "pharmaceutically acceptable" or "acceptable" it is meant the carrier, diluent or excipient must be compatible with the other ingredients of the formulation and not deleterious to the recipient thereof.

[0066] The terms "regulating plant growth" and "growth regulation amount" are intended to mean that the method and composition of the present invention regulate at least one aspect of the growth of a plant. The regulation of growth does not need to be on all aspects of plant growth. For example, the composition of the present invention may regulate the growth of any one of the foliage, leaves, flowers, stems, branches, fruits, vegetables, bulb, tubers, or any other

part of the plant, independently from other parts of the plant. As used herein, the term "growth regulating amount" is intended to mean an amount of the composition of the present invention that causes at least one of the aspects of the growth of a plant to be regulated as defined above. The regulation of plant growth may also include an overall increase on the growth of a plant. The regulation of plant growth may also show as an increase in the number of healthy plants in a culture of plants comprising several individuals. The regulation of plant growth may also include stimulation of fruit ripening. The regulation of plant growth may also include inhibition of plant growth and shoot growth. The regulation of plant growth may also include an increase in flowering. The regulation of plant growth may also include the regulation of leaf and fruit senescence. The growth regulating amount may span a range of concentration over which the effect may be observed, and each growth regulating effects may be observed at the detriment of the growth of other parts of the plant. Preferably, the growth regulating effect may be obtained without any phytotoxic effects to the remainder of the plants, but in some embodiments this may not be possible.

[0067] The term "pesticidal amount" to mean an amount of the composition of the present invention that will be sufficient to control a given pest. This, the amount may vary according to the targeted pest, which implies that a lower concentration may be sufficient to control one pest, and that a higher concentration may be required to control another pest.

[0068] The terms "fruit" and "vegetable" are intended to mean the common language usage of "fruit" and "vegetable" which normally means the fleshy seed-associated structures of a plant that are sweet or sour, and edible in the raw state, such as apples, bananas, grapes, lemons, oranges, and strawberries. It also includes the botanical usage of "fruit" and "vegetable" which includes many structures that are not commonly called "fruits" or "vegetable", such as bean pods, corn kernels, tomatoes, and wheat grains.

[0069] The term "tuber" is intended to mean the enlarged structures in some plant species used as storage organs for nutrients. They are used for the plant's perennation (survival of the winter or dry months), to provide energy and nutrients for regrowth during the next growing season, and as a means of asexual reproduction. Stem tubers form from thickened rhizomes (underground stems) or stolons (horizontal connections between organisms). Common plant species with stem tubers include potato and yam. Some sources also treat

modified lateral roots, (root tubers) under the definition; these are encountered in sweet potato, cassava, and dahlia.

[0070] Features and advantages of the subject matter hereof will become more apparent in light of the following detailed description of selected embodiments, as illustrated in the accompanying figures. As will be realized, the subject matter disclosed and claimed is capable of modifications in various respects, all without departing from the scope of the claims. Accordingly, the drawings and the description are to be regarded as illustrative in nature, and not as restrictive and the full scope of the subject matter is set forth in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0071] Further features and advantages of the present disclosure will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0072] Fig. 1 illustrates the cumulative germination of common ragweed (AMBAR) and barnyard grass (ECHCR) for the different compositions during 21 days in Petri dishes. Vertical bars represent ± SE

[0073] Fig. 2 illustrates the adjusted seed mortality of common ragweed (AMBAR) and barnyard grass (ECHCR) for the different compositions, after 21 days in Petri dishes. Columns with the same letter are not significantly different according to Fisher's Protected LSD at α=0.05. Vertical bars represent ± SE.

[0074] Fig. 3 illustrates a visual symptoms of water, compositions 10 and 11 phytoxicity observed on common ragweed (AMBAR) and barnyard grass (ECHCR).

[0075] Fig. 4 illustrates the mean rates (± SE) of codling moth egg mortality observed 7 days after spraying. Treatments with different letters are significantly different (ANOVA, HSD Tukey-Kramer test, α=0.05).

[0076] Fig. 5 illustrates the codling moth eggs seven days after spraying with water (control) (a), composition 8 (b) and composition 10 (c).

[0077] Fig. 6 illustrates the mean rates (± SE) of two spotted spider mites mortality, 24 hours after spraying. Treatments with different letters are significantly different (ANOVA, HSD Tukey-Kramer test, α=0.05).

[0078] Fig. 7 illustrates the King B agar media containing streptomycin inoculated with bacterial suspensions for sensitivity test. Quadrant 1 (Q1), *E.*

amylovora 433; Quadrant 2 (Q2), *E. amylovora* 435; Quadrant 3 (Q3), *E. amylovora* 153sm5; and Quadrant 4 (Q4), *E. coli* ATCC25922.

[0079] Fig. 8 illustrates the King B agar media containing Composition 12 at different dilutions inoculated with bacterial suspensions for sensitivity test. Quadrant 1 (Q1), *E. amylovora* 433; Quadrant 2 (Q2), *E. amylovora* 435; Quadrant 3 (Q3), *E. amylovora* 153sm5; and Quadrant 4 (Q4), *E. coli* ATCC25922.

[0080] Fig. 9 illustrates the effect of compositions of the present invention on yield of harvested potato tubers at the end of the trial. This effect is measured as the mean of total tubers / plants (A) and mean weight of tubers and / plant (B). Light bars represent assay A where compositions of the present invention are applied alone, and dark bars represent assay B where compositions of the present invention are applied in combination with oil and fungicide.

[0081] Fig 10. illustrates the mean % of green plants after application of the compositions of the present invention. Light bars represent assay A where compositions of the present invention are applied alone, dark bars represent assay B where compositions of the present invention are applied in combination with oil and fungicide.

[0082] Fig. 11. illustrates the mean % of plants with dry leaflets after application of the compositions of the present invention. Light bars represent assay A where compositions of the present invention are applied alone, dark bars represent assay B where compositions of the present invention are applied in combination with oil and fungicide.

[0083] Fig. 12. illustrates the mean % of plants with early blight symptoms (spotted leaflets, panel A) and magnitude of symptoms (number of spots / leaflets, panel B) following the application of compositions of the present invention, in combination with oil and fungicide.

DETAILED DESCRIPTION

[0084] In a first embodiment there is disclosed a composition for regulating plant growth comprising:

a pesticide composition which consists of :

a) from about 0.01% to about 25% weight of at least one antimicrobial isolated or synthetic phenolic compound of natural origin selected from the group consisting of thymol and/or carvacrol;

b) from about 0.001% to about 15% weight of an anionic, a cationic, an amphoteric, an non-ionic surfactant, or combinations thereof, sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% weight of a solvent;
d) sufficient water to make 100 weight percent,

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

Compositions of the present invention

[0085] The phenolic compounds of natural origin as used in the present invention can be synthetically made by known methods within the capacity of a skilled technician, or can be obtained from plant oil extracts. In an embodiment of the present invention, the phenolic compounds of natural origin are obtained from plant extracts. In a further embodiment of the present invention, the phenolic compounds of natural origin are commercially available. In yet a further embodiment of the present invention, the phenolic compounds of natural origin comprise carvacrol and thymol.

[0086] In an embodiment, the pesticide compositions of the present invention comprise thymol, carvacrol or mixtures thereof. In a further embodiment, the pesticide compositions of the present invention comprise one or more natural essential oils enriched in thymol, carvacrol or mixtures of thymol and carvacrol.

[0087] In an embodiment, the pesticide compositions of the present invention further comprise a surfactant. A surfactant operative herein comprises a water soluble or water dispersible nonionic, anionic, cationic, or an amphoteric compound. In a further embodiment, the pesticide compositions of the present invention comprise one or more of the conventional anionic surfactants known in the art. A representative listing of surfactants and properties thereof is detailed in Remington's Pharmaceutical Sciences, 17th edition (Mack Publishing Company). Non-limiting examples of surfactants according to an embodiment of the present invention include sodium lauryl sulfate, sorbitan stearate, sorbitan esters, sodium laureth sulfate, sarkosyl, cocamidopropyl betaine (CAPB), sodium lauryl ether sulfonate, alkyl benzene sulfonates, nonylphenol ethoxylate, ether ethoxylate, as well as the surfactants listed in Table 9 below. It is appreciated that one or more

additional surfactants may be included in the pesticide compositions of the present invention. A surfactant (surface active agent) is generally intended to refer to a substance which when dissolved in water, or other aqueous system, reduces the surface or interfacial tension between it and another substance or material. In an embodiment of the present invention, the surfactant aids in the dispersion or emulsification of the essential oils within the aqueous carrier. According to an embodiment, the dispersion is not necessarily and homogenous dispersion. The dispersion may necessitate agitation and/or shaking prior to use. According to another embodiment, the dispersion is a homogenous dispersion. In a further embodiment of the present invention, the anionic surfactant aids in braking down the structure of biofilms through denaturation. In yet a further embodiment, the surfactant acts as a "wetting" agent. Wetting agents typically reduce the surface tension of the water molecules, allowing for a greater spreading of the solution and a deeper penetration into small crack and crevices of the surface to be treated.

[0088] In embodiments, the composition of the present invention comprises from about 0.1% to about 15% w/w surfactant, or from about 0.5% to about 15% w/w, or from about 1% to about 15% w/w, or from about 2% to about 15% w/w, or from about 3% to about 15% w/w, or from about 4% to about 15% w/w, or from about 5% to about 15% w/w, or from about 7.5% to about 15% w/w, or from about 10% to about 15% w/w, or from about 12.5% to about 15% w/w, 0.1% to about 12.5% w/w surfactant, or from about 0.5% to about 12.5% w/w, or from about 1% to about 12.5% w/w, or from about 2% to about 12.5% w/w, or from about 3% to about 12.5% w/w, or from about 4% to about 12.5% w/w, or from about 5% to about 12.5% w/w, or from about 7.5% to about 12.5% w/w, or from about 10% to about 12.5% w/w, 0.1% to about 10% w/w surfactant, or from about 0.5% to about 10% w/w, or from about 1% to about 10% w/w, or from about 2% to about 10% w/w, or from about 3% to about 10% w/w, or from about 4% to about 10% w/w, or from about 5% to about 10% w/w, or from about 7.5% to about 10% w/w, 0.1% to about 7.5% w/w surfactant, or from about 0.5% to about 7.5% w/w, or from about 1% to about 7.5% w/w, or from about 2% to about 7.5% w/w, or from about 3% to about 7.5% w/w, or from about 4% to about 7.5% w/w, or from about 5% to about 7.5% w/w, 0.1% to about 5% w/w surfactant, or from about 0.5% to about 5% w/w, or from about 1% to about 5% w/w, or from about 2% to about 5% w/w, or from about 3% to about 5% w/w, or from about 4% to about 5% w/w, 0.1% to about 4% w/w surfactant, or from about 0.5% to about

4% w/w, or from about 1% to about 4% w/w, or from about 2% to about 4% w/w, or from about 3% to about 4% w/w, 0.1% to about 3% w/w surfactant, or from about 0.5% to about 3% w/w, or from about 1% to about 3% w/w, or from about 2% to about 3% w/w, 0.1% to about 2% w/w surfactant, or from about 0.5% to about 2% w/w, or from about 1% to about 2% w/w, 0.1% to about 1% w/w surfactant, or from about 0.5% to about 1% w/w, 0.1% to about 0.5% w/w surfactant.

[0089] Phenolic compounds (*e.g.* carvacrol, thymol) are typically not sufficiently soluble in an aqueous medium. The pesticide compositions of the present invention thus typically comprise a solvent. The solvents may be hydrophilic, hydrophobic or amphiphilic in nature. In an embodiment, the pesticide compositions of the present invention comprise an amphiphilic solvent. Amphiphilic solvents are capable of solubilizing the phenolic compounds of natural origin and/or the essential oil(s) in the aqueous carrier. Non-limiting examples of solvents according to an embodiment of the present invention include methanol, ethanol, hexadecane, propylene glycol, propylene glycol *n*-butyl ether, propylene glycol methyl ether acetate, propylene glycol methyl ether, dipropylene glycol *n*-propyl ether, ethylene glycol methyl ether and hexylene glycol. The addition of a significant amount of solvent to the pesticide solutions of the present invention, allows for the solutions to be used at temperatures slightly inferior to 0°C. It is well within the capacity of a skilled technician to determine such amounts of solvent. In embodiments, the composition of the present invention comprises from about 0.1% to about 40% w/w solvent, or from about 0.5% to about 40% w/w, or from about 1% to about 40% w/w, or from about 5% to about 40% w/w, or from about 10% to about 40% w/w, or from about 15% to about 40% w/w, or from about 20% to about 40% w/w, or from about 25% to about 40% w/w, or from about 30% to about 40% w/w, or from about 35% to about 40% w/w,or from about 0.1% to about 35% w/w solvent, or from about 0.5% to about 35% w/w, or from about 1% to about 35% w/w, or from about 5% to about 35% w/w, or from about 10% to about 35% w/w, or from about 15% to about 35% w/w, or from about 20% to about 35% w/w, or from about 25% to about 35% w/w, or from about 30% to about 35% w/w, or from about 0.1% to about 30% w/w solvent, or from about 0.5% to about 30% w/w, or from about 1% to about 30% w/w, or from about 5% to about 30% w/w, or from about 10% to about 30% w/w, or from about 15% to about 30% w/w, or from about 20% to about 30% w/w, or from about 25% to about 30% w/w, or from about 0.1% to

about 25% w/w solvent, or from about 0.5% to about 25% w/w, or from about 1% to about 25% w/w, or from about 5% to about 25% w/w, or from about 10% to about 25% w/w, or from about 15% to about 25% w/w, or from about 20% to about 25% w/w, or from about 0.1% to about 20% w/w solvent, or from about 0.5% to about 20% w/w, or from about 1% to about 20% w/w, or from about 5% to about 20% w/w, or from about 10% to about 20% w/w, or from about 15% to about 20% w/w, or from about 0.1% to about 15% w/w solvent, or from about 0.5% to about 15% w/w, or from about 1% to about 15% w/w, or from about 5% to about 15% w/w, or from about 10% to about 15% w/w, or from about 0.1% to about 10% w/w solvent, or from about 0.5% to about 10% w/w, or from about 1% to about 10% w/w, or from about 5% to about 10% w/w, or from about 0.1% to about 5% w/w solvent, or from about 0.5% to about 5% w/w, or from about 1% to about 5% w/w, or from about 0.1% to about 1% w/w solvent, or from about 0.5% to about 1% w/w, or from about 0.1% to about 0.5% w/w solvent.

[0090] Since the disinfectant compositions are typically prepared on site from mixtures of ingredients in concentrated solution, tap water is used for dilution. Tap water generally has a certain amount of hardness. Since the presence of dissolved minerals (e.g. Ca^{++}, Mg^{++}) may adversely affect the performance and properties of the disinfectant composition, a sequestering agent is included in the composition to chelate the dissolved minerals in the form of a water soluble complex. Sequestering agents are well known in the art. Non-limiting examples include ethylene diamine tetraacetic acid (EDTA) sodium salt, sodium gluconate, sodium citrate, trisodium ethylenediamine disuccinate, citric acid, trisodium NTA, sodium phosphate and sodium choleate. Sequestering agents typically prevent the dissolved minerals from binding to the surfactant molecules. Moreover, sequestering agents may remove minerals from the surface to be disinfected.

[0091] In an embodiment, the pesticide compositions of the present invention comprise one or more phenolic compounds of natural origin. In an embodiment of the present invention, the phenolic compounds are selected from the group consisting of thymol and carvacrol. In a further embodiment, the pesticide compositions of the present invention comprise carvacrol. In a further embodiment, the pesticide compositions of the present invention comprise thymol. In a further embodiment, the pesticide compositions of the present invention comprise carvacrol and thymol.

[0092] In embodiments, the composition of the present invention comprises from about 0.01% to about 25% w/w, or from about 0.02% to about 25%, or from about 0.03% to about 25%, or from about 0.04% to about 25%, or from about 0.05% to about 25%, or from about 0.06% to about 25%, or from about 0.07% to about 25%, or from about 0.08% to about 25%, or from about 0.09% to about 25%, or from about 0.10% to about 25%, or from about 0.11% to about 25%, or from about 0.12% to about 25%, or from about 0.13% to about 25%, or from about 0.14% to about 25%, or from about 0.15% to about 25%, or from about 0.16% to about 25%, or from about 0.17% to about 25%, or from about 0.18% to about 25%, or from about 0.19% to about 25%, or from about 0.20% to about 25%, or from about 0.21% to about 25%, or from about 0.22% to about 25%, or from about 0.23% to about 25%, or from about 0.24% to about 25%, or from about 0.25% to about 25%, or from about 0.26% to about 25%, or from about 0.27% to about 25%, or from about 0.28% to about 25%, or from about 0.29% to about 25%, or from about 0.30% to about 25%, or from about 0.31% to about 25%, or from about 0.32% to about 25%, or from about 0.33% to about 25%, or from about 0.34% to about 25%, or from about 0.35% to about 25%, or from about 0.36% to about 25%, or from about 0.37% to about 25%, or from about 0.38% to about 25%, or from about 0.39% to about 25%, or from about 0.40% to about 25%, or from about 0.41% to about 25%, or from about 0.42% to about 25%, or from about 0.43% to about 25%, or from about 0.44% to about 25%, or from about 0.45% to about 25%, or from about 0.46% to about 25%, or from about 0.50% to about 25%, or from about 0.55% to about 25%, or from about 0.60% to about 25%, or from about 0.65% to about 25%, or from about 0.70% to about 25%, or from about 0.75% to about 25%, or from about 0.80% to about 25%, or from about 0.85% to about 25%, or from about 0.90% to about 25%, or from about 0.95% to about 25%, or from about 1.0% to about 25%, or from about 1.05% to about 25%, or from about 1.10% to about 25%, or from about 1.15% to about 25%, or from about 1.20% to about 25%, or from about 1.25% to about 25%, or from about 1.50% to about 25%, or from about 3% to about 25%, or from about 5% to about 25%, or from about 10% to about 25%, or from about 15% to about 25%, or from about 20% to about 25%, from about 0.01% to about 20% w/w, or from about 0.02% to about 20%, or from about 0.03% to about 20%, or from about 0.04% to about 20%, or from about 0.05% to about 20%, or from about 0.06% to about 20%, or from about 0.07% to about 20%, or from about 0.08% to about 20%, or from about 0.09% to about 20%, or

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[0093] Phenolic compounds typically have an associated pungent odor severely impeding large-scale applications. In an embodiment, the pesticide compositions of the present invention may thus further comprise one or more agents having the dual function of further enhancing the disinfectant properties of the compositions while imparting a more pleasant odor thereto. In yet a further embodiment of the present invention, the pesticide compositions of the present invention may further comprise one or more agents imparting a pleasant odor thereto (fragrance agent). Non-limiting examples of agents imparting a pleasant odor and/or enhancing the disinfectant properties comprise carvacrol, cymene, cineol, eugenol, thymol, menthol, citral and limonene. Further suitable examples of such agents are within the capacity of a skilled technician.

[0094] The pesticide compositions of the present invention may optionally include a wide range of additional ingredients, which may be added to the supplement present in some embodiments of the present invention. Non-limiting examples of which include colorants, pH adjusting agents, and sequestering agents. Such additional ingredients are within the capacity of a skilled technician.

[0095] In an embodiment, the pesticide compositions of the present invention comprise one or more essential oils enriched in thymol and/or carvacrol. Thymol and carvacrol are naturally occurring pesticides which are

readily degraded in the environment. As such, there is little or no accumulation in the environment or in living organisms, even following repeated application of the pesticide compositions of the present invention.

[0096] Compositions of the present invention can include any number of combinations of ingredients discussed throughout this specification (*e.g.*, phenolic compounds of natural origin, essential oils, surfactants, solvents, sequestering agents, water, *etc.*). It is also contemplated that that the concentrations of the ingredients can vary. In non-limiting embodiments, for example, the compositions may include in their final form, for example, at least about 0.0001%, 0.0002%, 0.0003%, 0.0004%, 0.0005%, 0.0006%, 0.0007%, 0.0008%, 0.0009%, 0.0010%, 0.0011%, 0.0012%, 0.0013%, 0.0014%, 0.0015%, 0.0016%, 0.0017%, 0.0018%, 0.0019%, 0.0020%, 0.0021%, 0.0022%, 0.0023%, 0.0024%, 0.0025%, 0.0026%, 0.0027%, 0.0028%, 0.0029%, 0.0030%, 0.0031%, 0.0032%, 0.0033%, 0.0034%, 0.0035%, 0.0036%, 0.0037%, 0.0038%, 0.0039%, 0.0040%, 0.0041%, 0.0042%, 0.0043%, 0.0044%, 0.0045%, 0.0046%, 0.0047%, 0.0048%, 0.0049%, 0.0050%, 0.0051%, 0.0052%, 0.0053%, 0.0054%, 0.0055%, 0.0056%, 0.0057%, 0.0058%, 0.0059%, 0.0060%, 0.0061%, 0.0062%, 0.0063%, 0.0064%, 0.0065%, 0.0066%, 0.0067%, 0.0068%, 0.0069%, 0.0070%, 0.0071%, 0.0072%, 0.0073%, 0.0074%, 0.0075%, 0.0076%, 0.0077%, 0.0078%, 0.0079%, 0.0080%, 0.0081%, 0.0082%, 0.0083%, 0.0084%, 0.0085%, 0.0086%, 0.0087%, 0.0088%, 0.0089%, 0.0090%, 0.0091%, 0.0092%, 0.0093%, 0.0094%, 0.0095%, 0.0096%, 0.0097%, 0.0098%, 0.0099%, 0.0100%, 0.0200%, 0.0250%, 0.0275%, 0.0300%, 0.0325%, 0.0350%, 0.0375%, 0.0400%, 0.0425%, 0.0450%, 0.0475%, 0.0500%, 0.0525%, 0.0550%, 0.0575%, 0.0600%, 0.0625%, 0.0650%, 0.0675%, 0.0700%, 0.0725%, 0.0750%, 0.0775%, 0.0800%, 0.0825%, 0.0850%, 0.0875%, 0.0900%, 0.0925%, 0.0950%, 0.0975%, 0.1000%, 0.1250%, 0.1500%, 0.1750%, 0.2000%, 0.2250%, 0.2500%, 0.2750%, 0.3000%, 0.3250%, 0.3500%, 0.3750%, 0.4000%, 0.4250%, 0.4500%, 0.4750%, 0.5000%, 0.5250%, 0.0550%, 0.5750%, 0.6000%, 0.6250%, 0.6500%, 0.6750%, 0.7000%, 0.7250%, 0.7500%, 0.7750%, 0.8000%, 0.8250%, 0.8500%, 0.8750%, 0.9000%, 0.9250%, 0.9500%, 0.9750%, 1.0%, 1.1%, 1.2%, 1.3%, 1.4%, 1.5%, 1.6%, 1.7%, 1.8%, 1.9%, 2.0%, 2.1%, 2.2%, 2.3%, 2.4%, 2.5%, 2.6%, 2.7%, 2.8%, 2.9%, 3.0%, 3.1%, 3.2%, 3.3%, 3.4%, 3.5%, 3.6%, 3.7%, 3.8%, 3.9%, 4.0%, 4.1%, 4.2%, 4.3%, 4.4%, 4.5%, 4.6%, 4.7%, 4.8%, 4.9%, 5.0%, 5.1%, 5.2%, 5.3%, 5.4%, 5.5%, 5.6%, 5.7%, 5.8%, 5.9%, 6.0%, 6.1%, 6.2%, 6.3%, 6.4%, 6.5%, 6.6%, 6.7%, 6.8%, 6.9%, 7.0%, 7.1%, 7.2%, 7.3%, 7.4%, 7.5%, 7.6%, 7.7%, 7.8%, 7.9%, 8.0%, 8.1%,

8.2%, 8.3%, 8.4%, 8.5%, 8.6%, 8.7%, 8.8%, 8.9%, 9.0%, 9.1%, 9.2%, 9.3%, 9.4%, 9.5%, 9.6%, 9.7%, 9.8%, 9.9%, 10%, 11%, 12%, 13%, 14%, 15%, 16%, 17%, 18%, 19%, 20%, 21%, 22%, 23%, 24%, 25%, 26%, 27%, 28%, 29%, 30%, 35%, 40%, 45%, 50%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95%, or 99% or more, or any range or integer derivable therein, of at least one of the ingredients mentioned throughout the specification and/or claims. In non-limiting aspects, the percentage can be calculated by weight or volume of the total composition. A person of ordinary skill in the art would understand that the concentrations can vary depending on the desired effect of the composition and/or on the product into which the composition is incorporated into.

[0097] The pesticide composition of the present invention may be used alone or in combination with one or more substances that are used in agricultural settings. i.e. as part of the supplements. Examples of substances include but are not limited to pesticides, such as disinfectants, fungicide, bactericide, virucide, insect repellent, arthropod repellent, nematicide, insecticide, acaricide, herbicide and plant growth regulators. Substances also include fertilizers, such as inorganic fertilizer, nitrogen fertilizer, potassium fertilizer, phosphate fertilizer, organic fertilizer, manure, compost, rock phosphate, bone meal, alfalfa, wood chips, langbeinite, cover crops, potassium sulfate, rock powder, ash, blood meal, fish meal, fish emulsion, algae, chitosan and molasses. Substances also include defoamers such as mineral oil, vegetable oil, paraffin wax, ester wax, silica, fatty alcohol, silicone, polyethylene glycol, polypropylene glycol copolymers and alkyl polyacrylates.

[0098] Pesticides

[0099] Most control measures are directed against inoculum of the pathogen and involve the principles of exclusion and avoidance, eradication, protection, host resistance and selection, and therapy. Control measures include the control of vectors of pathogens (insects and nematodes for example) and chemical control (pesticides). A variety of chemicals are available that have been designed to control plant diseases by inhibiting the growth of or by killing the disease-causing pathogens. Chemicals used to control bacteria (bactericides), fungi (fungicides), and nematodes (nematicides) may be applied to seeds, foliage, flowers, fruit, or soil. Soil treatments are designed to kill soil-inhabiting nematodes, fungi, and bacteria. This eradication can be accomplished using steam or chemical fumigants. Soilborne nematodes can be killed by applying

granular or liquid nematicides. Most soil is treated well before planting; however, certain fungicides can be mixed with the soil at planting time. Seeds, bulbs, corms, and tubers are frequently treated with chemicals to eradicate pathogenic bacteria, fungi, and nematodes and to protect the seeds against organisms in the soil—mainly fungi—that cause decay and damping-off. Seeds are often treated with systemic fungicides, which are absorbed and provide protection for the growing seedling. Protective sprays and dusts applied to the foliage and fruit of crops and ornamentals include a wide range of organic chemicals designed to prevent infection. Protectants are not absorbed by or translocated through the plant; thus they protect only those parts of the plant treated before invasion by the pathogen. A second application is often necessary because the chemical may be removed by wind, rain, or irrigation or may be broken down by sunlight. New, untreated growth also is susceptible to infection. New chemicals are constantly being developed.

[00100] Aside from plant-diseases caused by organisms listed above, animals like rodents and birds are responsible for important pre-harvest damage. On a global scale, it was recently estimated that almost 280 million undernourished could additionally benefit if more attention were paid to reducing pre- and post-harvest losses by rodents. Rodents are hazardous, as they can amplify pathogens from the environment and form reservoirs of (zoonotic) disease. With application of proper rodent control methods, it is possible to reduce the hazards of rodent-borne diseases in areas where humans, food animals and rodents are living close to each other. These control measures include animal and birds repellents.

[00101] Any organism that damages crops or reduces the fertility of land can be defined as a pest. These include fungus, bacteria, virus, insects, nematodes, parasites, gastropods, arthropods, snails, slugs, vertebrates (mammal and birds), algae, etc. Chemical used to kill or repel pests are called pesticides. As reported by the EPA, here is a list of examples of pesticides :

Table 1. Examples of pesticides

Pesticide	Targeted organism (pest)
Algicides	Control algae in lakes, canals, swimming pools, water tanks, and other sites.

Antifouling agents	Kill or repel organisms that attach to underwater surfaces, such as boat bottoms
Antimicrobials	Kill microorganisms (such as bacteria and viruses).
Attractants	Attract pests (for example, to lure an insect or rodent to a trap). (However, food is not considered a pesticide when used as an attractant.)
Biocides	Kill microorganisms.
Biopesticides	Biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals.
Disinfectants and sanitizers	Kill or inactivate disease-producing microorganisms on inanimate objects.
Fungicides	Kill fungi (including blights, mildews, molds, and rusts)
Fumigants	Produce gas or vapor intended to destroy pests in buildings or soil.
Herbicides	Kill weeds and other plants that grow where they are not wanted.
Insecticides	Kill insects and other arthropods.
Miticides (also called acaricides)	Kill mites that feed on plants and animals.
Microbial pesticides	Microorganisms that kill, inhibit, or out compete pests, including insects or other microorganisms.
Molluscicides	Kill snails and slugs.
Nematicides	Kill nematodes (microscopic, worm-like organisms that feed on plant roots).
Ovicides	Kill eggs of insects and mites.
Pheromones	Biochemicals used to disrupt the mating behavior of insects.
Repellents	Repel pests, including insects (such as mosquitoes) and birds.
Rodenticides	Control mice and other rodents.
Defoliants	Cause leaves or other foliage to drop from a plant, usually to facilitate harvest.
Desiccants	Promote drying of living tissues, such as unwanted plant tops.
Insect growth regulators	Disrupt the molting, maturity from pupal stage to adult, or other life processes of insects.
Plant growth regulators	Substances (excluding fertilizers or other plant nutrients) that alter the expected growth, flowering, or reproduction rate of plants.

[00102] Pesticides include a wide variety of substances usually targeting specific pests. Major chemical groups represented by pesticides are resumed in Table 2:

Table 2. Major Chemical Groups of pesticides

CHEMICAL GROUP	TYPE OF PESTICIDE
Acetamide	herbicide
Acylalanine + Carboxamide + Dithiocarbamate + Neonicotinoid	fungicide / insecticide
Acylalanine + Triazole	fungicide
Acylalanines	fungicide
Acylalanines + Chloronitriles	fungicide
Amide	herbicide
Amide/ Aniline	insecticide
Anilide	fungicide
Anilino Pyrimidine	fungicide
Antibiotic	fungicide
Aryloxphenoxy propionate	herbicide
Aryloxyphenoxy Acids	herbicide
Avermectin, Alcohol	miticide
Benzamide	herbicide
Benzamide + Dithiocarbamate	fungicide
Benzenamine	rodenticide
Benzimidazole	fungicide
Benzimidazole + Organophosphate + Phthalic Acid	insecticide / fungicide
Benzoic acid	herbicide
Benzothiadiazole	herbicide
Bipyridylium	herbicide
Carbamate (e.g. aldicarb, carbofuran, carbaryl, ethienocarb, fenobucarb, oxamyl, and methomyl)	Fungicide / growth regulator / insecticide / miticide / nematicide
Carbamate + Chloronitrile	fungicide
Carboxamide	fungicide
Carboxamide + Dithiocarbamate + Neonicotinoid	fungicide / insecticide
Carboxylic Acid	herbicide
Chlorinated Hydrocarbon	plant growth regulator
Chloroacetamide	herbicide
Chloro-nicotinyl	insecticide
Chloronitrile	fungicide
Chlorophenol	fungicide
Chlorophenyl	fungicide
Coumarin	rodenticide
Cyanoacetamide-	fungicide
Cyclohexanedione	Herbicide / plant growth regulator
Cyclohexanetrione	growth regulator
Dicarboximide	fungicide
Dinitroaniline	herbicide
Diphenylether	herbicide
Dithiocarbamate	fumigant, nematicide, fungicide, rodenticide, insecticide
Fatty Acid	insecticide / herbicide

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Glycine	herbicide
Guanidine	fungicide
Halogenated Hydrocarbons	fumigant
Hydroxyanilide	fungicide
Hydroxycoumarin	rodenticide
Imidazolinone	herbicide
Indanedione	rodenticide & deer repellant
Inorganic	Fungicide, algicide, insecticide, rodenticide
Microbial	Bactericide, insecticide,
Morpholine	fungicide
Neonicontinoid + Triazole + Acylalanine + Phenylpyrrole	insecticide / fungicide
Nicotine	insecticide
Nitrile	herbicide
Nitro derivative	fungicide
nitroguanidine	insecticide
Organic Acid	Herbicide, plant growth regulator
Organochlorine	Insecticide, miticide
Organometallic	Fungicide, miticide
Organophosphate	insecticide / miticide / nematicide
Organophosphate + Phthalic Acid	insecticide / fungicide
Oxadiazole	herbicide
Phenoxy	herbicide
Phenyl-Carbamate + Phenyl-Carbamate	herbicide
Phenylpyrrole + Triazole + Neonicotinoid + Acylalanine	fungicide / insecticide
Phthalamate	herbicide
Phthalic Acid + Organophosphate + Benzimidazole	insecticide / fungicide
Phthalimide	fungicide
Piperazine	fungicide
Pyrethrins	insecticide
Pyrethroid	insecticide
Pyridazinone	insecticide / miticide
Quaternary ammonium	Algaecide, disinfectant, herbicide
Quinolineacid	herbicide
Strobilurin	fungicide
Substituted benzoylurea	insecticide
Sulfonylurea	herbicide
Synethetic pyrethroid	insecticide
Tetrazine	miticide
Thiadiazole	fungicide
Thiocarbamate	herbicide
Triazapentadiene	insecticide
Triazine	fungicide
Triazole	fungicide
Uracil	herbicide
Urea	herbicide
dichloropropene	fumigant
dichloropropene + chlorpicrin	fumigant
metam sodium	fumigant, nematicide

oxine benzoate	fungicide
formaldehyde	fungicide, fumigant
stoddard solvent	herbicide
metaldehyde	molluscicide
ancymidol	plant growth regulator
ethephon	plant growth regulator
gibberellic acid	plant growth regulator
gibberellins + benazladenine	plant growth regulator
maleic hydrazide	plant growth regulator
NAA	plant growth regulator
napthalene acetamide	plant growth regulator
paclobutrazol	plant growth regulator
putrescent whole egg solids	repellents
strychnine	rodenticide
zinc phosphide	rodenticide

[00103] It is well within the skill of the person skilled in the art to determine how much of any given pesticide may be added to the compositions of the present invention in order to obtain the pesticidal effect desired.

[00104] Fertilizers and combined use of pesticides and fertilizers

[00105] Fertilizers are defined as any material of natural or synthetic origin that is added to soil to supply one or more plant nutrients essential to the growth of plants. Fertilizers come in various forms. The most typical form is solid fertilizer in granulated or powdered forms. The next most common form is liquid fertilizer. Fertilizers typically provide, in varying proportions: six macronutrients: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), and sulfur (S); eight micronutrients: boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn) and nickel (Ni). Fertilizers are broadly divided into organic fertilizers (composed of organic plant or animal matter), or inorganic or commercial fertilizers. Inorganic fertilizers include: ammonium nitrate, ammonium sulfate, ammonium thiosulfate, calcium ammonium nitrate, Calcium nitrate, Diammonium phosphate, monocalcium phosphate, potassium chloride, potassium nitrate, potassium sulfate and thermopotash. Organic fertilizers include: azomite, bioeffector, biofertilizer, compost, cottonseed meal, effluent spreading, feather meal, fish emulsion, fish hydrolysate, fish meal, manure, maxicrop, olive mill pomace, riverm, rockdust, seaweed fertiliser and slurry pit.

[00106] According to an embodiment, in agriculture, pesticides are used to limit damages caused by pests and stimulate growth, and can be used in combination with fertilizers.

[00107] It is well within the skill of the person skilled in the art to determine how much of any given fertilizer may be added to the compositions of the present invention in order to obtain the fertilizing effect desired.

[00108] Use and application of the composition of the present invention

[00109] In a second embodiment, there is disclosed a method of controlling pest, comprising contacting a soil, a seed, a plant, or combinations thereof, with pesticidal amount of the composition of the present invention. According to another embodiment, there is also disclosed a method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

[00110] The compositions of the present invention may be used for soil disinfection (fungicide, bactericide, virucide), as well as vegetable, plant and vegetal matter disinfection, which include as non-limiting examples seeds, grains, plants, trees, bushes, roots, foliage, weed, fruits, flowers, crops, graftings, and the likes. The compositions of the present inventions may also be used as plant growth regulator, insect repellents, arthropod repellents, pesticides, insecticides, nematicides, acaricides, ovicides, larvicides and adulticides.

[00111] Crops with which the composition of the present invention may be used include, for example, but are not limited to banana, apple, pear, potato, rice, coffee, citrus, onions, ginseng, soy, weed, tomato.

[00112] According to another embodiment, the compositions of the present invention may be used for soil fertilization to improve crop growth and health.

[00113] Thus, according to another embodiment, there is also disclosed a method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition according to the present invention. According to yet another embodiment, there is disclosed method for regulating the growth of a plant, the

method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of:

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[00114] Crops with which the composition of the present invention may be used include, for example, but are not limited to banana, apple, pear, potato, rice, coffee, citrus, onions, ginseng, soy, weed, tomato.

[00115] According to an embodiment, regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from the plant. According to another embodiment, regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from the plant. According to another embodiment, regulating the growth comprises an increase in the number of healthy plants. In another embodiment, regulating the growth may be of particular importance to plants whose foliage of particular interest, such as lettuce or other varieties of plants whose leaves are edible. According to another embodiment, regulating the growth comprises a stimulation of fruit ripening. According to another embodiment, regulating the growth comprises inhibition of plant and shoot growth. According to another embodiment, regulating the growth an increase in flowering. According to another embodiment, regulating the growth comprises the regulation of leaf and fruit senescence.

[00116] According to another embodiment, the composition of the present invention may be used in improving the production of seeds. Thus, according to another embodiment, there is also disclosed a method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a composition according to the present invention. According to yet another embodiment, there is disclosed method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing the seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of the phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

[00117] Crops with which the composition of the present invention may be used include, for example, but are not limited to banana, apple, pear, potato, rice, coffee, citrus, onions, ginseng, soy, weed, tomato. Particularly, the seed may be a potato tuber, and the growth regulating effect may be an increase in the length of a potato tuber sprout.

[00118] The compositions of the present invention may be applied onto a surface to be disinfected by means of a variety of techniques. In an embodiment, the compositions of the present invention may be applied using means to aerially disperse the composition of the present invention, such as by spraying, volatilizing, sublimation, aerosol, fumigation, fogging. Suitable apparatus for such purpose include but are not limited to diffusers, mist blowers, or sprayers. According to another embodiment, the compositions of the present invention may be used for coating or soaking seeds, grains, roots, etc. According to yet another embodiment, the composition of the present invention may be spread over the soil in liquid or solid form. Further means of applying the compositions of the present invention are within the capacity of a skilled technician. The compositions of the present invention can either be applied directly or can be diluted prior to application. Dilution may be from about 1:1, to about 1:10000 (liquid:composition), in a suitable liquid such as water. Due to the substantially non-corrosive nature of the compositions of the present invention, the compositions can be readily applied without undue damage to the existing physical structure (*i.e.* surface).

[00119] According to other embodiments, the compositions of the present invention may be useful in other domains of application, such as for example as deodorizer or air freshener, as preservative in cosmetics products, as pet disinfectant, in the production of surfaces coated with biocides, in food production, for the disinfection of production plants and of food containers, the

control of microbial growth in food and drinks, and the decontamination of carcasses, and as a food preservative; as a feed preservative in farming, as biocide for use in fish and shellfish farming, for example decontamination of fish eggs, ponds and equipment; as a wastewater disinfection solution; for the disinfection of cooling towers, as biocide in antifouling agents and paints in building/construction materials (including but not limited to wood, masonry, steel or other metallic materials, etc.), or marine anti-fouling paints and coatings; in fuels and plastic materials, as an animal and bird repellent, as a mole control products, as a herbicides in managing invasive species, for gardening and landscaping, and removing bracken, weed control, eg on pavements, industrial complexes and alongside roads and railways, parks and golf courses. The present invention will be more readily understood by referring to the following examples which are given to illustrate the invention rather than to limit its scope.

EXAMPLE 1

PESTICIDE SOLUTIONS

[00120] **Chemical and Physical Characteristics of the Pesticide Solutions**

[00121] The sequestering agent (sodium citrate) was first dissolved in a predetermined amount of water and stirred until dissolution. Glycol ether PM (solvent), thymol, origanum oil and optionally citral (fragrance) were then added and stirred until dissolution. Surfactant (Sodium Lauryl Sulfate) and additional water were then added and stirred until dissolution to provide a 100 wt. % composition. The final composition was stirred until a homogeneous solution was obtained. Composition 1, obtained from Composition 2 by means of dilution with water (1:100), is considered a "ready to use" composition.

Table 3. Exemplary pesticide solutions

	Thymol Crystal	Origanum Oil / Citral	Sequestrant	Surfactant	Solvent	pH
A	0.18	0.04	0.01	0.12	-	6.9
B	0.18	0.04	0.01	-	0.18	6.7
C	0.18	0.04	-	0.12	0.18	6.5
1	0.18	0.04	0.01	0.12	0.18	6.5
D	18	4	1	12	-	8.1
E	18	4	1	-	18	7.9
2	18	4	1	12	18	8.8
3	0.18	0.03	0.09	0.12	0.76	8.0
4	6	1	3	4	25	8.2
	Solubility in Water	**Stability**	**Foaming Effect**	**Foaming Effect in Hard Water**		
A	NO	NO	YES	YES		
B	NO	NO	NO	YES		
C	YES	YES	YES	NO		
1	YES	YES	YES	YES		
D	NO	NO	YES	*n/a*		

E	NO	NO	NO	*n/a*	
2	YES	YES	YES	*n/a*	
3	YES	YES	YES	YES	
4	YES	YES	YES	*n/a*	

n/a: Not applicable this formula requires dilution before use

[00122] As illustrated hereinabove, the compositions are first formulated as a "concentrate" (Compositions **2** and **4**), dilution of which provides for the preparation of Compositions **1** and **3**. Compositions **A**, **B**, **C**, **D**, **E**, **1** and **2** comprise Origanum Oil / Citral (3:1). Compositions **3** and **4** do not comprise any fragrance (citral). The compositions have a pH ranging from about 6 to about 9. Dilution using hard water did not affect the characteristics of the composition which is indicative of the efficacy of the sequestering agent.

EXAMPLE 2

BIOLOGICAL EFFICACY OF SELECTED PHENOLIC COMPOUNDS AND ESSENTIAL OILS

[00123] The minimum concentration at which a total antimicrobial activity (bactericidal activity) could be observed was determined for selected phenolic compounds of natural origin and selected essential oils using the AOAC method 955.15 ("Phenol Coefficient Method") with minor modifications. The results are indicative of the excellent antimicrobial activity of both thymol and carvacrol.

Table 4. Antimicrobial agent inhibitory concentration

Antimicrobial Agent	Minimal Concentration (v/v %)
Thymol	**0.07**
Carvacrol	**0.07**
Eugenol	**0.4**
Citral	**> 1 %**
Thyme oil	**0.3**
Origanum oil	**0.2**
Eucalyptus oil	**> 1 %**
Lemon oil	**> 1 %**

[00124] Different concentrations of essential oils and phenolic compounds of natural origin were incorporated into composition **F** (see table herein below) and inoculated with a 0.05 % bacterial suspension of *Staphylococcus aureus* (ATCC 6538; concentration of about 8 logs). After a contact time of 10 minutes, 0.1 ml of the inoculated solution was transferred to a broth culture with neutralizing (Difco 268110) and incubated over a period of 72 hours at 37°C.

The presence of turbidity in the broth culture is indicative of the survival of the microorganism.

EXAMPLE 3

MINIMUM INHIBITORY CONCENTRATION (MIC) OF SELECTED PHENOLIC COMPOUNDS

[00125] The minimum inhibitory concentration (MIC) is the lowest concentration of an antimicrobial that will inhibit the visible growth of a microorganism after overnight incubation. Minimum inhibitory concentrations are important in diagnostic laboratories to monitor the activity of new antimicrobial agent. An MIC is generally regarded as the most basic laboratory measurement of the activity of an antimicrobial agent against an organism. The MIC of thymol and carvacrol were determined against several organisms (including geophilic fungi *Trichophyton mentagrophytes and Microsporum gypseum*) and are reported in **Table 5**. The MIC values go from 0.0006% to 0.06% depending on the tested microorganism.

Table 5. MIC of thymol and carvacrol

Domain	Specie	MIC of Thymol (v/v %)	MIC of carvacrol (v/v %)
Bacteria, gram +	*Staphylococcus aureus ATCC43300* [1]	0.06	0.015
Bacteria, gram +	*Staphylococcus aureus ATCC6538* [2]	0.014	0.0175
Bacteria, gram +	*Staphylococcus epidermidis ATCC12228*[1]	0.06	0.03
Bacteria, gram -	*Pseudomonas aeruginosa ATCC2730* [2]	0.0385	0.045
Bacteria, gram -	*Treponema phagedaenis-like* [3]	0.0006	n.d.
Yeast	*Candida albicans ATCC10231* [4]	0.016	0.016
Yeast	*Candida tropicalis ATCC13803* [4]	0.016	0.016
Fungus	*Epidermophyton floccosum FF9* [4]	0.016	0.008
Fungus	*Trichophyton rubrum FF5* [4]	0.016	0.008
Fungus	*Trichophyton mentagrophytes FF7* [4]	0.016	0.004
Fungus	*Microsporum canis FF1* [4]	0.008	0.004
Fungus	*Microsporum gypseum FF3* [4]	0.016	0.004
Fungus	*Aspergillus niger ATCC16404* [4]	0.016	0.016
Fungus	*Aspergillus fumigatus ATCC46645* [4]	0.016	0.016

[1] A. Nostro et al. FEMS Microbiology Letters 230 (2004) 191-195
[2] R.J.W. Lambert et al. Journal of Applied Microbiology 91 (2001) 453-462
[3] D. Döpfer et al. Proceedings of the 9th International Conference on Lameness in Ruminants (2013) 228-229
[4] E. pinto et al. J Med Microbiol 55 (2006) 1367-1373

EXAMPLE 4

QUANTITATIVE MICROBIAL REDUCTION ASSAY

[00126] The antimicrobial activity for selected compositions of the present invention was determined. Several compositions comprising a phenolic compound of natural origin or an essential oil (0.18%) were tested to determine their effectiveness in reducing the load of *Staphylococcus aureus* (ATCC 6538). The solutions were prepared from a concentrate and diluted with water (1:100). The results are indicative of the high efficiency of Compositions **5**, **6** and **7** in reducing the load of *Staphylococcus aureus*.

Table 6. Antimicrobial efficacy of antimicrobial agents

	Antimicrobial Agent (w/w)	Sequestrant (w/w)	Surfactant (w/w)	Solvent(w/w)	Log Reduction
F	-	0.01	0.12	0.18	**0.60**
5	Thymol	0.01	0.12	0.18	**7.63**
6	Carvacrol	0.01	0.12	0.18	**7.63**
G	Eugenol	0.01	0.12	0.18	**2.50**
H	Citral	0.01	0.12	0.18	**2.04**
I	Thyme oil	0.01	0.12	0.18	**3.06**
7	Origanum oil	0.01	0.12	0.18	**7.63**
J	Eucalyptus oil	0.01	0.12	0.18	**0.71**
K	Lemon oil	0.01	0.12	0.18	**0.64**

[00127] Different compositions of the present invention were inoculated with 0.05% of a bacterial culture of *Staphylococcus aureus* (ATCC 6538) freshly incubated over a period of 48 hours at 37°C in an optimal growth medium. After a contact time of 10 minutes, 0.1 ml of the inoculated solution was seeded at different dilutions on TSA agar (Difco 255320) with neutralizing to determine the residual microbial load. The log reduction was determined by calculating the logarithm of the residual charge obtained with the reference composition (*i.e.* water) and comparing it with the residual charge obtained using any of the compositions comprising either a phenolic compound or an essential oil.

EXAMPLE 5

BIOLOGICAL EFFICACY OF COMPOSITION 1 ON SELECTED MICROORGANISMS

[00128] The pesticide compositions of the present invention exhibit a broad spectrum of activity on a variety of microorganisms. As shown herein below, the efficacy of Composition **1** against a variety of microorganisms was determined.

Table 7. Efficacy of composition 1 on selected microorganisms

Activity	Standard Method	Group of Microorganisms	Microorganism	1
Bactericidal	AOAC[1] (Dilution Test)	Bacteria Gram -	*Salmonella cholerasuis*	**Pass**
		Bacteria Gram +	*Staphylococcus aureus*	**Pass**
Fungicide	AOAC Fungicidal Activity Test	Fungus	*Trichophyton mentagrophytes*	**Pass**
Virucidal	ASTM[2] Efficacy of Virucidal Agents	Virus	*Influenza A*	**Pass**

[1]: Association of Analytical Communities, [2]: American Society for Testing and Materials

EXAMPLE 6

TOXICITY OF THE PESTICIDE COMPOSITIONS

[00129] Toxicity tests (LD_{50}) were performed on selected ingredients of the pesticide compositions of the present invention. Composition **1** was determined as having a LD_{50} of >15 g/Kg (substantially non-toxic).

Table 8. Toxicity ingredients

Ingredient	LD_{50} Oral-rat	Specification
Thymol	980 mg/kg	USP, FCC
Origanum oil	1850 mg/kg	USP, FCC
Citral	4960 mg/kg	Oxford University
Sodium Citrate	>8g/kg	USP, FCC
Sodium Lauryl Sulfate	1288 mg/kg	USP, FCC
Glycol Ether PM	5 210 mg/kg	WHMIS

EXAMPLE 7

DEMONSTRATION THAT ALL TYPES OF SURFACTANTS CAN BE USED IN THE PESTICIDE COMPOSITION OF THE PRESENT INVENTION

[00130] Surfactants can be grouped by the charge characteristics of their polar head groups. The four groups are:

1. **Anionic:** Negative charge on the polar head group. These include surfactants like sulfates, sulfonic acids and carboxylic acids.

2. **Cationic:** Positive charge on the polar head group. These include surfactants like amines and Quaternized Ammonium Compounds (Quats).

3. **Amphoteric:** Can have both positive and negative charge. Primarily used as secondary surfactants. These include betaines and imidazolium compounds.

4. **Non-ionic:** No specific charge. By far the most frequently used surfactants. These include alcohols, alkanolamides, esters and amine oxides.

[00131] The antimicrobial efficacy of the compositions of the present invention is evaluated with all types of surfactants. The different compositions tested differ only for the surfactant. All compositions are based on the general formula presented in Table 9. The different surfactants tested are presented in Table 10. The surfactants were tested at a concentration of 0.12 % (w/w) and or/ 0.35% (w/w).

Table 9. General formula of compositions 1 to 68

Ingredient	**% (w/w)**
Thymol	0.23
Surfactant	0.12 - 0.35
Solvent	0.9
Sequestrant	0.09
Water	Q.S.

Table 10. Surfactants tested in compositions 1 to 68

#	Type	Chemical group	INCI Name	# CAS
1	Anionic	Alpha Sulfo Methyl Ester	Sodium Methyl 2-Sulfolaurate (and) Disodium 2-Sulfolaurate	149458-07-1
2	Anionic	Diphenyl Oxide Disulfonate	Sodium Dodecyl Diphenyl Ether Disulfonate	119345-04-9
3	Anionic	Diphenyl Oxide Disulfonate	Sodium Decyl Diphenyl Oxide Disulfonate	36445-71-3
4	Anionic	Dodecylbenzene Sulfonic Acid & Salts	Sodium Dodecylbenzenesulfonate	68081-81-2
5	Anionic	Dodecylbenzene Sulfonic Acid & Salts	Dodecylbenzene Sulfonic Acid	68584-22-5
6	Anionic	ether carboxylate	Capryleth-9 carboxylic acid/ hexeth-4 carboxylic acid	53563-70-5 and 105391-15-9
7	Anionic	ether carboxylate	Glycolic Acid Ethoxylate Lauryl Ether	27306-90-7
8	Anionic	Isethionate	Sodium Cocoyl Isethionate	61789-32-0
9	Anionic	Lauryl Ether Sulfates	Sodium lauryl ether sulfate	9004-82-4
10	Anionic	Lauryl Sulfates	Sodium Lauryl Sulfate	151-21-3
11	Anionic	Lauryl Sulfates	Triethanolamine Lauryl Sulfate	90583-18-9
12	Anionic	Lauryl Sulfates	Magnesium Lauryl Sulfate	3097-08-3
13	Anionic	Phosphate Esters	Nonoxynol-10 Phosphate	51609-41-7
14	Anionic	Phosphate Esters	Deceth 4 Phosphate	68921-24-4
15	Anionic	Phophanates	Amino tri (methylene phosphonic acid) pentasodium salt, Na5ATMP	20592-85-2
16	Anionic	Phophanates	1-Hydroxyethylidene -1,1,-diphosphonic acid	2809-21-4
17	Anionic	Sarcosinate	Sodium Lauroyl Sarcosinate	137-16-6
18	Anionic	Sulfosuccinates	Disodium Laureth Sulfosuccinate	68815-56-5
19	Anionic	Xylene Sulfonates	Sodium Xylene Sulfonate	1300-72-7
20	Cationic	Amine Oxides	Lauramine Oxide	1643-20-5
21	Cationic	Amine Oxides	Cocamidopropylamine Oxide	68155-09-9
22	Cationic	Amine Oxides	Lauryl/Myristyl amidopropyl amine oxide	61792-31-2 and 67806-10-4
23	Cationic	Amine Oxides	tallow amine + 2 EO	61791-46-6
24	Cationic	Amine Oxides	Myristamine Oxide	3332-27-2
25	Cationic	Onium compound	Soyethyl morpholinium ethosulfate	61791-34-2
26	Cationic	Quaternized Ammonium Compound	Dioleyloylethyl hydroxyethylmonium methosulfate	94095-35-9
27	Cationic	Quaternized Ammonium Compound	Quaternium 18 (Distearyl Dimethyl Ammonium Chloride)	61789-80-8
28	Cationic	Quaternized Ammonium Compound	Alkyl Dimethyl Benzyl Ammonium Chloride	68424-85-1
29	Cationic	Quaternized Ammonium Compound	Quaternium 12 (Didecyl Dimethyl Ammonium Chloride)	7173-51-5
30	Cationic	Quaternized Ammonium Compound	Dialkyl dimethyl ammonium chloride	68424-95-3
31	Amphoteric	Betaine	Cocamidopropyl Betaine	61789-40-0
32	Amphoteric	Betaine	Cetyl Betaine	693-33-4 and 683-10-3
33	Amphoteric	Betaine	Lauramidopropyl Betaine	4292-10-8

34	Amphoteric	Imidazolium compound	Disodium Cocoamphodipropionate	68604-71-7
35	Amphoteric	Imidazolium compound	Disodium Cocoamphodiacetate	68650-39-5
36	Amphoteric	Imidazolium compound	Sodium Cocoamphoacetate	68608-65-1
37	Amphoteric	Sultaine	Lauryl Hydroxysultaine	13197-76-7
38	Nonionic	Alcohol Ethoxylates	Linear alcohol (C11) ethoxylate, POE-7	34398-01-1
39	Nonionic	Alcohol Ethoxylates	Linear alcohol (C9-11) ethoxylate, POE-2.5	68439-46-3
40	Nonionic	Alcohol Ethoxylates	Lauryl alcohol ethoxylate, POE-8	9002-92-0
41	Nonionic	Alcohol Ethoxylates	Secondary Alcohol Ethoxylates	84133-50-7
42	Nonionic	Alkanolamides	Trideceth-2 Carboxamide MEA	107628-04-6
43	Nonionic	Alkanolamides	PEG-4 Rapeseedamide	85536-23-8
44	Nonionic	Alkanolamides	PEG 5 Cocamide	68425-44-5
45	Nonionic	Alkanolamides	Cocamide DEA	68603-42-9
46	Nonionic	Alkanolamides	Lauramide MEA	142-78-9
47	Nonionic	Alkanolamides	Cocamide MEA	68140-00-1
48	Nonionic	Alkanolamides	Lauramide DEA	120-40-1
49	Nonionic	Alkanolamides	Oleamide DEA	93-83-4
50	Nonionic	Alkyl polyglycosides	Caprylyl/ Myristyl Glucosid	68515-73-1 and 110615-47-9
51	Nonionic	Alkyl polyglycosides	Lauryl/ Myristyl Glucosid	110615-47-9
52	Nonionic	Alkyl polyglycosides	Caprylyl/ Decyl Glucoside	68515-73-1
53	Nonionic	Amide	N, N- Dimethyldecanamide	14433-76-2
54	Nonionic	Biosurfactant	Sophorolipid	-
55	Nonionic	Esters	Isopropyl Myristate	110-27-0
56	Nonionic	Esters	Isopropyl Palmitate	142-91-6
57	Nonionic	Fatty acid, natural origin	Glycereth-17 Cocoate	68201-46-7
58	Nonionic	Fatty acid, natural origin	Glycereth -6 Cocoate	68201-46-7
59	Nonionic	Fatty acid, natural origin	PEG/PPG-6/2 Glyceryl cocoate	72245-11-5
60	Nonionic	Fatty Alcohol	Cetostearyl Alcohol	67762-27-0
61	Nonionic	Fatty Amine Ethoxylate	PEG 2 Cocamine	61791-14-8
62	Nonionic	Fatty Amine Ethoxylate	PEG 2 Tallow Amine	61791-26-2
63	Nonionic	Glycerol ester	Glycereth-7 Caprylate/Caprate	36145938-3
64	Nonionic	Glycerol ester	caprylic/capric triglyceride	73398-61-5
65	Nonionic	Glycerol ester	Glyceryl oleate	37220-82-9
66	Nonionic	Glycerol ester	Glyceryl stearate	123-94-4
67	Nonionic	Lactate	Lauryl Lactyl Lactate	910661-93-7
68	Nonionic	Sorbitan Ester	Polysorbate 80	9005-65-6

[00132] Antimicrobial efficacy test

[00133] 0.1 mL of bacterial culture containing *Staphylococcus aureus* is inoculated in a tube containing 10 mL of a given composition. The content of the tube is then mixed and left to stand for 2 minutes (the "contact time"). After 2

minutes, 0.01 mL of tube content is transferred to a tube containing 9 mL of a neutralizing bacterial culture media (Letheen Broth) that stops the antimicrobial action of the composition and allows microbial growth. Tubes are then checked for presence of microbial growth after 72h. For each antimicrobial efficacy test, the plating of positive controls followed by colony counting was done to establish the log reduction of *S. aureus* as a result of 2 minutes contact with compositions 1 – 68. If no growth is observed in the tested tube, the composition is considered to kill at least the bacterial load of the positive control.

[00134] Table 11 presents the results of the efficacy tests for compositions 1 – 68. The Log reduction of *S. aureus* is indicated for each composition. Each composition is formulated with the different surfactants at a concentration of 0.12 and/or 0.35% weight.

Table 11. Antimicrobial efficacy results against *Staphylococcus aureus.*

	Composition	Surfactant at 0.35% (w/w) Log reduction	Surfactant at 0.12% (w/w) Log reduction
Anionic	1	> 7.98	> 5.84
	2	> 5.04	> 5.84
	3	> 5.04	N/A
	4	> 7.98	N/A
	5	> 5.51	> 5.64
	6	> 5.76	> 5.64
	7	> 5.76	> 5.64
	8	> 5.76	> 5.64
	9	> 7.98	> 5.84
	10	> 7.98	> 5.84
	11	> 5.04	> 5.64
	12	> 5.04	> 5.64
	13	> 5.04	> 5.64
	14	> 5.04	> 5.64
	15	> 7.98	N/A
	16	> 7.98	> 5.84
	17	> 7.98	N/A
	18	> 5.04	> 5.64
	19	> 5.04	> 5.64
Cationic	20	> 4.43	N/A
	21	> 4.43	> 5.64
	22	> 5.72	> 5.64
	23	> 4.43	> 5.64
	24	N/A	N/A
	25	> 7.98	N/A
	26	> 5.76	> 5.64

	27	N/A	> 5.64
	28	> 5.04	> 5.64
	29	> 5.04	> 5.64
	30	> 7.98	> 5.84
Amphoteric	31	> 5.72	> 5.64
	32	> 4.43	> 5.64
	33	> 5.04	> 5.64
	34	> 5.04	> 5.84
	35	> 5.04	> 5.64
	36	> 5.04	> 5.64
	37	> 5.76	> 5.64
Non-ionic	38	> 4.43	> 5.64
	39	> 5.76	N/A
	40	N/A	> 5.64
	41	N/A	> 5.64
	42	N/A	> 5.64
	43	> 4.43	> 5.84
	44	> 4.43	N/A
	45	> 7.98	> 5.84
	46	> 5.04	> 5.64
	47	> 4.43	> 5.64
	48	N/A	> 5.64
	49	> 4.43	> 5.64
	50	> 7.98	> 5.84
	51	> 7.98	> 5.84
	52	> 7.98	N/A
	53	N/A	> 5.64
	54	> 6.43	> 5.64
	55	N/A	> 5.64
	56	N/A	> 5.84
	57	> 4.43	N/A
	58	> 5.76	> 5.64
	59	> 4.43	> 5.64
	60	> 4.43	> 5.64
	61	> 5.51	> 5.64
	62	N/A	> 5.64
	63	> 5.76	> 5.64
	64	> 4.43	> 5.64
	65	> 7.98	> 5.84
	66	N/A	> 5.64
	67	> 5.76	> 5.64
	68	> 4.43	> 5.64

Conclusions

[62] Each type of surfactants (anionic, cationic, amphoteric and non-ionic) was tested in the pesticide composition of the present invention. Compositions 1 – 68 covered the different types of surfactants, but also the most common chemical groups of surfactants available on the market. The

composition of the present invention therefore can be formulated with any surfactant, while maintaining the antimicrobial efficacy.

[63] From the results found in Table 11, it is clear that compositions 1 – 68 of the present invention maintain antimicrobial efficacy with a contact time of 2 minutes.

EXAMPLE 8

EFFICACY AGAINST MAJOR PESTS: WEED

[64] Weed control remains a major concern in agriculture. The presence of weeds can result in a significant crop yield reduction, quality loss and harvesting difficulties. The herbicidal efficacy of compositions of the present invention was tested 1) on seed germination of two weed species and 2) the phytotoxicity effect of compositions of the present invention on seedlings of two weed species.

[65] **Compositions**

[66] The compositions are prepared with the % (w/w) of ingredients found in Table 12.

Table 12 – Compositions tested

Composition	8	9	10	11	12
Thymol %	0.23	0.46	1.15	2.30	23.00
Surfactant %	0.12	0.24	0.60	1.20	12.00
Solvent %	0.36	0.72	1.80	3.60	36.00
Water %	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

[67] Experiment 1: Composition 8, 9 and 12 efficacy was evaluated in comparison with the control treatment receiving water only. Each experimental unit consisted of a Petri dish containing a filter paper and 25 seeds per weed species. The two weed species tested were a dicotyledonous, common ragweed, and a monocotyledonous, barnyard grass. Five milliliters of each compositions were poured into the Petri-plate containing seeds, which was subsequently sealed. There were four replicates per concentration. The Petri dishes were placed in a growth chamber at 27°C with a photoperiod of 16: 8 (day: night). Treatments were arranged in a completely randomized design. Germination was evaluated every two or three days for 21 days of incubation. At each observation

date, the number of germinated seeds (with visible radicle) was counted and removed from the Petri. At the end of the test, non-germinated seeds were submitted to the tetrazolium test (Peters 2000) to assess their viability. Seed coat was incised with a scalpel and soaked in a 1% triphenyl tetrazolium chloride solution for 12 hours. Seeds were then dissected under binocular in order to reveal the embryo structure. The living tissues turned red and dead tissues did not stain. Each embryo was examined and difference in staining color on seed tissue was interpreted to determine the seed viability. Cumulative mortality was adjusted to take into account the natural mortality in the control.

[68] Results: The total germination in the control treatment was 64 and 87% for common ragweed (AMBAR) and barnyard grass (ECHCR) respectively. Seed germination was delayed when compositions 8, 9 and 12 were applied (**Fig. 1**). There was no germination of ragweed seeds with composition 12 while 9% of the seeds of barnyard grass were able to germinate. Mortality increased as concentration of thymol in the compositions increased to reach a maximum of 100% for ragweed and 90% for barnyard grass (**Fig. 2**).

[69] Experiment 2: Seedlings of two weed species (common ragweed and barnyard grass) were transplanted into 50-multi-cell trays filled with potting soil. In total, 480 seedlings were transplanted: compositions 8, 9, 10, 11, 12 x 10 plants/concentration x 2 weed species x 4 replications. After 3 days, when transplanted seedlings were well established into multi-cell trays, they were sprayed with the different compositions by using a hand pump sprayer, at a volume application rate of 225 l ha^{-1}. The growing stages of weeds at spraying time ranged from 2 to 4 leaves and 3 to 5 leaves, respectively for common ragweed and barnyard grass. The trays were placed in a growth chamber at 25° C with a photoperiod of 16:8 (day: night) throughout the test. Treatments were arranged in a completely randomized design. Assessments of phytotoxicity were performed one week after spraying in each replicate for incidence (percentage of affected plants) and severity (affected leaf and stem area). "Weighed severity" was expressed by using a scale with five classes: (1: slight; 2: moderate; 3: high; 4: very high; 5: dead plant).

[70] Results: Visual symptoms of injury were readily apparent. Phytotoxicity severity on leaves and stems increased as concentration of thymol in the compositions increased (**Fig. 3**, **Table 13**).

Table 13. Compositions phytoxicity incidence and severity on common ragweed and barnyard grass seedlings [1].

Species	Composition	Incidence (%)	Weighed severity
AMBAR [2]	Water	0.0 c	0.00 e
	8	35.0 b	1.00 d
	9	92.5 a	2.25 c
	10	100.0 a	3.85 b
	11	100.0 a	4.78 a
	12	100.0 a	5.00 a
ECHCR [3]	Water	0.0 c	0.00 d
	8	40.0 b	1.14 c
	9	100.0 a	1.30 c
	10	100.0 a	3.58 b
	11	100.0 a	4.72 a
	12	100.0 a	5.00 a

[1] Means with the same letter are not significantly different according to Fisher's Protected LSD at P=0.05.
[2] AMBAR: common ragweed.
[3] ECHCR: barnyard grass.

[71] Conclusions: As demonstrated above, compositions of the present invention have herbicidal activity on common ragweed and barnyard grass. Weed seed germination was reduced and the aerial parts of plants were injured significantly by compositions 8, 9, 10, 11 and 12 meaning the compositions are acting as contact herbicides when applied pre and post-emergence of weed seedlings.

EXAMPLE 9

EFFICACY AGAINST MAJOR PESTS: INSECTS AND MITES

[72] Bioassays on two biological models, major pests in fruit and vegetable production, the codling moth, Cydia pomonella (L.) and the two-spotted spider mite, Tetranychus urticae Koch were conducted. The insecticidal effect (ovicidal) of compositions of the present invention on eggs of codling moth (CM) and the acaricidal effect of compositions of the present invention on two-spotted spider mite (TSSM) were evaluated.

[73] **Compositions**

[74] The compositions are prepared with the % (w/w) of ingredients found in **Table 14**.

Table 14 – Compositions tested

Composition	8	10
Thymol %	0.23	1.15
Surfactant %	0.12	0.60
Solvent %	0.36	1.80
Water %	Q.S.	Q.S.

[75] Part I. Evaluate the insecticidal effect (ovicidal) of compositions of the present invention on eggs of the codling moth. Codling moth (CM) eggs and adults were obtained from OKSIR (Kelowna, BC) and have been used for laboratory rearing in a growth chamber. Adults were placed in plastic bags to allow egg laying. Compositions 8 and 10 were evaluated and compared to a control composed of water. Topical application was used to evaluate insecticidal effect on CM eggs. Eggs laid less than 24 h were collected. Groups of 15 eggs were placed in Petri dishes and considered as a replicate. Ten replicates were sprayed for each composition. Petri dishes were placed under rearing condition. The effect of treatments on egg hatching was assessed 7 d after spraying (after completion of egg development). Data were analysed by a one-way analysis of variance followed by the HSD Tukey-Kramer test to compare the treatments. The critical point (α) was determined at 0.05.

[76] Results: Treatments were significantly different with higher mortality rates for compositions 8 and 10 compared to the control (**Fig. 4**). The highest mortality rate was observed for composition 10. Control eggs showed a normal development (**Fig. 5a**). Treated eggs with composition 8 seemed to have started embryogenesis but most of them did not complete it. These eggs had liquid vitellus (**Fig. 5b**). Most of the eggs treated composition 10 were dried and mortality reached 100% seven days after spraying (**Fig. 5c**).

[77] Part II. Evaluate the acaricidal effect of compositions of the present invention on the two-spotted spider mite (TSSM). The TSSM were obtained from Anatis Bioprotection (St-Jacques-le-Mineur, QC) and have been used for laboratory rearing on young bean plants (Phaseolus vulgaris (L.) cv. Gold rush). Only motile forms were used for bioassay. Compositions 8 and 10 were evaluated and compared to a control composed of water. Topical application was used to evaluate acaricidal effect on motile forms of TSSM. Fifteen TSSM were deposited on a young Lima bean leaf, underside up, resting on a 1.5 % agar in Petri dishes and considered as a replicate. Ten replicates were sprayed. Petri

dishes were placed under rearing condition. Mortality was evaluated 24h after spraying. Data were analysed at each sampling date by a one-way analysis of variance followed by the HSD Tukey-Kramer test to compare the treatments. The critical point (α) was determined at 0.05.

[78] Results: Treatments were significantly different 24h after spraying (**Fig. 6**). The highest mortality rate was observed for composition 10.

[79] Conclusions: The insecticidal and acaricidal effects of compositions of the present invention were very high especially for the eggs of the codling moth and the motile forms of the TSSM. An ovicidal effect of the compositions was observed. Since the eggs of the codling moth are exposed on apples or on apple leaves during oviposition in the orchards, these results suggest that no larvae would emerge from eggs and that no damage would be caused to apple by this pest. Moreover, the high toxicity of the compositions observed 24 hours after application on motile forms of TSSM is also an important criterion for controlling promptly this pest in the presence of high population density.

EXAMPLE 10

EFFICACY AGAINST MAJOR PESTS: BACTERIA

[80] Fire blight, which causative agent is *Erwinia amylovora* is an important disease of apple, pear and some ornamental plants causing important economic losses for growers. Strategies for fire bight control include many integrated pest management practices including cultivar choice, infected parts removing, and copper sulfate or streptomycin applications. However, those treatments raise many concerns regarding toxicity (copper sulfate) and antimicrobial resistance development (streptomycin). An alternative treatment is needed and compositions of the present invention would be perfect candidates. The sensitivity of three strains of *Erwinia amylovora* to compositions of the present invention under laboratory conditions was determined and compared to the gold standard streptomycin, commonly used to control fire blight.

[81] **Composition**

[82] Composition 12 is prepared and is used to make the tested dilutions of 1, 2.5 and 5%.

Table 15 – Composition tested

Composition	12	1% dilution	2.5% dilution	5% dilution

Thymol %	23.00	0.23	0.58	1.15
Surfactant %	12.00	0.12	0.30	0.60
Solvent %	36.00	0.36	0.90	1.80
Water %	Q.S.	Q.S.	Q.S.	Q.S.

[83] Two streptomycin-sensitive (Sm^S) strains of *E. amylovora* originated from Quebec, Canada (strains 433 and 435) and one streptomycin-resistant (Sm^R) strain originated from Oregon, USA (strain 153sm5). A streptomycin-sensitive *E. coli* strain, used as control, was obtained from ATCC® (ATCC 25922TM). A sufficient quantity of composition 12 was dispensed into bottles containing King B agar medium, in order to obtain 1, 2.5 and 5% (v/v) solutions (corresponding to compositions containing thymol ranging from 0.23 to 1.15%). The 0% (v/v) concentration was obtained by adding 25 ml of ultra-pure sterile water to 475 ml of cooled medium. A volume of 20 ml of media was then distributed in 100x15 mm sterile Petri dishes. *E. amylovora* and *E. coli* strains were cultivated on King B agar medium for 72 h at 26°C and on Trypticase Soy Agar medium overnight at 37°C, respectively. Individual colonies from plates were suspended in 5 ml of sterile saline solution (0.85% w/v) and adjusted to a cell density of approximately 15 x 10^8 colony-forming units (cfu) per milliliter. Aliquots (100 µl) of a dilution series of each bacterial suspension were spread on surfaces of King B agar medium and incubated for 72 h at 26° C. Bacterial strains were tested for streptomycin sensitivity at the following concentrations: 0, 100, 250 and 500 ppm. Bacterial strains were tested for composition 12 sensitivity at the following concentrations: 0%, 1%, 2.5%, and 5%. Briefly, the four strains by plate were tested for each concentration. An aliquot of 100 µl of each bacterial suspension was dropped on one of the four quadrants agar surface as follows: Q1) *E. amylovora* 433; Q2) *E. amylovora* 435; Q3) *E. amylovora* 153sm5; and Q4) *E. coli* ATCC 25922. Bacterial growth at the inoculation point was evaluated using a Quebec dark field colony counter after 24, 48 and 72 hours of incubation at 26°C. Sensitivity was determined from triplicate plates for each concentration.

[84] Results: The two Sm^S strains of *E. amylovora* and the *E. coli* strain were sensitive to streptomycin and did not grow on King B agar media containing streptomycin concentrations of 100, 250 and 500 ppm. In contrast, the Sm^R strain of *E. amylovora* was not inhibited by streptomycin at any concentration tested

(**Fig. 7**). All strains of *E. amylovora* and *E. coli* strain showed growth on King B agar media with no streptomycin.

[85] The two Sm^S strains of *E. amylovora*, the Sm^R strain of *E. amylovora* and the *E. coli* strain were sensitive to compositions of the present invention and did not grow on King B agar media containing composition 12 at concentrations of 1, 2.5 and 5% (**Fig. 8**). All strains of *E. amylovora* and *E. coli* strain showed growth on King B agar media with no composition 12.

[86] Conclusions: Results showed the bactericidal effect of compositions of the present invention on *Erwinia amylovora*, a major bacterial pest in orchards. Moreover, compositions of the present invention had an efficacy against an antibiotic resistant strain. Antibiotic (streptomycin) is currently the most widely used substance to fight fire blight in orchards and antibiotic resistance is rising. Compositions of the present invention are not only effective against this plant disease but also present an alternative treatment.

EXAMPLE 11

AGRONOMIC IMPACT ON POTATO CULTURE

[87] Seed potato growers commonly use mineral oil-fungicide mix in their crop management practices to fight fungal diseases and against propagation of many viruses transmitted by aphids. Growers must combine or alternate the active molecules of the fungicides to reduce the risk that pathogenic fungi develop fungicide resistance. An effective fungicide treatment must have no impact, or positive impact on agronomic variables, in other words the fungicide dosage should allow mimimal phytotoxic effect for maximum phytoprotection and productivity. In this example, impact on productivity (agronomic impact) was evaluated.

[88] Compositions of the present invention were evaluated for different agronomic variables, on potato plants. The potato cultivars Dark Red Chieftain (mid-season, round, red), Superior (mid-season, round, white) and Russet Burbank (late season, long, white) have been used in the trials. These varieties are representatives of the major markets of ware, peeled or seed potatoes. The following agronomic variables were studied: 1) phytotoxicity; 2) number and weight of tubers; 3) green plant percentage; 4) percentage of plants bearing dry leaflets; 5) percentage of plants with potato early blight.

[89] Compositions of the present invention were applied A) alone, or B) in combination with a mix of mineral oil Superior 70 (10L/ha) and one of the following fungicides: Ridomil (208mL/ha, comprising MEFENOXAM™ (Metalaxl-M) as active ingredient), Bravo 500 (2.4L/ha, containing chlorothalonil as active ingredient) or Manzate-Pro (2.24Kg/ha, a coordination product of zinc ion and manganese ethylenebisdithiocarbamate, as an activeingredient), used in alternance. The compositions were applied five times on potato plants with seven to ten days intervals. The study has been realized in a potato field in Quebec, Canada. The experimental design comprised a group of 4 blocks of 5 plots for A) and 4 blocks of 4 plots for B). These trials have been realized from July to October. The first application was done 40 days after the plantation. Tubers were harvested after 80 days of growth. The control treatment was for A) water, and for B) water, and a mix of oil and fungicide.

Table 16– Composition tested

	A: composition tested alone Control: water				B: Composition tested in combination with a mineral oil-fungicide mix (Ridomil, Bravo or Manzate-Pro, in alternance) Controls: water and mineral oil-fungicide	
Composition	9	8	13	14	15	16
Thymol %	0.46	0.23	0.12	0.02	0.46	0.12
Surfactant %	0.24	0.12	0.06	0.01	0.24	0.06
Solvent %	0.72	0.36	0.18	0.04	0.72	0.18
Applied in field with oil and fungicide	no	no	no	no	yes	yes
Water %	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.	Q.S.

1) Phytotoxic effect of composition of the present invention:

[90] Phytotoxicity symptoms have been assessed after the spray applications of the compositions alone or combined with mineral oil and a fungicide. The results obtained after all 5 spray applications are summarized in Table 17.

[91] In summary, It was demonstrated that compositions of the present invention can be applied with no or low phytotoxic effects on potato plants. Phytotoxic effects are generally observed when the compositions of the present invention have higher concentrations of thymol (> 0.23% thymol), surfactant and solvent. The phytotoxicity is thus dose-dependent. Higher dosage of thymol, surfactant and solvent can be tolerated by other plant species.

Table 17– Evaluation of the phytotoxicity of the spray application of compositions of the present invention on potato plants

Composition applied		Observations of the sprayed leaves and plants, after 5 sprayed applications with seven to ten days intervals
A	Water	Good turgescence, green midrib and foliage, leaves without spots and chlorosis
	9	Embossment, dark green midrib and foliage, many necrotic spots localized at the puddles
	8	Light wilting, dark green midrib and foliage, few necrotic spots localized at the puddles
	13	Good turgescence, green midrib and foliage, few necrotic spots localized at the puddles
	14	Good turgescence, green midrib and foliage, leaves without spots and chlorosis
B	Water	Good turgescence, green midrib and foliage, leaves without spots and chlorosis
	Oil + Fungicide	Good turgescence, green midrib and foliage, several leaves with spots and chlorosis
	15	Dark green midrib and foliage, many leaves embossments and necrotic spots localized at the puddles, several dry stems or leaves
	16	Light embossment, dark green midrib and foliage, few necrotic spots localized at the puddles

2) Potato yield (number and weight):

[92] Figures 9A and B present the average number (A) and weight (B) of tubers harvested at the end of the trial. It has been calculated for the total number of tubers harvested by plant, by plot and by treatment. The average number and weight of tubers per plant was determined in order to evaluate the impact of compositions of the present invention, alone or in a mineral oil-fungicide mix, on the plant physiology and the plant capacity to grow tubers initiated after the flowering period.

[93] In summary, and in concordance with phytotoxicity evaluation, there is a tendency for the average number and weight of tubers per plant to

decrease progressively as the concentration in thymol, surfactant and solvent increases in the compositions applied alone on the foliage of the potato plants. Composition 13 was determined as having the best impact on potato yield, when compared to the water control. In the second part of the assay, the compositions were applied in combination with mineral oil and a secondary fungicide. It was observed that for composition 16, embodiment of the present invention, the average weight of tubers was comparable to the controls, but that the number of tubers recovered / plants was unexpectedly greater than the controls. A synergistic effect between the composition of the present invention, oil and fungicide results in a positive impact on this agronomic variable.

3) Green plants.

[94] Figure 10 shows the percentage of green plants in accordance with the applied compositions. A plot with a high percentage of green plants shows plants displaying a turgid green canopy with almost no spots or necrosis and the plants are occupying all the space on the row. A plot with plants displaying spotted or dry leafs and stems has an uneven canopy. These plots will have a smaller percentage of green plants.

[95] In summary, for part A of the assay, the highest average percentage of green plants was found in the plots where composition 13 was applied alone, compared to the water treatment. For part B of the assay, more green plants resulted from the application of composition 16 in combination with oil and fungicide, compared to water or oil + fungicide alone. From these results, and with a composition containing specifically 0.12% of thymol, we unexpectedly observe that a) composition of the present invention has positive agronomic impact on the foliage of the potato plant and b) there is a synergistic effect between the composition, oil and another fungicide on this variable.

4) Plants with dry leaflets.

[96] Figure 11 shows the percentage of plants with dry leaflets. In summary, results are in accordance with the percentage of green plants. For part A of the assay, the smallest average percentage of plants displaying dry leaflets was found in the plots where composition 13 was applied alone, compared to the water treatment. For part B of the assay, less dry leaflets resulted from the application of composition 16 in combination with oil and fungicide, compared to water or oil + fungicide alone. From these results, and with a composition containing specifically 0.12% of thymol, we observe that a) composition of the

present invention has positive agronomic impact on the foliage of the potato plant and b) there is a synergistic effect between the composition, oil and another fungicide on this variable.

5) Plants with potato early blight.

[97] Plants affected by the early blight caused by the fungi *Alternaria alternata* (Fr :Fr) Keissl have leaves displaying well defined concentric brown spots. Spots from the early blight dry up progressively and when there are too many, the foliage dries up completely. Figures 12A and B shows the average percentage of plants displaying spotted leaflets per plot (A), and the average number of spot per leaflets (B), for the compositions applied in combination with oil and fungicide, compared to the controls water, and oil + fungicide.

[98] In summary, the percentage of plants presenting symptoms of the fungal infection early blight was lower in plots treated with oil + fungicide, compared to water. When compositions of the present invention were applied with oil and fungicide, there was a greater decrease in symptoms, suggesting a synergistic phytoprotective effect between compositions of the present invention and oil+ fungicide.

[99] In conclusion, some compositions of the present invention can present phytotoxic effect on potato plants, but these effects may not be observed on other plants / crops. For this reason, the compositions should not be limited to the ones presenting no phytotoxic effect in this trial. It was also found that compositions of this invention presenting low phytoxicity on potato plants were having a positive impact on different agronomic variables, particularly when the compositions were applied in combination with mineral oil and another fungicide. The synergistic effect between these components was observed on potato yield (quantity and weight of potatoes harvested, appearance of foliage) suggesting composition of the present invention can act as plant growth regulators, an unexpected result. This observation may be of particular importance to plants whose foliage of particular interest, such as lettuce or other varieties of plants whose leaves are edible. The synergistic effect was also observed on phytoprotection (protection against early blight), so the compositions of the present invention also have a fungicidal effect.

EXAMPLE 12

USAGE FOR POTATO SEED GROWING

[100] Potato seed growers use pesticides to disinfect warehouses, tubers storage bins and machinery in order to produce pathogen-free tubers for the industry. *Clavibacter michiganensis* is a pathogen that causes the bacterial ring rot of potato, and causes major concerns for the seed potato industry all around the world. In this trial, it was examined if compositions of the present invention have a bactericidal effect on the pathogen on 1) agar plates and 2) wooden surface while 3) the phytotoxic effect of the compositions was evaluated on potato tubers with sprouts.

1) Bactericidal effect on agar plates

[101] The bacterial strain used for this test was *Clavibacter michiganensis subsp. Sepedonicus* (*Cms*, Potato bacterial ring rot). Fresh suspension of 10^9 cells/mL was prepared in sterile NaCl 0.85% using loops of an actively growing purified culture of *Cms* kept on Tryptic Soy Agar (TSA). An aliquot of 100 µL of a fresh suspension was evenly spread on a TSA plate and four replicates per pathogens assay were prepared. The plates were left to dry for 2 hours in a biological hood. Then four sterile Whatmann no1 filter disks of 1.2 cm diameter were placed at squared angles from each other to form a cross onto the surface of the inoculated TSA plate.

[102] A volume of 50 µL of water or one of the tested composition (Table 18) was deposited on a sterile filter disk. The four plates per Cms assay were incubated at 22°C for four days. After each 24 hours of a three day period, a volume of 50 µL of each composition was applied on the corresponding filter disk. The radial zone of bacterial growth inhibition was evaluated for each filter disk after the 3rd and the 4th day of incubation. Results are presented in Table 19.

[103] In summary, Compositions 8 and 13 showed bactericidal effect on Cms. The cumulative effects of three applications of these compositions have increased, over a 24 hours period, the radial zone of Cms growth inhibition from each filter disk.

Table 18– Composition tested

Composition	8	13	14
Thymol %	0.23	0.12	0.02
Surfactant %	0.12	0.06	0.01
Solvent %	0.36	0.18	0.04
Water %	Q.S.	Q.S.	Q.S.

Table 19– Bactericidal effect of three applications of compositions 8, 13 and 14 on *Clavibacter michiganensis subsp. sepedonicus (Cms)*

Composition	3 days mean (mm)			4 days mean (mm)		
Water	0.0	±	0.0	0.0	±	0.0
8	2.8	±	0.5	9.0	±	2.4
13	2.0	±	0.0	4.1	±	1.2
14	0.0	±	0.0	0.0	±	0.0

2) Bactericidal effect on wood

[104] In order to mimic warehouse conditions, composition 8 of the present invention was tested on bacterial contamination of wood surface. A fresh suspension of 10^9 cells/mL (1.0 OD 600 nm) was prepared in sterile NaCl 0.85% using loops of an actively growing purified culture of Cms kept on Tryptic Soy Agar (TSA). An aliquot of 100 µL of a fresh suspension was evenly spread on a 3 cm^2 surface of a wood stick and twelve replicates per pathogens assay were prepared. The sticks were left to dry for 2 hours in a biological hood. A volume of 4 mL of Composition 8 or 4 mL of sterile NaCl 0.85% was deposited in a tube to cover a little more than the surface of a wood stick. Four replicates of each solution were prepared. The eight wood sticks per Cms assay were incubated at 22°C for 10 min. Then, each wood stick was left to dry for at least 20 min on a sterile filter paper in a biological hood. Then each wood stick was immersed in sterile NaCl 0.85% for 5 min under constant agitation to wash out the bacterial cells from the wood surface. As a control, four contaminated wood surface that were not immersed in Composition 8 or NaCl 0.85% were also washed in NaCl 0.85% for 5 min under constant agitation. For each resuspension, a volume of 100 µL was spread evenly on a TSA plate. Also, a volume of 100 µL of a 100 fold dilution was spread evenly on a TSA plate. For each Cms assay, the 24

inoculated TSA plates were incubated at 22°C for 4 days. The total number of bacterial colonies was determined on each TSA to assess the bactericidal effect of Composition 8 when applied to disinfect a highly contaminated wood surface.

[105] Between 3.4 x 10^7cells and 5.7 x 10^7 cells of Cms cells were washed out from wood surfaces that were not treated or treated with the negative control solution NaCl 0.85%. No viable bacterial cells of Cms were washed out from the wood sticks that were treated with Composition 8. The wood surfaces contaminated with Cms cells were efficiently disinfected with Composition 8.

3) Phytotoxic effect on potato tubers with sprouts.

[106] The phytotoxic effect of Compositions 8, 13 and 14 on potato tubers and sprouts was evaluated using Dark Red Chieftain tubers. The storage temperature was gradually increased from 8°C to 18°C to break their dormancy. The sprout length was monitored to confirm that 50 tubers showed sprout length varying between 0.5 cm and 1.5 cm (Group A), while 50 tubers showed sprout length varying between 2.0 cm and 4.5 cm (Group B). The length of each sprout of each tuber was recorded.

[107] Compositions 8, 13 and 14 were prepared, along with the water control. Ten tubers of each group (A, B) were put in a meshed basket to be immersed 5 seconds into one of the 4 solutions. The tubers were left to dry before being put in a potting mix used to grow potato plants. 4 containers suitable to sustain the growth of 20 tubers (10 tubers per group) were used, one for each of the 4 treatments. All the tubers were covered with no more than 2 cm of potting mix. The containers were kept in a growth chamber under a 16 hours photoperiod at 22°C (day) and 18°C (night). Water was added to each container just enough to keep the soil humid.

[108] After 12 days, the tubers were carefully taken out of the potting media. For each tuber, the length of each sprout was determined. To evaluate the effect of each treatment, the increase in the total sprouts length per tuber was calculated for each tuber groups. The results are presented in Table 20.

[109] In summary, when compositions 8 and 13 were applied, an increase in the average length of sprouts was observed, compared to the water treatment. This was not observed with composition 14 that had the lowest concentration of each ingredient (thymol, surfactant and solvent). Also, very few phytotoxic effects were observed during the experiment, as only three tubers showed sprout necrosis in group A. Thus, it was herein shown that compositions

of the present invention can unexpected stimulate the growth of sprouts on potato tubers. Not only some compositions of the present invention harbor low phytotoxicity on germinated potato tubers, but it is also a plant growth regulator with positive impact on the growth of sprouts of potato tubers.

Table 20– Impact of compositions 8, 13 and 14 on the average increase of sprouts length per tuber for two groups (A and B) of tubers treated.

Group	Composition	Mean increase of sprouts length/tuber (mm)		
A	Water	9.1	±	2.1
A	8	15.1	±	6.4
A	13	11.2	±	3.3
A	14	4.0	±	0.7
B	Water	15.5	±	2.9
B	8	27.6	±	7.0
B	13	24.9	±	6.2
B	14	10.4	±	2.8

[110] In conclusion, compositions of the present invention showed again their potential as a pesticide product for crop protection. Here, the compositions were effective in killing bacteria responsible for tubers infection in seed grower's installations, thus demonstrating its potential in preventing seed bacterial disease. Finally, specific compositions of the present invention presented very low phytotoxic effects on potato tubers, and they were at the same time stimulating the growth of sprouts on tubers, which is a desirable and unexpected effect for seed growers. The dual effect (bactericidal and growth stimulator) of compositions of the present invention was also unexpected.

[111] While preferred embodiments have been described above and illustrated in the accompanying drawings, it will be evident to those skilled in the art that modifications may be made without departing from this disclosure. Such modifications are considered as possible variants comprised in the scope of the disclosure.

File No. P2673PC00

CLAIMS:

1. A composition for regulating plant growth and/or control pests, the composition comprising:
a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent;

and a supplement comprising:

at least one of a pesticide, a fertilizer, a defoamer, a plant growth regulator, or combinations thereof.

2. The composition of claim 1, wherein antimicrobial compound is of synthetic origin.

3. The composition of claim 1, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

4. The composition of any one of claims 1 to 3, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

5. The composition of any one of claims 1 to 4, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

6. The composition of any one of claims 1 to 5, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

7. The composition of any one of claims 1 to 6, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

8. The composition of any one of claims 1 to 7, wherein said pesticide is chosen from an algicide, an antifouling agent, a disinfectant, a fungicide, a fumigant, an herbicide, a molluscicide, an ovicide, a rodenticide, an insect growth a bactericide, a virucide, an insect repellent, an arthropod repellent, a nematicide, an insecticide, an acaricide, an herbicide, and a plant growth regulator.

9. The composition of any one of claims 1 to 8, wherein said fertilizer is chosen from fertilizers an inorganic fertilizer, a nitrogen fertilizer, a potassium fertilizer, a phosphate fertilizer, an organic fertilizer, a manure, a compost, a rock phosphate, a bone meal, an alfalfa, a wood chip, a langbeinite, a cover crops, potassium sulfate, a rock powder, ash, a blood meal, a fish meal, a fish emulsion, an algae, a chitosan and a molasse.

10. The composition of any one of claims 1 to 9, wherein said defoamer is chosen from a mineral oil, a vegetable oil, a paraffin wax, an ester wax, a silica, a fatty alcohol, a silicone, a polyethylene glycol, a polypropylene glycol, copolymer, and an alkyl polyacrylate.

11. The composition of any one of claims 1 to 10, wherein said plant growth regulator is chosen from a carbamate, a chlorinated hydrocarbon, cyclohexadione, an organic acid, ancymidol, ethephon, gibberelic acid, gibberellins and benazladenine, maleic hydrazide, NAA, napthalene acetamide, paclobutrazol, N-acetylaspartic acid.

12. The composition of any one of claims 1 to 11, wherein said supplement further comprises a colorant, a pH adjusting agent, a sequestering agent, and combinations thereof.

13. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of the composition of any one of claims 1 to 12 to control said pest.

14. A method for the control of pests, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a pesticidal amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

15. The method of claim 14, wherein antimicrobial compound is of synthetic origin.

16. The method of claim 14, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

17. The method of any one of claims 14 to 16, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

18. The composition of any one of claims 14 to 16, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

19. The composition of any one of claims 14 to 18, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

20. The composition of any one of claims 14 to 19, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

21. The method of any one of claims 13 to 20, wherein said pest is chosen from an insect, a nematode, a fungi, a bacteria, a larvae, a plant, an animal, a virus, a parasite, a gastropod, an arthropod, a snail, a slug, an algae, or combinations thereof.

22. The method of claim 21, wherein said plant is a weed.

23. The method of claim 21, wherein said arthropod is a mite.

24. The method of claim 21, wherein said insect is a moth.

25. The method of claim 21, wherein said bacteria is chosen from an *E. Amylovora*, an *E. coli* or a combination thereof.

26. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a composition according to any one of claims 1 to 12.

27. A method for regulating the growth of a plant, the method comprising contacting a soil, a seed, a plant, or combinations thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;
b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;
c) from about 0.001% to about 40% by weight of a solvent; and
d) sufficient water to make 100 weight percent.

28. The method of claim 27, wherein antimicrobial compound is of synthetic origin.

29. The method of claim 27, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

30. The method of any one of claims 27 to 29, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

31. The method of any one of claims 27 to 29, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

32. The composition of any one of claims 27 to 31, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

33. The composition of any one of claims 27 to 32, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

34. The method of any one of claims 26 to 33, wherein regulating the growth comprises an increase in the number of fruit, vegetable, bulb or tuber from said plant.

35. The method of any one of claims 26 to 34, wherein regulating the growth comprises an increase in the size of fruit, vegetable, bulb or tuber from said plant.

36. The method of any one of claims 26 to 34, wherein regulating the growth comprises an increase in the number of healthy plants.

37. The method according to any one of claims 26 to 36, wherein said plant is chosen from a banana plant, an apple tree, a pear tree, a potato plant, a rice plant, a coffea plant, a citrus tree, an onion, ginseng, soy, a weed, a tomato plant.

38. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a composition according to any one of claims 1 to 12.

39. A method for regulating the growth of a seed, the method comprising contacting a seed or a soil containing said seed thereof, with a growth regulating amount of a pesticide composition consisting of :

a) from about 0.01% to about 25% by weight of at least one antimicrobial compound selected from the group consisting of thymol and carvacrol;

b) from about 0.001% to about 15% by weight of surfactant sufficient to form a solution or dispersion of said phenolic compound in an aqueous carrier;

c) from about 0.001% to about 40% by weight of a solvent; and

d) sufficient water to make 100 weight percent.

40. The method of claim 39, wherein antimicrobial compound is of synthetic origin.

41. The method of claim 39, wherein the surfactant is selected from the group consisting of an anionic surfactant, a cationic surfactant, an amphoteric surfactant, a non-ionic surfactant, and combinations thereof.

42. The method of any one of claims 39 to 41, wherein said at least one antimicrobial compound is from about 0.12% to about 1.15% w/w of said composition.

43. The method of any one of claims 39 to 42, wherein said at least one antimicrobial compound is from about 0.12% w/w, or about 0.23% w/w, or about 0.46% w/w, or about 1.15% w/w of said composition.

44. The composition of any one of claims 39 to 43, wherein said surfactant is from about 0.1% to about 15% (w/w) of said formulation.

45. The composition of any one of claims 39 to 43, wherein said solvent is from about 0.1% to about 40% (w/w) of said formulation.

46. The method of any one of claims 38 to 45, wherein said seed is a tuber.

47. The method of claim 46, wherein said tuber is from a potato (kumara), a sweet potato, a yam, a cassava, and a dahilia.

48. The method of any one of claims 38 to 47, wherein regulating the growth comprises an increase in the length of a tuber sprout.

ABSTRACT

The present document describes compositions and uses thereof in methods for controlling pests, and/or regulating growth of plants or seeds by contacting said plant, seed, or a soil containing said plant or seed thereof.

Industria y Comercio SUPERINTENDENCIA	**TESTIGO DOCUMENTAL**	Folio: 465

Dependencia Jerárquica: Delegatura para la propiedad Industrial	**Código**	2000
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TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR. PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	616175954.0	06/09/2017	$2.799.000,00

*** Conceptos Pagados ***

CANT	RENTISTICO	CONCEPTO	VR. UNITARIO	VR. CONCEPTO
1	50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE INVENCION	$86.000,00	$86.000,00
				$86.000,00

SON: ***OCHENTA Y SEIS MIL PESOS MONEDA CORRIENTE***

Responsable: _____
-*******-

cibo de Caja Aplicado al Expediente No. _____

Superintendencia de Industria y Comercio
Radicado: NC2017/0009112 **Folios :** 469
Dependencia: 2020 **Fecha:** 2017-09-06 14:55:55
Tipo aplicación: Solicitud PCT

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
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*** Soporte del Pago ***

TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	VR. PAGO
CONSIGNACION	BANCO DE BOGOTA	062754387	616175954.0	06/09/2017	$2.799.000,00

*** Conceptos Pagados ***

CANT	RENTISTICO	CONCEPTO	VR. UNITARIO	VR. CONCEPTO
1	50005-01-03 CAMBIO DE MODALIDAD Y MODIFICACIONES	1610 N.CREACION CORRECCION A SOLICITUD EN TRAMITE / MODIFICACION CAP. DESCRIPTIVO O REIVINDICATORIO	$176.000,00	$176.000,00
				$176.000,00

SON: ***CIENTO SETENTA Y SEIS MIL PESOS MONEDA CORRIENTE***

Responsable: _____
-********-

Recibo de Caja Aplicado al Expediente No. _____

Superintendencia de Industria y Comercio
Radicado: NC2017/0009112 **Folios :** 469
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CONSIGNACION	BANCO DE BOGOTA	062754387	616175954.0	06/09/2017	$2.799.000,00

*** Conceptos Pagados ***

CANT	RENTISTICO	CONCEPTO	VR. UNITARIO	VR. CONCEPTO
59	50005-01-01 SOLICITUDES	1607 REIVINDICACION PATENTE UNITARIA ADICIONAL A LAS 10 INICIALES	$43.000,00	$2.537.000,00
				$2.537.000,00

SON: ***DOS MILLONES QUINIENTOS TREINTA Y SIETE MIL PESOS MONEDA CORRIENTE***

sponsable: _____
******_

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Superintendencia de Industria y Comercio

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PATENTE DE INVENCIÓN ☐ MODELO DE UTILIDAD ☐ Art 33 Decisión 486/00

- ☐ Indicación que se solicita una patente.
- ☐ Datos de identificación del solicitante o de la persona que presenta la solicitud
- ☐ Descripción de la invención
- ☐ Dibujos de ser estos pertinentes
- ☐ Comprobante de pago de las tasas establecidas (De ser el caso formato de descuento)

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PATENTE DE INVENCIÓN PCT ☑ MODELO DE UTILIDAD PCT ☐ Art.33 Decisión 486/00, Circular Única

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- ☑ Copia de la solicitud en español, tal como fue presentada inicialmente (capítulo descriptivo, reivindicatorio, resumen)
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