FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

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The Patent Rules, 2003

COMPLETE SPECIFICATION

(See sections 10 & rule 13)

1. TITLE OF THE INVENTION

PLANT HEALTH COMPOSITION

2. APPLICANT (S)

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3. PREAMBLE TO THE DESCRIPTION

COMPLETE SPECIFICATION

The following specification particularly describes the invention and the manner in which it is to be performed

FIELD OF THE INVENTION

[0001] The present disclosure generally relates to the field of agrochemicals. Specifically, the present disclosure discloses a composition for enhancing the health of plants. More specifically, the present disclosure relates to a composition for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive. The disclosure also relates to a method of improving plant health with the composition.

BACKGROUND OF THE INVENTION

[0002] Background description includes information that may be useful in understanding the present invention. It is not an admission that any of the information provided herein is prior art or relevant to the present invention, or that any publication specifically or implicitly referenced is prior art.

[0003] Plants are a source of food and oxygen to humans and animals and thereby play a vital role in our lives. They are also essential to protect biodiversity and the ecosystem of nature. The need to maintain plant health is thus an absolute necessity. The term "health of a plant" or "plant health" is defined as a condition of the plant and/or its products. It is an umbrella term that includes a wide variety of components such as plant yield, height, shoot length/growth, fruit quality etc. Plant health may be impacted by elements including climate, soil, nutrients, surrounding environment, pests and/or diseases.

[0004] Maintenance of plant health is therefore challenging. Some of the strategies and practices explored by scientists for improving plant health include genetic modification. Plant varieties are developed that are resistant to abiotic stresses like draught, water salinity; or biotic stresses like attacks by pests and insects. Crop rotation is an alternative method wherein the soil nutrients and composition is optimized by growing different crops in a sequential manner over different seasons on the same plot of land. These methods may be challenging as well as time consuming. Some methods involve supplicating the plants with compositions capable of improving its health.

[0005] EP2561755 discloses nematicidal combination of flupyram and Mycorrhiza for controlling animal pests, such as insects and/or unwanted acarids and/or nematodes, in foliar and soil application and/or in seed treatment.

[0006] Despite the above methods, there is a continuous need to develop new and potent compositions that are capable of improving plant health to boost productivity and reduce damages in agriculture.

OBJECTS OF THE INVENTION

[0007] An object of the present disclosure is to provide a composition for improving the overall health of the plant.

[0008] An object of the present disclosure is to provide a composition for improving plant health by increasing the crop yield and resistance to biotic and/or abiotic stresses.

[0009] An object of the present disclosure is to provide a composition for improving plant health even in absence of pest pressure.

[0010] Another object of the present disclosure is to provide a method for improving plant health.

SUMMARY OF THE INVENTION

[0011] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in Detailed Description section. This summary is not intended to identify key features or essential features of the subject matter of the present invention, nor is it intended to be used as an aid in determining the scope of the subject matter disclosed herein.

[0012] The present disclosure relates to a synergistic composition for improving plant health that increases the plant yield, vigor, quality and tolerance to abiotic or biotic stresses.

[0013] In an aspect of the present invention, the present disclosure relates to a composition for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[0014] In an embodiment of the present invention, the insecticide may be selected from the class of diamide, meta-diamide, nereistoxin, nicotinic insecticides, or combinations thereof.

[0015] In an embodiment of the present invention, the diamides is selected from chlorantraniliprole, cyantraniliprole, cyclaniliprole, cyhalodiamide, cyproflanilide, flubendiamide, tetraniliprole, tetrachlorantraniliprole, tyclopyrazoflor, broflanilide, or combinations thereof.

[0016] In an embodiment of the present invention, the nereistoxin is selected from bensultap, monosultap, cartap hydrochloride, thiocyclam, thiocyclam hydrogen oxalate, thiocyclam hydrochloride, thiosultap sodium, and combinations thereof.

[0017] In an embodiment of the present invention, the nicotinic insecticide is selected from acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, thiacloprid, thiamethoxam, flupyrimin, cycloxaprid, paichongding, guadipyr, cycloxylidin, sulfoxaflor, flupyradifurone, triflumezopyrim, dichloromezotiaz, or combinations thereof.

[0018] In another embodiment of the present invention, the at least one insecticide is selected from chlorantraniliprole, cyantraniliprole, tetraniliprole, flupyrimin, triflumezopyrim, clothianidin, thiamethoxam, fipronil, cartap hydrochloride, thiocyclam hydrogen oxalate, and combination thereof.

[0019] In an embodiment of the present invention, the mycorrhizal fungus is ecto-mycorrhiza or endo-mycorrhiza.

[0020] In another embodiment of the present invention, the mycorrhizal fungus is *Acaulospora* spp., *Gigaspora* spp., *Sclerocystis* spp., *Scutellospora* spp., *Glomus* spp., *Funneliformis mosseae*, *Paraglomus occultum*, *Glomus mosseae*, *Glomus fasciculatum*, *Glomus intraradices*, *Gigaspora decipiens*, *Rhizophagus irregularis*, *Rhizophagus intraradices*, *Septoglomus constrictum*, *Funneliformis mosseae*, *Claroideoglomus etunicatum*, or combinations thereof.

[0021] In an embodiment of the present invention, the plant health additive is selected from bio-stimulants, plant growth regulators, micronutrients or mixtures thereof.

[0022] In another embodiment of the present invention, the bio-stimulant is selected from humic acid or its salts; fulvic acid or its salts; amino acids, protein hydrolysates; peptides; organic acids; acetylthioproline; thiazolidine carboxylic acid; jasmonic acid; methyl jasmonate; chitosan; chitin; probenazole; acibenzolar-s-methyl; seaweed extract; polyamines; silicic acid or its salts; salicylic acid; lactic acid; phenyllactic acid; fumaric acid; nitrobenzene; brassinolide; forchlorfenuron; triacontanol; nitrophenolate; or combinations thereof.

[0023] In another embodiment of the present invention, the plant growth regulator is selected from auxins; cytokinins; ethylene modulators; gibberellins; growth inhibitors; growth retardants; or combinations thereof.

[0024] In another embodiment of the present invention, the micronutrient is selected from zinc; chelated-zinc; iron (Fe); manganese; boron; sulphur; and combinations thereof.

[0025] In another embodiment of the present invention, the plant health additive is selected from humic acid, fulvic acid, amino acid, carboxylic acid, seaweed extract, chitosan, nitrobenzene, brassinolide, triacontanol, zinc, paclobutrazol and sulphur.

[0026] In another aspect, the present disclosure relates to a formulation for improving plant health comprising an insecticide, a mycorrhizal fungus, a plant health additive and one or more agro-chemically acceptable additive.

[0027] In another embodiment of the present invention, the one or more agro-chemically acceptable additive is selected from wetting agent, dispersing agent, solvent, carrier, colouring agent, controlled release agent or combination thereof.

[0028] In another embodiment of the present invention, the composition is in the form of Granule (GR) / Soil Applied Granules (SAG), capsule suspension (CS), dispersible concentrate (DC), emulsifiable concentrate (EC), emulsion, water in oil (EO), emulsion, oil in water (EW), jambo balls or bags (bags in water soluble pouch), micro-emulsion (ME), oil dispersion (OD), oil miscible flowable concentrate (oil miscible suspension) (OF), oil miscible liquid (OL), suspension concentrate (SC), suspo-emulsion (SE), soluble concentrate (SL), water dispersible granule (WG or WDG), water soluble granule (SG), water soluble

powder (SP), wettable powder (WP), a mixed formulation of CS and SC (ZC), a mixed formulation of CS and SE (ZE), a mixed formulation of CS and EW (ZW), and Controlled release granules (CR).

[0029] In yet another aspect, the present disclosure relates to a method of improving plant health, wherein the method comprises treating the plant with an effective amount of a composition or formulation for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[0030] In still another aspect, the present disclosure relates to use of a composition or formulation for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[0031] Other aspects of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learnt by the practice of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0032] The following is a detailed description of embodiments of the disclosure. The embodiments are in such detail as to clearly communicate the disclosure. However, the amount of detail offered is not intended to limit the anticipated variations of embodiments; on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the scope of the present disclosure.

[0033] All publications herein are incorporated by reference to the same extent as if each individual publication or patent application were specifically and individually indicated to be incorporated by reference. Where a definition or use of a term in an incorporated reference is inconsistent or contrary to the definition of that term provided herein, the definition of that term provided herein applies and the definition of that term in the reference does not apply.

[0034] Reference throughout this specification to “one embodiment” or “an embodiment” means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment. Thus, the appearances of the phrases “in one embodiment” or “in an embodiment” in

various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

[0035] In some embodiments, numbers have been used for quantifying weights, percentages, ratios, and so forth, to describe certain embodiments of the invention and are to be understood as being modified in some instances by the term "about." Accordingly, in some embodiments, the numerical parameters set forth in the written description are approximations that can vary depending upon the desired properties sought to be obtained by a particular embodiment. In some embodiments, the numerical parameters should be construed in light of the number of reported significant digits and by applying ordinary rounding techniques. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of some embodiments of the invention are approximations, the numerical values set forth in the specific examples are reported as precisely as practicable. The numerical values presented in some embodiments of the invention may contain certain errors necessarily resulting from the standard deviation found in their respective testing measurements.

[0036] Various terms as used herein are shown below. To the extent a term used is not defined below, it should be given the broadest definition persons in the pertinent art have given that term as reflected in printed publications and issued patents at the time of filing.

[0037] As used in the description herein that follow, the meaning of "a," "an," and "the" includes plural reference unless the context clearly dictates otherwise. Also, as used in the description herein, the meaning of "in" includes "in" and "on" unless the context clearly dictates otherwise.

[0038] Unless the context requires otherwise, throughout the specification which follow, the word "comprise" and variations thereof, such as, "comprises" and "comprising" are to be construed in an open, inclusive sense that is as "including, but not limited to."

[0039] The recitation of ranges of values herein is merely intended to serve as a shorthand method of referring individually to each separate value falling within the range. Unless otherwise indicated herein, each individual value is incorporated into the specification as if it were individually recited herein.

[0040] All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g. "such as") provided with respect to certain embodiments herein is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention.

[0041] Groupings of alternative elements or embodiments of the invention disclosed herein are not to be construed as limitations. Each group member can be referred to individually or in any combination with other members of the group or other elements found herein. One or more members of a group can be included in, or deleted from, a group for reasons of convenience and/or patentability. When any such inclusion or deletion occurs, the specification is herein deemed to contain the group as modified.

[0042] The description that follows, and the embodiments described therein, is provided by way of illustration of an example, or examples, of particular embodiments of the principles and aspects of the present disclosure. These examples are provided for the purposes of explanation, and not of limitation, of those principles and of the disclosure.

[0043] It should also be appreciated that the present disclosure can be implemented in numerous ways, including as a system, a method or a device. In this specification, these implementations, or any other form that the invention may take, may be referred to as processes. In general, the order of the steps of the disclosed processes may be altered within the scope of the invention.

[0044] The headings and abstract of the invention provided herein are for convenience only and do not interpret the scope or meaning of the embodiments.

[0045] The following discussion provides many example embodiments of the inventive subject matter. Although each embodiment represents a single combination of inventive elements, the inventive subject matter is considered to

include all possible combinations of the disclosed elements. Thus, if one embodiment comprises elements A, B, and C, and a second embodiment comprises elements B and D, then the inventive subject matter is also considered to include other remaining combinations of A, B, C, or D, even if not explicitly disclosed.

[0046] The term ‘synergistic’ herein means the simultaneous application of components of the composition or formulation, together or independently, provides enhanced health benefits to the plant compared to individual components.

[0047] The term ‘effective amount of’ herein means an amount of the composition that is sufficient to provide the desired enhanced plant health without causing any adverse effects or phytotoxicity. A person of skill in the art based on the plant, the growth and climatic conditions will be able to determine such an amount.

[0048] In crop protection, there is a need to look for compositions that improve the health of plants. Note worthily, the health of a plant when applying the composition according to the present disclosure, is increased independently of the pesticidal properties of the active ingredients used because the increase in health is not based upon the reduced pest pressure but instead on complex physiological and metabolic reactions which result, for example, in an activation of the plant's own natural defense system. As a result, the health of a plant is increased even in the absence of pest pressure.

[0049] In an embodiment, the present disclosure relates to a composition for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[0050] In an embodiment, the insecticide may be selected from the class of diamide, meta-diamide, nereistoxin, nicotinic insecticides, or combinations thereof. Diamides may be selected from chlorantraniliprole, cyantraniliprole, cyclaniliprole, cyhalodiamide, cyproflanilide, flubendiamide, tetraniliprole, tetrachlorantraniliprole, tyclopyrazoflor, broflanilide, or combinations thereof. Nereis toxin may be selected from bensultap, monosultap, cartap hydrochloride,

thiocyclam, thiocyclam hydrogen oxalate, thiocyclam hydrochloride, thiosultap sodium, or combinations thereof.

[0051] In an embodiment, the nicotinic insecticide may be neonicotinoids selected from acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, thiacloprid, thiamethoxam, flupyrimin, cycloxaprid, paichongding, guadipyr, cycloxylidin or combinations thereof. The nicotinic insecticide may be a sulfoximine - sulfoxaflor. The nicotinic insecticide may be a butenolide – flupyradifurone. The nicotinic insecticide may be a mesoionic selected from triflumezopyrim, dichloromezotiaz, or combinations thereof.

[0052] In an embodiment, the insecticide may be present in a weight percentage range of about 0.01% to about 20% with respect to the composition. Preferably, the weight range of the insecticide may be in the range of about 0.01% to about 18%, about 0.01% to about 15%, about 0.01% to about 10%, or about 0.01% to about 5%.

[0053] In an embodiment, the mycorrhizal fungus may be ecto-mycorrhiza or endo-mycorrhiza. Ecto-mycorrhiza may be arbutoid mycorrhiza. Endo-mycorrhiza may be selected from vesicular-arbuscular mycorrhiza, ericoid mycorrhiza, orchid mycorrhiza, monotropoid mycorrhiza, or combinations thereof. Vesicular Arbuscular Mycorrhiza (VAM) may be selected from, but not limited to, the different strains of *Acaulospora* spp., *Gigaspora* spp., *Sclerocystis* spp., *Scutellospora* spp., *Glomus* spp., *Funneliformis mosseae*, *Paraglomus occultum*, *Glomus mosseae*, *Glomus fasciculatum*, *Glomus intraradices*, *Gigaspora decipiens*, *Rhizophagus irregularis*, *Rhizophagus intraradices*, *Septoglomus constrictum*, *Funneliformis mosseae*, *Claroideoglomus etunicatum*, or combinations thereof. Preferably, the mycorrhizal fungus can be *Glomus mosseae or Gigaspora decipiens.*

[0054] In an embodiment, the mycorrhizal fungus may be present in a range of about 1 to 10^9 IP (Infective propagules) per gram.

[0055] In an embodiment, the mycorrhizal fungus may be present in an amount ranges from about 0.5 % -to 2 % by weight of the composition. Preferably, in an amount of 1% by weight of the composition.

[0056] In an embodiment, the plant health additive may be selected from bio-stimulants, plant growth regulators, micronutrients or mixtures thereof.

[0057] Bio-stimulants may be selected from humic acid or its salts; fulvic acid or its salts; amino acids; protein hydrolysates; peptides; organic acids; acetylthioproline; thiazolidine carboxylic acid; jasmonic acid; methyl jasmonate; carboxylic acid; chitosan; chitin; probenazole; acibenzolar-s-methyl; seaweed extract including *Ascophyllum nodosum*; polyamines; silicic acid or its salts including orthosilicic acid H_4SiO_4; salicylic acid; lactic acid; phenyllactic acid; nitrobenzene; brassinolide; forchlorfenuron; triacontanol; nitrophenolate including sodium para-nitrophenolate, ortho-nitrophenolate, sodium-5-nitroguaiacolate; or combinations thereof.

[0058] In an embodiment of the present invention, the amino acids can be alanine, arginine, aspartic acid, cysteine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, valine or mixtures thereof. Preferably, the amino acid is glycine.

[0059] In an embodiment of the present invention, the carboxylic acid can be oxalic acid, malonic acid, succinic acid, DL malic acid, fumaric acid, maleic acid, citraconic acid or mixture thereof. Preferably, the carboxylic acid is maleic acid.

[0060] Plant growth regulators may be selected from auxins including indole acetic acid, indole butyric acid, and alpha-naphthyl acetic acid; cytokinins including kinetin, zeatin, 6-benzylaminopurine, 6-benzyladenine, dipheylurea, and thidiazuron; ethylene modulators including aviglycine, prohexadione, prohexadione calcium, trinexapac, trinexapac-ethyl, and aminoethoxyvinylglycine (AVG); gibberellins including gibberelline, gibberellic acid, and GA3; growth inhibitors including abscisic acid, chlorpropham, flumetralin, maleic hydrazide, mepiquat, mepiquat chloride, and mepiquat pentaborate; growth retardants including chlormequat, chlormequat chloride, paclobutrazol, and uniconazole-P; or combinations thereof.

[0061] Micronutrients may be selected from zinc including zinc sulphate heptahydrate $ZnSO_4.7H_2O$, zinc sulphate monohydrate $ZnSO_4.H_2O$; chelated-zinc

including Zn-EDTA, zinc oxide, zinc lactate gluconate, zinc polyflavonoid; iron (Fe) as ferrous sulphate; manganese as manganese sulphate; boron including borax-sodium tetraborate, boric acid (H_3BO_3), di-sodium octaborate tetrahydrate ($Na_2B_8O_{13}.4H_2O$), di-sodium tetraborate pentahydrate, anhydrous borax; and sulphur including elemental sulphur, boronated sulphur; or combinations thereof.

[0062] In an embodiment, the plant health additive may be present in a range of about 0.001% to about 80% of the composition. Preferably, the weight range of the additive may be in the range of about 0.001% to about 70%, about 0.001% to about 60%, about 0.01% to about 50%, about 0.01% to about 40% or about 0.01 to about 20%.

[0063] In an embodiment, the present disclosure relates to a composition for improving plant health comprising 0.01% to 20% of the insecticide, 0.5% to 2% of the mycorrhizal fungus and 0.001 to 80% of the plant health additive.

[0064] In an embodiment, the composition may further comprise one or more auxiliary agents. The auxiliary additives may be selected from dispersing agents, fillers, thickeners, anti-freezing agents, wetting agents, colorants, fertilizers, surfactants, tackifiers, pH regulators, anti-foaming agents, solvents, emulsifier, solid carriers, combinations thereof and the like.

[0065] The composition of the present disclosure may also comprise other active components as auxiliary additives including insecticides, bactericides, fungicides, pesticides, combinations thereof and the like. The composition content of these additives is not particularly limiting and may be determined by a skilled person in the art according to conventional protocols.

[0066] The components of the composition as disclosed above may include all their isomers including enantiomers, diastereomers; salts; derivatives and the like.

[0067] In an embodiment, the composition shows a synergistic effect in improving the plant health, wherein the effect of the composition is over and above the effects of the individual components.

[0068] In an embodiment, the present disclosure relates to a formulation for improving plant health comprising an insecticide, a mycorrhizal fungus, a plant

health additive and an agro-chemically acceptable additive. The agrochemically acceptable additive may be those well known in the art.

[0069] In an embodiment, the agrochemically acceptable additive are selected from wetting agent, dispersing agent, solvent, carrier, colouring agent, controlled release agent or combination thereof.

[0070] In another embodiment, the wetting agent can be Mono C_{2-6} alkyl ether of a poly C_{2-4}alkylene oxide block copolymer, condensation product of castor oil and polyC_{2-4}alkylene oxide, alkoxylated castor oil is available under the trade name Agnique CSO-36, a mono- or di-ester of a C_{12-24}fatty acid and polyC_{2-4}alkylene oxide, carboxylates, sulphates, sulphonates, alcohol ethoxylates, alkyl phenol ethoxylates, fatty acid ethoxylates, sorbitan esters, ethoxylated fats or oils, amine ethoxylates, phosphate esters, ethylene oxide - propylene oxide copolymers, fluorocarbons,alkyd-polyethylene glycol resin, polyalkylene glycol ether, apolyalkoxylated nonyl phenyl, alkoxylated primary alcohol, ethoxylated distyrylphenol, ethoxylated distyrylphenol sulphate, ethoxylated tristyrylphenol phosphate, tristyrylphenol phosphate ester, hydroxylated stearic acid polyalkylene glycol polymer, and their corresponding salts,alkyd-polyethylene glycol resin, polyalkylene glycol ether, ethoxylated distyrylphenol, ethoxylated distyrylphenol sulphate, ethoxylated tristyrylphenol phosphate, tristyrylphenol phosphate ester, tristyrylphenol phosphate potassium salt, dodecysulfate sodium salt or a combination thereof.

[0071] In another embodiment, the dispersing agent can be copolymer of propylene oxide (PO) and ethylene oxide (EO) and/or an ethoxylated tristyrene phenol, copolymer of PO and EO is alpha-butyl-omega-hydroxypoly(oxypropylene) block polymer with poly(oxyethylene), ethoxylated tristyrene phenol is alpha-[2,4,6-tris[1-(phenyl)ethyl] phenyl]-omega-hydroxy poly(oxyethylene, poly(oxy-1,2-ethanediyl)-alpha-C_{10-15}alkyl-omega-hydroxy phosphate or sulphate and/or a C_{10-13}alkylbenzenesulfonic acid, tristyrylphenols, nonylphenols, dinonylphenol and octylphenols, styrylphenol polyethoxyester phosphate, alkoxylated C_{14-20}fatty amines or combination thereof.

[0072] In another embodiment, the solvent is fatty acid methyl ester, cyclohexane, xylene, mineral oil or kerosene, mixtures or substituted naphthalenes, mixtures of mono- and polyalkylated aromatics, dibutyl phthalate or dioctyl phthalate, ethylene glycol monomethyl or monoethyl ether, butyrolactone, octanol, castor oil, soybean oil, cottonseed oil , epoxidised coconut oil or soybean oil, aromatic hydrocarbons, dipropyleneglycol monomethylether, polypropylene glycol [M.W. 2000-4000], polyoxyethylene polyoxypropylene glycols, polyoxypropylene polyoxyethylene glycols, diethyleneglycol, polyethylene glycol [M.W. 200-4000 amu], methoxy polyethylene glycols 350, 550, 750, 2000, 5000; glycerol, methyl oleate, n-octanol, alkyl phosphates such as tri-n-butyl phosphate, propylene carbonate and isoparaffinic, tetrahydrofurfuryl alcohol, gamma-butyrolactone, N-methyl-2-pyrrolidone, tetramethylurea, dimethylsulfoxide, N,N-dimethylacetamide , Diacetone alcohol, Polybutene, Propylene carbonate, Dipropylene glycol isomer mixture or combination thereof.

[0073] In another embodiment, the carriers can be diatomaceous earth, attapulgite or zeolites, dolomite, limestone, silica, fly ash, hydrated lime, wheat flour, wood flour, ground wheat straw, cellulose and soy flour, bentonite, kaolin, attapulgite, diatomaceous earth, calcium carbonate, talc, muscovite mica, fused sodium potassium, aluminum silicate , perlite, talc and muscovite mica, urea, sulfur-coated urea, isobutylidene diurea, ammonium nitrate, ammonium sulfate, ammonium phosphate, triple super phosphate, phosphoric acid, potassium sulfate, potassium nitrate, potassium metaphosphate, potassium chloride, dipotassium carbonate, potassium oxide and a combination of these, calcium, magnesium, sulfur, iron, manganese, copper, zinc; oxides, humic acid, Wood floor, Calcium silicate, Cellulose granules, Magnesium stearate or combination thereof.

[0074] In another embodiment, the colouring agent is crystal violet, thalocyano dye chlorinated, aerosol green FFB dye, rhodamine, and azo compound.

[0075] In another embodiment, the controlled release agent is Xanthan gum, PVK, carboxymethyl celluloses, polyvinyl alcohols, gelatin, sodium carboxymethylcellulose, hydroxyethylcellulose, Sodium Polyacrylate, modified

starch, Paraffin wax, Polyvinyl acetate, Montan wax and vinyl acetate, Polyethylene Glycol 6000, Cationic hydrosoluble polymer, C4alkylated Polyvinyl pyrrolidine.

[0076] In an embodiment, the formulation may be a solid, liquid or semi-solid formulation. In an embodiment, the formulation may be selected from the group comprising of Granule (GR) / Soil Applied Granules (SAG), capsule suspension (CS), dispersible concentrate (DC), emulsifiable concentrate (EC), emulsion, water in oil (EO), emulsion, oil in water (EW), jambo balls or bags (bags in water soluble pouch), micro-emulsion (ME), oil dispersion (OD), oil miscible flowable concentrate (oil miscible suspension) (OF), oil miscible liquid (OL), suspension concentrate (SC), suspo-emulsion (SE), soluble concentrate (SL), water dispersible granule (WG or WDG), water soluble granule (SG), water soluble powder (SP), wettable powder (WP), a mixed formulation of CS and SC (ZC), a mixed formulation of CS and SE (ZE), a mixed formulation of CS and EW (ZW), and Controlled release granules (CR).

[0077] In a preferred embodiment, the formulation may be granules (GR) including controlled release granules (CR), slow release granules or fast release granules for soil application.

[0078] In an embodiment, the present invention relates to a composition for improving plant health comprising of an insecticide, mycorrhizal fungus and plant health additive.

[0079] In an embodiment, the present invention relates to a composition for improving plant health comprising of two insecticides, mycorrhizal fungus and plant health additive.

[0080] In an embodiment, the present invention to a composition for improving plant health comprising of 0.01% to 20% of the insecticide, 1 to 10^9IP per gram of the mycorrhizal fungus, 0.001 to 80% of the plant health additive and optionally comprises agrochemically acceptable additives.

[0081] In an embodiment of the present invention, the composition for improving plant health comprises:

(a) 0.3% to 5% insecticide by total weight of the composition;

(b) 0.75% to 1% mycorrhizal fungus by total weight of the composition;

(c) 0.02 to 20 % plant health additive and

(d) 74% to 99% agro-chemically acceptable additives.

[0082] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% clothianidin by total weight of the composition, (c) Mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram, (d) 1.5 % humic acid by total weight of the composition, (e) 1.5% amino acid by total weight of the composition, and (f) 1.2 % seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[0083] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram and (c) humic acid.

[0084] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram, (c) seaweed extract (*Ascophyllum nodosuam*).

[0085] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) mycorrhiza fungus (Glomus mosseae) 100 IP/gram and (c) chitosan.

[0086] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram, (c) triacontanol.

[0087] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram, and (c) zinc lactate gluconate.

[0088] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) clothianidin, (c) Mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram, (d) humic acid, (e) amino acid, and (f) seaweed extract (*Ascophyllum nodosuam*).

[0089] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) clothianidin, (c) Mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram, (d) humic acid, (e) amino acid and (f) seaweed extract (*Ascophyllum nodosuam*).

[0090] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) thiamethoxam, (c) Mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram, (d) humic acid, (e) amino acid and (f) seaweed extract (*Ascophyllum nodosuam*).

[0091] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) thiamethoxam, (c) Mycorrhiza fungus (Glomus mosseae) 100 IP/gram, (d) humic acid, (e) amino acid and (f) seaweed extract (*Ascophyllum nodosuam*).

[0092] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) clothianidin, (c) mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram, (d) zinc lactate gluconate, (e) humic acid, (f) amino acid, (g) seaweed extract (*Ascophyllum nodosuam*).

[0093] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) chlorantraniliprole, (b) thiamethoxam, (c) mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram, (d) zinc lactate gluconate, (e) humic acid, (f) amino acid and (g) seaweed extract (*Ascophyllum nodosuam*).

[0094] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 1 % Mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram by total weight of the composition and (c) 4% humic acid by total weight of the composition.

[0095] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 1 % Mycorrhiza fungus (*Glomus mosseae*) 100

IP/gram by total weight of the composition and 4% seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[0096] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 1% mycorrhiza fungus (Glomus mosseae) 100 IP/gram by total weight of the composition and (c) 2.5% chitosan by total weight of the composition.

[0097] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.1% mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram by total weight of the composition, (c) 0.1% triacontanol by total weight of the composition.

[0098] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 1% Mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram by total weight of the composition, and (c) 2% Zinc lactate gluconate by total weight of the composition.

[0099] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% clothianidin by total weight of the composition, (c) 1% Mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram by total weight of the composition, (d) 1.5% humic acid by total weight of the composition, (e) 1.5% amino acid by total weight of the composition and (f) 1.2%) seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[00100] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% clothianidin by total weight of the composition, (c) 1% Mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram by total weight of the composition, (d) 1.5% humic acid by total weight of the

composition, (e) 1.5% amino acid by total weight of the composition and (f) 1.2% seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[00101] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% thiamethoxam by total weight of the composition, (c) 1% Mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram by total weight of the composition, (d) 1.5% humic acid by total weight of the composition, (e) 1.5% amino acid by total weight of the composition and (f) 1.2% seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[00102] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% thiamethoxam by total weight of the composition, (c) 1% Mycorrhiza fungus (Glomus mosseae) 100 IP/gram by total weight of the composition, (d) 1.5% humic acid by total weight of the composition, (e) 1.5% amino acid by total weight of the composition and (f) 1.2%seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[00103] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% clothianidin by total weight of the composition, (c) 1% Mycorrhiza fungus (Gigaspora decipiens) 75 IP/gram by total weight of the composition, (d) 2% zinc lactate gluconate by total weight of the composition, (e) 1% humic acid by total weight of the composition, (f) 1% amino acid by total weight of the composition, and (g) 1% seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[00104] In an embodiment, the present invention relates to a GR composition for improving plant health comprising of (a) 0.3% chlorantraniliprole by total weight of the composition, (b) 0.75% thiamethoxam by total weight of the composition, (c) 1% Mycorrhiza fungus (*Gigaspora decipiens*) 75 IP/gram by total weight of the composition, (d) 2% zinc lactate gluconate by total weight of the composition, (e) 1% humic acid by total weight of the composition, (f) 1%

amino acid by total weight of the composition and (g) 1% seaweed extract (*Ascophyllum nodosuam*) by total weight of the composition.

[00105] In an embodiment, the present disclosure relates to a process of preparing the composition comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[00106] In an embodiment, the process may comprise the steps of mixing, blending, drying, packaging, inoculating, incubating, heating, combinations thereof and the like.

[00107] In an embodiment, the present disclosure relates to a method of improving plant health, wherein the method comprises treating the plant with an effective amount of a composition for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[00108] Based on the formulation or composition the treatment may be performed by spraying, dusting, scattering, soaking and the like. It may be applied on the locus of the plant, including all plant parts, or plant propagules, or on the soil or turf of growth. It may be applied before or after the seeds are planted. In an embodiment, the plant may be treated at the seeds, stems, tubers, roots, bulbs, rhizomes, shoots or sprouts. The treatment may be done on the plant before transplant or before emergence from soil; or on seeds before germination. In an embodiment, the composition may be prophylactic in nature.

[00109] In an embodiment, the composition or formulation may be applied via tank mix method or sequential application.

[00110] In an especially preferred embodiment of the method according to the present disclosure, the health of a plant is increased both in the presence and absence of biotic or abiotic stress factors. The indicators-yield, plant vigor, quality and tolerance to abiotic or biotic stress-for the health condition of a plant may be interdependent or they may result from each other. An increase in plant vigor may for example result in an increased yield and/or tolerance to abiotic or biotic stress.

[00111] One indicator of the condition of the plant is the yield. "Yield" is to be understood as any plant product of economic value that is produced by the plant such as grains, fruits in the proper sense, vegetables, nuts, grains, seeds, wood (as

in the case of silviculture plants) or even flowers (as in the case of gardening plants, or ornamentals). The plant products may in addition be further utilized and/or processed after harvesting.

[00112] In an especially preferred embodiment of the disclosure, the yield of the treated plant is increased.

[00113] In another preferred embodiment of the disclosure, the yield of the plants treated according to the method of the present disclosure, is increased synergistically.

[00114] According to the present disclosure, "increased yield" of a plant, in particular of an agricultural, silvicultural and/or horticultural plant means that the yield of a product of the respective plant is increased by a measurable amount over the yield of the same product of the plant produced under the same conditions, but without the application of the composition or formulation according to the disclosure.

[00115] Increased yield can be characterized, among others, by the following improved properties of the plant: increased plant weight, increased plant height, increased biomass such as higher overall fresh weight (FW), increased number of flowers per plant, higher grain yield, more tillers or side shoots (branches), larger leaves, increased shoot growth, increased protein content, increased oil content, increased starch content, increased pigment content, and/or increased leaf index.

[00116] According to the present disclosure, the yield is increased by at least 5%, preferable by 5 to 10 %, more preferable by 10 to 20 %, or even 20 to 30 % compared to the untreated control plants or plants treated with pesticides in a way different from the method according to the present disclosure. In general, the yield increase may even be higher.

[00117] A further indicator for the condition of the plant is the plant vigor. The plant vigor manifests in several aspects such as the general visual appearance. In another especially preferred embodiment of the disclosure, the plant vigor of the treated plant is increased. In another preferred embodiment of the disclosure, the plant vigor of the plants treated according to the method of the disclosure, is increased synergistically.

[00118] Improved plant vigor can be characterized, among others, by the following improved properties of the plant: improved vitality of the plant, improved plant growth, improved plant development, improved visual appearance, improved plant stand (less plant verse/lodging), improved emergence, enhanced root growth and/or more developed root system, enhanced nodulation, in particular rhizobial nodulation, bigger leaf blade, bigger size, increased plant weight, increased plant height, increased tiller number, increased number of side shoots, increased number of flowers per plant, increased shoot growth, increased root growth (extensive root system), increased yield when grown on poor soils or unfavourable climate, enhanced photosynthetic activity including based on increased stomatal conductance and/or increased CO_2 assimilation rate, increased stomatal conductance, increased CO_2 assimilation rate, enhanced pigment content including chlorophyll content, earlier flowering, earlier fruiting, earlier and improved germination, earlier grain maturity, improved self-defense mechanisms, improved stress tolerance and resistance of the plants against biotic and abiotic stress factors such as fungi, bacteria, viruses, insects, heat stress, cold stress, drought stress, UV stress and/or salt stress, less non-productive tillers, less dead basal leaves, less input needed including fertilizers or water, greener leaves, complete maturation under shortened vegetation periods, less fertilizers needed, less seeds needed, easier harvesting, faster and more uniform ripening, longer shelf-life, longer panicles, delay of senescence, stronger and/or more productive tillers, better extractability of ingredients, improved quality of seeds including for being seeded in the following seasons for seed production, better nitrogen uptake, improved reproduction, reduced production of ethylene and/or the inhibition of its reception by the plant.

[00119] The improvement of the plant vigor according to the present disclosure particularly means that the improvement of any one or several or all of the above mentioned plant characteristics are improved independently of the pesticidal action of the composition or active ingredients (components).

[00120] Another indicator for the condition of the plant is the "quality" of a plant and/or its products.

[00121] In an especially preferred embodiment of the disclosure, the quality of the treated plant is increased.

[00122] In another preferred embodiment of the disclosure, the quality of the plants treated according to the method of the invention, is increased synergistically.

[00123] According to the present disclosure, enhanced quality means that certain plant characteristics such as the content or composition of certain ingredients are increased or improved by a measurable or noticeable amount over the same factor of the plant produced under the same conditions, but without the application of the composition or formulation of the present disclosure.

[00124] Enhanced quality can be characterized, among others, by following improved properties of the plant or its product: increased nutrient content, increased protein content, increased content of fatty acids, increased metabolite content, increased carotenoid content, increased sugar content, increased amount of essential amino acids, improved nutrient composition, improved protein composition, improved composition of fatty acids, improved metabolite composition, improved carotenoid composition, improved sugar composition, improved amino acids composition, improved or optimal fruit color, improved leaf color, higher storage capacity, or higher processability of the harvested products.

[00125] Another indicator for the condition of the plant is the plant's tolerance or resistance to biotic and/or abiotic stress factors. Biotic and abiotic stress, especially over longer terms, can have harmful effects on plants. Biotic stress is caused by living organisms while abiotic stress is caused for example by environmental extremes. According to the present disclosure, "enhanced tolerance or resistance to biotic and/or abiotic stress factors" means (1.) that certain negative factors caused by biotic and/or abiotic stress are diminished in a measurable or noticeable amount as compared to plants exposed to the same conditions, but without being treated with the composition or formulation according to the present disclosure and (2.) that the negative effects are not diminished by a direct action of the composition according to the disclosure on the stress factors,

including by its insecticidal action which directly destroys the microorganisms or pests, but rather by a stimulation of the plants' own defensive reactions against said stress factors.

[00126] The improvement in plant health, among others, may include one of the following:

- Synergistic control of insect and pests;
- Improved crop growth and vigour;
- Early plant establishment;
- Increase in crop yield and biomass;
- Increase in yield of treated plants;
- Increase in yield due to protection against insects and pests;
- Increase in yield due to plant growth regulation, and increase in reproductive parts of plant;
- Increase in yield due to more number of tillers, branches, sub branches, flowers, and fruits;
- Increase in tolerance to biotic stress including insects/pests damage, fungal, bacterial and viral diseases;
- Increase in tolerance to abiotic stress including weather stress, and moisture stress;
- Reduced lodging in susceptible plants including lodging due to biotic and abiotic factors;
- Improvement in quality which includes visual appearance, color, size, and shape of grains, fruits, fiber, flowers, tuber, bulb, rhizomes, straw, leaves and other plant parts and plant products;
- Improvement in keeping quality of produce and post-harvest life; and
- Uniform sizing in tuber, bulb, rhizome and root crops

[00127] In another embodiment, the present disclosure relates to a use of a composition for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive.

[00128] In an embodiment, for improving plant health the composition or formulation may provide insecticidal and pesticidal effect. The synergistic composition of the present disclosure may be used to control the insects-pests and plant parasitic nematodes. The major insects or pests may belong to the order Hemiptera including, but not limited to, rice leafhopper/green leaf hopper (GLH) *Nephotettix nigropictus*, rice brown plant hopper (BPH) *Nilaparvata lugen*, rice backed plant hopper (WBPH) *Sogatella furcifera*, Apple Mealy bug *Phenococcus aceris*, bean aphid *Aphis fabae*, black citrus aphid *Toxoptera aurantii*, citrus black scale *Saissetia oleae*, cabbage aphid *Brevicoryne brassicae*, *Lipaphis erysimi*, citrus red scale *Aonidiella aurantii*, yellow scale *Aonidiella citrine*, citrus mealybug *Planococcus citri*, corn leaf aphid *Rhopalosiphum maidis*, aphid Aphis *gossypii*, jassid *Amrasca biguttula biguttla*, mealy bug *Planococcus* spp. and *Pseudococcus* spp., cotton stainer *Dysdercus suturellus*, whitefly *Bemisia tabaci*, cowpea aphid *Aphis crassivora*, grain aphid *Sitobion avenae*, golden glow aphid *Uroleucon* spp., grape mealybug *Pseudococcus maritimus*, green peach aphid *Myzus persicae*, greenhouse whitefly *Trialeurodes vaporariorum*, papaya mealy bug *Pracoccus marginatus*, pea aphid *Acyrthosiphon pisum*, sugarcane mealybug *Saccharicoccus sacchari*, potato aphid *Myzus persicae*, potato leaf hopper *Empoasca fabae*, cotton whitefly *Bemisia tabaci*, tarnished plant bug *Lygus lineolaris*, wooly apple aphid *Eriosoma lanigerum*, mango hopper *Amritodus atkinsoni*, or *Idioscopus* spp.; order Lepidoptera, army worm *Mythimna unipuncta*, asiatic rice borer *Chilo suppressalis*, bean pod borer *Maruca vitrata*, beet armyworm *Spodoptera exigua*, black cutworm *Agrotis ipsilon*, bollworm *Helicoverpa armigera*, cabbage looper *Trichoplusia ni*, codling moth *Cydia pomonella*, croton caterpillar *Achea janata*, diamond backmoth *Plutella xylostella*, cabbage worm *Pieris rapae*, pink bollworm *Pectinophora gossypiella*, sugarcane borer *Diatraea saccharalis*, sugarcane early shoot borer *Chiloinfuscatellus tobacco* budworm *Heliothis virescens*, tomato fruitworm *Helicoverpa zea*, velvet bean caterpillar *Anticarsia gemmatalis*, yellow stem borer *Scirpophaga incertulas*, spotted bollworm *Earias vittella*, rice leaffolder *Cnaphalocrocis medinalis*, pink stem borer *Sesamia* spp., tobacco leafeating

caterpillar *Spodoptera litura*, brinjal fruit and shoot borer *Leucinodes orbonalis*, bean pod borer *Maruca vitrata*, *Maruca testulalis*, armyworm *Mythimna separata*, cotton pinkbollworm *Pectinophora gossypiella*, citrus leafminer *Phyllocnistis citrella*, cabbage butterfly *Pieris bras-sicae*, diamond backmoth *Plutella xylostella*, paddy stem borer *Scirpophaga excerptallis*, *Scirpophaga incertulas*, *Scirpophaga innotata*, wheat stem borer *Sesamia inferens*, *Sitotroga cerealella*, *Spilosoma obliqua*, fall armyworm *Spodoptera frugiperda*, *Spodoptera littoralis*, *Spodoptera litura*, *Trichoplusia ni*, *Tryporyza nivella*, *Tryporyza incertulas*, or Tutaabsoluta; from the order Coleoptera including, but not limited to, apple twig borer *Amphicerus* spp., corn root worm *Diabrotica virgifera*, cucumber beetle *diabrotica balteata*, boll weevil *Anthonomus grandis*, grape flea beetle *Altica chalybea*, grape root worm *Fidia viticola*, grape trunk borer *Clytoleptus albofasciatus*, radish flea beetle *Phyllotreta armoraciae*, maize weevil *Sitophilus zeamais*, northern corn rootworm *Diabrotica barberi*, rice water weevil *Lissorhoptrus oryzophilus*, *Anthonomus grandis*, *Bruchus lentis*, *Diabrotica semipunctata*, *Diabrotica virgifera*, *Dicladispa armigera*, *Epila-chna varivestis*; species of white grubs including, but not limited to Holotrichia bicolor, *Holotrichia consanguinea*, *Holotrichia serrata*, *Leptinotarsa decemlineata*, *Phyllotreta chrysocephala*, or *Popillia japonica*; from the order Orthoptera including, but not limited to, *Gryllotalpa* spp., *Locusta* spp., and *Schistocerca* spp.; from the order *Thysanoptera* including, but not limited to, *Frankliniella* spp., *Thrips palmi*, *Thrips tabaci* and *Scirtothrips dorsalis*; termites (Isoptera) including, but not limited to *Calotermes flavicollis*, *Coptotermes formosanus*, *Heterotermes aureus*, *Leucotermes flavipes*, *Microtermes obesi*, *Odontotermes obesus*, *Reticulitermes flavipes*, and *Termes natalensis*; from the order Heteroptera including, but not limited to *Dysdercus* spp., *Leptocorisa* spp.; from the order Hymenoptera including, but not limited to, *Solenopsis* spp.; from the order *Diptera* including, but not limited to, *Antherigona soccata*, *Dacus* spp., *Liriomyza* spp., *Melanagromyza* spp.; from the order *Acarina*, including, but not limited to, *Aceria mangiferae*, *Brevipalpus* spp., *Eriophyes* spp., *Oligonychus mangiferus*, *Oligonychus punicae*, *Panonychus citri*, *Panonychus ulmi*,

Polyphagotarsonemus latus, Tarsonemus spp., *Tetranychus urticae, Tetranychus cinnabarinus*; plant parasitic nematodes including, but not limited to root-knot nematodes, *Meloidogyne incognita, Meloidogyne javanica* and other *Meloidogyne* species; cyst nematodes, *Globodera rostochiensis, Globodera pallida, Globodera tabacum* and other *Globodera* species; *Heterodera avenae, Heterodera glycines, Heterodera schachtii, Heterodera trifolii*, and other *Heterodera* species; seed gall nematodes, *Anguina funesta, Anguina tritici* and other *Anguina* species; stem and foliar nematodes, *Aphelenchoides besseyi, Aphelen-choides fragariae, Aphelenchoides ritzemabosi* and other *Aphelenchoides* species; sting nematodes, *Belonolaimus longicaudatus* and other *Belonolaimus* species; pine nematodes, *Bursaphelenchus xylophilus* and other *Bursaphelenchus* species; ring ne-matodes, *Criconema* species, *Criconemella* species, *Criconemoides* species, and *Me-socriconema* species; stem and bulb nematodes, *Ditylenchus destructor, Ditylenchus dipsaci, Ditylenchus myceliophagus* and other *Ditylenchus* species; awl nematodes, *Dolichodorus* species; spiral nematodes, *Helicotylenchus dihystera, Helicotylenchus multicinctus* and other *Helicotylenchus* species, *Rotylenchus robustus* and other *Roty-lenchus* species; sheath nematodes, *Hemicycliophora* species and *Hemicriconemoides* species; *Hirshmanniella* species; lance nematodes, *Hoplolaimus columbus, Hoplolai-mus galeatus* and other *Hoplolaimus* species; false root-knot nematodes, *Nacobbus aberrans* and other *Nacobbus* species; needle nematodes, *Longidorus elongates* and other *Longidorus* species; pin nematodes, *Paratylenchus* species; lesion nematodes, *Pratylenchus brachyurus, Pratylenchus coffeae, Pratylenchus curvitatus, Pratylenchus goodeyi, Pratylencus neglectus, Pratylenchus penetrans, Pratylenchus scribneri, Pratylenchus vulnus, Pratylenchus zeae* and other *Pratylenchus* species; *Radinaphelenchus cocophilus* and other *Radinaphelenchus* species; burrowing nematodes, *Radopholus similis* and other *Radopholus* species; reniform nematodes, *Rotylenchulus reniformis* and other *Rotylenchulus* species; *Scutellonema* species; stubby root nematodes, *Tri-chodorus primitivus* and other *Trichodorus* species; *Paratrichodorus* minor and other *Paratrichodorus* species; stunt nematodes, *Tylenchorhynchus claytoni, Tylenchorhyn-chus dubius* and other

Tylenchorhynchus species and *Merlinius* species; citrus nematodes, *Tylenchulus semipenetrans* and other *Tylenchulus* species; dagger nematodes, *Xiphinema americanum, Xiphinema index, Xiphinema diversicaudatum* and other *Xi-phinema* species.

[00129] In an embodiment, the composition or formulation may be suitable for use on a host of plants. The plants may be selected from agricultural plants, silvicultural plants, horticultural plants, ornamental plants or gardening plants. In an embodiment, the composition or formulation may be used on plants including, but not limited to, GMO (Genetically Modified Organism) and Non GMO varieties of Cotton *(Gossypium* spp.), Paddy *(Oryza sativa*), Wheat *(Triticum aestivum*), Barley *(Hordeum vulgare*), Maize *(Zea mays*), Sorghum (Sorghum bicolor), Oat *(Avena sativa*), Pearl millet *(Pennisetum glaucum*),Sugarcane *(Saccharum officinarum*), Sugarbeet *(Beta vulgaris*), Soybean (Glycin max), Peanut *(Arachis hypogaea*), Sunflower *(Helianthus annuus*) , Mustard *(Brassica juncea*), Rape seed *(Brassica napus*), Linseed *(Linum usitatissimum*), Sesame *(Sesamum indicum*), Green gram *(Vigna radiata*), Black gram *(Vigna mungo*), Chickpea *(Cicer aritinum*), Cowpea *(Vigna unguiculata*), Red gram *(Cajanus cajan*), French bean *(Phaseolus vulgaris*), Indian bean *(Lablab purpureus*), Horse gram *(Macrotyloma uniflorum*), Field pea *(Pisum sativum*), Cluster bean *(Cyamopsis tetragonoloba*), Lentils *(Lens culinaris*), Brinjal *(Solanum melongena*), Cabbage *(Brassica oleracea var. capitata*), Cauliflower *(Brassica oleracea var. botrytis*), Okra *(Abelmoschus esculentus*) , Onion *(Allium cepa* L.), Tomato *(Solanum lycopersicun*), Potato *(Solanum tuberosum*), Sweet potato *(Ipomoea batatas*), Chilly *(Capsicum annum*), Garlic *(Allium sativum*), Cucumber *(Cucumis sativus*), Muskmelons *(Cucumis melo*), Watermelon *(Citrullus lanatus*), Bottle gourd *(Lagenaria siceraria*), Bitter gourd *(Momordica charantia*), Radish *(Raphanus sativus*), Carrot *(Dacuscarota subsp. sativus*), Turnip *(Brassica rapasubsprapa*), Apple *(Melusdomestica*), Banana *(Musa* spp.), Citrus groups (Citrus spp.), Grape *(Vitis vinifera*), Guava *(Psidium guajava*), Litchi *(Litchi chinensis*), Mango *(Mangifera indica*), Papaya *(Carica papaya*), Pineapple *(Ananas comosus*), Pomegranate *(Punica granatum*), Sapota

(Manilkara zapota), Tea *(Camellia sinensis*), Coffea *(Coffea Arabica*), Turmeric *(Curcuma longa*), Ginger *(Zingiber officinale*), Cumin *(Cuminum cyminum*), Fenugreek *(Trigonella foenum-graecum*), Fennel *(Foeniculum vulgare*), Coriander*(Coriandrum sativum*), Ajwain *(Trachyspermum ammi*), Psyllium *(Plantago ovate*), Black Pepper *(Piper nigrum*), Stevia *(Stevia rebaudiana*), Safed musli *(Chlorophytum tuberosum*), Drum stick *(Moringa oleifera*), Coconut *(Coco nucifera*), Mentha (*Mentha* spp.), Rose *(Rosa* spp.), Jasmine *(Jasminum* spp.), Marigold (*Tagetes* spp.), Common daisy *(Bellis perennis*), Dahlia *(Dahlia hortnesis*), Gerbera (*Gerbera jamesonii*), Carnation *(Dianthus caryophyllus*), vegetables including solanaceous vegetables such as eggplant, tomato, pimento, pepper, or potato; cucurbit vegetables such as cucumber, pumpkin, zucchini, water melon, melon, or squash; cruciferous vegetables such as radish, white turnip, horseradish, kohlrabi, Chinese cabbage, cabbage, leaf mustard, broccoli, or cauliflower; asteraceous vegetables such as burdock, crown daisy, artichoke, or lettuce; liliaceous vegetables such as green onion, onion, garlic, and asparagus; ammiaceous vegetables such as carrot, parsley, celery, or parsnip; chenopodiaceous vegetables such as spinach, or Swiss chard; lamiaceous vegetables such as *Perilla frutescens*, mint, or basil; strawberry, sweet potato, *Dioscorea japonica*, *colocasia*; flowers, foliage plants, turf grasses, fruits including pome fruits such apple, pear, or quince; stone fleshy fruits such as peach, plum, nectarine, *Prunus mume*, cherry fruit, apricot, or prune; citrus fruits such as orange, lemon, rime, or grapefruit; nuts such as chestnuts, walnuts, hazelnuts, almond, pistachio, cashew nuts, or macadamia nuts; berries such as blueberry, cranberry, blackberry, or raspberry; grape, kaki fruit, olive, plum, banana, coffee, date palm, or coconuts; trees other than fruit trees; tea, mulberry, flowering plant, trees such as ash, birch, dogwood, Eucalyptus, *Ginkgo biloba*, lilac, maple, Quercus, poplar, Judas tree, *Liquidambar formosana*, plane tree, zelkova, Japanese arborvitae, fir wood, hemlock, juniper, Pinus, Picea, and Taxus cuspidate.

[00130] In another embodiment, the present disclosure also provides a kit comprising the composition for improving plant health along with a user manual with instructions.

EXAMPLES

[00131] The present invention is further explained in the form of following examples. However, it is to be understood that the following examples are merely illustrative and are not to be taken as limitations upon the scope of the invention.

[00132] Example 1: Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Humic acid 4% GR

Ingredients	**Percent % (w/w)**	**Function**
Riversand (Silica)	75.10	Carrier/filler
Chlorantraniliprole a.i.	0.30	Active ingredient 1
Tri-styryl Phenol Ethoxylate	3.00	Emulsifier
Phosphoric acid	0.10	Buffering agent
Polyvinyl alcohols	2.00	Controlled release agent-1
Nano polysaccharide	2.50	Innert 1
Mycorrhiza fungus (Glomus mosseae) 100 IP/gram a.i.	1.00	Active ingredient 2
N-methyl-2-pyrrolidone	3.00	Solvent
Trisiloxane ethoxylate	1.50	Wetting agent
Copolymer of propylene oxide (PO) and ethylene oxide (EO)	1.00	Dispersing agent
Paraffin wax	5.00	Controlled release agent-2
Humic acid a.i.	4.00	Active ingredient 3
Rhodamine	0.50	Colourant
Precipitated silica	1.00	Innert 2
Total	100.00	

[00133] Manufacturing process for Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Humic acid 4% GR :

Step 1: Added chlorantraniliprole into N-methyl-2-pyrrolidone and mixed copolymer of propylene oxide (PO), ethylene oxide (EO) and paraffin wax and homogenized the mixture.

Step 2-Now sprayed the homogenized mixture on River sand granules and blend it till homogeneity.

Step 3-Added nano polysaccharide on to these granules.

Step 4-Mixed mycorrhiza fungus (Glomus mosseae) 100 IP/gram, trisiloxane ethoxylate and polyvinyl alcohol and then spray on treated granules and homogenize it till homogeneity.

Step 5-Now added Humic acid and Rhodamine dye onto these granules so that it can coat on these sand granules.

Step 6 - Finally added silica to make granules free flowing and free of moisture.

Step 7- Final product obtained is sent for QC approval.

Step 8- After approval, material is packed in required pack sizes.

[00134] S**torage stability - Chlorantraniliprole 0.3% + Mycorrhiza fungus (*Glomus mosseae*) 100 IP/gram + Humic acid 4% GR**

1. Laboratory storage stability

Laboratory storage stability				
Parameters	Specification (in house)	Initial	At 54±2 ^{0}C	At 0±2 ^{0}C
Chlorantraniliprole (% w/w)	0.285 to 0.330	0.32	0.30	0.31
Mycorrhiza fungus (*Glomus mosseae*) content by IP/g	50 to 150	145.00	140.00	145.00
Humic acid (% w/w)	3.80 to 4.40	4.25	4.10	4.20
pH range (1% aq. Suspension)	4.0 to 7.0	5.50	5.50	5.50
Dustiness	< 20 mg	10	10	10
Dry sieve (300 micron) percent by mass min.	> 90%	99.5	99.2	99.3
Attrition Resistance (<100 micron)	< 5%	2.10	2.10	2.10
Bulk density (g/ml)	1.25 to 1.50	1.35	1.35	1.35
Moisture content percent by mass max.	max. 2%	1.50	1.50	1.50

2. Room temperature storage stability

Room temperature storage stability				
Parameters	specification (in house)	1 month	6 months	12 months

Chlorantraniliprole (% w/w)	0.285 to 0.330	0.32	0.32	0.32
Mycorrhiza fungus (Glomus mosseae) content by IP/g	50 to 150	145.00	145.00	145.00
Humic acid (% w/w)	3.80 to 4.40	4.25	4.24	4.23
pH range (1% aq. Suspension)	4.0 to 7.0	5.50	5.50	5.50
Dustiness	< 20 mg	10	10	10
Dry sieve (300 micron) percent by mass min.	> 90%	99.50	96.35	96.25
Attrition Resistance (<100 micron)	< 5%	2.10	2.10	2.10
Bulk density (g/ml)	1.25 to 1.50	1.35	1.35	1.35
Moisture content percent by mass max.	max. 2%	1.50	1.50	1.40

[00135] The following GR type formulations in the table below were manufactured according to the present invention by following the above manufacturing procedures using different excipients.

[00136] GR type Formulations comprising three Active ingredients

Compound A	Compound B*	Compound C	Active ingredients (%)			Formulation Strength (%)
			A	B	C	
Chlorantraniliprole	MF	Humic acid	0.3	1	4	5.30
Chlorantraniliprole	MF	Fulvic acid	0.3	1	4	5.30
Chlorantraniliprole	MF	Amino acid	0.3	1	3	4.30
Chlorantraniliprole	MF	Carboxylic acid	0.3	1	3	4.30
Chlorantraniliprole	MF	Seaweed extract	0.3	1	4	5.30
Chlorantraniliprole	MF	Chitosan	0.3	1	2.5	3.80
Chlorantraniliprole	MF	Nitrobenzene	0.3	1	5	6.30
Chlorantraniliprole	MF	Brassinolide	0.3	1	0.02	1.32
Chlorantraniliprole	MF	Triacontanol	0.3	1	0.1	1.40
Chlorantraniliprole	MF	Zinc	0.3	1	2	3.30
Chlorantraniliprole	MF	Paclobutrazol	0.3	1	0.25	1.55
Chlorantraniliprole	MF	Sulphur	0.3	1	20	21.30
Cyantraniliprole	MF	Humic acid	0.5	1	4	5.50
Cyantraniliprole	MF	Fulvic acid	0.5	1	4	5.50
Cyantraniliprole	MF	Amino acid	0.5	1	3	4.50
Cyantraniliprole	MF	Carboxylic acid	0.5	1	3	4.50
Cyantraniliprole	MF	Seaweed extract	0.5	1	4	5.50
Cyantraniliprole	MF	Chitosan	0.5	1	2.5	4.00
Cyantraniliprole	MF	Nitrobenzene	0.5	1	5	6.50
Cyantraniliprole	MF	Brassinolide	0.5	1	0.02	1.52
Cyantraniliprole	MF	Triacontanol	0.5	1	0.1	1.60

Cyantraniliprole	MF	Zinc	0.5	1	2	3.50
Cyantraniliprole	MF	Paclobutrazol	0.5	1	0.25	1.75
Cyantraniliprole	MF	Sulphur	0.5	1	20	21.50
Tetraniliprole	MF	Humic acid	0.4	1	4	5.40
Tetraniliprole	MF	Fulvic acid	0.4	1	4	5.40
Tetraniliprole	MF	Amino acid	0.4	1	3	4.40
Tetraniliprole	MF	Carboxylic acid	0.4	1	3	4.40
Tetraniliprole	MF	Seaweed extract	0.4	1	4	5.40
Tetraniliprole	MF	Chitosan	0.4	1	2.5	3.90
Tetraniliprole	MF	Nitrobenzene	0.4	1	5	6.40
Tetraniliprole	MF	Brassinolide	0.4	1	0.02	1.42
Tetraniliprole	MF	Triacontanol	0.4	1	0.1	1.50
Tetraniliprole	MF	Zinc	0.4	1	2	3.40
Tetraniliprole	MF	Paclobutrazol	0.4	1	0.25	1.65
Tetraniliprole	MF	Sulphur	0.4	1	20	21.40
Flupyrimin	MF	Humic acid	1	1	4	6.00
Flupyrimin	MF	Fulvic acid	1	1	4	6.00
Flupyrimin	MF	Amino acid	1	1	3	5.00
Flupyrimin	MF	Carboxylic acid	1	1	3	5.00
Flupyrimin	MF	Seaweed extract	1	1	4	6.00
Flupyrimin	MF	Chitosan	1	1	2.5	4.50
Flupyrimin	MF	Nitrobenzene	1	1	5	7.00
Flupyrimin	MF	Brassinolide	1	1	0.02	2.02
Flupyrimin	MF	Triacontanol	1	1	0.1	2.10
Flupyrimin	MF	Zinc	1	1	2	4.00
Flupyrimin	MF	Paclobutrazol	1	1	0.25	2.25
Flupyrimin	MF	Sulphur	1	1	20	22.00
Triflumezopyrim	MF	Humic acid	0.25	1	4	5.25
Triflumezopyrim	MF	Fulvic acid	0.25	1	4	5.25
Triflumezopyrim	MF	Amino acid	0.25	1	3	4.25
Triflumezopyrim	MF	Carboxylic acid	0.25	1	3	4.25
Triflumezopyrim	MF	Seaweed extract	0.25	1	4	5.25
Triflumezopyrim	MF	Chitosan	0.25	1	2.5	3.75
Triflumezopyrim	MF	Nitrobenzene	0.25	1	5	6.25
Triflumezopyrim	MF	Brassinolide	0.25	1	0.02	1.27
Triflumezopyrim	MF	Triacontanol	0.25	1	0.1	1.35
Triflumezopyrim	MF	Zinc	0.25	1	2	3.25
Triflumezopyrim	MF	Paclobutrazol	0.25	1	0.25	1.50
Triflumezopyrim	MF	Sulphur	0.25	1	20	21.25
Clothianidin	MF	Humic acid	1	1	4	6.00
Clothianidin	MF	Fulvic acid	1	1	4	6.00
Clothianidin	MF	Amino acid	1	1	3	5.00
Clothianidin	MF	Carboxylic acid	1	1	3	5.00
Clothianidin	MF	Seaweed extract	1	1	4	6.00
Clothianidin	MF	Chitosan	1	1	2.5	4.50
Clothianidin	MF	Nitrobenzene	1	1	5	7.00
Clothianidin	MF	Brassinolide	1	1	0.02	2.02
Clothianidin	MF	Triacontanol	1	1	0.1	2.10

Clothianidin	MF	Zinc	1	1	2	4.00
Clothianidin	MF	Paclobutrazol	1	1	0.25	2.25
Clothianidin	MF	Sulphur	1	1	20	22.00
Thiamethoxam	MF	Humic acid	1.25	1	4	6.25
Thiamethoxam	MF	Fulvic acid	1.25	1	4	6.25
Thiamethoxam	MF	Amino acid	1.25	1	3	5.25
Thiamethoxam	MF	Carboxylic acid	1.25	1	3	5.25
Thiamethoxam	MF	Seaweed extract	1.25	1	4	6.25
Thiamethoxam	MF	Chitosan	1.25	1	2.5	4.75
Thiamethoxam	MF	Nitrobenzene	1.25	1	5	7.25
Thiamethoxam	MF	Brassinolide	1.25	1	0.02	2.27
Thiamethoxam	MF	Triacontanol	1.25	1	0.1	2.35
Thiamethoxam	MF	Zinc	1.25	1	2	4.25
Thiamethoxam	MF	Paclobutrazol	1.25	1	0.25	2.50
Thiamethoxam	MF	Sulphur	1.25	1	20	22.25
Fipronil	MF	Humic acid	0.75	1	4	5.75
Fipronil	MF	Fulvic acid	0.75	1	4	5.75
Fipronil	MF	Amino acid	0.75	1	3	4.75
Fipronil	MF	Carboxylic acid	0.75	1	3	4.75
Fipronil	MF	Seaweed extract	0.75	1	4	5.75
Fipronil	MF	Chitosan	0.75	1	2.5	4.25
Fipronil	MF	Nitrobenzene	0.75	1	5	6.75
Fipronil	MF	Brassinolide	0.75	1	0.02	1.77
Fipronil	MF	Triacontanol	0.75	1	0.1	1.85
Fipronil	MF	Zinc	0.75	1	2	3.75
Fipronil	MF	Paclobutrazol	0.75	1	0.25	2.00
Fipronil	MF	Sulphur	0.75	1	20	21.75
Cartap hydrochloride	MF	Humic acid	5	1	4	10.00
Cartap hydrochloride	MF	Fulvic acid	5	1	4	10.00
Cartap hydrochloride	MF	Amino acid	5	1	3	9.00
Cartap hydrochloride	MF	Carboxylic acid	5	1	3	9.00
Cartap hydrochloride	MF	Seaweed extract	5	1	4	10.00
Cartap hydrochloride	MF	Chitosan	5	1	2.5	8.50
Cartap hydrochloride	MF	Nitrobenzene	5	1	5	11.00
Cartap hydrochloride	MF	Brassinolide	5	1	0.02	6.02
Cartap hydrochloride	MF	Triacontanol	5	1	0.1	6.10
Cartap hydrochloride	MF	Zinc	5	1	2	8.00
Cartap hydrochloride	MF	Paclobutrazol	5	1	0.25	6.25
Cartap hydrochloride	MF	Sulphur	5	1	20	26.00
Thiocyclam hydrogen oxalate	MF	Humic acid	5	1	4	10.00
Thiocyclam hydrogen oxalate	MF	Fulvic acid	5	1	4	10.00
Thiocyclam hydrogen oxalate	MF	Amino acid	5	1	3	9.00
Thiocyclam hydrogen oxalate	MF	Carboxylic acid	5	1	3	9.00
Thiocyclam hydrogen oxalate	MF	Seaweed extract	5	1	4	10.00
Thiocyclam hydrogen oxalate	MF	Chitosan	5	1	2.5	8.50
Thiocyclam hydrogen oxalate	MF	Nitrobenzene	5	1	5	11.00
Thiocyclam hydrogen oxalate	MF	Brassinolide	5	1	0.02	6.02
Thiocyclam hydrogen oxalate	MF	Triacontanol	5	1	0.1	6.10

Thiocyclam hydrogen oxalate	MF	Zinc	5	1	2	8.00
Thiocyclam hydrogen oxalate	MF	Paclobutrazol	5	1	0.25	6.25
Thiocyclam hydrogen oxalate	MF	Sulphur	5	1	20	26.00

* Compound B - MF-Mycorrhizal fungi, containing 100 IP (Infective Propagules)/gram

[00137] GR type Formulations comprising four Active ingredients

Compound A		Compound B**	Compound C	Active ingredients(%)				Formulation Strength
A1	A2			A1	A2	B	C	(%)
Chlorantraniliprole	Clothianidin	MF	Humic acid	0.3	0.75	1	4	6.05
Chlorantraniliprole	Clothianidin	MF	Fulvic acid	0.3	0.75	1	4	6.05
Chlorantraniliprole	Clothianidin	MF	Amino acid	0.3	0.75	1	3	5.05
Chlorantraniliprole	Clothianidin	MF	Carboxylic acid	0.3	0.75	1	3	5.05
Chlorantraniliprole	Clothianidin	MF	Seaweed extract	0.3	0.75	1	4	6.05
Chlorantraniliprole	Clothianidin	MF	Chitosan	0.3	0.75	1	2.5	4.55
Chlorantraniliprole	Clothianidin	MF	Nitrobenzene	0.3	0.75	1	5	7.05
Chlorantraniliprole	Clothianidin	MF	Brassinolide	0.3	0.75	1	0.02	2.07
Chlorantraniliprole	Clothianidin	MF	Triacontanol	0.3	0.75	1	0.1	2.15
Chlorantraniliprole	Clothianidin	MF	Zinc	0.3	0.75	1	2	4.05
Chlorantraniliprole	Clothianidin	MF	Paclobutrazol	0.3	0.75	1	0.25	2.30
Chlorantraniliprole	Clothianidin	MF	Sulphur	0.3	0.75	1	20	22.05
Cyantraniliprole	Clothianidin	MF	Humic acid	0.5	0.75	1	4	6.25
Cyantraniliprole	Clothianidin	MF	Fulvic acid	0.5	0.75	1	4	6.25
Cyantraniliprole	Clothianidin	MF	Amino acid	0.5	0.75	1	3	5.25
Cyantraniliprole	Clothianidin	MF	Carboxylic acid	0.5	0.75	1	3	5.25
Cyantraniliprole	Clothianidin	MF	Seaweed extract	0.5	0.75	1	4	6.25
Cyantraniliprole	Clothianidin	MF	Chitosan	0.5	0.75	1	2.5	4.75
Cyantraniliprole	Clothianidin	MF	Nitrobenzene	0.5	0.75	1	5	7.25
Cyantraniliprole	Clothianidin	MF	Brassinolide	0.5	0.75	1	0.02	2.27
Cyantraniliprole	Clothianidin	MF	Triacontanol	0.5	0.75	1	0.1	2.35
Cyantraniliprole	Clothianidin	MF	Zinc	0.5	0.75	1	2	4.25
Cyantraniliprole	Clothianidin	MF	Paclobutrazol	0.5	0.75	1	0.25	2.50
Cyantraniliprole	Clothianidin	MF	Sulphur	0.5	0.75	1	20	22.25
Tetraniliprole	Clothianidin	MF	Humic acid	0.4	0.75	1	4	6.15
Tetraniliprole	Clothianidin	MF	Fulvic acid	0.4	0.75	1	4	6.15
Tetraniliprole	Clothianidin	MF	Amino acid	0.4	0.75	1	3	5.15
Tetraniliprole	Clothianidin	MF	Carboxylic acid	0.4	0.75	1	3	5.15
Tetraniliprole	Clothianidin	MF	Seaweed extract	0.4	0.75	1	4	6.15
Tetraniliprole	Clothianidin	MF	Chitosan	0.4	0.75	1	2.5	4.65
Tetraniliprole	Clothianidin	MF	Nitrobenzene	0.4	0.75	1	5	7.15
Tetraniliprole	Clothianidin	MF	Brassinolide	0.4	0.75	1	0.02	2.17
Tetraniliprole	Clothianidin	MF	Triacontanol	0.4	0.75	1	0.1	2.25
Tetraniliprole	Clothianidin	MF	Zinc	0.4	0.75	1	2	4.15
Tetraniliprole	Clothianidin	MF	Paclobutrazol	0.4	0.75	1	0.25	2.40
Tetraniliprole	Clothianidin	MF	Sulphur	0.4	0.75	1	20	22.15
Chlorantraniliprole	Thiamethoxam	MF	Humic acid	0.3	0.75	1	4	6.05
Chlorantraniliprole	Thiamethoxam	MF	Fulvic acid	0.3	0.75	1	4	6.05
Chlorantraniliprole	Thiamethoxam	MF	Amino acid	0.3	0.75	1	3	5.05
Chlorantraniliprole	Thiamethoxam	MF	Carboxylic acid	0.3	0.75	1	3	5.05
Chlorantraniliprole	Thiamethoxam	MF	Seaweed extract	0.3	0.75	1	4	6.05
Chlorantraniliprole	Thiamethoxam	MF	Chitosan	0.3	0.75	1	2.5	4.55

Chlorantraniliprole	Thiamethoxam	MF	Nitrobenzene	0.3	0.75	1	5	7.05
Chlorantraniliprole	Thiamethoxam	MF	Brassinolide	0.3	0.75	1	0.02	2.07
Chlorantraniliprole	Thiamethoxam	MF	Triacontanol	0.3	0.75	1	0.1	2.15
Chlorantraniliprole	Thiamethoxam	MF	Zinc	0.3	0.75	1	2	4.05
Chlorantraniliprole	Thiamethoxam	MF	Paclobutrazol	0.3	0.75	1	0.25	2.30
Chlorantraniliprole	Thiamethoxam	MF	Sulphur	0.3	0.75	1	20	22.05
Cyantraniliprole	Thiamethoxam	MF	Humic acid	0.5	0.75	1	4	6.25
Cyantraniliprole	Thiamethoxam	MF	Fulvic acid	0.5	0.75	1	4	6.25
Cyantraniliprole	Thiamethoxam	MF	Amino acid	0.5	0.75	1	3	5.25
Cyantraniliprole	Thiamethoxam	MF	Carboxylic acid	0.5	0.75	1	3	5.25
Cyantraniliprole	Thiamethoxam	MF	Seaweed extract	0.5	0.75	1	4	6.25
Cyantraniliprole	Thiamethoxam	MF	Chitosan	0.5	0.75	1	2.5	4.75
Cyantraniliprole	Thiamethoxam	MF	Nitrobenzene	0.5	0.75	1	5	7.25
Cyantraniliprole	Thiamethoxam	MF	Brassinolide	0.5	0.75	1	0.02	2.27
Cyantraniliprole	Thiamethoxam	MF	Triacontanol	0.5	0.75	1	0.1	2.35
Cyantraniliprole	Thiamethoxam	MF	Zinc	0.5	0.75	1	2	4.25
Cyantraniliprole	Thiamethoxam	MF	Paclobutrazol	0.5	0.75	1	0.25	2.50
Cyantraniliprole	Thiamethoxam	MF	Sulphur	0.5	0.75	1	20	22.25
Tetraniliprole	Thiamethoxam	MF	Humic acid	0.4	0.75	1	4	6.15
Tetraniliprole	Thiamethoxam	MF	Fulvic acid	0.4	0.75	1	4	6.15
Tetraniliprole	Thiamethoxam	MF	Amino acid	0.4	0.75	1	3	5.15
Tetraniliprole	Thiamethoxam	MF	Carboxylic acid	0.4	0.75	1	3	5.15
Tetraniliprole	Thiamethoxam	MF	Seaweed extract	0.4	0.75	1	4	6.15
Tetraniliprole	Thiamethoxam	MF	Chitosan	0.4	0.75	1	2.5	4.65
Tetraniliprole	Thiamethoxam	MF	Nitrobenzene	0.4	0.75	1	5	7.15
Tetraniliprole	Thiamethoxam	MF	Brassinolide	0.4	0.75	1	0.02	2.17
Tetraniliprole	Thiamethoxam	MF	Triacontanol	0.4	0.75	1	0.1	2.25
Tetraniliprole	Thiamethoxam	MF	Zinc	0.4	0.75	1	2	4.15
Tetraniliprole	Thiamethoxam	MF	Paclobutrazol	0.4	0.75	1	0.25	2.40
Tetraniliprole	Thiamethoxam	MF	Sulphur	0.4	0.75	1	20	22.15
Chlorantraniliprole	Fipronil	MF	Humic acid	0.3	0.6	1	4	5.90
Chlorantraniliprole	Fipronil	MF	Fulvic acid	0.3	0.6	1	4	5.90
Chlorantraniliprole	Fipronil	MF	Amino acid	0.3	0.6	1	3	4.90
Chlorantraniliprole	Fipronil	MF	Carboxylic acid	0.3	0.6	1	3	4.90
Chlorantraniliprole	Fipronil	MF	Seaweed extract	0.3	0.6	1	4	5.90
Chlorantraniliprole	Fipronil	MF	Chitosan	0.3	0.6	1	2.5	4.40
Chlorantraniliprole	Fipronil	MF	Nitrobenzene	0.3	0.6	1	5	6.90
Chlorantraniliprole	Fipronil	MF	Brassinolide	0.3	0.6	1	0.02	1.92
Chlorantraniliprole	Fipronil	MF	Triacontanol	0.3	0.6	1	0.1	2.00
Chlorantraniliprole	Fipronil	MF	Zinc	0.3	0.6	1	2	3.90
Chlorantraniliprole	Fipronil	MF	Paclobutrazol	0.3	0.6	1	0.25	2.15
Chlorantraniliprole	Fipronil	MF	Sulphur	0.3	0.6	1	20	21.90
Cyantraniliprole	Fipronil	MF	Humic acid	0.5	0.6	1	4	6.10
Cyantraniliprole	Fipronil	MF	Fulvic acid	0.5	0.6	1	4	6.10
Cyantraniliprole	Fipronil	MF	Amino acid	0.5	0.6	1	3	5.10
Cyantraniliprole	Fipronil	MF	Carboxylic acid	0.5	0.6	1	3	5.10
Cyantraniliprole	Fipronil	MF	Seaweed extract	0.5	0.6	1	4	6.10
Cyantraniliprole	Fipronil	MF	Chitosan	0.5	0.6	1	2.5	4.60
Cyantraniliprole	Fipronil	MF	Nitrobenzene	0.5	0.6	1	5	7.10
Cyantraniliprole	Fipronil	MF	Brassinolide	0.5	0.6	1	0.02	2.12
Cyantraniliprole	Fipronil	MF	Triacontanol	0.5	0.6	1	0.1	2.20
Cyantraniliprole	Fipronil	MF	Zinc	0.5	0.6	1	2	4.10
Cyantraniliprole	Fipronil	MF	Paclobutrazol	0.5	0.6	1	0.25	2.35

Cyantraniliprole	Fipronil	MF	Sulphur	0.5	0.6	1	20	22.10
Tetraniliprole	Fipronil	MF	Humic acid	0.4	0.6	1	4	6.00
Tetraniliprole	Fipronil	MF	Fulvic acid	0.4	0.6	1	4	6.00
Tetraniliprole	Fipronil	MF	Amino acid	0.4	0.6	1	3	5.00
Tetraniliprole	Fipronil	MF	Carboxylic acid	0.4	0.6	1	3	5.00
Tetraniliprole	Fipronil	MF	Seaweed extract	0.4	0.6	1	4	6.00
Tetraniliprole	Fipronil	MF	Chitosan	0.4	0.6	1	2.5	4.50
Tetraniliprole	Fipronil	MF	Nitrobenzene	0.4	0.6	1	5	7.00
Tetraniliprole	Fipronil	MF	Brassinolide	0.4	0.6	1	0.02	2.02
Tetraniliprole	Fipronil	MF	Triacontanol	0.4	0.6	1	0.1	2.10
Tetraniliprole	Fipronil	MF	Zinc	0.4	0.6	1	2	4.00
Tetraniliprole	Fipronil	MF	Paclobutrazol	0.4	0.6	1	0.25	2.25
Tetraniliprole	Fipronil	MF	Sulphur	0.4	0.6	1	20	22.00
Chlorantraniliprole	Flupyrimin	MF	Humic acid	0.3	1	1	4	6.30
Chlorantraniliprole	Flupyrimin	MF	Fulvic acid	0.3	1	1	4	6.30
Chlorantraniliprole	Flupyrimin	MF	Amino acid	0.3	1	1	3	5.30
Chlorantraniliprole	Flupyrimin	MF	Carboxylic acid	0.3	1	1	3	5.30
Chlorantraniliprole	Flupyrimin	MF	Seaweed extract	0.3	1	1	4	6.30
Chlorantraniliprole	Flupyrimin	MF	Chitosan	0.3	1	1	2.5	4.80
Chlorantraniliprole	Flupyrimin	MF	Nitrobenzene	0.3	1	1	5	7.30
Chlorantraniliprole	Flupyrimin	MF	Brassinolide	0.3	1	1	0.02	2.32
Chlorantraniliprole	Flupyrimin	MF	Triacontanol	0.3	1	1	0.1	2.40
Chlorantraniliprole	Flupyrimin	MF	Zinc	0.3	1	1	2	4.30
Chlorantraniliprole	Flupyrimin	MF	Paclobutrazol	0.3	1	1	0.25	2.55
Chlorantraniliprole	Flupyrimin	MF	Sulphur	0.3	1	1	20	22.30
Cyantraniliprole	Flupyrimin	MF	Humic acid	0.5	1	1	4	6.50
Cyantraniliprole	Flupyrimin	MF	Fulvic acid	0.5	1	1	4	6.50
Cyantraniliprole	Flupyrimin	MF	Amino acid	0.5	1	1	3	5.50
Cyantraniliprole	Flupyrimin	MF	Carboxylic acid	0.5	1	1	3	5.50
Cyantraniliprole	Flupyrimin	MF	Seaweed extract	0.5	1	1	4	6.50
Cyantraniliprole	Flupyrimin	MF	Chitosan	0.5	1	1	2.5	5.00
Cyantraniliprole	Flupyrimin	MF	Nitrobenzene	0.5	1	1	5	7.50
Cyantraniliprole	Flupyrimin	MF	Brassinolide	0.5	1	1	0.02	2.52
Cyantraniliprole	Flupyrimin	MF	Triacontanol	0.5	1	1	0.1	2.60
Cyantraniliprole	Flupyrimin	MF	Zinc	0.5	1	1	2	4.50
Cyantraniliprole	Flupyrimin	MF	Paclobutrazol	0.5	1	1	0.25	2.75
Cyantraniliprole	Flupyrimin	MF	Sulphur	0.5	1	1	20	22.50
Tetraniliprole	Flupyrimin	MF	Humic acid	0.4	1	1	4	6.40
Tetraniliprole	Flupyrimin	MF	Fulvic acid	0.4	1	1	4	6.40
Tetraniliprole	Flupyrimin	MF	Amino acid	0.4	1	1	3	5.40
Tetraniliprole	Flupyrimin	MF	Carboxylic acid	0.4	1	1	3	5.40
Tetraniliprole	Flupyrimin	MF	Seaweed extract	0.4	1	1	4	6.40
Tetraniliprole	Flupyrimin	MF	Chitosan	0.4	1	1	2.5	4.90
Tetraniliprole	Flupyrimin	MF	Nitrobenzene	0.4	1	1	5	7.40
Tetraniliprole	Flupyrimin	MF	Brassinolide	0.4	1	1	0.02	2.42
Tetraniliprole	Flupyrimin	MF	Triacontanol	0.4	1	1	0.1	2.50
Tetraniliprole	Flupyrimin	MF	Zinc	0.4	1	1	2	4.40
Tetraniliprole	Flupyrimin	MF	Paclobutrazol	0.4	1	1	0.25	2.65
Tetraniliprole	Flupyrimin	MF	Sulphur	0.4	1	1	20	22.40
Chlorantraniliprole	Triflumezopyrim	MF	Humic acid	0.3	0.2	1	4	5.50
Chlorantraniliprole	Triflumezopyrim	MF	Fulvic acid	0.3	0.2	1	4	5.50
Chlorantraniliprole	Triflumezopyrim	MF	Amino acid	0.3	0.2	1	3	4.50
Chlorantraniliprole	Triflumezopyrim	MF	Carboxylic acid	0.3	0.2	1	3	4.50

Chlorantraniliprole	Triflumezopyrim	MF	Seaweed extract	0.3	0.2	1	4	5.50
Chlorantraniliprole	Triflumezopyrim	MF	Chitosan	0.3	0.2	1	2.5	4.00
Chlorantraniliprole	Triflumezopyrim	MF	Nitrobenzene	0.3	0.2	1	5	6.50
Chlorantraniliprole	Triflumezopyrim	MF	Brassinolide	0.3	0.2	1	0.02	1.52
Chlorantraniliprole	Triflumezopyrim	MF	Triacontanol	0.3	0.2	1	0.1	1.60
Chlorantraniliprole	Triflumezopyrim	MF	Zinc	0.3	0.2	1	2	3.50
Chlorantraniliprole	Triflumezopyrim	MF	Paclobutrazol	0.3	0.2	1	0.25	1.75
Chlorantraniliprole	Triflumezopyrim	MF	Sulphur	0.3	0.2	1	20	21.50
Cyantraniliprole	Triflumezopyrim	MF	Humic acid	0.5	0.2	1	4	5.70
Cyantraniliprole	Triflumezopyrim	MF	Fulvic acid	0.5	0.2	1	4	5.70
Cyantraniliprole	Triflumezopyrim	MF	Amino acid	0.5	0.2	1	3	4.70
Cyantraniliprole	Triflumezopyrim	MF	Carboxylic acid	0.5	0.2	1	3	4.70
Cyantraniliprole	Triflumezopyrim	MF	Seaweed extract	0.5	0.2	1	4	5.70
Cyantraniliprole	Triflumezopyrim	MF	Chitosan	0.5	0.2	1	2.5	4.20
Cyantraniliprole	Triflumezopyrim	MF	Nitrobenzene	0.5	0.2	1	5	6.70
Cyantraniliprole	Triflumezopyrim	MF	Brassinolide	0.5	0.2	1	0.02	1.72
Cyantraniliprole	Triflumezopyrim	MF	Triacontanol	0.5	0.2	1	0.1	1.80
Cyantraniliprole	Triflumezopyrim	MF	Zinc	0.5	0.2	1	2	3.70
Cyantraniliprole	Triflumezopyrim	MF	Paclobutrazol	0.5	0.2	1	0.25	1.95
Cyantraniliprole	Triflumezopyrim	MF	Sulphur	0.5	0.2	1	20	21.70
Tetraniliprole	Triflumezopyrim	MF	Humic acid	0.4	0.2	1	4	5.60
Tetraniliprole	Triflumezopyrim	MF	Fulvic acid	0.4	0.2	1	4	5.60
Tetraniliprole	Triflumezopyrim	MF	Amino acid	0.4	0.2	1	3	4.60
Tetraniliprole	Triflumezopyrim	MF	Carboxylic acid	0.4	0.2	1	3	4.60
Tetraniliprole	Triflumezopyrim	MF	Seaweed extract	0.4	0.2	1	4	5.60
Tetraniliprole	Triflumezopyrim	MF	Chitosan	0.4	0.2	1	2.5	4.10
Tetraniliprole	Triflumezopyrim	MF	Nitrobenzene	0.4	0.2	1	5	6.60
Tetraniliprole	Triflumezopyrim	MF	Brassinolide	0.4	0.2	1	0.02	1.62
Tetraniliprole	Triflumezopyrim	MF	Triacontanol	0.4	0.2	1	0.1	1.70
Tetraniliprole	Triflumezopyrim	MF	Zinc	0.4	0.2	1	2	3.60
Tetraniliprole	Triflumezopyrim	MF	Paclobutrazol	0.4	0.2	1	0.25	1.85
Tetraniliprole	Triflumezopyrim	MF	Sulphur	0.4	0.2	1	20	21.60
Cartap hydrochloride	Clothianidin	MF	Humic acid	4	0.75	1	4	9.75
Cartap hydrochloride	Clothianidin	MF	Fulvic acid	4	0.75	1	4	9.75
Cartap hydrochloride	Clothianidin	MF	Amino acid	4	0.75	1	3	8.75
Cartap hydrochloride	Clothianidin	MF	Carboxylic acid	4	0.75	1	3	8.75
Cartap hydrochloride	Clothianidin	MF	Seaweed extract	4	0.75	1	4	9.75
Cartap hydrochloride	Clothianidin	MF	Chitosan	4	0.75	1	2.5	8.25
Cartap hydrochloride	Clothianidin	MF	Nitrobenzene	4	0.75	1	5	10.75
Cartap hydrochloride	Clothianidin	MF	Brassinolide	4	0.75	1	0.02	5.77
Cartap hydrochloride	Clothianidin	MF	Triacontanol	4	0.75	1	0.1	5.85
Cartap hydrochloride	Clothianidin	MF	Zinc	4	0.75	1	2	7.75
Cartap hydrochloride	Clothianidin	MF	Paclobutrazol	4	0.75	1	0.25	6.00
Cartap hydrochloride	Clothianidin	MF	Sulphur	4	0.75	1	20	25.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Humic acid	4	0.75	1	4	9.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Fulvic acid	4	0.75	1	4	9.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Amino acid	4	0.75	1	3	8.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Carboxylic acid	4	0.75	1	3	8.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Seaweed extract	4	0.75	1	4	9.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Chitosan	4	0.75	1	2.5	8.25
Thiocyclam hydrogen oxalate	Clothianidin	MF	Nitrobenzene	4	0.75	1	5	10.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Brassinolide	4	0.75	1	0.02	5.77
Thiocyclam hydrogen oxalate	Clothianidin	MF	Triacontanol	4	0.75	1	0.1	5.85

Thiocyclam hydrogen oxalate	Clothianidin	MF	Zinc	4	0.75	1	2	7.75
Thiocyclam hydrogen oxalate	Clothianidin	MF	Paclobutrazol	4	0.75	1	0.25	6.00
Thiocyclam hydrogen oxalate	Clothianidin	MF	Sulphur	4	0.75	1	20	25.75
Cartap hydrochloride	Thiamethoxam	MF	Humic acid	4	1	1	4	10.00
Cartap hydrochloride	Thiamethoxam	MF	Fulvic acid	4	1	1	4	10.00
Cartap hydrochloride	Thiamethoxam	MF	Amino acid	4	1	1	3	9.00
Cartap hydrochloride	Thiamethoxam	MF	Carboxylic acid	4	1	1	3	9.00
Cartap hydrochloride	Thiamethoxam	MF	Seaweed extract	4	1	1	4	10.00
Cartap hydrochloride	Thiamethoxam	MF	Chitosan	4	1	1	2.5	8.50
Cartap hydrochloride	Thiamethoxam	MF	Nitrobenzene	4	1	1	5	11.00
Cartap hydrochloride	Thiamethoxam	MF	Brassinolide	4	1	1	0.02	6.02
Cartap hydrochloride	Thiamethoxam	MF	Triacontanol	4	1	1	0.1	6.10
Cartap hydrochloride	Thiamethoxam	MF	Zinc	4	1	1	2	8.00
Cartap hydrochloride	Thiamethoxam	MF	Paclobutrazol	4	1	1	0.25	6.25
Cartap hydrochloride	Thiamethoxam	MF	Sulphur	4	1	1	20	26.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Humic acid	4	1	1	4	10.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Fulvic acid	4	1	1	4	10.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Amino acid	4	1	1	3	9.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Carboxylic acid	4	1	1	3	9.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Seaweed extract	4	1	1	4	10.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Chitosan	4	1	1	2.5	8.50
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Nitrobenzene	4	1	1	5	11.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Brassinolide	4	1	1	0.02	6.02
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Triacontanol	4	1	1	0.1	6.10
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Zinc	4	1	1	2	8.00
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Paclobutrazol	4	1	1	0.25	6.25
Thiocyclam hydrogen oxalate	Thiamethoxam	MF	Sulphur	4	1	1	20	26.00

** Compound B-MF-Mycorrhizal fungi, containing 75 IP (Infective Propagules)/gram.

[00138] Efficacy Examples:

[00139] The field trials have been carried out on different crops to judge the synergism and benefits of innovative ready-mix combinations in comparison to prior arts.

[00140] Experiment 1: Field experiment in paddy crop

Crop : Paddy

Plot size : 24 sq. mt. (6m x 4m)

Number of Treatments : 24

Application Time : 15 DATP (Days after transplanting)

Method of Application: Soil application. The required quantity of ready-mix granules and other conventional treatments were manually broad casted in the field.

Observations:

Plant vigour: Observations on plant vigour recorded with score of 1 to 10.

Score Description:

1-Very few tillers, yellowish leaves, narrow leaf blades, very short plant height, few root mass, very poor vigour

10-Profuse tillering, dark green leaves, wider leaf blades, good plant height, profuse root mass, excellent vigour

Productive Tillers: Count the number of productive tillers per hill, observe 20 hills per plot before harvest.

1000 grain weight: weight of 1000 grains at the time of harvest, take the average of 20 observations.

[00141] Treatment details

Treatment Number	Treatment details	gram active per hectare
T1	Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Humic acid 4% GR	30+100 IP/g+400
T2	Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Seaweed extract (Ascophyllum nodosuam) 4% GR	30+100 IP/g+400
T3	Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Chitosan 2.5%% GR	30+100 IP/g+250
T4	Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Triacontanol 0.1% GR	30+100 IP/g+10
T5	Chlorantraniliprole 0.3%+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram+Zinc lactate gluconate 2% GR	30+100 IP/g+200
T6	Chlorantraniliprole 0.4% GR+Humic acid 90% WP	30+400
T7	Chlorantraniliprole 0.4% GR+Seaweed extract (Ascophyllum nodosuam) 90% L	30+400
T8	Chlorantraniliprole 0.4% GR+Chitosan 20% WP	30+250
T9	Chlorantraniliprole 0.4% GR+Triacontanol 0.05% GR	30+10
T10	Chlorantraniliprole 0.4% GR+Zinc lactate gluconate 10% WP	30+200
T11	Mycorrhiza fungus (Glomus mosseae) 100 IP/gram GR+Humic acid 90% WP	100 IP/g+400
T12	Mycorrhiza fungus (Glomus mosseae) 100 IP/gram GR+Seaweed extract (Ascophyllum nodosuam) 90% L	100 IP/g+400
T13	Mycorrhiza fungus (Glomus mosseae) 100 IP/gram GR+Chitosan 20% WP	100 IP/g+250
T14	Mycorrhiza fungus (Glomus mosseae) 100 IP/gram	100 IP/g+10

	GR+Triacontanol 0.05% GR	
T15	Mycorrhiza fungus (Glomus mosseae) 100 IP/gram GR+Zinc lactate gluconate 10% WP	100 IP/g+200
T16	Chlorantraniliprole 0.4% GR+Mycorrhiza fungus (Glomus mosseae) 100 IP/gram GR	30+100 IP/g
T17	Chlorantraniliprole 0.4% GR	30
T18	Mycorrhiza fungus (Glomus mosseae) 100 IP/gram GR	100 IP/g
T19	Humic acid 90% WP	400
T20	Seaweed extract (Ascophyllum nodosuam) 90% L	400
T21	Chitosan 20% WP	250
T22	Triacontanol 0.05% GR	10
T23	Zinc lactate gluconate 10% WP	200
T24	Untreated Check (UTC)	-

IP infective propagules per gram; T1 to T5 were ready mix granular formulation.

GR Granule for soil application, WP Wettable powder, L Liquid

[00142] Effect of ready mix granular composition on paddy growth and yield parameters

Treatment Number	Plant vigour index (1-10 scale)	Number of productive tillers	Increase (%) in productive tillers over T24	1000 grains weight (g)	Increase (%) in productive tillers over T24
T1	9.9	17.3	54.5	30.7	26.3
T2	9.8	17.8	58.9	30.2	24.3
T3	9.8	17.5	56.3	30.6	25.9
T4	9.9	17.2	53.6	30.1	23.9
T5	9.8	17.6	57.1	30.4	25.1
T6	8.6	15.8	41.1	28.4	16.9
T7	8.7	15.3	36.6	28.7	18.1
T8	8.6	15.7	40.2	28.6	17.7
T9	8.8	15.4	37.5	28.3	16.5
T10	8.8	15.8	41.1	28.8	18.5
T11	8.4	13.6	21.4	27.5	13.2
T12	8.2	13.2	17.9	27.9	14.8
T13	8.2	14.0	25.0	27.5	13.2
T14	8.3	13.8	23.2	27.7	14.0
T15	8.4	13.5	20.5	27.8	14.4
T16	8.6	16.3	45.5	28.4	16.9
T17	7.8	14.9	33.0	27.2	11.9
T18	7.4	12.9	15.2	27.4	12.8
T19	7.2	12.6	12.5	26.9	10.7
T20	7.4	12.7	13.4	26.8	10.3

T21	7.3	12.2	8.9	28.1	15.6
T22	7.4	12.8	14.3	27.8	14.4
T23	7.2	12.3	9.8	27.9	14.8
T24	6.8	11.2	0.0	24.3	0.0

[00143] Results: All the ready mix granular formulations (T1 to T5) of the present invention provide excellent plant vigour, more number of productive tillers and 1000 grain weight as compared to all conventional treatments (T6 to T23).

[00144] Experiment 2: Field experiment in tomato crop

Crop : Tomato

Plot size : 100 sq. mt.

Number of Treatments : 5

Application Time : 32 DATP (Days after transplanting) at the time of earthing up.

Method of Application :

Soil application : The required quantity of ready-mix granules and other conventional treatments were manually broad casted in the root zone area and covered up with soil while earthing up.

Observations:

Plant vigour : Observations on plant vigour recorded with score of 1 to 10.

Score Description:

1-Few branches, Few flowers, Few fruits, smaller fruit size, yellowish leaves, smaller leaves, stunted plant growth, few roots, very poor vigour

10-Profuse branches, more number of flowers, fruits, bigger fruit size, dark green leaves, bigger leaf size, good plant height, profuse root mass, excellent vigour.

Healthy fruit count: Count the number of healthy and marketable fruits per plant, observe 20 plants per plot.

Fruit weight: weight of fruits in kg, at the time of each picking. Record the observations from 20 plants per plot.

Flower count: Count the number of flower per plant. Record the observations from 20 plants per plot.

[00145] Treatment details

Treatment Number	Treatment details	gram active per hectare
T1	(Chlorantraniliprole 0.3%+Clothianidin 0.75%+Mycorrhiza fungus (Gigaspora decipiens) 75 IP/gram+Humic acid 1.5%+glycine 1.5%+Seaweed extract (Ascophyllum nodosuam) 1.2%) GR	30+750000 IP+420 (150+150+120)
T2	(Chlorantraniliprole 0.3%+Clothianidin 0.75%) GR	30
T3	(Mycorrhiza fungus (Gigaspora decipiens) 75 IP/gram) GR	750000 IP
T4	(Humic acid 1.5%+glycine 1.5%+Seaweed extract (Ascophyllum nodosuam) 1.2%) GR	420 (150+150+120)
T5	Untreated Check (UTC)	-

[00146] Effect of ready mix granular composition on tomato growth and yield parameters

Treatment Number	Plant Vigour (1-10 scale)	Number of Healthy fruits per plant	Increase in healthy fruits over T5 (%)	Fruit weight (kg) per plant (3 pickings)	Increase in fruit weight over T5 (%)	Number of flowers per plant	Increase in healthy fruits over T5 (%)
T1	10.0	32.90	100.6	5.82	120.5	44.2	135.1
T2	8.6	26.20	59.8	4.86	84.1	30.6	62.8
T3	7.4	19.40	18.3	3.75	42.0	25.6	36.2
T4	8.0	21.50	31.1	3.12	18.2	30.2	60.6
T5	6.8	16.40	0.0	2.64	0.0	18.8	0.0

[00147] Results: The ready mix granular composition (T1) of present invention provides excellent plant vigour, produces more number of healthy marketable fruits, bigger fruit size and more number of flower per plant as compared to all conventional treatments (T2 to T4).

[00148] While the foregoing describes various embodiments of the disclosure, other and further embodiments of the disclosure may be devised without departing

from the basic scope thereof. The invention is not limited to the described embodiments, versions or examples, which are included to enable a person having ordinary skill in the art to make and use the invention when combined with information and knowledge available to the person having ordinary skill in the art.

[00149] The foregoing examples are merely illustrative and are not to be taken as limitations upon the scope of the invention. Various changes and modifications to the disclosed examples and/or embodiments will be apparent to those skilled in the art. Such changes and modifications may be made without departing from the scope of the invention.

ADVANTAGES OF THE INVENTION

[00150] The present disclosure provides a synergistic composition for improving plant health.

[00151] The present disclosure provides a composition that improves plant yield, plant vigor, quality and tolerance to abiotic or biotic stress.

[00152] The present disclosure provides a composition for improving plant health even in absence of pest pressure.

[00153] The present disclosure also provides a method for improving plant health.

We Claim:

1. A composition for improving plant health comprising at least one insecticide, a mycorrhizal fungus and a plant health additive.

2. The composition as claimed in claim 1, wherein the at least one insecticide is selected from a class of diamide, meta-diamide, nereistoxin, nicotinic insecticides, or combinations thereof.

3. The composition as claimed in claim 2, wherein the diamides is selected from chlorantraniliprole, cyantraniliprole, cyclaniliprole, cyhalodiamide, cyproflanilide, flubendiamide, tetraniliprole, tetrachlorantraniliprole, tyclopyrazoflor, broflanilide, or combinations thereof.

4. The composition as claimed in claim 2, wherein the nereistoxin is selected from bensultap, monosultap, cartap hydrochloride, thiocyclam, thiocyclam hydrogen oxalate, thiocyclam hydrochloride, thiosultap sodium, and combinations thereof.

5. The composition as claimed in claim 2, wherein the nicotinic insecticide is selected from acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, thiacloprid, thiamethoxam, flupyrimin, cycloxaprid, paichongding, guadipyr, cycloxylidin, sulfoxaflor, flupyradifurone, triflumezopyrim, dichloromezotiaz, or combinations thereof.

6. The composition as claimed in claim 1, wherein the at least one insecticide is selected from chlorantraniliprole, cyantraniliprole, tetraniliprole, flupyrimin, triflumezopyrim, clothianidin, thiamethoxam, fipronil, cartap hydrochloride, thiocyclam hydrogen oxalate, and combination thereof.

7. The composition as claimed in claim 1, wherein the plant health additive is selected from bio-stimulants, plant growth regulators, micronutrients or combination thereof.

8. The composition as claimed in claim 7, wherein the bio-stimulant is selected from humic acid or its salts; fulvic acid or its salts; amino acids, protein hydrolysates; peptides; organic acids; acetylthioproline; thiazolidine carboxylic acid; jasmonic acid; methyl jasmonate; chitosan; chitin; probenazole; acibenzolar-s-methyl; seaweed extract; polyamines; silicic acid or its salts; salicylic acid;

lactic acid; phenyllactic acid; fumaric acid; nitrobenzene; brassinolide; forchlorfenuron; triacontanol; nitrophenolate; or combinations thereof.

9. The composition as claimed in claim 7, wherein the plant growth regulator is selected from auxins; cytokinins; ethylene modulators; gibberellins; growth inhibitors; growth retardants; or combinations thereof.

10. The composition as claimed in claim 7, wherein the micronutrients is selected from zinc; chelated-zinc; iron (Fe); manganese; boron; sulphur; and combinations thereof.

11. The composition as claimed in claim 1, wherein the plant health additive is selected from humic acid, fulvic acid, amino acid, carboxylic acid, seaweed extract, chitosan, nitrobenzene, brassinolide, triacontanol, zinc, paclobutrazol and sulphur.

12. The composition as claimed in claim 1, wherein the mycorrhizal fungus is ecto-mycorrhiza or endo-mycorrhiza.

13. The composition as claimed in claim 1, wherein the composition comprises 0.01% to 20% of the insecticide by weight of the composition, 1 to 10^9 IP per gram of the mycorrhizal fungus by weight of the composition and 0.001 to 80% of the plant health additive by weight of the composition.

14. The composition as claimed in claim 1, wherein the composition further comprises one or more agro-chemically acceptable additive.

15. The composition as claimed in claim 14, wherein the one or more agro-chemically acceptable additive is selected from wetting agent, dispersing agent, solvent, carrier, colouring agent, controlled release agent or combination thereof.

16. The composition as claimed in any one of the claims 1 to 15, wherein the composition is in the form of Granule (GR) / Soil Applied Granules (SAG), capsule suspension (CS), dispersible concentrate (DC), emulsifiable concentrate (EC), emulsion, water in oil (EO), emulsion, oil in water (EW), jambo balls or bags (bags in water soluble pouch), micro-emulsion (ME), oil dispersion (OD), oil miscible flowable concentrate (oil miscible suspension) (OF), oil miscible liquid (OL), suspension concentrate (SC), suspo-emulsion (SE), soluble concentrate (SL), water dispersible granule (WG or WDG), water soluble granule (SG), water

soluble powder (SP), wettable powder (WP), a mixed formulation of CS and SC (ZC), a mixed formulation of CS and SE (ZE), a mixed formulation of CS and EW (ZW), and Controlled release granules (CR).

17. The composition as claimed in claim 16, wherein the composition is in the form of Granule (GR).

18. The composition as claimed in claim 1, wherein the mycorrhizal fungus is *Acaulospora* spp., *Gigaspora* spp., *Sclerocystis* spp., *Scutellospora* spp., *Glomus* spp., *Funneliformis mosseae*, *Paraglomus occultum*, *Glomus mosseae*, *Glomus fasciculatum*, *Glomus intraradices*, *Gigaspora decipiens*, *Rhizophagus irregularis*, *Rhizophagus intraradices*, *Septoglomus constrictum*, *Funneliformis mosseae*, *Claroideoglomus etunicatum*, or combinations thereof.

19. The composition as claimed in claim 1, wherein the mycorrhizal fungus is *Glomus mosseae*, or *Gigaspora decipiens*

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ABSTRACT

PLANT HEALTH COMPOSITION

The present invention generally relates to the field of agrochemicals. More specifically, the present disclosure relates to a composition for improving plant health comprising an insecticide, a mycorrhizal fungus and a plant health additive. The disclosure also relates to a method of improving plant health with the composition. Plant health includes improvement of plant yield, plant vigor, quality and tolerance to abiotic or biotic stress.

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