

KK), Etocas 35 (additional number of moles of ethylene
oxide: 35, product name of Croda Japan KK), Etocas 40
(additional number of moles of ethylene oxide: 40, product
name of Croda Japan KK), Etocas 60 (additional number of
5 moles of ethylene oxide: 60, product name of Croda Japan
KK), EMALEX C-20 (additional number of moles of ethylene
oxide: 20, product name of Nihon Emulsion Co., Ltd.),
EMALEX C-30 (additional number of moles of ethylene oxide:
30, product name of Nihon Emulsion Co., Ltd.), and EMALEX
10 C-40 (additional number of moles of ethylene oxide: 40,
product name of Nihon Emulsion Co., Ltd.). Examples of
ethoxylated hydrogenated castor oil which is commercially
available include Croduret 7 (product name of Croda Japan
KK), Croduret 25 (product name of Croda Japan KK), Croduret
15 40 (product name of Croda Japan KK), Croduret 50 (product
name of Croda Japan KK), BCroduret 60 (product name of
Croda Japan KK), HCO-20 (additional number of moles of
ethylene oxide: 20, product name of Nikko Chemicals, Co.,
Ltd.), HCO-30 (additional number of moles of ethylene
20 oxide: 30, product name of Nikko Chemicals, Co., Ltd.),
HCO-40 (additional number of moles of ethylene oxide: 40,
product name of Nikko Chemicals, Co., Ltd.), EMALEX HC-20
(additional number of moles of ethylene oxide: 20, product
name of Nihon Emulsion Co., Ltd.) and the like. Examples
25 of ethoxylated hydrogenated castor oil fatty acid ester

which is commercially available include EMALEX RWIS-158 (ethoxylated hydrogenated castor oil monoisostearate, additional number of moles of ethylene oxide: 58, product name of Nihon Emulsion Co., Ltd.), EMALEX RWIS-360 (ethoxylated hydrogenated castor oil triisostearate, additional number of moles of ethylene oxide: 60, product name of Nihon Emulsion Co., Ltd.), and EMALEX RWL-160 (ethoxylated hydrogenated castor oil laurate: product name of Nihon Emulsion Co., Ltd.).

10 As the present nonionic surfactant, ethoxylated castor oil or ethoxylated hydrogenated castor oil is preferable. Among ethoxylated castor oil or ethoxylated hydrogenated castor oil, those having a hydrophile-lipophile balance (so-called HLB) in the range from 9.0 to 20.0 are suitable, and those having the HLB around 14.0 are particularly suitable.

 An amount of the present nonionic surfactant in the present invention is usually from 0.5 to 4 parts by weight and preferably from 1 to 3 parts by weight relative to 100 parts by weight of the composition of the present invention.

[0016]

 Water in the present invention may be either of so-called soft water or hard water, and ion-exchanged water, distilled water or the like may be also used. Water having an electric conductivity of 2 μ S/cm or less and an electric

resistance of 0.5 MΩ or more is preferably used.

An amount of water in the present invention is usually from 25 to 85 parts by weight relative to 100 parts by weight of the composition of the present invention.

5 [0017]

The composition of the present invention is an oil-in-water type emulsion composition, and a weight ratio of pyriproxyfen and water is in the range from 1:20 to 1:3, and preferably in the range from 1:15 to 1:5.

10 [0018]

The composition of the present invention contains pyriproxyfen, the present hydrophobic organic solvent, polyvinyl alcohol, the present nonionic surfactant, and water as an essential components but, if it is necessary, it may contain a surfactant except for the present nonionic surfactant, a viscosity adjusting agent, a anti-foaming agent, an antifreezing agent, an antiseptic agent, a stabilizing agent, a coloring agent, a perfume, an effectiveness enhancing agent, a harmful medicine effect reducing agent, and the like.

Examples of the surfactant except for (c) include a nonionic surfactant such as polyoxyethylene glycerine fatty acid ester, polyoxyethylene sorbitan fatty acid ester, polyoxyethylene alkyl ether, polyoxyethylene alkylphenyl ether, polyoxyethylene alkylphenyl ether/formalin

MD

condensate, ethylene oxide/propylene oxide/block polymer
and the like, and an anionic surfactant such as alkyl
sulfate, polyoxyethylene alkyl ether sulfate,
polyoxyethylene alkylphenyl ether sulfate, polyoxystyryl
5 phenyl ether sulfate, dialkyl sulfosuccinate, alkylbenzene
sulfonate, monoalkylnaphthalene sulfonate,
dialkylnaphthalene sulfonate, naphthalene
sulfonate/formalin condensate, alkyl diphenyl ether
disulfonate, polyoxyethylene alkylphenyl ether sulfonate
10 and the like.

[0019]

Examples of the viscosity adjusting agent include a
natural polysaccharide such as xanthan gum, lumthan gum,
roast bean gum, guar gum, carrageenan, welan gum, alginic
15 acid, alginate, tragacanth gum and the like; a synthetic
polymer such as sodium polyacrylate and the like; a semi-
synthetic polymer such as carboxymethylcellulose and the
like; a mineral powder such as aluminum silicate, magnesium
aluminum silicate, smectite, bentonite, heclite, synthetic
20 silicate hydrate, dried silica and the like; and alumina
sol. Such the viscosity adjusting agent which is
commercially available may be used as it is, and as xanthan
gum, for example, Kelthan S (product name of Monsanto,
Corp.) may be listed, as aluminum silicate, for example,
25 Beagum R (product name of Vanderbilt, Co., Ltd.) may be

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listed, as dried silica, for example, Aerozil 200 (product name of Degussa-Huels AG) may be listed, as the mixture of dried silica and aluminum sol, for example, Aerozil COK-84 (product name of Degussa-Huels AG) may be listed. In the case where the viscosity adjusting agent is used, an amount thereof is usually from 0.01 to 10 parts by weight, and preferably in the range from 0.1 to 5 parts by weight relative to 100 parts by weight of the composition of the present invention.

10 [0020]

Examples of the anti-foaming agent include a silicone-based anti-foaming agent such as Antifoam C (product name of Dow Corning Ltd.), Antifoam CE (product name of Dow Corning Ltd.), TSA 730 (product name of Toshiba Silicone Co., Ltd.), TSA 731 (product name of Toshiba Silicone Co., Ltd.), TSA 732 (product name of Toshiba Silicone Co., Ltd.), YMA 6509 (product name of Toshiba Silicone Co., Ltd.) and the like; and a fluorine-based anti-foaming agent such as Fluowet PL 80 (product name of Clariant Ltd.) and the like. In the case where the anti-foaming agent is used, an amount thereof is usually in the range from 0.001 to 3 parts by weight relative to 100 parts by weight of the composition of the present invention.

[0021]

25 Examples of the antifreezing agent include a water

soluble glycol such as ethylene glycol, propylene glycol and the like. In the case where the antifreezing agent is used, an amount thereof is usually in the range from 0.5 to 30 parts by weight, preferably in the range from 1 to 20 parts by weight, and more preferably in the range from 5 to 10 parts by weight relative to 100 parts by weight of the composition of the present invention.

[0022]

Examples of the antiseptic agent include p-hydroxybenzoic acid ester, salicylic acid derivative, isothiazolin-3-on derivative (for example, Biohope L (product name of K.I. Chemical Industry Co., Ltd.) and the like. In the case where the antiseptic agent is used, an amount thereof is usually from 0.01 to 5 parts by weight, preferably from 0.05 to 3 parts by weight, and more preferably in the range from 0.1 to 1 part by weight relative to 100 parts by weight of the composition of the present invention.

[0023]

The composition of the present invention can be manufactured, for example, by the following method.

A uniform oil phase solution containing pyriproxyfen is prepared by mixing pyriproxyfen, the present hydrophobic organic solvent and the present nonionic surfactant, if it is necessary, with heating. Separately, an aqueous phase

solution containing polyvinyl alcohol is prepared by mixing polyvinyl alcohol and water, if it is necessary, further adding the anti-foaming agent. Next, the composition of the present invention is manufactured by emulsifying and dispersing the oil phase solution and the aqueous phase solution. If it is necessary, the above-described viscosity adjusting agent, antifreezing agent, antiseptic agent, stabilizing agent and coloring agent may be further added to the manufactured composition of the present invention.

[0024]

As a method of emulsifying and dispersing, for example, a mechanically dispersing method of forcefully dispersing by applying mechanical energy is intended.

Examples of the mechanically dispersing method include a method of forcefully emulsifying and dispersing a pyriproxyfen solution into water by high mechanical sharing force. Examples of a dispersing machine giving a high sharing force used in this method include a machine which agitates the mixture of pyriproxyfen solution and polyvinyl alcohol aqueous solution at a high speed (for example, planetary agitating machine, homomixer), a machine which inject the mixture into water at a high speed from a pore to impact into a plate (for example, Gaulin homogenizer, microfluidizer), a machine which disperses the mixture by

the shearing force generated upon forcefully passing through a narrow clearance (for example, colloid mill), or a dispersing machine which utilizes supersonic wave and the like, and they may be utilized. The dispersing machine used in the present invention may be selected by totally considering the easiness of dispersion of the mixture, the viscosity of a system, adaptability with all of the steps, a product amount and the like.

[0025]

To the composition of the present invention obtained via the emulsification and dispersion step, water may be added so that the composition is properly diluted, and to water which is added, the surfactant except for (c), the viscosity adjusting agent, the anti-foaming agent, the antifreezing agent, the antiseptic agent, the stabilizing agent, the coloring agent, the perfume, the effectiveness enhancing agent, the harmful effect of a medicine reducing agent, and the like may be added.

[0026]

The composition of the present invention is a composition in which oil droplets have been uniformly dispersed in an aqueous continuous phase. In the present invention, from the viewpoints of preparation stability during the long term storage and the like, a condition of emulsifying and dispersing is selected so that the volume

median diameter of the oil droplet particle becomes preferably in the range from 0.1 to 7 μm , more preferably in the range from 0.5 to 5 μm , and still more preferably in the range from 1 to 3 μm .

5 [0027]

The volume median diameter of the oil droplet particle in the composition of the present invention is a value calculated by analyzing an image of a large number of particles measured by laser beam diffraction scattering
10 based on a Mie-scattering theory, and as a specific measuring machine, Master Sizer 2000 (product name of Malburn Co., Ltd.) may be listed. A particle size distribution measured by a device is a particle size distribution based on a particle volume when the particle
15 measured is supposed to be in a spherical shape and, therefore, the volume median diameter (VMD) in the present specification indicates the value in which a total volume of the particles having a value smaller than this value and a total volume of the particles having a value larger than
20 this value occupy 50% of the whole volume, respectively.

[0028]

Examples of an insect pest to which the composition of the present invention exerts an effect of control include the followings:

25 Hemiptera insect pests:

planthoppers such as small brown planthopper (*Laodelphax striatellus*), brown planthopper (*Nilaparvata lugens*), white-backed rice planthopper (*Sogatella furcifera*) and the like, leafhoppers such as green rice leafhopper

- 5 (*Nephotettix cincticeps*), Taiwan green rice leafhopper (*Nephotettix virescens*) and the like, aphides such as cotton aphid (*Aphis gossypii*), green peach aphid (*Myzus persicae*), apple aphid (*Aphis citricola*), turnip aphid (*Lipaphis pserudobrassicae*), pear green aphid (*Nippolachnus*
- 10 *piri*), black citrus aphid (*Toxoptera aurantii*), tropical citrus aphid (*Toxoptera ciidius*) and the like, stink bugs such as green stink bug (*Nezara antennata*), *Cletus punctiger*, bean bug (*Riptortus clavetus*), brownwinged green bug (*Plautia stali*) and the like, whiteflies such as
- 15 greenhouse whitefly (*Trialeurodes vaporariorum*), sweet-potato whitefly (*Bemisia tabaci*), silverleaf whitefly (*Bemisia argentifolii*) and the like, scale insects such as California red scale (*Aonidiella aurantii*), San Jose scale (*Comstockaspis perniciosus*), citrus snow scale (*Unaspis*
- 20 *citri*), white peach scale (*Pseudaulacaspis pentagona*), brown olive scale (*Saissetia oleae*), purple scale (*Lepidosaphes beckii*), red wax scale (*Ceroplastes rubens*), cottony cushion scale (*Icerya purchasi*) and the like, lace bugs, jumping plant lice and the like;
- 25 Lepidopteran insect pests:

[0029]

Pyralidae such as rice stem borer (*Chilo suppressalis*),
 rice leafroller (*Cnaphalocrocis medinalis*), European corn
 borer (*Ostrinia nubilalis*), cabbage webworm (*Hellulla*
 5 *undalis*), bluegrass webworm (*Parapediasia teterrella*),
 cotton leafroller (*Notarch derogata*), Indian meal moth
 (*Plodia interpuncterlla*) and the like, Noctuidae such as
 tabaco cutworm (*Spodoptera litura*), rice armyworm
 (*Pseudaletia separata*), cabbage armyworm (*Mamestra*
 10 *brassicae*), black cutworm (*Agrotis ipsilon*), *Trichoplusia*
spp., *Heliothis spp.*, *Helicoverpa spp.* and the like,
 Pieridae such as small white (*Pieris rapae*) and the like,
 Tortricidae such as *Adoxophyes spp.*, oriental fruit moth
 (*Grapholita molesta*), codling moth (*Cydia pomonella*) and
 15 the like, Carposinidae such as peach fruit moth (*Carposina*
niponensis) and the like, Lyonetiidae such as *Lyonetia spp.*
 and the like, Lymantriidae such as *Lymantria spp.*,
Euproctis spp. and the like, Yponomeutidae such as
 diamondback moth (*Plutela xylostella*) and the like,
 20 Gelechiidae such as pink ball worm (*Pectinophora*
gossypiella) and the like, Arctiidae such as fall webworm
 (*Hyphantria cunea*) and the like, Tineidae such as
 casemaking clothes moth (*Tinea translucens*), webbing
 clothes moth (*Tineola bisselliella*) and the like;

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[0030]

Diptera insect pests:

Culex spp. such as common mosquito (*Culex pipiens pallens*),
 oriental latrine fly (*Culex tritaeniorhynchus*) and the like,
 Aedes spp. such as dengue mosquito (*Aedes aegypti*), tiger
 5 mosquito (*Aedes albopictus*) and the like, Anopheles spp.
 such as chinese malaria mosquito (*Anopheles sinensis*) and
 the like, Chironomidae, Muscidae such as housefly (*Musca*
domestica), false stablefly (*Muscina stabulans*) and the
 like, Calliphoridae, Sarcophagidae, little housefly (*Fannia*
 10 *canicularis*), Anthomyiidae such as seedcorn maggot (*Delia*
platura), onion maggot (*Delia antiqua*) and the like, leaf
 miner flies such as legume leafminer (*Liriomyza trifolii*)
 and the like, fruit flies, Phoridae, Drosophila, moth flies,
 Simuliidae (blackfly), gadflies, and Culicoides and the
 15 like;

[0031]

Coleopteron insect pests:

Corn root worms such as Western corn root worm (*Diabrotica*
virgifera virgifera), Southern corn root worm (*Diabrotica*
 20 *undecimpunctata howardi*) and the like, gold beetles such as
 cupreous chafer (*Anomala cuprea*), soybean beetle (*Anomala*
rufocuprea) and the like, weevils such as maize weevil
 (*Sitophilus zeamais*), ricewater weevil (*Lissorhoptrus*
oryzophilus), alfalfa weevil (*Hypera pastica*), adzuki bean
 25 weevil (*Callosobruchus chienensis*) and the like,

- Tenebrionidae such as yellow mealworm (*Tenebrio molitor*),
red flour beetles (*Tribolium castaneum*) and the like,
Chrysomilidae such as cucurbit leaf beetle (*Aulacophora*
femoralis), striped flea beetle (*Phyllotreta striolata*),
5 Colorado beetle (*Leptinotarsa decemlineata*) and the like,
Epilachna such as twenty-eight-spotted ladybirds (*Epilachna*
vigintioctopunctata) and the like, Bostrychidae, robe
beetle (*Paederus fuscipes*) and the like;
Thysanopteran insect pests:
10 melon thrips (*Thrips palmi*), onion thrips (*Thrips tabaci*),
flower thrips (*Thrips hawaiiensis*), yellow tea thrips
(*Scirtothrips dorsalis*), flower thrips (*Frankliniella*
intonsa), western flower thrips (*Frankliniella*
occidentalis), *Ponticulothrips diospyrosi* and the like;
15 Hymenopteran insect pests:
ants, hornets, bethylidae, sawflies such as cabbage sawfly
(*Athalia japonica*) and the like.

[0032]

- When the oil-in-water type emulsion composition
20 containing pyriproxyfen in the present invention is sprayed,
an amount thereof may be varied depending upon a variety of
conditions such as weather conditions, application period,
application methods, soil conditions, subject crops,
subject pests and the like, however, usually, the
25 pesticidal composition is applied by diluting it with water

so that an amount of pyriproxyfen becomes in the range from 0.1 to 1,000 g/1000 m² and preferably in the range from 1 to 100 g/1000 m². Such an application or spraying amount may be varied depending upon a situation such as
 5 application times, application places, application methods, kinds of pests, degrees of crop damage and the like, regardless of the above-described range, and the amount may be increased and decreased.

Moreover, the present composition which has been
 10 diluted with water for spraying may be also sprayed in air, for example, from helicopters, airplanes or radio controlled helicopters.

[Examples]

[0033]

15 Hereinafter, the present invention will be described below in detail by Manufacturing Examples and Experimental Examples, however, the present invention is not limited thereto. It should be noted that in the following Examples, the term "part(s)" denotes part(s) by weight.

20 (Manufacturing Example 1)

An oil phase solution was prepared by dissolving 10 parts of pyriproxyfen into 20 parts of a mixture of 1-phenyl-1-xylylethane and 1-phenyl-1-ethylphenylethane (Hisol SAS-296, product name of Nippon Oil Co., Ltd.) and
 25 further, by adding and dissolving 2.5 parts of ethylene

oxide/propylene oxide block polymer (Pepol B-184, HLB=10.1, product name of Toho Chemical Industry Co., Ltd.) and 2.5 parts of ethoxylated castor oil (Sorpol CA42, HLB=13.3, product name of Toho Chemical Industry Co., Ltd.) into the mixture.

Separately from the above-described oil phase solution, a polyvinyl alcohol aqueous solution was prepared by dissolving 2.0 parts of polyvinyl alcohol (GOHSENOL GL-05, surface tension of 1% by weight of aqueous solution: 45 dyne/cm, viscosity of 4% aqueous solution at 20°C: 4.8-5.8 mPa·s, degree of saponification; 86.5-89.0%, product name of Nippon Synthetic Chemical Industries, Co., Ltd.) into 18 parts of water.

An oil-in-water emulsion was obtained by adding 20 parts of the above-described polyvinyl alcohol aqueous solution to 35 parts of the above-described oil phase solution, agitating it for 5 minutes at 6000 rpm by a T.K. autohomomixer (homogenizer, manufactured by Tokushu Kika Kogyo, Co., Ltd.) to emulsify and disperse it. 5 parts of propylene glycol was added to the obtained oil-in-water emulsion and, further, 40 parts of water was added to make a total amount of the composition into 100 parts and, then, Composition 1 of the present invention was obtained.

[0034]

(Manufacturing Example 2)

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A uniform oil phase solution was prepared by placing 10.1 parts of pyriproxyfen previously heated and melt, 20 parts of a mixture of 1-phenyl-1-xylylethane and 1-phenyl-1-ethylphenylethane (Hisol SAS-296, product name of Nippon Oil Co., Ltd.), and 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Corp.) in a container and agitating it by a magnetic stirrer for one hour at 25°C.

A uniform 6.25% polyvinyl alcohol aqueous solution was prepared by putting 29.8 parts of water, 0.2 parts of the anti-foaming agent (Antifoam C, product name of Dow Corning Asia, Corp.) and 2 parts of polyvinyl alcohol (GOHSENOL GL-05, surface tension of 1% by weight of aqueous solution: 45 dyne/cm, viscosity of 4% aqueous solution at 20°C: 4.8-5.8 mPa·s, degree of saponification; 86.5-89.0%, product name of Nippon Synthetic Chemicals Co., Ltd.) into another container, and agitating it by Three One Motor (agitator manufactured by Yamato Scientific Co., Ltd.) at 300 rpm for one hour after the temperature was raised to 60°C.

20 An oil-in-water emulsion was obtained by adding 32.1 parts of the above-described oil phase solution to 32 parts of the above-described 6.25% polyvinyl alcohol aqueous solution, agitating it by the T.K. autohomomixer (homogenizer, manufactured by Tokushu Kika Kogyo Co., Ltd.) 25 at 6000 rpm for 10 minutes at 25°C to emulsify and disperse

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it. 5 parts of propylene glycol and, then, 26.6 parts of an aqueous solution containing 0.2 parts of xanthan gum, 0.4 parts of aluminum silicate and 0.2 parts of Proxycel GXL (20% propylene glycol aqueous solution of 1,2-benzisothiazoline-3-on, product name of Avecia KK) were added to the obtained oil-in-water emulsion and, further, 6.3 parts of water was added and, then, Composition 2 of the present invention was obtained.

The volume median diameter of the oil droplet was 1.5 μm in Composition 2 of the present invention (measurement by Master Sizer 2000, manufactured by Malburn Co., Ltd.) and the viscosity was 1940 mPa·s (when a B type viscosity meter with a No.2 rotor at 6 rpm is used, 25°C).

[0035]

15 (Manufacturing Example 3)

Composition 3 of the present invention was obtained by preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co, Ltd.) of Manufacturing Example 2 was changed to 2 parts of ethoxylated castor oil (Alkamulus R81, HLB=9.2, product name of Rhodia Co., Ltd.).

The volume median diameter of the oil droplet was 1.4 μm in Composition 3 of the present invention (measurement by Master Sizer 2000, manufactured by Malburn Co., Ltd.).

25 [0036]

(Manufacturing Example 4)

Composition 4 of the present invention was obtained by preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of ethoxylated castor oil (Alkamulus BR, HLB=12.6, product name of Rhodia Co., Ltd.).

The volume median diameter of the oil droplet was 1.6 μm in Composition 4 of the present invention (measurement by Master Sizer 2000, manufactured by Malburn Co., Ltd.).

[0037]

(Manufacturing Example 5)

Composition 5 of the present invention was obtained by preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of ethoxylated castor oil (Sorpul CA42, HLB=13.3, product name of Toho Chemical Industry Co., Ltd.).

The volume median diameter of the oil droplet was 1.5 μm in Composition 5 of the present invention (measurement by Master Sizer 2000, manufactured by Malburn Co., Ltd.).

[0038]

(Manufacturing Example 6)

Composition 6 of the present invention was obtained by

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preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of ethoxylated castor oil

5 (Alkamulus 14R, HLB=14.9, product name of Rhodia Co., Ltd.).

The volume median diameter of the oil droplet was 1.6 μm in Composition 6 of the present invention (measurement by Master Sizer 2000, manufactured by Malburn Co., Ltd.).

[0039]

10 (Manufacturing Example 7)

Composition 7 of the present invention was obtained by preparing similarly to Manufacturing Example 2 except that 20 parts of the mixture of 1-phenyl-1-xylylethane and 1-phenyl-1-ethylphenylethane (Hisol SAS-296, product name of Nippon Oil Co., Ltd.) of Manufacturing Example 2 was
15 changed to 20 parts of aromatic hydrocarbon solvent (Solvesso 200, product name of ExxonMobil Co., Ltd.).

The volume median diameter of the oil droplet was 1.1 μm in Composition 7 of the present invention (measurement
20 by Master Sizer 2000, manufactured by Malburn Co., Ltd.).

[0040]

(Manufacturing Example 8)

Composition 8 of the present invention was obtained by preparing exactly similar to Manufacturing Example 2 except
25 that 2 parts of xanthan gum and 4 parts of aluminum

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silicate of Manufacturing Example 2 were changed to 1.4 parts of xanthan gum and 2.8 parts of aluminum silicate.

The volume median diameter of the oil droplet was 1.5 μm in Composition 8 of the present invention (measurement by Master Sizer 2000, manufactured by Malvern Co., Ltd.) and the viscosity was 1210 mPa·s (when a B type viscosity meter with a No.2 rotor at 6 rpm was used, 25°C).

[0041]

Next, Manufacturing Examples of Comparative compositions will be described below.

(Comparative Manufacturing Example 1)

An oil phase solution was prepared by dissolving 10 parts of pyriproxyfen into 20 parts of the mixture of 1-phenyl-1-xylylethane and 1-phenyl-1-ethylphenylethane (Hisol SAS-296, product name of Nippon Oil Co., Ltd.) and, further, by adding and dissolving 2.5 parts of ethylene oxide/propylene oxide block polymer (Pepol B-184, HLB=10.1, product name of Toho Chemical Industry Co., Ltd.) and 2.5 parts of ethoxylated castor oil (Sorpel CA42, HLB=13.3, product name of Toho Chemical Industry Co., Ltd.).

An oil-in-water type emulsion composition was obtained by adding 20 parts of water to the above-described oil phase solution and by agitating it by the T.K.

autohomomixer (homogenizer, manufactured by Tokushu Kika Kogyo, Co., Ltd.) at 6000 rpm for 5 minutes to emulsify and

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disperse it. 5 parts of propylene glycol was added to the
obtained oil-in-water type emulsion composition and,
further, 40 parts of water was added so that a total amount
was made into 100 parts, and Comparative composition 1 of
5 the present invention was obtained.

[0042]

(Comparative Manufacturing Example 2)

Comparative composition 2 of the present invention was
obtained by preparing similarly to Manufacturing Example 2
10 except that 2 parts of ethoxylated castor oil (Alkamulus
OR/40, HLB=14, product name of Rhodia Co., Ltd.) of
Manufacturing Example 2 was not added and, further, that 2
parts of polyvinyl alcohol (GOHSENOL GL-05: product name of
Nippon Synthetic Chemical Industry Co., Ltd.) was changed
15 to 4 parts of polyvinyl alcohol (GOHSENOL GL-05: product
name of Nippon Synthetic Chemical Industry Co., Ltd.).

The volume median diameter of the oil droplet was 3.2
 μm in Comparative composition 2 of the present invention
(measurement by Master Sizer 2000, manufactured by Malvern
20 Co., Ltd.) and the viscosity of Comparative composition 2
was 1890 mPa·s (when a B type viscosity meter with a No.2
rotor at 6 rpm was used, 25°C).

[0043]

(Comparative Manufacturing Example 3)

25 Comparative composition 3 of the present invention was

obtained by preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of
5 polyoxyethylene tristyrylphenyl ether (Soprophor CY8, HLB=13.7, product name of Rhodia Co., Ltd.).

The volume median diameter of the oil droplet was 2.0 μm in Comparative composition 3 of the present invention (measurement by Master Sizer 2000, manufactured by Malburn
10 Co., Ltd.) and the viscosity of Comparative composition 3 was 1900 mPa·s (when a B type viscosity meter with a No.2 rotor at 6 rpm was used, 25°C).

[0044]

(Comparative Manufacturing Example 4)

15 Comparative composition 4 of the present invention was obtained by preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of
20 polyoxyethylene nonylphenol (Igepar CO-720, HLB=13.6, product name of Rhodia Co., Ltd.).

The volume median diameter of the oil droplet was 1.5 μm in Comparative composition 4 (measurement by Master Sizer 2000, manufactured by Malburn Co., Ltd.) and the
25 viscosity of Comparative composition 4 was 1940 mPa·s (when

a B type viscosity meter with a No.2 rotor at 6 rpm was used, 25°C).

[0045]

(Comparative Manufacturing Example 5)

5 Comparative composition 5 of the present invention was obtained by preparing similarly to Manufacturing Example 2 except that 2 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of
10 polyoxyethylene sorbitan ester (Alkamulus T20, HLB=16.7, product name of Rhodia Co., Ltd.).

The volume median diameter of the oil droplet was 1.6 μm in Comparative composition 5 (measurement by Master Sizer 2000, manufactured by Malvern Co., Ltd.) and the viscosity
15 of Comparative composition 5 was 1900 mPa·s (when a B type viscosity meter with a NO.2 rotor at 6 rpm was used, 25°C).

[0046]

(Comparative Manufacturing Example 6)

Comparative composition 6 was obtained by preparing
20 similarly to Manufacturing Example 2 except that 20 parts of ethoxylated castor oil (Alkamulus OR/40, HLB=14, product name of Rhodia Co., Ltd.) of Manufacturing Example 2 was changed to 2 parts of polyoxyethylene sorbitan monolauric acid ester (Sorbon T20, HLB=13.6, product name of Toho
25 Chemical Industry Co., Ltd.).

The volume median diameter of the oil droplet was 1.5 μm in Comparative composition 5 (measurement by Master Sizer 2000, manufactured by Malvern Co., Ltd.) and the viscosity of Comparative composition 5 was 1940 mPa·s (when a B type viscosity meter with a No.2 rotor at 6 rpm was used, 25°C).

[0047]

(Experimental Example 1)

Each 100g of Composition 1 of the present invention and Comparative composition 1 was separately placed in a container made of HDPE, and the container was tightly sealed. The container was stored under a condition that a cycle of leaving the container at -15°C for 3 days and at 30°C for 4 days was alternately repeated. The appearance of the composition after a predetermined period was visually observed and a ratio of a transparent aqueous phase in the composition was examined. The results are indicated in Table 1.

[0048]

[Table 1]

	After 2 weeks
Composition 1 of the present invention	Extremely trace amount
Comparative composition 1	44%

The composition of the present invention is excellent in storage stability since even in the case where it is

161-101

stored under the condition of repetition of low and high temperatures, there is little separation between an aqueous phase and an oil phase.

[0049]

5 (Experimental Example 2)

Each 100g of Compositions 2-8 of the present invention and Comparative compositions 2-6 was separately placed in the container made of HDPE, and the container was tightly sealed. The container was stored at 54°C. After the
10 predetermined period, the volume median diameter of the oil droplet particle in the composition was measured by Master Sizer 2000 manufactured by Malvern Co., Ltd. The results are indicated in Table 2.

[0050]

[Table 2]

	Before storage (μm)	After 2 weeks (μm)
Composition 2 of the present invention	1.5	1.4
Composition 3 of the present invention	1.4	1.3
Composition 4 of the present invention	1.6	1.5
Composition 5 of the present invention	1.5	1.4
Composition 6 of the present invention	1.6	1.5
Composition 7 of the present invention	1.1	1.1
Composition 8 of the present invention	1.5	1.5
Comparative composition 2	3.2	6.2
Comparative composition 3	2.0	9.5
Comparative composition 4	1.5	6.4
Comparative composition 5	1.6	3.6
Comparative composition 6	1.7	5.1

The composition of the present invention is excellent in storage stability since even in the case where it is stored under high temperature condition, there is little increase in a diameter of the oil phase drop. The composition of the present invention is excellent in preparation stability such that a diameter of a droplet particle in the oil phase is scarcely increased even during storage under a high temperature condition.

[Document name] Abstract

[Summary]

[Problem]

To provide an excellent oil-in-water emulsion
5 composition containing 4-phenoxyphenyl 2-(2-
pyridyloxy)propyl ether.

[Means for solving]

An oil-in-water type emulsion composition comprising 4-
phenoxyphenyl 2-(2-pyridyloxy)propyl ether; a hydrophobic
10 organic solvent capable of dissolving 0.1-fold by weight of
4-phenoxyphenyl 2-(2-pyridyloxy)propyl ether at 0°C;
polyvinyl alcohol; a compound selected from a group
consisting of alkoxyated castor oil and the like; and
water, has an excellent property. For example, it may be
15 produced by preparing an oil phase solution of 4-
phenoxyphenyl 2-(2-pyridyloxy)propyl ether, said
hydrophobic organic solvent and a compound selected from a
group consisting of alkoxyated castor oil and the like,
preparing an aqueous phase solution of polyvinyl alcohol
20 and water, and emulsifying and dispersing them.

Applicant Record

Identification No. [000002093]

1. Date of Change: October 1, 2004 (Change of name and address)

Address: 27-1, Shinkawa 2-chome, Chuo-ku, Tokyo

Name: SUMITOMO CHEMICAL COMPANY, LIMITED

165

OFICINA DE PATENTES DEL JAPON

Por la presente se certifica que lo que obra anexo es copia fiel
de la siguiente solicitud como se presentó en esta oficina.

Fecha de Presentación: **Diciembre 14 de 2004**

Número de Solicitud: **Solicitud de patente No. 2004-360988**

El código del país y el número
de prioridad, para utilizarse en
la presentación en el extranjero
de conformidad con la convención
de Paris, es: JP 2004-360988

Solicitante(s): **SUMITOMO CHEMICAL COMPANY,
LIMITED**

Octubre 4 de 2005
Comisionado de la Oficina de Patentes de
Japón

2005-3082614

166

Nombre del documento	Solicitud para Patente
No., de caso	S11493JP01
Fecha de solicitud	Diciembre 14 de 2004
Dirección	Comisionado de la Oficina de Patentes
Clasificación Internacional De Patentes	A01N 25/04
Inventor	
Dirección	c/o SUMITOMO CHEMICAL COMPANY, LIMITED, 2-1, Takatsukasa 4-chome, Takarazuka-shi, Hyogo
Nombre	Toshiyuki TANEDANI
Solicitante	
Identificación No.	000002093
Nombre	SUMITOMO CHEMICAL COMPANY, LIMITED
Abogado(s) de Patente	
Identificación No.	100093285
Nombre	Takashi KUBOYAMA
Teléfono No.	06-6220-3405
Identificación No.	100113000
Nombre	Toru NAKAYAMA
Teléfono No.	06-6220-3405
Identificación No.	100119471
Nombre	Masayuki ENOMOTO
Teléfono No.	06-6220-3405
Pago de tasas	
Libro de Prepago No.	010238
Suma a pagar	16,000 yen
Documentos adjuntos	
Reinvindicaciones	1
Descripción	1
Resumen	1
Poder General	
Identificación No.	0212949

168

REIVINDICACIONES

1. Una composición tipo emulsión aceite en agua que comprende:
 - (a) 4-fenoxifenil 2-(2-piridiloxi) propil éter,
 - (b) un solvente orgánico hidrofóbico capaz de disolver 0.1-veces en peso del 4-fenoxifenil 2-(2-piridoxi)propil éter a 0°C,
 - (c) alcohol polivinílico,
 - (d) un compuesto seleccionado del grupo que consiste de aceite de ricino alcoxilado, aceite de ricino hidrogenado alcoxilado y éster del ácido graso del aceite de ricino hidrogenado alcoxilado, y
 - (e) agua, en donde la proporción en peso de (a) 4-fenoxifenil 2-(2-piridiloxi)propil éter y (e) se encuentra en el intervalo desde 1:20 a 1:3.
2. La composición tipo emulsión aceite en agua de acuerdo con la reivindicación 1, en donde la proporción en peso de una cantidad total de una composición tipo emulsión aceite en agua y (e) agua se encuentra en el intervalo de 100:25 a 100:85.
3. La composición tipo emulsión aceite en agua de acuerdo con la reivindicación 1 o 2, en donde la proporción en peso de una cantidad total de una composición tipo emulsión aceite en agua y (c) polivinil alcohol se encuentra en el intervalo de 100:0.5 a 100:4.
4. La composición tipo emulsión aceite en agua de acuerdo con cualquiera de las reivindicaciones 1 a 3, en donde la proporción en peso de una

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cantidad total de una composición tipo emulsión aceite en agua y (d) un compuesto que se selecciona de un grupo que consiste de aceite de ricino alcoxilado, aceite de ricino hidrogenado alcoxilado y éster del ácido graso del aceite de ricino hidrogenado alcoxilado, se encuentra en el intervalo de 100:0.5 a 100:4.

5. La composición tipo emulsión aceite en agua de acuerdo con cualquiera de las reivindicaciones 1 a 4, en donde un solvente orgánico hidrofóbico capaz de disolver 0.1-veces en peso de 4-fenoxifenil 2-(2-piridiloxi)propil éter a 0°C, es un solvente hidrocarburo aromático.

6. Un método para producir una composición tipo emulsión aceite en agua que comprende:

- el paso de mezclar (a) 4-fenoxifenil 2-(2-piridiloxi)propil éter, (b) un solvente orgánico hidrofóbico capaz de disolver 0.1-veces en peso de 4-fenoxifenil 2-(2-piridiloxi)propil éter a 0°C, y (d) un compuesto que se selecciona de un grupo que consiste de aceite de ricino alcoxilado, aceite de ricino hidrogenado alcoxilado y éster del ácido graso del aceite de ricino hidrogenado alcoxilado, para preparar una solución de fase oleosa uniforme;
- el paso de mezclar (c) polivinil alcohol y (e) agua para preparar una solución de fase acuosa uniforme; y
- el paso de emulsificar y dispersar la solución de fase oleosa y la solución de fase acuosa para preparar una composición tipo emulsión aceite en agua.

ALVARO CASTELLANOS M. & CIA.
ABOGADOS
Calle 94 A No. 7 A - 09
A.A. 6349
Bogotá, D.C., COLOMBIA

169 ~~108~~
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
Rad: 05-125629-00005-0000 Rec: 2008-04-24 14:50:24
Dep. 2020 NUECREACIONES
Tra: 2 PATENTES Evo 1 REGDEPOSITO
Act 328 CTOINFORMACION Folios: 9

Señor

Jefe de la División de Nuevas Creaciones

Superintendencia de Industria y Comercio

Ministerio de Desarrollo Económico

E. S. D.

Ref.: Expediente No. 05.125.629

Solicitud de Patente de Invención Fase Nacional para:

"COMPOSICIÓN PESTICIDA QUE COMPRENDE 4-FENOXIFENIL 2-(2-PIRIDILOXI) PROPIL ETHER".

Solicitante: SUMITOMO CHEMICAL COMPANY LIMITED

CORRECCION A SOLICITUD EN TRAMITE

MARGARITA CASTELLANOS ABONDANO, mayor de edad, identificada y domiciliada como aparece al pie de mi firma, atentamente me permito presentar las siguientes correcciones a errores tipográficos que presentaba la descripción originalmente presentada:

- En la página 7 línea 11 la palabra "BCroduret 60" se cambió por Croduret 60.
- En la página 13 línea 23 la palabra "ciidius" se cambió por citricidius.
- En la página 13 línea 25 la palabra "clavetus" se cambió por clavatus.
- En la página 15 línea 23 la palabra "Chrysomilidae" se cambió por Chrysomelidae.
- En la página 16 línea 9 la palabra "bethylidae" se cambió por Bethylidae.
- En la página 25 línea 6 se cambió "20 partes" por "2 partes" y las líneas 13 y 14 el número "5" se cambió por "6" quedando como una composición comparativa 6.

Las anteriores correcciones se fundamentan en lo establecido por el artículo 34 de la Decisión 486, **"el solicitante de una patente podrá pedir que se modifique la solicitud en cualquier momento del trámite. La modificación no podrá implicar**

170 120

una ampliación de la protección que correspondería a la divulgación contenida en la solicitud inicial. Del mismo modo, se podrá pedir la corrección de cualquier error material”.

Anexos:

- Formulario único de correcciones y modificaciones
- Recibo de pago por concepto de modificación y correcciones a solicitudes en trámite.
- Nuevas páginas 7, 13, 15, 16 y 25.

En consecuencia, atentamente solicito se anexasen dichas páginas al expediente correspondiente a la solicitud de patente de la referencia.

Del Señor Jefe,


Margarita Castellanos Abondano
C.C. No. 39.779.654 de Usaquén
T.P.A. No. 70819 del C. Sup. de la Judicatura.
Calle 94 A No. 7 A - 09 - Bogotá
Teléfonos: 610 74 80 y 610 74 60

Bogotá, 24 ABR. 2006
0028/modificaciones

FORMULARIO ÚNICO DE CORRECCIONES Y MODIFICACIONES

① SOLICITUD DE:

☒ Corrección de Error Material ☐ Modificación a una solicitud

② SOLICITANTE	Nombre:	SUMITOMO-CHEMICAL COMPANY LIMITED	
	Dirección:	27-1, Shinkawa 2-chome, Chuo-ku Tokyo 104-8260 - JAPON	
	Nacionalidad o Domicilio:	Tokyo - JAPON	
	Lugar de Constitución:	JAPON	
	Teléfono:	Fax:	
	E-mail:		
		IDENTIFICACIÓN	
		C.C. ☐	NIT ☐
		C.E. ☐	Otro ☐
		Cual _____	
		Número _____	

③ REPRESENTANTE O APODERADO	Nombre:	MARGARITA CASTELLANOS A.	
	Dirección:	CALLE 94A No. 7A-09	
	Teléfono:	610 74 20	Fax: 610 07 06
	E-mail:	mail@alvarocastellanos.com	
		IDENTIFICACIÓN	
		C.C. ☒	NIT ☐
		C.E. ☐	Otro ☐
		Cual _____	
		Número <u>38'779.654</u>	TPA <u>70.819</u>

④ Número de Expediente: **05.125.629**

⑤ Descripción de la corrección o modificación solicitada:

Presento nuevas páginas 7, 13, 15, 16 y 25, de la descripción, en las cuales se corrigieron errores tipográficos.

⑥ Comprobante de pago No. 06-24,049 Fecha Marzo 27 de 2006

⑦ Anexos:

☒ Comprobante de pago de la tasa.

☐ Poderes al fuere el caso, junto con la sustitución de los mismos a mi favor.

☐ Documento que acredita la existencia y representación legal de las partes, cuando sean personas jurídicas

☒ Nuevas páginas 7, 13, 15, 16 y 25 de la descripción.

⑧ NOMBRE MARGARITA CASTELLANOS A. FIRMA Margarita Castellanos

CC 38'779.654 Usaquén - TPA 70.819 CSJ

6026
172 172

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
Rad: 05-125625-00003-0000 Rec: 2006-04-24 14:50:24
Dep. 2020 NUECREACIONES
Tra: 2 PATENTES Evc: 1 REGDEPOSITO
Act: 338 CTOINFORMACION Folios: 8

NIT : 800176089-2

RECIBO OFICIAL DE CAJA : 06 - 24,049
FECHA : MARZO 27 DE 2006

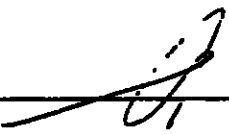
***** CONSIGNACION *****

USITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
ALVARO CASTELLANOS	CONSIGNACION	BANCO POPULAR	050-00110-6	51162653	27/03/2006	2,147,160.00

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-03	CAMBIO DE MODALIDAD Y MODIFICA	
12		MARCAS Y LENAS COMERCIALES	95,000.00
		TOTAL :	\$ 95,000.00

SON: NOVENTA Y CINCO MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

En cuanto al presente surfactante no iónico, es preferible el aceite de ricino etoxilado o aceite de ricino hidrogenado etoxilado. Entre el aceite de ricino etoxilado

imagen de un gran número de mediciones de partículas por un dispersor de difracción de rayo láser con base en la teoría de Mie-scattering, y como una máquina de medición específica, se puede enumerar un Master Sizer 2000 (nombre del producto de Malvern Co., Ltd). La distribución del tamaño de partícula medida por el dispositivo, es una distribución del tamaño de partícula basada en el volumen de la partícula cuando se supone que la partícula medida se encuentra en forma esférica y por lo tanto, el diámetro medio del volumen (VDM) en la presente descripción indica el valor en el cual, el volumen total de las partículas que poseen un valor más pequeño que este valor y el volumen total de las partículas que poseen un valor más grande que este valor, ocupa el 50% del volumen total, respectivamente.

Los ejemplos de una plaga de insectos a los cuales la composición de la presente invención ejerce un efecto de control incluyen los siguientes:

Plaga de insectos Hemiptera: saltamontes tal como pequeño saltamontes marrón (*Leodelphax striatellus*), saltamontes marrón (*Nilaparvata lugens*), saltamontes del arroz blanco reforzado (*Sogatella furcifera*) y similares, saltamontes de hoja tal como saltamonte de hoja arroz verde (*Nephotettix cincticeps*), saltamontes de hoja del arroz verde de Taiwan (*Nephotettix virescens*) y similares, áfidos tal como áfido del algodón (*Aphis gossypii*), áfido del durazno verde (*Myzus persicae*), áfido de la manzana (*Aphis citricola*), áfido del navo (*Lipaphis pseudobrassicae*), áfido de la pera verde (*Nippolachnus pin*), áfido del cítrico negro (*Toxoptera aurantii*), áfido del cítrico tropical (*Toxoptera citricidius*) y similares, chinches apestosos tal como el chinche verde apestoso (*Nezara antennata*), *Cletus punctiger*, chinche del haba (*Riptortus clavatus*), chinche verde de alas marrón (*Plautia stali*) y similares, moscas blancas tal como la mosca blanca de invernadero (*Trialeurodes vaporariorum*), mosca blanca de la papa dulce (*Bemisia tabaci*), mosca blanca de la hoja plateada (*Bemisia argentifolii*) y similares, insectos

Plagas de insectos Díptera:

5 **Culex** spp. tal como mosquito común (*Culex pipiens pallens*) , mosca latrina oriental (*Culex tritaeniorhynchus*) y similares, **Aedes** spp. tal como mosquito del dengue (*Aedes aegypti*), mosquito tigre (*Aedes albopictus*) y similares, **Anopheles** spp. tal como mosquito de la malaria china (*Anopheles sinensis*) y similares, Chironomidae, Muscidae tal como mosca común (*Musca domestica*), mosca falsa de establo (*Muscina stabulans*) y similares, Calliphoridae, Sarcophagidae, mosca común pequeña (*Fannia canicularis*), Arithomyiidae tal como larva de la semilla del maíz (*Delia platura*), larva de la cebolla (*Delia antiqua*) y similares, moscas minadoras de la hoja tal como minadoras de la hoja de legumbre (*Liriomyza trifolii*) y similares, moscas de la fruta, Phoridae, Drosophila, moscas polilla, Simuliidae (mosca negra), tábanos, y Culicoides y similares;

Plagas de insectos Coleoptera:

15 **Gusanos de la raíz del maíz** tal como gusano de la raíz del maíz occidental (*Diabrotica virgifera virgifera*), gusano de la raíz del maíz del sur (*Diabrotica undecimpunctata howardi*) y similares, **escarabajos dorados** tal como abejorro cuproso (*Anomala cyprea*), **escarabajo de la soya** (*Anomala rufocuprea*) y similares, **calapatillos** tal como calapatillo del maíz (*Sitophilus zeamais*), calapatillo del arroz acuático (*Lissorhoptus oryzophilus*), calapatillo de la alfalfa (*Hypera pastica*), calapatillo de haba adzuki (*Callosobruchus chinenensis*) y similares.

Tenebrionidae tal como la oruga de la harina de maíz amarillo (*Tenebrio molitor*), **escarabajos de la harina roja** (*Tribolium castaneum*) y similares, **Chrysomelidae** tal como el **escarabajo de la hoja de la cucúrbita** (*Aulacophora femoralis*), **escarabajo pulga rayado** (*Phyllotreta striolata*), **escarabajo Colorado** (*Leptinotarsa decemlineata*) y similares, **Epilachna** tal como **mariquitas de veintiocho manchas** (*Epilachna vigintioctapunctata*) y similares, **Bostrychidae**, **escarabajo con manto** (*Paederus fuscipes*) y similares;

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Co., Ltd) y la viscosidad de la composición comparativa 5 fue de 1900 mPa·s (cuando se empleó un viscosímetro tipo B con un rotor No. 2 a 6 rpm, 25°C).

Ejemplo de Fabricación Comparativo 6

5 La composición comparativa 6 de la presente invención se obtuvo mediante la preparación de manera similar al Ejemplo de Fabricación 2 excepto que las 2 partes en peso de aceite de ricino etoxilado (Alkamulus OR/40, HLB=14, nombre del producto de Rhodia Co., Ltd) del Ejemplo de Fabricación 2, se cambiaron por 2 partes en peso del éster del ácido polioxietilen sorbitan monoláurico (Sorbon T20, HLB=13.6, nombre del producto de Toho chemical Industry Co., Ltd).

10

 El diámetro medio del volumen de la gota de aceite fue de 1.5 µm en la composición comparativa 6 (medido por un Master Sizer 2000, fabricado por Malburn Co., Ltd) y la viscosidad de la composición comparativa 6 fue de 1940 mPa·s (cuando se empleó un viscosímetro tipo B con un rotor No. 2 a 6 rpm, 25°C).

15

Ejemplo experimental 1

 Cada 100 gramos de composición 1 de la presente invención y de la composición comparativa 1, se colocaron de manera separada en un recipiente hecho de HDPE, y el recipiente se selló fuertemente. Se almacenó el recipiente bajo la condición de que se repitiera alternativamente un ciclo que dejara el recipiente a -15°C por 3 días y a 30°C por 4 días. Se observó visualmente la apariencia de la composición después del período predeterminado y se examinó la proporción de la fase acuosa transparente en la composición. Los resultados se encuentran indicados en la Tabla 1.

20

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Tabla 1

	Después de 2 semanas
--	----------------------

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REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCI

Folio 178

2020
Bogotá D.C.,

Doctor(a)
CASTELLANOS ABONDANO MARGARITA
Apoderado(a) y/o Representante de
SUMITOMO CHEMICAL COMPANY LIMITED

REFERENCIA	Radicación No. 05 125629
	Trámite 2
	Evento 1
	Actuación 416
	Oficio No. 2874
	Folios 1

Teniendo en cuenta que la solicitud de privilegio de patente que se tramita bajo el expediente indicado en la referencia, reúne los requisitos de forma establecidos en los artículos 26 y 27 de la Decisión 486 de la Comisión de la Comunidad Andina, y en las demás disposiciones vigentes sobre la materia, se envía el extracto de la solicitud a la Oficina de Comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial.

De acuerdo con lo previsto por el artículo 40 de la Decisión 486/00, la publicación en este caso se hará a partir del día 13 del mes de Junio de 2007.

Cúmplase
Dado en Bogotá DC,

27 MAR. 2007

ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

adpa10



Industria y Comercio
SUPERINTENDENCIA

Delegatura de propiedad Industrial
División de Nuevas Creaciones

PCT

SOLICITUD
PATENTE DE INVENCION

fase nacional

21. EXPEDIENTE No.

05-18883

54. TÍTULO

Mejorador de transporte de proteína
en plantas transgenicas.

51. CLASIFICACIÓN INTERNACIONAL

A01N 58/22

71. SOLICITANTE

Lta- Resource management.

DOMICILIO

Portland, Texas - EU.

74. APODERADO

Jesus Abelardo Cordero Alfaro.

22. BOGOTÁ, D. C.,

4. marzo - 2005.

PETITORIO



SUPERINDUSTRIA Y COMERCIO
 Radicación : 05010003 00000000 Folios: 47
 Fecha (RD): 2005-03-01 14:05:07
 Trámite : 011 PCT-PATENT 379 FASE NACI 411 PRESENTE
 Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

FORMULARIO ÚNICO DE SOLICITUD DE PATENTE

PCT

ENTRADA EN FASE NACIONAL

01-03-2005

(1)

SOLICITUD DE:

☒ Patente de Invención.

☐ Patente de Modelo de Utilidad.

☐ Capítulo I.

☒ Capítulo II.

(2)

SOLICITANTE
(71)

Nombre: LTA RESOURCE MANAGEMENT

Dirección: 4748 Country Road 3667 Portland, Texas 78374

Nacionalidad o Domicilio: Portland, Texas

Lugar de Constitución: Estados Unidos de América

Teléfono:

Fax:

E-mail:

IDENTIFICACION

C.C. ☐ NIT ☐

C.E. ☐ Otro ☐

Cual _____

Número _____

(3)

REPRESENTANTE
O APODERADO
(74)

Nombre: JESUS ABELARDO CARDENAS A.

Dirección: Carrera 7 No. 74-56 Oficina 804

Teléfono: 3131652, 3132414 Fax: 3131713

E-mail: cardenaslaw@etb.net.co

IDENTIFICACION

C.C. ☒ NIT ☐

C.E. ☐ Otro ☐

Cual _____

No. 19.427.257 TP 38.319

(4)

INVENTOR (ES)
(72)

Nombre: JAMES LACKEY

Dirección: P.O. Box 193, Taft, Texas 78390

Nacionalidad o Domicilio: Estados Unidos de América

(5) PCT (86)

Solicitud Internacional No. PCT/US2003/023823 Fecha 31-07-2003

Publicación Internacional No. WO2004/013286 Fecha 12-02-2004

(6) Título (54) MEJORADOR DE TRANSPORTE DE PROTEINA EN PLANTAS TRANSGENICAS

(7) Clasificación Internacional (51) AOIN 33/22

(8) Prioridad

SI ☒ NO ☐

(33) País de Origen

US

US

(32) Fecha

01-08-2002

06-05-2003

(31) Número de Solicitud

60/399,716

10/429,974

(9) Comprobante de pago No. 05 - 15.351 y 05 - 15.352

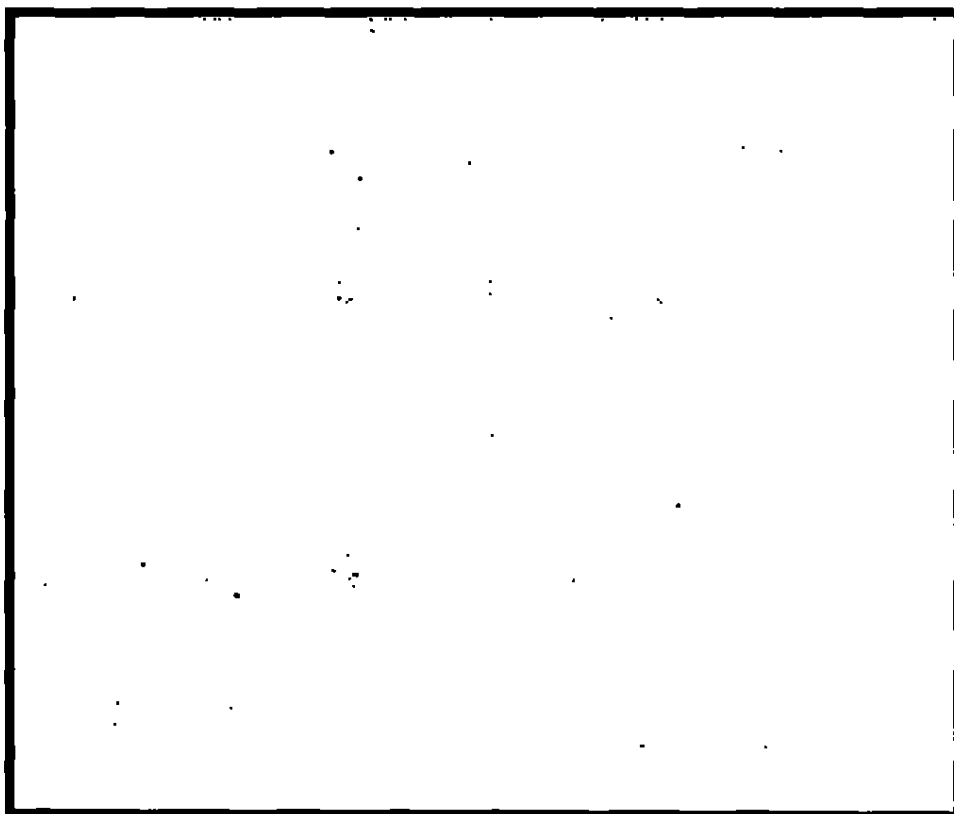
Fecha 28-02-2005

(10)

ANEXOS

- ☒ Comprobante de pago de la tasa de presentación de la solicitud.
- ☐ Documento que acredite la existencia y representación legal cuan el solicitante sea persona jurídica.
- ☐ Poderes, si fuere el caso necesario.
- ☐ Documento de cesión del inventor al solicitante o causante.
- ☐ Declaraciones.
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Copia del examen preliminar internacional efectuado por la Autoridad Internacional de Examen Preliminar (IPEA).
- ☐ Traducción del examen preliminar internacional efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☐ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☐ De ser el caso, modificaciones efectuadas a la solicitud internacional.
- ☒ Otros: Informe de búsqueda internacional con traducción, publicación internacional A2 y A3 con traducción, extracto para su publicación en medio magnético, tarjeta archivo temático.

(11) FIGURA CARACTERÍSTICA:



(12) Solicito la concesión de la patente,

NOMBRE: JESÚS ABELARDO CARDENAS ALFARO

FIRMA:

C.C. 19.427.257 Bogotá T.P. 38.319

C & R

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : 800176009-2

RECIBO OFICIAL DE CAJA : 05 - 15,331
FECHA : FEBRERO 28 DE 2005

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***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PBO	Vr. PAGO
CACHARERIA LA 14 LTDA	CONSIGNACION	BANCO POPULAR	050-00110-6	32973521	28/02/2005	545,000.

***** CONCEPTO *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	443,000.00
TOTAL :			443,000.

SON: CUATROCIENTOS CUARENTA Y TRES MIL PESOS

RESPONSABLE : _____

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

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***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PGO	Vr. PAGO
CACHARERIA LA 14 LTBA	CONSIGNACION	BANCO POPULAR	050-00110-6	32973521	28/02/2005	565,000.00

***** C O N C E P T O *****

CANT.	RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1	50005-01-09	OTROS SERVICIOS DE PROPIEDAD I	
		99 OTROS SERVICIOS ADMINISTRATIVOS	32,760.00
		TOTAL :	\$ 32,760.00

SON: TREINTA Y DOS MIL SETECIENTOS SESENTA PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

ESTA CERTIFICACION DE EXCEDENTE DE PAGO SOLO PODRA SER UTILIZADA
COMO PARTE DE LA CANCELACION DE UNA TARIFA VIGENTE Y NO PODRA SER
SUSTITUIDA POR NINGUN RECIBO.

From the INTERNATIONAL BUREAU

PCT**NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES**

(PCT Rule 47.1(c), first sentence)

To:

DAVIS, Garrett
1300 19th Street, N.W.
Suite 600
Washington, DC 20038
ETATS-UNIS D'AMERIQUEDoc'd _____ File _____
Rec'd _____

FEB 23 2004

ROYLANCE, ABRAMS
CERDO & GOODMAN, L.L.P.
BY KAP

Date of mailing (day/month/year)

12 February 2004 (12.02.2004)

Applicant's or agent's file reference

45539

IMPORTANT NOTICE

International application No.

PCT/US2003/023823

International filing date (day/month/year)

31 July 2003 (31.07.2003)

Priority date (day/month/year)

01 August 2002 (01.08.2002)

Applicant

LTA RESOURCE MANAGEMENT

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:

AU, AZ, BY, CH, CN, CO, DE, DZ, EP, HU, JP, KG, KP, KR, MD, MK, MZ, RU, TM

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BZ, CA, CR, CU, CZ, DK, DM, EA, EC, EE, ES, FI, GB, GD, GE, GH, GM,
HR, ID, IL, IN, IS, KE, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PG, PH, PL, PT,
RO, SC, SD, SE, SG, SK, SL, SY, TJ, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on 12 February 2004 (12.02.2004) under No. WO 2004/013286

4. **TIME LIMITS** for filing a demand for international preliminary examination and for entry into the national phase

The applicable time limit for entering the national phase will, subject to what is said in the following paragraph, be 30 MONTHS from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of 19 months from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see *PCT Gazette* No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the *PCT Newsletter*, October and November 2001 and February 2002 issues.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For regular updates on the applicable time limits (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

For filing a demand for international preliminary examination, see the *PCT Applicant's Guide*, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

It is the applicant's sole responsibility to monitor all these time limits.

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Gijsbertus Beijer - Carlos Roy

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ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: PROTEIN TRANSPORT ENHANCER FOR TRANSGENIC PLANTS

(57) Abstract: Expression and stability of desirable proteins in transgenic plants are promoted and maintained by treatment with a protein transport enhancer. Preferably, the transgenic plant is a commodity crop that has been modified to express pesticidally effective protein proteins.

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PROTEIN TRANSPORT ENHANCER FOR TRANSGENIC PLANTS

FIELD OF INVENTION

[0001] The invention relates to a method for the treatment of transgenic plants, especially crop plants that are designed to express pesticidally effective proteins.

BACKGROUND OF THE INVENTION

[0002] Transgenic plants have had a significant impact on commercial agriculture, with promising benefits but raising new pest management issues. Notably, agricultural crops based on plants that have been modified with pesticidally effective crystal protein genes to express pesticidally effective proteins hold the promise of selectively targeting pests by making their food source (the plant tissues) toxic thereby reducing or eliminating the amount of chemical insecticides that are used to control pest populations.

[0003] Certain members of the gram positive bacteria belonging to the genus *Bacillus* produce proteins that are insecticidal. The most well characterized are those of *Bacillus thuringiensis* (BT), where the insecticidal proteins are found as crystalline bodies with sporulating bacteria. The insecticidal crystal proteins are characterised by their potency and specificity towards specific insect pests, many of which are agronomically important, and their relative safety to non-target insect species and vertebrates, particularly humans. They have enjoyed a long history of use in horticultural industries where the mixture of crystals and spores are sprayed just like a chemical pesticide, but they have not been used with much success on broad-acre field crops.

[0004] The insecticidal crystals are composed of a large protein that is essentially inactive. When a caterpillar ingests some of the insecticidal crystals, the alkaline reducing conditions of the insects midgut cause the crystals to dissociate and release the crystal protein. At this stage the protein toxin is inactive, but specific proteases within the gastric juices of the insect chop the protein down to its protease resistant core that is now fully active. This activated insecticidal protein then binds to a specific receptor on the brush border membranes of the cells lining the midgut and inserts itself into the cells membrane. When about eight of these aggregate together, they form a pore or channel through the membrane, and allow the cell contents to leak out causing the death of the cells essential for nutrient absorption. The insects rapidly stop feeding and eventually starve to death or

die from secondary bacterial infections within about 24 hours. The processes of crystal solubilization, proteolytic processing to an active insecticidal protein and the binding to a specific receptor, all make the BT proteins highly specific and very desirable from an environmental perspective.

[0005] Many thousands of different isolates of *B. thuringiensis* have been collected and their insecticidal protein content and activity spectrums determined. A large number of BT-insecticidal protein genes have also now been cloned and sequenced. To avoid any confusion researchers have proposed a uniform naming system for the crystal protein genes (Cry genes) based on their protein sequence and the types of insects for which they were toxic.

Table 1

Gene Type	Insect Host	Size (kD)
Cry IA	Caterpillars	133.2
Cry IB	Caterpillars	138.0
Cry IC	Caterpillars	134.8
Cry IIA	Caterpillars/	70.9
Cry IIB	Fly larvae	70.8
Cry IIIA	Beetle larvae	73.1
Cry IVA	Fly larvae	134.4
Cry IVB	Fly larvae	127.8
Cry IVC	Fly larvae	77.8
Cry IVD	Fly larvae	72.4

[0006] The proteins encoded by the Cry I genes are all similar in protein sequence and are toxic only to caterpillars, ie. the larvae of moths and butterflies (Lepidoptera); the Cry II genes encode proteins toxic to Lepidoptera and/or Diptera (flies and mosquitoes) while the Cry IV proteins are only active against Diptera. Cry III genes produce proteins active against beetle (Coleoptera) larvae. Within these major groupings smaller divisions have been made by considering the similarities or differences between the different protein sequences. The Cry I group, for example was originally divided into Cry IA, IB and IC

(although it is now up to Cry IG) where the different sub-groups may only be 50% identical at the protein sequence level. Finer sub-divisions have also been made and Cry IA now consists of Cry IA(a), IA(b) and IA(c).

[0007] A number of methods have been developed for introducing desired genes into crop plant cells and growing fertile plants therefrom. See, US Patent No. 6,329,574 and <http://www.cotton.pi.csiro.au/publicat/pest/transgen.htm>, the contents of which are herein incorporated by reference. The method of choice depends in part upon the target species, but cotton modification often rely on a natural gene transfer agent that has evolved its own method of plant genetic engineering. The disease called Crown Gall is a plant tumor disease caused by the soil-borne bacterial pathogen, *Agrobacterium tumefaciens*. In the early 70's it was recognized that the bacterium caused the disease by transferring some of its own genetic material into the DNA of the plant cells that it infected. These parasitic genes subverted the normal biochemical machinery of the infected cells and caused them to make novel compounds that only the bacterium could utilize. This process of genetic colonization by the bacterium was just what genetic engineers were looking for, provided that they could stop the bacterium causing the disease symptoms. After further study scientists were able to identify which genes caused the disease and because bacteria are much simpler organisms to genetically manipulate, they were able to replace the disease-causing genes with the novel genes they were constructing from parts of potentially useful genes. The bacterium could then be used to piggy-back genes from the test-tube into plant cells. However not all plant cells exposed to the bacterium eventually receive the novel genes. Removal of unmodified plant cells from modified cells uses antibiotic purification.

[0008] Plant cells are sensitive to many of the antibiotics that are used to control bacterial infections in animals and humans. If a gene could be isolated that gave the plant cells tolerance to one of these toxic antibiotics then if physically linked to some desirable gene and inserted into the *Agrobacterium*, it would provide a useful selection system to kill off those cells that don't receive the genes during the "infection" process. Genes have been known in bacteria for many years that give the bacteria resistance to antibiotics by producing enzymes that breakdown or chemically modify the antibiotic so that it is no longer toxic. Using the techniques of gene splicing described above researchers have been able to modify a bacterial gene that encodes an enzyme that detoxifies the antibiotic

kanamycin and have produced a new hybrid gene that causes the production of this enzyme in plant cells and prevents their death in the presence of potentially lethal doses of kanamycin. Combining this antibiotic selection system with plant tissue culture procedures it has been possible to use *Agrobacterium* to deliver genes into a wide variety of plants from petunias to cottons.

[0009] Cotton is a crop of particular interest. Commercially available forms of transgenic cotton use the CryIAC (BOLLGARD™ by Monsanto) or a combination of CryIAC with Cry2Ab (BOLLGARD™ II by Monsanto) genes to express the endotoxin protein of *B. thuringiensis*. Field efficacy reports indicate a 50-70% reduction in the amount of applied pesticide needed to control the pests *Helicoverpa armigera* and *H. punctigera*. Also of interest are crop plants modified with the *B. thuringiensis* crystal toxin genes designated cryBT33 and cryBT34 which encode the coleopteran-toxic crystal proteins, CryBT33 (29-kDa) crystal protein, and the cryBT34 gene encodes the 14-kDa CryBT34 crystal protein. The CryBT33 and CryBT34 crystal proteins are toxic to red flour beetle larvae and Japanese beetle larvae. (See, US Patent No. 6,399,330.)

[0010] The use of transgenic crop plants raises new issues in the ongoing struggle towards integrated pest management. Some of these issues concern a reduction in the amount of expressed endotoxin as the plants mature which leads to a loss of efficacy in the latter stages of the growing season (the last 1/3 of the cotton growing season) and the increased probability of surviving pests that can develop immunity to the endotoxin. Such drawbacks have led to the development of pest control strategies that dictate a planting "window" relative to the development cycle of local pests and designated pest population minimum threshold values for pesticide application.

[0011] Physiological stress and physical damage to the transgenic plants can also result in a reduction of expressed endotoxin protein with a corresponding drop in pest control efficacy. Thus, an extended drought and/or high temperatures can reduce the endotoxin expression rate in the transgenic crop and provide a significant drop in pest protection that can dictate the need for pesticide spraying

[0012] The specific reasons for the drop in endotoxin protein expression are not well understood. In BT cotton, it is theorized that expression of the CryIAC gene drops because the CMV35S promoter concentration declines, the gene is "silenced, or other post-transcription events. It is also thought that the CryIAC protein is reduced due to

increased turnover, sequestration within the plant, or dilution due to growth and aging. It is understood that CryIAC transcription levels are unstable in both immature and mature BT cotton plants.

[0013] It would be desirable to have a system for treating transgenic plants designed to express pesticidally effective proteins that would promote the expression of these proteins despite increasing plant maturity, physiological stress, and physical damage.

SUMMARY OF THE INVENTION

[0014] It is an objective of the invention to provide a method for treating transgenic plants, preferably transgenic crops that express pesticidal proteins, and especially for transgenic crops that express insecticidal proteins.

[0015] It is another objective of the invention to provide a method for extending the period over which expressed proteins are present in sufficient quantity to control pest insect populations feeding on the treated plants.

[0016] In accordance with these and other objectives that will become apparent from the description herein, a method for treating transgenic crop plants according to the invention comprises applying to foliage of transgenic plants that are designed to express pesticidally effective proteins a protein transport enhancer that promotes the expression and/or stability of pesticidally effective proteins within the treated plants.

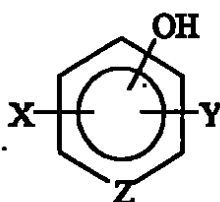
[0017] Although not wishing to be bound by any particular theory of operation, it is thought that the protein transport enhancer acts in one or more of several ways: (a) as a form of protective water substitute for cellular membranes during times of water deprivation stress, (b) as a protein stabilizer for the desired pesticidal protein, and/or (c) as a binder for proteins that facilitates movement via intraplant transport mechanisms. The result is that transgenic crop plants treated according to the invention express and move pesticidally effective proteins into fruit tissues despite physiological stress from water shortage and plant damage. It is thought that the treatment according to the invention will also continue to express effective levels of pesticidal protein through plant growth and maturity.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Transgenic plants are treated, according to the invention, with a protein transport enhancer that stimulates and/or protects cellular expression and intraplant transport mechanisms sufficiently that desired levels of pesticidal protein proteins are maintained in plant tissues, fruits, and seeds despite water deprivation, physical damage to plant tissues, growth, and plant maturity. Maintenance of desired protein expression levels and concentrations of protein proteins within transgenic plant tissues help to maintain efficacy levels for better pest control, further reductions in amounts of applied pesticides now required to counteract reductions in efficacy, and should help to prevent survival of exposed pests and the development of resistant pest populations.

[0019] It will be understood that all percentages identified herein are by weight with respect to the total weight of product, unless otherwise noted.

[0020] Suitable protein transport enhancers for use in the present invention include one or more compounds and agrichemically acceptable salts of compounds according to the structure in Formula 1:



Formula 1

wherein:

X is NO₂,

Y is H, C₁-C₆ alkyl, C₁-C₆ alkyloxy, C₂-C₆ alkenyl, and

Z is C or N.

[0021] In particular, moiety Y can be methyl, ethyl, propyl, butyl, iso-butyl, pentyl, hexyl, methoxy, ethoxy, propoxy, butoxy, iso-butoxy, pentoxy, and hexoxy.

[0022] Preferably protein transport enhancers used in the present invention include one or more compounds and salts of compounds according to the above structure in which X is a nitro group at the ortho or para positions relative to the hydroxy group, Y is hydrogen or a C₁-C₃ alkyloxy, and Z is a carbon atom. Suitable salts include water soluble

alkali metal salts (especially sodium and potassium salts), ammonium salts, and other water soluble salts that are not phytotoxic or of environmental concern.

[0023] The most preferred protein transport enhancer includes a combination of the sodium salts of p-nitrophenolate (A), o-nitrophenolate (B), and 2-methoxy-5-nitrophenolate (C). It is particularly preferred that the protein transport enhancer contain a mixture of these salts in a range of ratios within the range of A:B:C of (0.1-10):(0.1-10):1. A commercial source of these salts is available under the name ATONIK® Asahi Chemical Mfg. Co., Ltd. at a ratio of A:B:C of 2:3:1.

[0024] Protein transport enhancers according to the invention are applied at a rate generally less than 20 grams of each active ingredient per acre of treated field (gAI/ac). Preferably, these enhancers are applied at a rate within the range of 1-20 gAI/ac and most preferably at a rate within the range of 3-18 gAI/ac. It is especially preferred when salts of the protein transport enhancers are used within the range of 0.01-5 wt% based on total weight and applied at a rate (combined) within the range of 0.5-20 fluid ounces per acre (oz/ac).

[0025] Protein transport enhancers according to the invention can be applied in combination with one or more active ingredients, spray aids, spreading agents, or additional agents suitable for agricultural use on the target plant. Exemplary active ingredients that can be applied with the protein transport enhancer of the invention include herbicides, plant growth enhancing agents, plant growth stunting agents, foliar fertilizers, fungicides (external and systemic), and insecticides (external and systemic).

[0026] Herbicides that can be used include the triazines (e.g., atrazine), the ureas, glyphosate, sulfosate, glyfosinate, and sethoxydim.

[0027] Suitable plant growth enhancing agents for the present invention include plant growth hormones such as at least one of the 84 identified gibberellins with GA₃, GA₄, GA₇, GA₉, and GA₁₂ being preferred; cytokinins (e.g., zeatin, kinetin, benzyladenine, dihydrozeatin, and isopentenyl adenine); auxins (e.g., indolacetic acid (IAA), indolebutyric acid (IBA), and naphthalenacetic acid (NAA)); and polyhydroxycarboxylic acids of 2, 4, 5, and 6 carbon structures; ethephon; and fertilizers.

[0028] Suitable plant growth stunting agents useful in the invention include chlormequat chloride, mepiquat chloride, as well as maleic hydrazide and its esters. Such plant growth regulators affect and alter plant metabolic processes to enhance or retard

plant growth. All such agents can be used according to the application rates and timing specified by the manufacturer on the product label.

[0029] Systemic fungicides that will benefit from the invention include tridemorph, metalaxyl, iprodione, fosetyl-aluminum, thiophanate, benomyl, triadimefon, carboxin, oxycarboxin, carbendazim, thiabendazole, thiophanate, ethirimol, bupirimate, and dimethirimol.

[0030] Suitable systemic insecticides include aldicarb, acephate, carbofuran, dimethoate, phorate, and terbufos.

[0031] The specific mechanisms by which the expression and transport mechanisms are effected are not well known. For example, tests on unmodified wheat with radiolabeled nitrophenolate salts have tracked the treatment agent to proteins transported to the seed kernel in wheat plants. Another study suggests that phenolic agents act as hydration agents for cellular membranes.

[0032] In cotton, it is recognized that cotton seed requires high amounts of protein, and seeds produce lint from carbohydrates within the plant system. Tests with ATONIK® on normal (i.e., not genetically modified or otherwise altered to express pesticidal proteins as a normal part of plant metabolism function) show an increased yield of seed and lint. Such an effect is consistent with action as a plant growth regulator, but does not necessarily suggest anything regarding the effect of treating plants that have been genetically modified to produce a designated protein as part of the normal plant function.

[0033] Transgenic plants that can be treated according to the invention are generally those that have been modified from wild type to contain a gene that expresses a desired pesticidally effective protein sequence. Preferably, the transgenic plant includes genes that express pesticidally effective proteins that are effective to provide resistance against attacks or infections by insects, bacteria, fungus, mildew, mold, mites, and the like.

[0034] Two genes of particular effectiveness are the CryIAc gene (driven by the CMV35S promoter) and the Cry2Ab gene. These genes can be inserted individually or in combination into cotton, corn, wheat, sorghum, soybeans, and similar agricultural commodity crops to provide pesticidally effective protection against a variety of pest insects. Of special interest is cotton stock that has been modified to express pesticidally effective protein proteins (e.g., BT cotton). Seed stock for BT cotton that can be treated

according to the invention is commercially available from several sources under the tradename BOLLGARD™ or BOLLGARD™ II (Monsanto Co.).

[0035] Protein transport enhancers according to the invention are applied to transgenic plants at rates and times in the plant's growing cycle or season so as to maintain pesticide protein expression and stabilization within plant tissues. The table below identifies preferred transgenic plants to be treated and the amount of protein transport enhancer to be applied within generally useful, preferred, and more preferred application rates.

Table 1

TRANSGENIC PLANT	APPLICATION RATE (Oz/Ac)	PREFERRED APPLICATION RATE (Oz/Ac)	MORE PREFERRED APPLICATION RATE (Oz/Ac)
Bt cotton	1-100	1-50	5-30
Bt corn	1-100	1-50	5-30

EXAMPLES

[0036] Transgenic Bt cotton (Deltapine Nucotr B) and unmodified cotton plants in two liter pots in a controlled environment were sprayed with ATONIK®, a commercially available product containing a mixture of agents thought to be general growth regulating agents but which appears to act well as protein transport enhancers for genetically modified commodity crop plants. ATONIK® contains the sodium salts of p-nitrophenolate (0.3%), o-nitrophenolate (0.2%), and 5-nitroguaiacolate (0.1%). Cotton plants were treated at 7th true leaf (TL) and sampled 10 days later for the upper expanded main stem leaf. The temperature was maintained within the range of 76-86°F with adequate watering. After sampling (7th TL + 10 days), the plants were again sprayed with ATONIK® and subjected to stress from an elevated temperature (86-102°F) and inadequate water supply (drought conditions) until they were sampled 5 days later (7th TL +15 days) for expanded upper main stem leaf. Five days thereafter (7th TL +20 days) under the same conditions, the plants were sampled for leaf and squares.

[0037] After each sampling, tissue samples were placed in sealed bag and immediately taken to a facility for bollworm feeding tests. Bollworm mortality was measured at 24, 48, 72 and 96 hrs from initiation of feeding for the first spray application samples and at 72 and 96 hrs for the 2nd spray application samples.

[0038] Once the mortality study was completed, a leaf profile from representative cotton plants was taken for protein analysis. Leaves were collected at nodes 2, 6, 8, and 10 (counting from the top) and stored at -80° F.

[0039] The bollworm mortality for collected leaves in the first collected sample (7th TL + 10 days) are shown in Table 2.

Table 2

1 st Treatment	Bollworm Mortality (% dead at 7 th TL + 10 days)			
	24 hrs	48 hrs	72 hrs	96 hrs
Control (Bt cotton)	0	28.3	56.7	58.3
ATONIK 5 oz/ac	0	35.0	60.0	68.3
ATONIK 10 oz/ac	1.7	43.3	61.7	71.7
ATONIK 20 oz/ac	3.3	60.0	78.3	81.7
Control (non-Bt cotton)	0	1.7	1.7	3.3

[0040] The bollworm mortality from leaves collected at five and 10 days after the second spraying are reported in Table 3.

Table 3

2 nd Treatment	Bollworm Mortality (% dead at 7 th TL + X days)			
	15 Days		20 Days	
	72 hrs	96 hrs	72 hrs	96 hrs
Control (Bt cotton)	68.3	71.1	90.0	95.0
ATONIK 5 oz/ac	63.3	71.1	81.7	91.7
ATONIK 10 oz/ac	85.0	90.0	85.0	96.7
ATONIK 20 oz/ac	83.3	90.0	90.0	98.3
Control (non-Bt cotton)	0	0	5.0	6.7

[0041] The bollworm mortality from squares collected at 7th TL + 20 days (2nd treatment) spraying are reported in Table 4.

Table 4

2 nd Treatment	Bollworm Mortality (% dead at 7 th TL + 20 days)	
	72 hrs	96 hrs
Control (Bt cotton)	75.0	81.7
ATONIK 5 oz/ac	95.0	98.3
ATONIK 10 oz/ac	88.3	93.3
ATONIK 20 oz/ac	86.7	95.0
Control (non-Bt cotton)	0	3.3

[0042] Table 5 shows the effect of treatments with ATONIK on the height and number of nodes in Bt cotton.

Table 5

Treatment	Plant Height (cm)	No. of Nodes (avg)
Control (Bt cotton)	63.5	16.7
ATONIK 5 oz/ac	61.7	15.8
ATONIK 10 oz/ac	62.0	16.0
ATONIK 20 oz/ac	62.2	17.0
Control (non-Bt cotton)	61.0	13.8

[0043] The results show that treatment with the protein transport enhancer according to the invention resulted in higher bollworm mortality under both optimum growth conditions (Table 2) and under stress conditions from both temperature and lack of water (Tables 3 and 4). Treatment with ATONIK did not, however, result in increased vegetative growth (Table 5).

CLAIMS:

1. A method for maintaining the pesticidal efficacy of transgenic plants that include a gene which expresses a pesticidally effective protein, said method comprising:
treating said transgenic plants with a protein transport enhancer that stabilizes transport of pesticidally effective proteins within said plant.
2. A method according to claim 1 wherein said transgenic plant is cotton or corn.
3. A method according to claim 1 wherein said transgenic plant is cotton that has been modified to express *B. thuringiensis* protein.
4. A method according to claim 1 wherein said protein transport enhancer comprises a mixture of phenolate and nitroguaiacolate salts.
5. A method according to claim 4 wherein said protein transport enhancer is applied to said plants at a rate within the range of 1-100 oz/acre.
6. A method according to claim 5 wherein said protein transport enhancer is applied to said plants at a rate within the range of 1-50 oz/acre.
7. A method according to claim 6 wherein said protein transport enhancer is applied to said plants at a rate within the range of 5-30 oz/acre.
8. A method according to claim 1 wherein said protein transport enhancer comprises polyols obtained from reduction of aldo- and keto- groups in a carbohydrate.

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TRATADO DE COOPERACIÓN SOBRE PATENTES

P C T

De la OFICINA INTERNACIONAL

**AVISO INFORMANDO AL SOLICITANTE SOBRE LA COMUNICACIÓN DE LA
SOLICITUD INTERNACIONAL A LAS OFICINAS DESIGNADAS**

(PTC Regla 47.1(c), primera fase)

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ESTADOS UNIDOS DE AMÉRICA

Fecha Recibido: Feb. 23, 2004

Fecha envío por correo (d/m/a) Febrero 12, 2004 (12.02.2004)		
Referencia al expediente del Agente o Solicitante 45538		AVISO IMPORTANTE
No. Solicitud Internacional PCT/US2003/023823	Fecha Registro Internacional (d/m/a) Julio 31, 2003 (31.07.2003)	Fecha Prioridad (d/m/a) Agosto 1, 2002 (01.08.2002)
Solicitante LTA RESOURCE MANAGEMENT		

1. Se da aviso de que la Oficina Internacional ha comunicado, como se dispone en el Artículo 30, la solicitud internacional a las siguientes oficinas designadas en la fecha indicada arriba como la fecha de envío por correo de este aviso.

AU, AZ, BY, CH, CN, CO, DE, DZ, EP, HU, JP, KG, KP, KR, MD, MK, MZ, RU,
TM

De acuerdo con la Regla 47.1(c), tercer párrafo, las Oficinas aceptarán el presente aviso como evidencia concluyente de que la comunicación internacional ha tenido debidamente en la fecha de envío por correo indicada antes y no se requiere que el solicitante suministra copia de la solicitud internacional a las Oficinas Designadas.

2. Las siguientes Oficinas han renunciado al requisito de dicha comunicación en este momento:

AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BZ, CA, CR, CU, CZ, DK, DM, EA, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, ID, IL, IN, IS, KE, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MN, MX, NI, NO, NZ, OA, OM, PG, PH, PL PT, RO, SC, SD, SE, SG, SK, SL, SY, TJ, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW

La comunicación se realizará a las oficinas solamente a su solicitud. Además, las oficinas no exigen que el solicitante suministre una copia de la solicitud internacional (Regla 49.1(a-bis))

3. Adjunto a este aviso hay una copia de la solicitud internacional publicada por la Oficina en febrero 12 de 2004 (12.02.2004) bajo el número WO 2004/013286

4. **LIMITES DE TIEMPO para presentar una solicitud de examen preliminar internacional para entrada en la fase nacional**

El límite de tiempo aplicable para entrar en la fase nacional, **sujeto a lo que se diga en el siguiente párrafo**, será **30 MESES** a partir de la fecha de prioridad, no sólo con respecto de una Oficina elegida si la solicitud de examen preliminar internacional se presenta antes del vencimiento de los **19 meses**, a partir de la fecha de prioridad, pero también con respecto de una Oficina designada, en ausencia de presentación de dicha solicitud, en que se aplica el Artículo 22(1), modificado con vigencia desde abril 1 de 2002 con respecto de esa Oficina designada. Para más detalles, ver *PCT Gazette* No. 44/2001 de Noviembre 2001, páginas 19926 y 19934, y también *PCT Newsletter*, ediciones de octubre y noviembre 2001, y febrero 2002.

En la práctica, los límites de tiempo diferentes del límite de tiempo de **30 meses** continuarán aplicándose, por varios periodos de tiempo, con respecto de ciertas Oficinas designadas o elegidas, véase *PCT Gazette*, *PCT Newsletter* y *PCT Applicant's Guide, Volumen II, Capítulos Nacionales*, todos existente en Internet site de OMS, en <http://www.wipo.int/pct/en/index.html>.

Para presentar una **demanda para examen preliminar internacional**, véase *PCT Applicant's Guide*, Volumen I/A, Capítulo IX. Solamente un solicitante que sea nacional o residente en un Estado Contratante del PCT que esté obligado según el Capítulo II tiene derecho a presentar una demanda para examen preliminar internacional (actualmente, todos los estados Contratantes del PCT están obligados por el Capítulo II).

Es **responsabilidad exclusiva** del solicitante controlar todos estos límites de tiempo.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Ginebra 20, Suiza	Funcionario autorizado Gujsbertus Beijer – Carlos Roy
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**(12) SOLICITUD INTERNACIONAL PUBLICADA DE ACUERDO CON EL
TRATADO DE COOPERACIÓN SOBRE PATENTES (PCT)**

**(19) Organización Mundial de la Propiedad Intelectual
Oficina Internacional**

(43) Fecha Publicación Internacional: (10) Número Publicación Internacional

12 de Febrero de 2004 (12.02.2004) PCT WO 2004/013286 A2

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- (51) Clasificación Internacional de Patentes⁷ C12N**
- (21) Número de Solicitud Internacional PCT/US2003/023823**
- (22) Fecha Presentación Internacional: 31 de julio de 2003 (31.07.2003)**
- (25) Idioma de presentación Inglés**
- (26) Idioma de Publicación Inglés**
- (30) Fecha de Prioridad**
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|------------|----------------------------------|----|
| 60/399,716 | 1 de Agosto de 2002 (01.08.2002) | US |
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- (81) Estados Designados (Nacional):** AE, AG, AL, AM, AT (modelo de utilidad), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (modelo de utilidad), CZ, DE (modelo de utilidad), DE, DK (modelo de utilidad), DK, DM, DZ, EC, EE, (modelo de utilidad), EE, ES, FI (modelo de utilidad), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (modelo de utilidad), SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Estados Designados: (regional):** ARIPO patente (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Patente Eurasia (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Patente Europea (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR) OAPI patente (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Publicado:

- *sin informe de búsqueda internacional y para ser publicado al recibo de ese informe.*

Para código de dos letras y otras abreviaturas, consultar las Notas Gula sobre Códigos y Abreviaturas que aparecen al comienzo de cada edición regular de PCT Gazette.