

DOCUMENT MADE AVAILABLE UNDER THE PATENT COOPERATION TREATY (PCT)

International application number:	PCT/IB2018/060686
International filing date:	28 December 2018 (28.12.2018)
Document type:	Certified copy of priority document
Document details:	Country/Office: IN
	Number: 201831001958
	Filing date: 17 January 2018 (17.01.2018)
Date of receipt at the International Bureau:	14 January 2019 (14.01.2019)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a),(b) or (b-bis)

IBR/60686



INTELLECTUAL
PROPERTY INDIA

पेटेंट/डिजाइन/ व्यापार
चिह्न/भौगोलिक उपदर्शन



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

वाणिज्य एवं उद्योग मंत्रालय

MINISTRY OF COMMERCE & INDUSTRY

पेटेंट कार्यालय

THE PATENT OFFICE

जिस किसी से संबन्धित हो

TO WHOMSOEVER IT MAY CONCERN

मैं, अधोहस्ताक्षरी जो पेटेंट अधिनियम, 1970 की धारा 73(3) के तहत महानियंत्रक एकस्व, अभिकल्प एवं व्यापार चिह्न की ओर से प्रमाणपत्र हस्ताक्षर व जारी करने के लिए प्राधिकृत अधिकारी हूँ, एतद्वारा यह प्रमाणित करता/ती हूँ कि निम्नलिखित पेटेंट आवेदन के संबंध में फाइल दस्तावेज़(जों) की सही प्रतिलिपि इसके साथ संलग्न है:

I, the undersigned, being an officer duly authorized to sign and issue the certificate on behalf of the Controller General of Patents, Designs and Trademarks in accordance with the provisions of Section 73(3) of the Patents Act, 1970, hereby certify that annexed hereto is a True Copy of the document(s) as filed in connection with the following Patent Application:

क) आवेदन संख्या/a) Application Number: 201831001958

ख) फाइल करने की तारीख/ b) Date of Filing 17th January, 2018

ग) अनुरोधित दस्तावेज़(जों) का नाम:

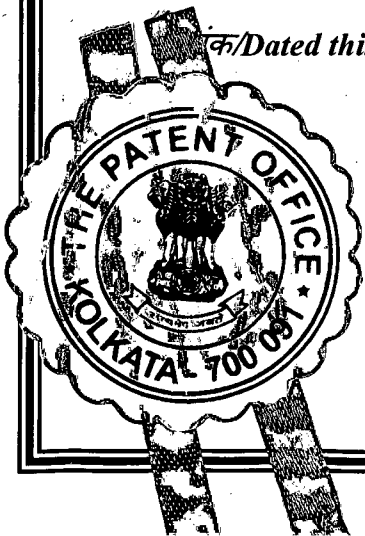
C) Name of the document(s) requested: Provisional Specification with Form 2 and Form 1.

यह प्रमाणपत्र पेटेंट अधिनियम, 1970 की धारा 147(1) के अधीन मुझमें निहित शक्तियों के तहत जारी किया गया है। This certificate is issued under the powers vested in me U/S 147(1) of The Patents Act, 1970.

क/Dated this.....02nd.... day of ...January...2019

Sharmishta Ghosh

नियंत्रक पेटेंट व डिजाइन/ Controller of Patents and Designs
(प्राधिकृत हस्ताक्षरी/ Authorised Signatory)



FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

&

The Patents Rules, 2003

PROVISIONAL SPECIFICATION

(See section 10; rule 13)

5

10

**1. Title of the invention - NOVEL AGROCHEMICAL
COMBINATIONS**

15

2. Applicant(s)

20

(a) NAME : **UPL LTD**

(b) NATIONALITY : **An Indian Company**

25

(c) ADDRESS : **Agrochemical Plant, Durgachak Haldia – 721
602, Midnapore Dist. West Bengal, India**

30

3. PREAMBLE TO THE DESCRIPTION

35

The following specification describes the invention

Field of the invention:

The present invention relates to agrochemical combinations for the control of
5 plant pests. More particularly, the present invention relates to novel
combinations, compositions comprising these combinations and methods of
using the combinations for the treatment of plant propagation material.

Background and Prior art:

10 Combination of insecticides and fungicides are used to broaden the spectrum of
control of insect and fungal pests, reduce dosage, thereby reducing
environmental impact, and decrease chances of development of resistance. The
combination of insecticides and fungicides at times demonstrate an additive or
synergistic effect that results in an improved control on the pests.

15

Damage to seeds from insect and fungal pests is another major concern for
agriculturalist. There are various diseases such as seed rot etc. which reduce
germination rates and cause considerable decrease in yield. Treating the seed
with insecticidal and fungicidal combinations helps reduce damage from such soil
20 pests. Another advantage of treating seeds or other plant propagation material
is the improvement in germination rates, increased yield and improved plant
health.

25

There are many combinations of insecticide and fungicide known in the art for
the control of soil borne pests. For example, **US5877194A** teaches combinations
of fipronil and triticonazole for seed treatment. **US7732374B2** teaches

combinations of prothioconazole and insecticides for the control of pests in seeds, soils etc.

5 There is however a need for improvement of these combinations. Single active combinations used over a long period of time has resulted in resistance. With the onset of resistance to certain pests, there is a need in the art for a combination of actives that decreases chances of resistance and improves the spectrum of disease and pest control.

10 **Objects of the invention:**

Therefore, one object of the present invention is to provide improved combinations of insecticides and fungicides for the control of soil borne pests.

15 Another object of the present invention is to provide a method and a composition for controlling insect pests and fungal diseases around plant propagation material.

20 Yet another object of the present invention is to provide improved combinations of insecticides and fungicides that promote plant health.

Embodiment of the present invention can ameliorate one or more of the above mentioned problems.

25 **SUMMARY OF THE INVENTION:**

Therefore an aspect of the present invention can provide combinations of fipronil; azoxystrobin; at least one benzimidazole fungicide; and either a multi-site fungicide or a neonicotinoid insecticide.

- 5 Another aspect of the present invention can provide a method of improving yield in crops, the method comprising applying, to a plant propagation material of said crop, a combination comprising fipronil, azoxystrobin, at least one benzimidazole fungicide and either a multi-site fungicide or a neonicotinoid insecticide.
- 10 Yet another aspect of the present invention can provide a method of improving plant health, the method comprising applying, to a plant propagation material of said crop, a combination comprising fipronil, azoxystrobin, a benzimidazole fungicide and either a multi-site fungicide or a neonicotinoid insecticide.
- 15 Another aspect of the present invention can provide a composition for treating plant propagation material, the composition comprising fipronil, azoxystrobin, at least one benzimidazole fungicide and either a multi-site fungicide or a neonicotinoid insecticide.
- 20 In another aspect, the present invention can provide a method of controlling pests by treating a plant propagation material with a composition comprising fipronil, azoxystrobin, at least one benzimidazole fungicide and either a multi-site fungicide or a neonicotinoid insecticide.
- 25 In yet another aspect, the present invention can provide a composition for improving plant health, the method comprising applying to a plant propagation material of said crop, a combination comprising fipronil, azoxystrobin, a

benzimidazole fungicide and either a multi-site fungicide or a neonicotinoid insecticide.

DETAILED DESCRIPTION OF THE INVENTION:

- 5 The term "plant propagation material" refers to the parts of the plant, such as seeds, which can be used for the propagation of the plant and vegetative plant material such as cuttings and tubers (for example, potatoes). There may be mentioned, e.g., the seeds (in the strict sense), roots, fruits, tubers, bulbs, rhizomes, parts of plants. Germinated plants or young plants, which may be
- 10 transplanted after germination or after emergence from the soil. "Insecticidal" refers to the ability of a substance to increase mortality or inhibit, growth rate of insects. "Fungicidal" refers to the ability of a substance to decrease or inhibit growth of fungi. The term "agriculturally acceptable amount of active" refers to an amount of an active that kills or inhibits the plant disease for which control is
- 15 desired, in an amount not significantly toxic to the plant being treated. To "control" or "controlling" insects means to inhibit, through a toxic effect, the ability of insect pests to survive, grow, feed, and/or reproduce, or to limit insect-related damage or loss in crop plants or denotes control and prevention of a disease. Controlling effects include all deviation from natural development, for
- 20 example: killing, retardation, decrease of the fungal disease or insect pest. To "control" insects may or may not mean killing the insects, although it preferably means killing the insects. The term "agriculturally acceptable amount of active" refers to an amount of an active that kills or inhibits the plant disease for which control is desired, in an amount not significantly toxic to the plant being treated.
- 25 The term "improved seed vigour" refers to seed properties that determines potential for fast and uniform emergence, and development of seedlings under a

wide range of field conditions, when compared with the same trait in a control plant which has been grown under the same conditions in the absence of the method of the invention. Such traits may include, early and/or improved germination, improved emergence, increased root growth, a developed root system, increased root nodulation, increased shoot growth, improvement in plant height, an increase in plant weight (fresh or dry), bigger leaf blades, greener leaf colour, increased pigment content, increased photosynthetic activity, earlier flowering, longer panicles, early grain maturity, increased seed, fruit or pod size, increased pod or ear number, increased seed number per pod or ear, increased seed mass, enhanced seed filling, delay of senescence, and improved vitality of the plant.

The present inventors found unexpected synergy when fipronil and azoxystrobin was combined with a benzimidazole fungicide and either a multi-site fungicide or a neonicotinoid insecticide. More specifically, the present inventors found unexpected synergy when fipronil and azoxystrobin was combined with either carbendazim or thiophanate methyl and either imidacloprid or a multi-site fungicide or both.

Fipronil is a phenylpyrazole insecticide which acts on the insects' central nervous system by blocking GABA-gated chloride channels and glutamate-gated chloride channels. Its chemical name is (RS)-5-amino-1-[2,6-dichloro-4-(trifluoromethyl)phenyl]-4-(trifluoromethylsulfinyl)-1H-pyrazole-3-carbonitrile.

Azoxystrobin is a systemic fungicide belonging to the strobilurin class of compounds. Its mode of action is brought about by attaching to the Qo site of Complex III of the mitochondrial electron transport chain, thereby preventing

production of ATP. Its chemical name is methyl (E)-2-{2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl}-3-methoxyacrylate.

5 Benzimidazole fungicides inhibit mitosis and cell division in fungi. They are broad spectrum fungicides that are known to control a wide variety of fungi.

Neonicotinoid insecticides are systemic with contact and stomach action. Acetylcholine receptor (nAChR) agonist. These insecticides are known to control a broad spectrum of insect pests.

10

Multi-site fungicides are known to attack fungi at multiple sites. These fungicides are used for broad-spectrum disease control. Known multi-site fungicides include but are not limited to dithiocarbamates, phthalimides, chloronitriles, inorganic fungicides, sulfamides, bis-guanidines, triazines, quinones, quinoxalines, 15 dicoarboxamides etc.

20

The present inventors believe that the combination of the present invention surprisingly results in a synergistic action. The combinations of the present invention allow for a broad spectrum of pest control and has surprisingly improved plant vigour and yield. The broad spectrum of the present combination also provides a solution for preventing the development of resistance.

Therefore, an aspect of the present invention can provide combinations comprising:

25

- i) fipronil;
- ii) azoxystrobin;
- iii) a benzimidazole fungicide; and

- iv) at least one active agent selected from a neonicotinoid insecticide or a multi-site fungicide or both.

In an embodiment, the benzimidazole fungicide is selected from at least one of
5 albendazole, benomyl, carbendazim, chlorfenazole, cypendazole, debacarb, fuberidazole, mecarbinzid, rabenzazole, thiabendazole, furophanate, thiophanate, thiophanate-methyl.

In an embodiment, the benzimidazole fungicide is selected from benomyl,
10 carbendazim and thiophanate or thiophanate-methyl.

In an embodiment, the benzimidazole fungicide is carbendazim.

In an embodiment, the benzimidazole fungicide is thiophanate methyl.
15

In an embodiment, the multi-site fungicide is a fungicide selected from the group consisting of dithiocarbamates, phthalimides, chloronitriles, inorganic fungicides, sulfamides, bis-guanidines, triazines, quinones, quinoxalines, and dicarboxamides.

20 In an embodiment, the dithiocarbamate fungicide is selected from asamobam, asomate, azithiram, carbamorph, cufraneb, cuprobam, disulfiram, ferbam, metam, nabam, tecoram, thiram, urbacide, ziram, dazomet, etem, milneb, mancopper, mancozeb, maneb, metiram, polycarbamate, propineb and zineb.

25 In a preferred embodiment, the dithiocarbamate fungicide is selected from maneb, mancozeb and zineb.

In another embodiment, the dithiocarbamate fungicide is mancozeb.

5 In an embodiment, the multi-site fungicide is a phthalimide fungicide selected from captan, captafol and folpet.

In an embodiment, the multi-site fungicide is a chloronitrile fungicide such as chlorothalonil.

10 In an embodiment, the multi-site fungicide is a sulfamide fungicide selected from dichlofluanid and tolylfluanid.

In an embodiment, the multi-site fungicide is a bis-guanidine fungicide selected from guazatine and iminoctadine.

15 In an embodiment, the multi-site fungicide is a triazine fungicide selected from anilazine.

In an embodiment, the multi-site fungicide is a quinone fungicide dithianon.

20 In an embodiment, the multi-site fungicide is a quinoxaline fungicide selected from quinomethionate and chlorquinox.

In an embodiment, the multi-site fungicide is a dicarboxamide fungicide selected from fluoroimide.

25

In an embodiment, the multi-site fungicide is an inorganic fungicide selected from copper fungicides including copper (II) hydroxide, copper oxychloride, copper (II) sulfate, basic copper sulfate, Bordeaux mixture, copper salicylate $C_7H_4O_3 \cdot Cu$, cuprous oxide CU_2O ; or sulphur.

5

In an embodiment, the neonicotinoid insecticide may be selected from the group consisting of acetamiprid, clothianidin, imidacloprid, nitenpyram, nithiazine, thiacloprid and thiamethoxam.

- 10 In a preferred embodiment, the neonicotinoid insecticide is selected from the group consisting of acetamiprid, thiamethoxam and imidacloprid.

Thus, an embodiment of the present invention can provide combinations for treatment of plant propagation material comprising:

- 15 i) fipronil;
ii) azoxystrobin;
iii) a benzimidazole fungicide selected from carbendazim or thiophanate-methyl; and
iv) at least one active agent selected from imidacloprid, acetamiprid,
20 thiamethoxam, mancozeb, maneb, zineb, folpet, chlorothalonil, and tribasic copper sulfate.

Another embodiment of the present invention may provide combinations for treatment of plant propagation material comprising:

- 25 i) fipronil;
ii) azoxystrobin;

- iii) a benzimidazole fungicide selected from carbendazim or thiophanate methyl; and
- iv) imidacloprid.

5 Another embodiment of the present invention may provide combinations comprising:

- i) fipronil;
- ii) azoxystrobin;
- 10 iii) a benzimidazole fungicide selected from carbendazim or thiophanate methyl; and
- iv) mancozeb.

Another embodiment of the present invention may provide combinations comprising:

- 15 i) fipronil;
- ii) azoxystrobin
- iii) carbendazim; and
- iv) imidacloprid.

20 Another embodiment of the present invention may provide combinations comprising:

- i) fipronil;
- ii) azoxystrobin;
- iii) carbendazim; and
- 25 iv) mancozeb.

Another embodiment of the present invention may provide combinations comprising

- i) fipronil;
- ii) azoxystrobin;
- 5 iii) thiophanate methyl; and
- iv) mancozeb.

Another embodiment of the present invention may provide combinations comprising:

- 10 i) fipronil;
- ii) azoxystrobin;
- iii) thiophanate methyl; and
- iv) imidacloprid.

Another embodiment of the present invention can provide combinations for
15 treatment of plant propagation material comprising:

- i) fipronil;
- ii) azoxystrobin;
- iii) a benzimidazole fungicide selected from carbendazim or thiophanate-methyl; and
- 20 iv) acetamiprid.

Another embodiment of the present invention can provide combinations for treatment of plant propagation material comprising:

- i) fipronil;
- 25 ii) azoxystrobin;
- iii) a benzimidazole fungicide selected from carbendazim or thiophanate-methyl; and

- iv) thiamethoxam.

Yet another embodiment of the present invention can provide combinations for treatment of plant propagation material comprising:

- 5 i) fipronil;
- ii) azoxystrobin;
- iii) a benzimidazole fungicide selected from carbendazim or thiophanate-methyl; and
- iv) chlorothalonil.

10

Yet another embodiment of the present invention can provide combinations for treatment of plant propagation material comprising:

- i) fipronil;
- ii) azoxystrobin;
- 15 iii) a benzimidazole fungicide selected from carbendazim or thiophanate-methyl; and
- iv) tribasic copper sulfate.

20

In an embodiment, the constituent fungicides of the combination of the present invention may be admixed in ratio of (1-80): (1-80): (1-80): (1-80) of the fipronil, azoxystrobin, benzimidazole fungicide, neonicotinoid or multi-site fungicide respectively.

25

The combinations of the present invention may be admixed with suitable agrochemical adjuvants to form compositions.

Thus, an aspect of the present invention may provide a seed treatment composition comprising:

- i) fipronil;
- ii) azoxystrobin;
- 5 iii) a benzimidazole fungicide selected from carbendazim or thiophanate methyl;
- iv) an active selected from neonicotinoid or a multi-site fungicide or both; and
- v) agrochemcially acceptable adjuvants.

10

Another aspect of the present invention may provide a seed treatment composition comprising:

- i) fipronil;
- ii) azoxystrobin;
- 15 iii) a benzimidazole fungicide selected from carbendazim or thiophanate methyl;
- iv) at least one active agent selected from imidacloprid, acetamiprid, thiamethoxam, mancozeb, maneb, zineb, folpet, chlorothalonil, and tribasic copper sulfate; and
- 20 v) agrochemcially acceptable adjuvants.

In an embodiment, the total amount of fipronil in the composition may typically be in the range of 0.1 to 99% by weight, preferably 0.2 to 90% by weight. The total amount of azoxystrobin in the composition may be in the range of 0.1 to 99% by weight. The total amount of benzimidazole inhibitor in the composition
25 may be in the range of 0.1 to 99% by weight. The total amount of neonicotinoid in the composition may be in the range of 0.1 to 99% by weight or the total

amount of multi-site fungicide in the composition may be in the range of 0.1 to 99% by weight.

5 In an embodiment, the constituent fungicides and insecticides of the composition of the present invention may be admixed in ratio of (1-80): (1-80): (1-80): (1-80) of the fipronil, azoxystrobin, benzimidazole fungicide and either neonicotinoid or multi-site fungicide respectively.

10 In an embodiment, the constituents of the composition of the present invention may be applied as per known methods of application to seeds and other plant propagation material or transplanted saplings. .

15 In an embodiment of the present invention, the compositions can be formulated into either solid or liquid formulations that are suitable for application to plant propagation material. The formulation may be made as known formulation types such as wettable powders (WP), solutions (LS), emulsions (ES), suspension concentrates (FS), water dispersible granule (WG), or aqueous suspension concentrate (CS).

20 The formulation may be applied by various methods such methods using conventional treating techniques and machines, such as fluidized bed techniques, the roller mill method, rotostatic seed treaters, and drum coaters, spouted beds etc. Pre and post coating procedures such as sizing etc., may also be carried out. Such procedures are known in the art. It is readily understood that plant
25 propagation material will be treated only once it is removed from the plant and is ready to be re-sown.

In an embodiment, the treatment may occur before sowing of the plant propagation material so that the sown material has been pre-treated with the combination. In particular, seed coating or seed pelleting are preferred in the treatment of the combinations according to the invention. As a result of the
5 treatment, the active ingredients in the combination are adhered on to the seed and therefore available for pest and/or disease control.

The formulations may contain standard agriculturally acceptable adjuvants, carriers, diluents, emulsifiers, fillers, anti-foaming agents, thickening agents, anti-
10 freezing agents, biocides, pigments etc.

Suitable agricultural adjuvants and carriers may include, but are not limited to, crop oil concentrates; methylated seed oils, emulsified methylated seed oil, nonylphenol ethoxylate; benzylcocoalkyldimethyl quaternary ammonium salt;
15 blend of petroleum hydrocarbon, alkyl esters, organic acid, and anionic surfactant; C₉-C₁₁ alkylpolyglycoside; phosphated alcohol ethoxylate; natural primary alcohol (C₁₂-C₁₆) ethoxylate; di-sec-butylphenol EO-PO block copolymer; polysiloxane-methyl cap; nonylphenol ethoxylate, urea ammonium nitrate; tridecyl alcohol (synthetic) ethoxylate (8EO); tallow amine ethoxylate ; PEG(400) dioleate-99, alkyl
20 sulfates, such as diethanolammonium lauryl sulfate; alkylarylsulfonate salts, such as calcium dodecylbenzenesulfonate; alkylphenol-alkylene oxide addition products, such as nonylphenol-C₁₈ ethoxylate; alcohol-alkylene oxide addition products, such as tridecyl alcohol-C₁₆ ethoxylate; soaps, such as sodium stearate; alkyl-naphthalene-sulfonate salts, such as sodium dibutyl-naphthalenesulfonate;
25 dialkyl esters of sulfosuccinate salts, such as sodium di(2-ethylhexyl)sulfosuccinate; sorbitol esters, such as sorbitol oleate; quaternary amines, such as lauryl trimethylammonium chloride; polyethylene glycol esters of

fatty acids, such as polyethylene glycol stearate; block copolymers of ethylene oxide and propylene oxide; salts of mono and dialkyl phosphate esters; vegetable or seed oils such as soybean oil, rapeseed/canola oil, olive oil, castor oil, sunflower seed oil, coconut oil, corn oil, cottonseed oil, linseed oil, palm oil, peanut oil, safflower oil, sesame oil, tung oil and the like; and esters of the above vegetable oils, and in certain embodiments, methyl esters.

Suitable liquid carriers that may be employed in a composition of the present invention may include water or organic solvents. The organic solvents include, but are not limited to, petroleum fractions or hydrocarbons such as mineral oil, aromatic solvents, paraffinic oils, and the like; vegetable oils such as soybean oil, rapeseed oil, olive oil, castor oil, sunflower seed oil, coconut oil, corn oil, cottonseed oil, linseed oil, palm oil, peanut oil, safflower oil, sesame oil, tung oil and the like; esters of the above vegetable oils; esters of monoalcohols or dihydric, trihydric, or other lower polyalcohols (4-6 hydroxy containing), such as 2-ethyl hexyl stearate, n-butyl oleate, isopropyl myristate, propylene glycol dioleate, di-octyl succinate, di-butyl adipate, di-octyl phthalate and the like; esters of mono, di and polycarboxylic acids and the like. Organic solvents include, but are not limited to toluene, xylene, petroleum naphtha, crop oil, acetone, methyl ethyl ketone, cyclohexanone, trichloroethylene, perchloroethylene, ethyl acetate, amyl acetate, butyl acetate, propylene glycol monomethyl ether and diethylene glycol monomethyl ether, methyl alcohol, ethyl alcohol, isopropyl alcohol, amyl alcohol, ethylene glycol, propylene glycol, glycerine, N-methyl-2-pyrrolidinone, N,N-dimethyl alkylamides, dimethyl sulfoxide.

25

Solid carriers that may be employed in the compositions of the present invention may include but are not limited to attapulgite, pyrophyllite clay, silica, kaolin clay,

kieselguhr, chalk, diatomaceous earth, lime, calcium carbonate, bentonite clay, Fuller's earth, talc, cottonseed hulls, wheat flour, soybean flour, pumice, wood flour, walnut shell flour, lignin, cellulose etc.

5 Thickeners such as silicates such meal silicates, sodium carboxymethyl cellulose, methyl cellulose, ethyl cellulose, polyvinylalcohol, sodium alginate, Sodium poly acrylate, xanthan gum, welan gum, gum arabic, montmorillonite, lignosulfonates, hydroxy methyl cellulose, dextrin, starch and mixtures thereof;

10 Anti-freezing agents such as glycerin, ethylene glycol, propylene glycol, preferably propylene glycol and the like. Anti-foaming agents such as silicone oils, mineral oils, Fatty acid ester; biocides such as sodium benzoate, 1 ,2-benzisothiazoline -3-one, 2-methyl-4-isothiazolin-3-one, 5-chloro-2-methyl-4-isothiazolin-3-one, potassium sorbate, parahydroxy benzoates and the like.

15 Pigments may also be included in the formulation and may include but are not limited to pigment blue 15:4, pigment blue 15:3, pigment blue 15:2, pigment blue 15:1 , pigment blue 80, pigment yellow 1 , pigment yellow 13, pigment red 112, pigment red 48:2, pigment red 48:1 , pigment red 57:1 , pigment red 53:1 , pigment orange 43, pigment orange 34, pigment orange 5, pigment green 36,
20 pigment green 7, pigment white 6, pigment brown 25, basic violet 10, basic violet 49, violet 23, acid red 51, acid red 52, acid red 14, acid blue 9, acid yellow 23, basic red 10, basic red 108.

Polymers such as such polyvinyl alcohols, polyvinylpyrrolidone, gel-forming
25 carraagheenans, water-soluble gelatine and casein, superabsorbent polymers such polyacrylamides and polyacrylates based polymers, Semi-synthetic or fully-synthetic peptide/protein-based superabsorbent polymers such as collagen-

based synthetic polymers, elastin-like polypeptides, polyaspartic acid, polyaspartates, polyglutamic acid, polyglutamate, Semi-synthetic or fully-synthetic polysaccharide: carboxymethyl starch, sulfoethyl starch, carboxymethyl cellulose, sulfoethyl cellulose, hydroxypropyl cellulose, hydroxyethyl cellulose, methylcellulose, chitosan; cross-linked polysaccharides such as CMS cross-linked with multi-functional carboxylic acids or multi-functional epoxides and the like. Polysaccharide graft copolymer: Polysaccharides obtained by graft polymerizing a monomer onto a polysaccharide, wherein the monomer is selected from acrylonitrile, acrylic acid, methacrylic acid, acrylamide, methacrylamide, 2-acrylamido-2-methyl- propanesulfonic acid (AMPS), vinyl sulfonic acid, ethyl acrylate, and potassium acrylate and the like.

The combination of the present invention are effective against phytopathogenic fungi, especially occurring in plants, including seed borne fungi and belong to the following classes such as those selected from Ascomycetes (e.g. *Penicillium*, *Gaeumannomyces graminis*); Basidiomycetes (e.g. the genus *Hemileia*, *Rhizoctonia*, *Puccinia*); Fungi imperfecti (e. g. *Botrytis*, *Helminthosporium*, *Rhynchosporium*, *Fusarium*, *Septoria*, *Cercospora*, *Alternaria*, *Pyricularia* and *Pseudocercospora herpotrichoides*); Oomycetes (e. g. *Phytophthora*, *Peronospora*, *Bremia*, *Pythium*, *Plasmopara*); Zygomycetes (e.g., *Rhizopus* spp.). The combination of the present invention is especially effective against *Alternaria* spp., *Ascochyta* spp., *Aspergillus* spp., *Claviceps purpurea*, *Cochliobolus* spp., *Colletotrichum* spp., *Diplodia maydis*, *Erysiphe graminis*, *Fusarium* spp. (such as *Fusarium culmorum*, *Fusarium oxysporum*, *Fusarium solani*, *Fusarium graminearum* and *Fusarium moniliforme*, *Fusarium subglutinans*), *Gaeumannomyces graminis*, *Giberella fujikuroi*, *Giberella zeae*, *Helminthosporium* spp. (such as *Helminthosporium graminearum*,

Helminthosporium oryzae, Helminthosporium solani), Monographella nivalis, Penicillium spp., Puccinia spp., Pyrenophora spp. (such as Pyrenophora graminea), Peronosclerospora spp., Peronospora spp., Phakopsora pachyrhizi, Phythium spp., Phoma spp., Phomopsis spp., Rhizoctonia spp. (such as Rhizoctonia cerealis, 5 Rhizoctonia solani), Septoria spp., Pseudocercospora spp., Tilletia spp., Rhizopus spp., Thielaviopsis basicola, Typhula spp., Ustilago spp., Sphacelotheca spp. (e.g. Sphacelotheca reilliani), Thanatephorus cucumeris, and Verticillium spp.

The present combinations may be used to control insect pests such as those from 10 the order Lepidoptera, for example, Acleris spp., Adoxophyes spp., Aegeria spp., Agrotis spp., Alabama argillaceae, Amylois spp., Anticarsia gemmatilis, Archips spp., Argyrotaenia spp., Autographa spp., Busseola fusca, Cadra cautella, Carposina nipponensis, Chilo spp., Choristoneura spp., Clysia ambiguella, Cnaphalocrocis spp., Cnephasia spp., Cochylis spp., Coleophora spp., 15 Crocidolomia spp., Cryptophlebia leucotreta, Crysodeixis includens, Cydia spp., Diatraea spp., Diparopsis castanea, Earias spp., Elasmopalpus spp., Ephestia spp., Eucosma spp., Eupoecilia ambiguella, Euproctis spp., Euxoa spp., Grapholita spp., Hedya nubiferana, Heliothis spp., Heliothis undalis, Hyphantria cunea, Keiferia lycopersicella, Leucoptera scitella, Lithocollethis spp., Lobesia botrana, Lymantria spp., Lyonetia spp., Malacosoma spp., Mamestra brassicae, Manduca sexta, 20 Operophtera spp., Ostrinia nubilalis, Pammene spp., Pandemis spp., Panolis flammea, Pectinophora gossypiella, Phthorimaea operculella, Pieris rapae, Pieris spp., Plutella xylostella, Prays spp., Scirpophaga spp., Sesamia spp., Sparganothis spp., Spodoptera spp., Synanthedon spp., Thaumetopoea spp., Tortrix spp., 25 Trichoplusia ni and Yponomeuta spp.; from the order Coleoptera, for example, Agriotes spp., Anthonomus spp., Atomaria linearis, Ceutorhynchus spp., Chaetocnema tibialis, Cosmopolites spp., Curculio spp., Dermestes spp.,

Diabrotica spp., Epilachna spp., Eremnus spp., Gonocephalum spp., Heteronychus
 spp., Leptinotarsa decemlineata, Lissorhoptrus spp., Melolontha spp.,
 Orycaephilus spp., Otiorhynchus spp., Phlyctinus spp., Phyllotreta spp., Popillia
 spp., Protostrophus spp., Psylliodes spp., Rhizopertha spp., Scarabeidae,
 5 Sitophilus spp., Sitotroga spp., Tenebrio spp., Tribolium spp. and Trogoderma
 spp.; from the order Orthoptera, for example, Blatta spp., Blattella spp., Gryllotalpa
 spp., Leucophaea maderae, Locusta spp., Periplaneta spp. and Schistocerca spp.;
 from the order Isoptera, for example, Reticulitermes spp.; from the order
 Psocoptera, for example, üposcelis spp.; from the order Anoplura, for example,
 10 Haematopinus spp., Linognathus spp., Pediculus spp., Pemphigus spp. and
 Phylloxera spp.; from the order Mallophaga, for example, Damalinae spp. and
 Trichodectes spp.; from the order Thysanoptera, for example, Frankliniella spp.,
 Hercinothrips spp., Taeniothrips spp., Thrips palmi, Thrips tabaci and Scirtothrips
 aurantii; from the order Heteroptera, for example, Dichelops melacanthus,
 15 Distantiella theobroma, Dysdercus spp., Euchistus spp., Eurygaster spp.,
 Leptocorisa spp., Nezara spp., Piesma spp., Rhodnius spp., Sahlbergella singularis,
 Scotinophara spp. and Triatoma spp.; from the order Homoptera, for example,
 Aleurothrixus floccosus, Aleyrodes brassicae, Aonidiella spp., Aphididae, Aphis
 spp., Aspidiotus spp., Bemisia tabaci, Ceroplaster spp., Chrysomphalus aonidium,
 20 Chrysomphalus dictyospermi, Coccus hesperidum, Empoasca spp., Eriosoma
 larigerum, Erythroneura spp., Gascardia spp., Laodelphax spp., Lecanium corni,
 Lepidosaphes spp., Macrosiphus spp., Myzus spp., Nephrotettix spp., Nilaparvata
 spp., Paratoria spp., Pemphigus spp., Planococcus spp., Pseudaulacaspis spp.,
 Pseudococcus spp., Psylla spp., Pulvinaria aethiopica, Quadraspidiotus spp.,
 25 Rhopalosiphum spp., Saissetia spp., Scaphoideus spp., Schizaphis spp., Sitobion
 spp., Trialeurodes vaporariorum, Trioza erytreae and Unaspis citri; from the order
 Hymenoptera, for example, Acromyrmex, Athalia rosae, Atta spp., Cephus spp.,

Diprion spp., Diprionidae, Gilpinia polytoma, Hoplocampa spp., Lasius spp., Monomorium pharaonis, Neodiprion spp., Solenopsis spp. and Vespa spp.; from the order Diptera, for example, Antherigona soccata, Bibio hortulanus, , Ceratitis spp., Chrysomyia spp., Culex spp., Cuterebra spp., Dacus spp., Delia spp.,

5 Drosophila melanogaster, , Liriomyza spp., , Melanagromyza spp., , Orseolia spp., Oscinella frit, Pegomyia hyoscyami, Phorbia spp., Rhagoletis pomonella, Sciara spp.; from the order Acarina, for example, Acarus siro, Aceria sheldoni, Aculus schlechtendali, Amblyomma spp., Argas spp., , Brevipalpus spp., Bryobia praetiosa, Calipitimerus spp., Chorioptes spp., Dermanyssus gallinae,

10 Eotetranychus carpini, Eriophyes spp., Hyalomma spp., Olygonychus pratensis, Ornithodoros spp., Panonychus spp., Phyllocoptruta oleivora, Polyphagotarsonemus latus, Psoroptes spp., Rhipicephalus spp., Rhizoglyphus spp., Sarcoptes spp., Tarsonemus spp. and Tetranychus spp.; and from the class Nematoda, for example, the species of Meloidogyne spp. (for example,

15 Meloidogyne incognita and Meloidogyne javanica), Heterodera spp. (for example, Heterodera glycines, Heterodera schachtii, Heterodora avenae and Heterodora trifolii), Globodera spp. (for example, Globodera rostochiensis), Radopholus spp. (for example, Radopholus similis), Rotylenchulus spp., Pratylenchus spp. (for example, Pratylenchus neglectans and Pratylenchus penetrans), Aphelenchoides spp., Helicotylenchus spp., Hoplolaimus spp.,

20 Paratrichodorus spp., Longidorus spp., Nacobbus spp., Subanguina spp. Belonlaimus spp., Criconemella spp., Criconemoides spp. Ditylenchus spp., Dolichodorus spp., Hemicriconemoides spp., Hemicycliophora spp., Hirschmaniella spp., Hypsoperine spp., Macroposthonia spp., Melinius spp.,

25 Punctodera spp., Quinisulcius spp., Scutellonema spp., Xiphinema spp., and Tylenchorhynchus spp.

In an embodiment, the combination of the present invention may be used for treatment of plant propagation material of crops such as cereals such as wheat, barley, rye, oats, corn, rice, sorghum, triticale and related crops; beets such as sugar beet and fodder beet; leguminous plants such as beans, lentils, peas, soybean; oil plants such as rape, mustard, sunflowers; cucurbits such as marrows, cucumbers, melons; fibre plants such as cotton, flax, hemp, jute; vegetables such as spinach, lettuce, asparagus, cabbages, carrots, onions, tomatoes, potatoes, paprika as well as ornamentals such as flowers, shrubs, broad-leaved trees and evergreens, such as conifers. The plant propagation material may also be used on varieties of plant propagation material such as conventional, hybrid or transgenic plants.

In an embodiment, the combinations of the present invention may further contain herbicide, fungicides, insecticides, fertilizers, biologicals, other plant growth additives such as mycorrhiza, silicic acid, plant derived growth promoters etc.

In an aspect, the present invention may provide methods of improving vigour or yield of the plant comprising, applying to a plant propagation material before sowing, a combination comprising:

- i) fipronil;
- ii) azoxystrobin;
- iii) a benzimidazole fungicide selected from carbendazim or thiophanate methyl; and
- iv) an active agent selected from imidacloprid, acetamiprid, thiamethoxam, or a multi-site fungicide or both.

In an embodiment, the multi-site fungicide is a dithiocarbamate fungicide.

In an embodiment, the dithiocarbamate fungicide is mancozeb.

5 In an embodiment, the multi-site fungicide is a phthalimide fungicide selected from captan, captafol and folpet.

● In an embodiment, the multi-site fungicide is a chloronitrile fungicide such as chlorothalonil.

10 In an embodiment, the multi-site fungicide is a sulfamide fungicide selected from dichlofluanid and tolylfluanid.

In an embodiment, the multi-site fungicide is a bis-guanidine fungicide selected from guazatine and iminoctadine.

15

In an embodiment, the multi-site fungicide is a triazine fungicide selected from anilazine.

● 20 In an embodiment, the multi-site fungicide is a quinone fungicide selected from dithianon.

In an embodiment, the multi-site fungicide is a quinoxaline fungicide selected from quinomethionate and chlorquinox.

25 In an embodiment, the multi-site fungicide is a dicarboxamide fungicide selected from fluoroimide.

In an embodiment, the multi-site fungicide is an inorganic fungicide selected from copper fungicides including copper (II) hydroxide, copper oxychloride, copper (II) sulfate, basic copper sulfate, Bordeaux mixture, copper salicylate $C_7H_4O_3 \cdot Cu$, cuprous oxide CU_2O ; or sulphur.

5

In another aspect, the present invention may provide methods of controlling soil borne fungi and insect pests, the method comprising, applying to a plant propagation material before sowing, a combination comprising:

- i) fipronil;
- 10 ii) azoxystrobin;
- iii) a benzimidazole fungicide selected from carbendazim or thiophanate methyl; and
- iv) an active selected from imidacloprid, acetamiprid, thiamethoxam, mancozeb, maneb, zineb, folpet, chlorothalonil, and tribasic copper
- 15 sulfate or a multi-site fungicide or both.

In an embodiment, the multi-site fungicide is a dithiocarbamate fungicide.

In an embodiment, the dithiocarbamate fungicide is mancozeb.

20

In an embodiment, the multi-site fungicide is a phthalimide fungicide selected from captan, captafol and folpet.

In an embodiment, the multi-site fungicide is a chloronitrile fungicide such as

25 chlorothalonil.

In an embodiment, the multi-site fungicide is a sulfamide fungicide selected from dichlofluanid and tolylfluanid.

5 In an embodiment, the multi-site fungicide is a bis-guanidine fungicide selected from guazatine and iminoctadine.

● In an embodiment, the multi-site fungicide is a triazine fungicide selected from anilazine.

10 In an embodiment, the multi-site fungicide is a quinone fungicide selected from dithianon.

In an embodiment, the multi-site fungicide is a quinoxaline fungicide selected from quinomethionate and chlorquinox.

15

In an embodiment, the multi-site fungicide is a dicarboxamide fungicide selected from fluoroimide.

● 20 In an embodiment, the multi-site fungicide is an inorganic fungicide selected from copper fungicides including copper (II) hydroxide, copper oxychloride, copper (II) sulfate, basic copper sulfate, Bordeaux mixture, copper salicylate $C_7H_4O_3 \cdot Cu$, cuprous oxide Cu_2O ; or sulphur.

25 In an aspect, the combination of the present invention may be presented as a kit of parts, or as a ready mix formulation that may be readily applied to the plant propagation material or may be applied to plant propagation material before being commercially vended.

Surprisingly, it has been found by the present inventors that combinations of fipronil, azoxystrobin, a benzimidazole fungicide and at least one of Imidacloprid or a multi-site fungicide when applied individually, was ineffective in the control of soil borne fungi and insect pests, but demonstrated excellent synergistic control on weeds when applied together. The combination controlled the soil borne fungi and insect pests. The combination of fipronil, azoxystrobin, a benzimidazole fungicide and at least one of Imidacloprid or a multi-site fungicide controlled seed borne diseases such as seed rot among others. The current invention therefore provides advantageous methods of soil borne fungal and insect pests. The present method also provides a broader spectrum of controlling such pests and helps in resistance management, thus improving germination rate and producing plants with improved vigour and a broader spectrum of control at lower use rates.

Advantages of the present invention:

The combinations of the present invention exert at least one of the following advantages:

These combinations prevent mycelial development, spore germination and the formation of apressories and hapteria, controlling the main soil and seed pathogens such as *Rhizoctonia solani* and *Sclerotinia sclerotiorum*. The combinations were found to be totally selective for the cultures and not interfering in the organisms responsible for nodulation in legumes, containing the first multisite fungicide for seed treatment that has multiple action in relation to the cellular functions of the pathogens, forms a barrier on the surface of the seeds. The combinations of the invention thus eliminated the fungi present on

the surface of the seeds and prevented germination of the spores that come after the treatment, presenting synergistic effect among the three fungicides, potentiated by mancozeb.

- 5 The storage time of the thus treated seeds was found to be greater than 120 days without interfering with the germination and vigor patterns.

The combination of the invention could be adapted to a violet color associated to the "optical brightness" providing nighttime brightness through black light, making it difficult to falsify the product and aiding the differentiation of grain for
10 treated seed.

The combinations displayed improvement of the plant defense mechanism against pathogens. It promoted the growth of the seedlings through the increment of the root system, with greater depth of roots and better utilization of
15 nutrients. Increased photosynthetic, consequently lower energy consumption of the seedling providing vigorous growth, conditioning the plant to achieve superior productivity even under stress conditions

The combinations of the invention facilitated better coverage of seeds due to adherence products through a differentiated and specific formulation for the
20 treatment of seeds, consequently less loss of active ingredient.

Example:

Experiments were carried out to study the combinations of the present invention
25 for seed treatment in corn. These studies were aimed at verifying the efficacy of doses of the combinations of the inventions, when compared to the standard

products. The following combinations were tank-mixed and used for treating corn seeds.

S No.	Composition	Combination components
1	UPL1	Fipronil 150 g/L + Imidacloprid 150 g/L + Azoxystrobin 30 g/L + Cabendazim 90 g/L
2	UPL2	Fipronil 150 g/L + Imidacloprid 150 g/L + Azoxystrobin 30 g/L + Thiophanate-methyl 120 g/L
3	UPL3	Fipronil 160 g/L + Mancozeb 160 g/L + Azoxystrobin 23 g/L + Thiophanate-methyl 90 g/L
4	Comparative P1	Metalaxyl 20 g/L + Thiabendazol 150 g/L + Fludioxonil 25 g/L
5	Comparative P2	Thiamethoxam 350 g/L
6	Comparative P3	Thiodicarb 450 g/L + Imidacloprid 150 g/L
7	Comparative P4	Clothianidin 600 g/L

- 5 These combinations were used to treat corn seeds before sowing, and the treated seeds were tested for plant strength after emergence. The plant strength was tested by measuring the percentage of plants found laid (fallen) at 70 days after emergence in the field. The following results were tabulated:

Table 1:

S No.	Treatment	Plants laid (percentage %) at 70 DAE
1	Untreated	77.5
2	UPL1 @ 0.30 kg/Ha	7.6
3	UPL1 @ 0.50 kg/Ha	6.6
4	UPL2 @ 0.40 kg/Ha	1.2
5	UPL3 @ 0.30 kg/Ha	0.0
6	UPL3 @ 0.40 g/Ha	10.0
7	UPL3 @ 0.50 kg/Ha	7.5
8	P3 + Carbendazim 150 g/L + Thiram 350 g/L	42.5
9	P1 + P2 + Fipronil @ 250 g/L	61.2
10	Pyroclostrobin 25 g/L + Thiophanate-methyl 225 g/L + Fipronil 250 g/L	12.5

It was thus concluded that the plants emerging from the seeds treated with the combinations according to the present invention displayed surprisingly improved plant strength.

Example 2:

The combination UPL2 according to the present invention was tested for seed treatment advantages in dry bean, and compared vis-à-vis the industry standard of thiadicarb 225 g/L and imidacloprid 75 g/L. The dry bean seeds were treated

with the following regimen, and the percentage control of *Bemisia tabaci* nymphs was calculated using Abbott's formula. The following results were tabulated:

Table 2:

S No.	Treatment [/per 100 kg of seeds]	<i>Bemisia tabaci</i> Control (%) of nymphs Abbott's formula				
		7 DAE	15 DAE	21 DAE	30 DAE	45 DAE
1	Untreated	0.0	0.0	0.0	0.0	0.0
2	UPL2 @ 0.40 kg	80.2	66.3	39.4	68.8	38.1
3	UPL2 @ 0.50 kg	81.0	73.6	33.3	25.0	33.3
4	UPL2 @ 0.60 kg	94.3	89.6	42.4	62.5	23.8
5	UPL2 @ 0.70 kg	89.1	82.8	27.3	72.5	66.7
6	Thiadicarb 225 g/L and Imidacloprid 75 g/L [@ 0.50 kg]	54.9	54.7	15.2	37.5	4.7

5

The percentage control (%) for adults + nymphs of *Bemisia tabaci* was also calculated using Abbott's formula and tabulated as below:

Table 3:

S No.	Treatment [/per 100 kg of seeds]	<i>Bemisia tabaci</i> Control (%) of nymphs + adults Abbott's formula				
		7 DAE	15 DAE	21 DAE	30 DAE	45 DAE
1	Untreated	0.0	0.0	0.0	0.0	0.0
2	UPL2 @ 0.40 kg	80.2	66.3	84.4	49.7	0.0
3	UPL2 @ 0.50 kg	81.0	73.6	30.5	21.7	15.4
4	UPL2 @ 0.60 kg	94.3	89.6	77.3	63.7	40.0
5	UPL2 @ 0.70 kg	89.1	82.8	81.3	70.1	44.6
6	Thiadicarb 225 g/L and Imidacloprid 75 g/L [@ 0.50 kg]	54.9	54.7	11.7	0.6	0.0

It was thus concluded that the combinations of the present invention were surprisingly efficacious for the control of *Bemisia tabaci* nymphs and adults during

5 the treatment of dry bean seeds.

While the foregoing written description of the invention enables one of ordinary skill to make and use what is considered presently to be the best mode thereof, those of ordinary skill will understand and appreciate the existence of variations, combinations, and equivalents of the specific embodiment, method, and examples herein. The invention should therefore not be limited by the above
5 described embodiment, method, and examples, but by all embodiments and methods within the scope and spirit of the invention.

Dated this the 17th day of January 2018



Dr. Sanchita Ganguli
Of S. MAJUMDAR & CO.
Applicant's Agent

FORM 1 THE PATENTS ACT, 1970 (39 of 1970) and The Patents Rules, 2003 APPLICATION FOR GRANT OF PATENT [See section 7, 54 & 135 and sub-rule (1) of rule 20]	(FOR OFFICE USE ONLY)
---	------------------------------

	Application No :		
	Filing Date :		
	Amount of Fee Paid :		
	CBR No :		
	Signature :		
1. APPLICANT'S REFERENCE / IDENTIFICATION NO. (AS ALLOTTED BY OFFICE)			
2. TYPE OF APPLICATION [Please tick (✓) at the appropriate category]			
Ordinary (✓)		Convention ()	
PCT-NP ()			
Divisional ()	Patent of Addition ()	Divisional ()	Patent of Addition ()
Divisional ()	Patent of Addition ()	Divisional ()	Patent of Addition ()

3A. APPLICANT(S)

Name in Full	Nationality	Country of Residence	Address of the Applicant	
UPL LTD	An Indian Company	India	House No.	Agrochemical Plant
			Street	Durgachak Haldia
			City	Midnapore
			State	West Bengal
			Country	India
			Pin code	721 602

3B. CATEGORY OF APPLICANT [Please tick (✓) at the appropriate category]

Natural Person ()	Other than Natural Person		
	Small Entity ()	Startup ()	Others (✓)

4. INVENTOR(S) [Please tick (✓) at the appropriate category]

Are all the inventor(s) same as the applicant(s) named above ?	YES ()	NO (✓)
--	----------------	---------------

If "No", furnish the details of the inventor(s)				
Name in Full	Nationality	Country of Residence	Address of the Inventor	
SEARA WAGNER	A Brazilian citizen	Brazil	House No.	United Phosphorus do Brasil Ltda,
			Street	Avenida Jandira, 257, Cjt 142/143, Indianopolis,
			City	Sao Paulo - SP,
			State	
			Country	Brazil
			Pin code	
OLIVEIRA, GILSON APARECIDO HERMENEGILDO OLIVEIRA	A Brazilian citizen	Brazil	House No.	United Phosphorus do Brasil Ltda,
			Street	Avenida Jandira, 257, Cjt 142/143, Indianopolis,
			City	Sao Paulo - SP,
			State	
			Country	Brazil
			Pin code	
VAIDYALINGAM, SAMBANDAM PANCHATSHARAM	A US citizen	USA	House No.	UPI,
			Street	630 Freedom Business Center Dr, King of Prussia,
			City	
			State	
			Country	USA
			Pin code	PA 19406,
BORANE MAHESH DHARMA	An Indian citizen	Indian	House No.	UPL House,
			Street	610 B/2, Bandra Village, Off Western Express Highway, Bandra East,
			City	Mumbai,
			State	Maharashtra
			Country	India
			Pin code	400051
QUEIROZ ,ANA FLÁVIA	A Brazilian citizen	Brazil	House No.	United Phosphorus do Brasil Ltda,
			Street	Avenida Jandira, 257, Cjt 142/143, Indianopolis,
			City	Sao Paulo - SP,
			State	
			Country	Brazil
			Pin code	
GONÇALVES, NATALIA	A Brazilian citizen	Brazil	House No.	United Phosphorus do Brasil Ltda,
			Street	Avenida Jandira, 257, Cjt 142/143, Indianopolis,
			City	Sao Paulo - SP,
			State	
			Country	Brazil
			Pin code	
BHARAMBE, SHAIENDRA MITHARAM	An Indian citizen	Indian	House No.	UPL House,
			Street	610 B/2, Bandra Village, Off Western Express Highway, Bandra East,
			City	Mumbai,
			State	Maharashtra
			Country	India

WAGH, PRADIP DATTATRAY	An Indian citizen	Indian	Pin code	400051
			House No.	UPL House,
			Street	610 B/2, Bandra Village, Off Western Express Highway, Bandra East,
			City	Mumbai,
			State	Maharashtra
			Country	India
			Pin code	400051
SHROFF, Jaidev Rajnikant	A British Citizen	Dubai - U.A.E.	House No.	206, Swiss Tower, Cluster Y
			Street	Jumeirah Lake Towers, P.O. Box: 33421
			City	
			State	
			Country	Dubai - U.A.E.
			Pin code	
SHROFF, Vikram Rajnikant	A British Citizen	Dubai - U.A.E.	House No.	206, Swiss Tower, Cluster Y
			Street	Jumeirah Lake Towers, P.O. Box: 33421
			City	
			State	
			Country	Dubai - U.A.E.

5. TITLE OF THE INVENTION: NOVEL AGROCHEMICAL COMBINATIONS

6. AUTHORISED REGISTERED PATENT AGENT(S)	IN/PA No.	625
	Name	Dr. Sanchita Ganguli
	Mobile No.	9331827882
7. ADDRESS FOR SERVICE OF APPLICANT IN INDIA	Name	S. MAJUMDAR & CO.
	Postal Address	5 Harish Mukherjee Road, Kolkata – 700 025, West Bengal, India
	Telephone No.	(033) 2455 7484 / 85 / 86
	Mobile No.	9331827882
	Fax No.	(033) 2455 7487 / 88
	E-mail ID	cal@patentindia.com

8. IN CASE OF APPLICATION CLAIMING PRIORITY OF APPLICATION FILED IN CONVENTION COUNTRY, PARTICULARS OF CONVENTION APPLICATION

COUNTRY	APPLICATION NUMBER	FILING DATE	NAME OF THE APPLICANT	TITLE OF THE INVENTION	IPR (as classified in the convention country)

9. IN CASE OF PCT NATIONAL PHASE APPLICATION, PARTICULARS OF INTERNATIONAL APPLICATION FILED UNDER PATENT COOPERATION TREATY (PCT)

International application number	International filing date as allotted by the receiving office

~~10. IN CASE OF DIVISIONAL APPLICATION FILED UNDER SECTION 16, PARTICULARS OF ORIGINAL (FIRST) APPLICATION~~

Original (first) application number	Date of filing of Original (first) application

~~11. IN CASE OF PATENT OF ADDITION FILED UNDER SECTION 54, PARTICULARS OF MAIN APPLICATION OR PATENT~~

Main application / patent Number	Date of filing of main application

12. DECLARATIONS

(i) Declaration by the inventor(s)

(In case the applicant is an assignee : the inventor(s) may sign herein below or the applicant may upload the assignment or enclose the assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period).

We, the above named inventor(s) are the true & first inventor(s) for this invention and declare that the applicant(s) herein are our assignee or legal representative.

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **SEARA WAGNER**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **OLIVEIRA, GILSON APARECIDO HERMENEGILDO OLIVEIRA**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **VAIDYALINGAM, SAMBANDAM PANCHATSHARAM**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **BORANE MAHESH DHARMA**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **QUEIROZ ,ANA FLÁVIA**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **GONÇALVES, NATALIA**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **BHARAMBE, SHAILENDRA MITHARAM**

(a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **WAGH, PRADIP DATTATRAY**

- (a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **SHROFF, Jaidev Rajnikant**

- (a) Date _____
(b) Signature(s) of the inventor(s):
(c) Name of the inventor: **SHROFF, Vikram Rajnikant**

(ii) Declaration by the applicant(s) in the convention country

~~(In case the applicant in India is different than the applicant in the convention country: the applicant in the convention country may sign herein below or applicant in India may upload the assignment from the applicant in the convention country or enclose the said assignment with this application for patent or send the assignment by post/electronic transmission duly authenticated within the prescribed period)~~

~~I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative~~

- (a) Date _____
(b) Signature(s)
(c) Name(s) of the Signatory:

(iii) Declaration by the applicant(s):

I/We, the applicant(s) hereby declare(s) that :

- ☐ We are in possession of the above-mentioned invention
- ☐ The provisional specification relating to the invention is filed with this application.
- ☒ The invention as disclosed in the specification uses the biological material from India and the necessary permission from the competent authority shall be submitted by us before the grant of patent to us.
- ☐ There is no lawful ground of objection(s) to the grant of the Patent to us.
- ☒ We are the true & first inventor(s).
- ☐ We are the assignee or legal representative of true & first inventor(s).
- ☒ The application or each of the applications, particulars of which are given in Paragraph-8, was the first application in convention country/countries in respect of my/our invention.
- ☒ I/We claim the priority from the above mentioned application(s) filed in convention country/ countries and state that no application for protection in respect of the invention had been made in a convention country before that date by me/us or by any person from which I/we derive the title.
- ☒ My/Our application in India is based on international application under Patent Cooperation Treaty (PCT) as mentioned in Paragraph-9.
- ☒ The application is divided out of my/our application particulars of which is given in Para-10 and pray that this application may be treated as deemed to have been filed on (DD/MM/YYYY) under Section 16 of the Act.
- ☒ The said invention is an improvement in or modification of the invention particulars of which are given in Paragraph-11.

13. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

(a) Form 2.

Item	Details	Fee	Remarks
Provisional specification)#	No. of pages (33)	Rs. 2400.00	33-30 = 03 x Rs. 800.00 = Rs. 2400.00
No. of claims	No. of claims and no. of pages		
Abstract	No. of pages		
No. of Drawing(s)	No. of drawings () and No. of pages ()		

In case of a complete specification, if the applicant desires to adopt the drawings filed with his provisional specification as the drawings or part of the drawings for the complete specification under rule 13(4), the number of such pages filed with the provisional specification are required to be mentioned here.

(b)

- (a) Form -2 with provisional specification (2 copies). No. of pages **33**
- (b) Statement and undertaking on Form 3
- (c) General Power of Attorney in our favour.
- (d) Fee for excess pages exceeding 30 = $33-30 = 03 \times \text{Rs. } 800.00 = \text{Rs. } 2400.00$
- (e) Fee for application = Rs. 8,000.00

Fee Rs. 10400/-

We hereby declare that to the best of our knowledge, information and belief the fact and matters stated herein are correct and we request that a patent may be granted to us for the said invention.

Dated this 17th day of January 2018



Dr. Sanchita Ganguli
of S. MAJUMDAR & CO.
Applicants' Agent

To
The Controller of Patents
The Patent Office,
At Kolkata

Note:-

- * Repeat boxes in case of more than one entry.
- * To be signed by the applicant(s) or by authorized registered patent agent otherwise where mentioned.
- * Tick (✓)/cross (x) whichever is applicable/not applicable in declaration in paragraph - 12.
- * Name of the inventor and applicant should be given in full, family name in the beginning.
- * Strike out the portion which is/are not applicable.
- * For fee: See First Schedule