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(54) **Title**: FUNGICIDAL COMBINATIONS COMPRISING PROTHIOCONAZOLE, TRIFLOXYSTROBIN AND A MULTISITE FUNGICIDE AND THEIR USE FOR CROP PROTECTION

(57) **Abstract**: The present invention relates to a new method for reducing phytotoxicity of fungicidal compositions by addition of multisite fungicides compounds capable to have a multisite action. Furthermore, the application relates to novel compositions comprising a strobilurin, triazole and multisite fungicides compounds capable to have a multisite action, and their use for controlling unwanted phytopathogenic fungi.

FUNGICIDAL COMBINATIONS COMPRISING PROTHIOCONAZOLE, TRIFLOXYSTROBIN AND A MULTISITE FUNGICIDE AND THEIR USE FOR CROP PROTECTION

The present invention relates to a new method for reducing phytotoxicity of fungicidal compositions by addition of multisite fungicides compounds capable to have a multisite action. Furthermore, the application relates to novel compositions comprising a strobilurin, triazole and multisite fungicides compounds capable to have a multisite action, and their use for controlling unwanted phytopathogenic fungi.

Fungicides are chemical substances that were developed for controlling fungi, which are the main causative agents of diseases in plants. Owing to the increase in diseases and their intensity, there is a constant need to develop new fungicides, as well as increase their concentration in commercial formulations. This increase in concentration, associated with adverse environmental conditions, may lead to phytotoxicity (collateral effects on the plants), since the disease-causing fungi and the plants parasitized by them share much physiology in common.

The main fungicides used on large-scale crops, such as soya, maize and wheat, have two types of active ingredients in their composition a triazole and a strobilurin.

Triazole fungicides which inhibit ergosterol biosynthesis are economically important active compounds and are widely used in crop plants such as wheat, barley, leguminous plants, vegetables and in the cultivation of fruits. However, these fungicides may cause phytotoxic damage to some plants when used at their customary application rates for controlling unwanted fungi. This phytotoxic effect can be observed in particular in stress situations such as drought or when the triazole fungicides are used in combination with penetration promoters.

To minimize the phytotoxic effect, WO 2007/028388 proposes a certain formulation which, in addition to the triazole fungicides as active compound, comprises various further components, such as solvents and surfactants.

WO 03/073852 describes fungicidal mixtures based on prothioconazole and a strobilurin derivative such as trifloxystrobin for controlling fungicidal pathogens.

WO 2009/000407 discloses a method for reducing the phytotoxicity of triazole fungicides on dicotyledonous plants by using prothioconazole or tebuconazole or a mixture of tebuconzole and trifloxystrobin in combination with sulphosuccinates as additive.

In phytotoxicity by fungicides, and some insecticides (e.g. phosphorates), the commonest symptoms appear as burning of the tissue between the veins of the leaf. In this case the product is absorbed by the leaf, but through lack of water in the plant it does not move, remaining concentrated at the sites of application and causing partial death of the tissue.

Most of the fungicides used on soya penetrate into the plant and move to a lesser or greater degree. The internal movement of the fungicides accompanies that of water, which the plant absorbs from the soil via the roots and transpires through the leaves. When water is available in the soil, the plant absorbs and transpires continuously, moving the fungicide. In this case there is minimum risk of phytotoxicity. When there is little water in the soil, the product remains concentrated at the sites of application and phytotoxicity increases, especially in the case of triazoles.

Besides the environmental circumstances such as heat and water stress, the age of the leaf is also important. Older leaves show a progressively negative energy balance (their energy is conveyed to the pods and grains), which lead to an increase of their susceptibility to diseases and to phytotoxicity and at the same time lowering their capacity for thermoregulation.

Due to the fact that in some countries fungicides are used in higher concentrations and due to the climatic change connected with higher temperatures, as well as water stress and applications in the grain-filling phase of the crop, the problem of phytotoxicity increases dramatically.

Therefore it was an object of the present invention to develop a new method for reducing phytotoxicity in crops, especially soya plants, and to provide new compositions which in some areas at least help to overcome the above mentioned disadvantages.

The present invention provides a method which in some aspects at least achieves the stated objective. Moreover, active compound combinations or compositions are provided which likewise in some aspects at least achieve the stated objective.

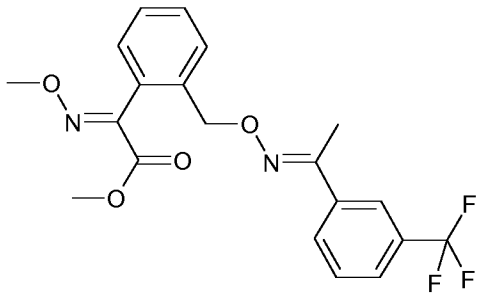
Surprisingly, it has now been found that the co-application of a combination comprising trifloxystrobin and prothioconazole (Fox®) and compounds capable to have a multisite action at pre- or post-emergence application results in a reduction of the phytotoxic effects of the latter, particularly on soya plants, without a corresponding reduction of effectiveness in the control of undesired phytopathogens.

Accordingly, the present invention relates to a method for reducing the phytotoxicity of a fungicidal composition, comprising at least prothiocanazole and trifloxystrobin, on soya plants, characterized in that multisite fungicides compounds capable to have a multisite action are added to the fungicidal composition.

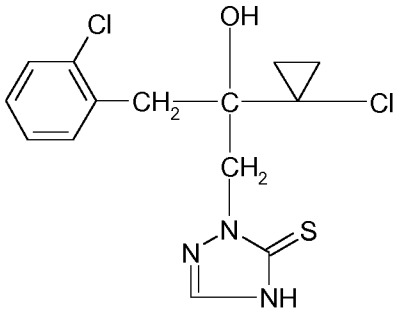
In a preferred embodiment of the method according to the invention the composition, comprising at least prothiocanazole and trifloxystrobin, is applied under stress weather conditions. Stress weather conditions are for example temperatures ≥ 30°C and humidity ≤ 50 %.

Trifloxystrobin is a known fungicidal compound. Its chemical name is methyl (2E)-2-methoxyimino-2-[2-[[(E)-1-[3-(trifluoromethyl)phenyl]ethylideneamino]oxymethyl]phenyl]acetate (CAS-number

141517-21-7), and suitable processes for its preparation starting from commercially available starting materials are described in EP-A 460 575 and its chemical structure is the following:

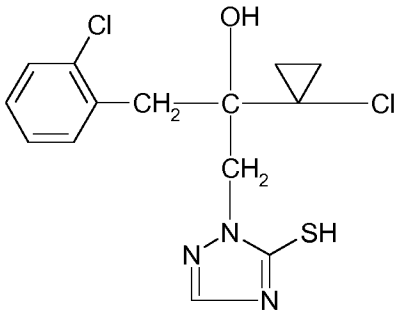


Prothioconazole (having the chemical name 2-[2-(1-chlorocyclopropyl)-3-(2-chlorophenyl)-2-hydroxy-propyl]-1,2-dihydro-3H-1,2,4-triazole-3-thione) (CAS-number 178928-70-6), and suitable processes for its preparation starting from commercially available starting materials are described in DE-A 195280 can be present in the „thiono„ form of the formula (I)



(I)

or in the tautomeric „mercapto„ form of the formula



(Ia).

By using the common name prothioconazole both tautomeric forms are covered.

Multisite fungicides are fungicides having multiple modes of action, so they affect multiple target sites, and simultaneously interfere with numerous metabolic processes of the fungus. Such multisite fungicides are classified in group M ("Multi Site Action") of the FRAC classification (FRAC website http://www/frac.info/).

Suitable multisite fungicides compounds capable to have a multisite action are for example (5.001) bordeaux mixture, (5.002) captafol, (5.003) captan, (5.004) chlorothalonil, (5.005) copper hydroxide, (5.006) copper naphthenate, (5.007) copper oxide, (5.008) copper oxychloride, (5.009) copper(2+) sulfate, (5.010) dichlofluanid, (5.011) dithianon, (5.012) dodine, (5.013) dodine free base, (5.014) ferbam, (5.015) fluorofolpet, (5.016) folpet, (5.017) guazatine, (5.018) guazatine acetate, (5.019)

iminoctadine, (5.020) iminoctadine albesilate, (5.021) iminoctadine triacetate, (5.022) mancopper, (5.023) mancozeb, (5.024) maneb, (5.025) metiram, (5.026) metiram zinc, (5.027) oxine-copper, (5.028) propamidine, (5.029) propineb, (5.030) sulfur and sulfur preparations including calcium polysulfide, (5.031) thiram, (5.032) tolylfluanid, (5.033) zineb, (5.034) ziram, (5.035) anilazine.

Preference is given to using multisite fungicides compounds capable to have a multisite action which are selected form the group consisting of chlorothalonil, mancozeb, metiram, metiram zinc, propineb, sulfur and sulfur preparations including calcium polysulfide.

Particular preference is given to using mancozeb. Also particular preference is given to using propineb.

The invention is also directed to fungicidal combinations comprising prothiocanazole and trifloxystrobin and at least one multisite fungicide compound capable to have a multisite action.

Preferred combinations according to the invention comprise prothiocanazole and trifloxystrobin and one multisite fungicide are compound capable to have a multisite action selected form the group consisting of chlorothalonil, mancozeb, metiram, metiram zinc, propineb, sulfur and sulfur preparations including calcium polysulfide.

Particular preferred combinations according to the invention comprise prothiocanazole and trifloxystrobin and mancozeb or propineb.

Such a fungicidal combination can further comprise at least one agriculturally suitable additive. The invention also comprises a method for preparing compositions comprising adding at least one agriculturally suitable additive to the active compound combination according to the invention.

Therefore the present invention is also directed to a composition comprising an effective and non-phytotoxic amount of the fungicidal combination comprising prothiocanazole and trifloxystrobin and at least one multisite fungicide compound capable to have a multisite action.

Furthermore the invention comprises a method for reducing damage of plants and plant parts or losses in harvested fruits or vegetables caused by phytopathogenic fungi by controlling such phytopathogenic fungi, comprising applying the active compound combination or the crop protection composition to the plant or the phytopathogenic fungi or the habitat of the plant or the habitat of the phytopathogenic fungi.

Furthermore the invention encompasses a method for curatively or preventively controlling phytopathogenic fungi comprising the use of an active compound combination or a composition for control of soybean diseases. The invention also encompasses the use of the active compound combination or the crop protection composition for reducing damage of plants and plant parts or losses in harvested fruits or vegetables caused by phytopathogenic fungi by controlling such phytopathogenic fungi. In this connection the plants can be genetically modified or non-genetically modified. Furthermore the

invention comprises the use of active compound combinations or compositions according to the invention for the treatment of seed, comprising contacting said seeds with the active compound combinations or compositions. Finally, the present invention also relates to seed treated with the above-mentioned active compound combination or crop protection composition.

Application Rates and Timing

When using the inventive active combinations or compositions as fungicides, the application rates can be varied within a relatively wide range, depending on the kind of application. The application rate of the inventive combinations or compositions is

- in the case of treatment of plant parts, for example leaves: from 0.1 to 10 000 g/ha, preferably from 10 to 1000 g/ha, more preferably from 10 to 800 g/ha, even more preferably from 50 to 300 g/ha (in the case of application by watering or dripping, it is even possible to reduce the application rate, especially when inert substrates such as rockwool or perlite are used);

- in the case of seed treatment: from 2 to 200 g per 100 kg of seed, preferably from 3 to 150 g per 100 kg of seed, more preferably from 2.5 to 25 g per 100 kg of seed, even more preferably from 2.5 to 12.5 g per 100 kg of seed;

- in the case of soil treatment: from 0.1 to 10 000 g/ha, preferably from 1 to 5000 g/ha.

These application rates are merely by way of example and are not limiting for the purposes of the invention.

The inventive active combinations or compositions can thus be used to protect plants from attack by the pathogens mentioned for a certain period of time after treatment. The period for which protection is provided extends generally for 1 to 28 days, preferably for 1 to 14 days, more preferably for 1 to 10 days, most preferably for 1 to 7 days, after the treatment of the plants with the active ingredients, or for up to 200 days after a seed treatment.

The addition of the multisite fungicides compounds capable to have a multisite action may take place at various points in time. Firstly, it is possible to add the multisite fungicides compounds capable to have a multisite action (multisites) already to the active compound formulation. Secondly, it is possible to mix the multisites shortly before the application to the plant with customary formulations of the fungicidal composition (tank mix).

Co-application can be achieved using tank mixes of preformulated individual active ingredients, simultaneaus or sequential (preferably 1-2 days) application of such formulations or application of preformulated fixed pre-mix combinations of the individual active ingredients.

The application rates of Fox® and the multisites employed in co-application will of course depend on the multisite compound chosen, the phytopathogenic fungi to be controlled, the crop plant involved, soil type, season, climate, soil ecology, and various other factors. Optimum usage is readily determinable by one skilled in the art using routine testing such as greenhouse or small plot testing.

Application rates of Fox® will usually be those recommended for use of commercially available forms of Fox®. In general, for example, satisfactory results are obtained when co-applying at rates of 50 to 2000 g/ha, preferably 50 to 1500 g/ha of Fox®, and 10 to 2000 g/ha, preferably 50 to 2000 g/ha of a multisite compound.

Preferred weight ratios of Fox® to a multisite compound lies conveniently within the range of from 1:40 to 200:1, preferably 1:7 to 20:1, more preferably 1:5 to 15:1

A typical co-application of Fox® (Compound I) with the multisite compound (Compound II) would be e.g. from 250 to 1500 g/ha, preferably 97,5 to 975 g/ha or 0,3 to 3 L/ha of Fox® 325 SC of Compound I and 50 to 1500 g/ha, preferably 350 a 3500 g/ha of Compound II.

With co-application of compositions according to the invention it is possible to control phytopathogens in crops like soya bean.

Composition / Formulation

The present invention further relates to a crop protection composition for controlling harmful microorganisms, especially phytopathogenic fungi, comprising an effective and non-phytotoxic amount of the inventive active compound combinations. These are preferably fungicidal crop protection compositions which comprise agriculturally suitable auxiliaries, solvents, carriers, surfactants, extenders or the like.

An “effective and non-phytotoxic amount” means an amount of the inventive active compound combination or composition which is sufficient to control the fungal disease of the plant in a satisfactory manner or to eradicate the fungal disease completely, and which, at the same time, does not cause any significant symptoms of phytotoxicity. In general, this application rate may vary within a relatively wide range. It depends on several factors, for example on the fungus to be controlled, the plant, the climatic conditions and the ingredients of the inventive active compound combinations or compositions.

The treatment is effected directly or by action on their surroundings, habitat or storage space by the customary treatment methods, for example by dipping, spraying, atomizing, irrigating, evaporating, dusting, fogging, broadcasting, foaming, painting, spreading-on, watering (drenching) and drip irrigating. It is also possible to deploy the compositions by the ultra-low volume method or to inject the composition preparation or the compositions itself into the soil.

Suitable organic solvents include all polar and non-polar organic solvents usually employed for formulation purposes. Preferable the solvents are selected from ketones, e.g. methyl-isobutyl-ketone and cyclohexanone, amides, e.g. dimethyl formamide and alkanecarboxylic acid amides, e.g. N,N-dimethyl decaneamide and N,N-dimethyl octanamide, furthermore cyclic solvents, e.g. N-methyl-pyrrolidone, N-octyl-pyrrolidone, N-dodecyl-pyrrolidone, N-octyl-caprolactame, N-dodecyl-caprolactame and butyrolactone, furthermore strong polar solvents, e.g. dimethylsulfoxide, and aromatic hydrocarbons, e.g. xylol, Solvesso™, mineral oils, e.g. white spirit, petroleum, alkyl benzenes and spindle oil, also esters, e.g. propyleneglycol-monomethylether acetate, adipic acid dibutylester, acetic acid hexylester, acetic acid heptylester, citric acid tri-*n*-butylester and phthalic acid di-*n*-butylester, long-chain fatty acid methyl esters, e.g. Soybean oil, methyl ester (67784-80-9) and also alkohols, e.g. benzyl alcohol and 1-methoxy-2-propanol.

According to the invention, a carrier is a natural or synthetic, organic or inorganic substance with which the active compound combinations are mixed or combined for better applicability, in particular for application to plants or plant parts or seed. The carrier, which may be solid or liquid, is generally inert and should be suitable for use in agriculture.

Useful solid or liquid carriers include: for example ammonium salts and natural rock dusts, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and synthetic rock dusts, such as finely divided silica, alumina and natural or synthetic silicates, resins, waxes, solid fertilizers, water, alcohols, especially butanol, organic solvents, mineral and vegetable oils, and derivatives thereof. Mixtures of such carriers can likewise be used.

Suitable solid filler and carrier include inorganic particles, e.g. carbonates, silikates, sulphates and oxides with an average particle size of between 0.005 and 20 µm, preferably of between 0.02 to 10 µm, for example ammonium sulphate, ammonium phosphate, urea, calcium carbonate, calcium sulphate, magnesium sulphate, magnesium oxide, aluminium oxide, silicium dioxide, so-called fine-particle silica, silica gels, natural or synthetic silicates, and alumosilicates and plant products like cereal flour, wood powder/sawdust and cellulose powder.

Useful solid carriers for granules include: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite, dolomite, and synthetic granules of inorganic and organic meals, and also granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks.

Useful liquefied gaseous extenders or carriers are those liquids which are gaseous at standard temperature and under standard pressure, for example aerosol propellants such as halohydrocarbons, and also butane, propane, nitrogen and carbon dioxide.

In the formulations, it is possible to use tackifiers such as carboxymethylcellulose, and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and

polyvinyl acetate, or else natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids. Further additives may be mineral and vegetable oils.

If the extender used is water, it is also possible to employ, for example, organic solvents as auxiliary solvents. Useful liquid solvents are essential: aromatics such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics and chlorinated aliphatic hydrocarbons such as chlorobenzenes, chloroethylenes or dichloromethane, aliphatic hydrocarbons such as cyclohexane or paraffins, for example mineral oil fractions, mineral and vegetable oils, alcohols such as butanol or glycol and their ethers and esters, ketones such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents such as dimethylformamide and dimethyl sulphoxide, and also water.

The inventive compositions may additionally comprise further components, for example surfactants. Useful surfactants are emulsifiers and/or foam formers, dispersants or wetting agents having ionic or nonionic properties, or mixtures of these surfactants. Examples of these are salts of polyacrylic acid, salts of lignosulphonic acid, salts of phenolsulphonic acid or naphthalenesulphonic acid, polycondensates of ethylene oxide with fatty alcohols or with fatty acids or with fatty amines, substituted phenols (preferably alkylphenols or arylphenols), salts of sulphosuccinic esters, taurine derivatives (preferably alkyl taurates), phosphoric esters of polyethoxylated alcohols or phenols, fatty esters of polyols, and derivatives of the compounds containing sulphates, sulphonates and phosphates, for example alkylaryl polyglycol ethers, alkylsulphonates, alkylsulphates, arylsulphonates, protein hydrolysates, lignosulphite waste liquors and methylcellulose. The presence of a surfactant is necessary if one of the active ingredients and/or one of the inert carriers is insoluble in water and when application is effected in water. The proportion of surfactants is between 5 and 40 per cent by weight of the inventive composition.

Suitable surfactants (adjuvants, emulsifiers, dispersants, protective colloids, wetting agent and adhesive) include all common ionic and non-ionic substances, for example ethoxylated nonylphenols, polyalkylene glycolether of linear or branched alcohols, reaction products of alkyl phenols with ethylene oxide and/or propylene oxide, reaction products of fatty acid amines with ethylene oxide and/or propylene oxide, furthermore fattic acid esters, alkyl sulfonates, alkyl sulphates, alkyl ethersulphates, alkyl etherphosphates, arylsulphate, ethoxylated arylalkylphenols, e.g. tristyryl-phenol-ethoxylates, furthermore ethoxylated and propoxylated arylalkylphenols like sulphated or phosphated arylalkylphenol-ethoxylates and -ethoxy- and propoxylates. Further examples are natural and synthetic, water soluble polymers, e.g. lignosulphonates, gelatine, gum arabic, phospholipides, starch, hydrophobic modified starch and cellulose derivatives, in particular cellulose ester and cellulose ether, further polyvinyl alcohol, polyvinyl acetate, polyvinyl pyrrolidone, polyacrylic acid, polymethacrylic acid and co-polymerisates of (meth)acrylic acid and (meth)acrylic acid esters, and further co-polymerisates of methacrylic acid and methacrylic acid esters which are neutralized with alkalimetal hydroxide and also condensation products of optionally substituted naphthalene sulfonic acid salts with formaldehyde.

It is possible to use dyes such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyes such as alizarin dyes, azo dyes and metal phthalocyanine dyes, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

Antifoams which may be present in the formulations include e.g. silicone emulsions, longchain alcohols, fatty acids and their salts as well as fluoroorganic substances and mixtures thereof.

Examples of thickeners are polysaccharides, e.g. xanthan gum or veegum, silicates, e.g. attapulgite, bentonite as well as fine-particle silica.

If appropriate, it is also possible for other additional components to be present, for example protective colloids, binders, adhesives, thickeners, thixotropic substances, penetrants, stabilizers, sequestrants, complexing agents. In general, the active ingredients can be combined with any solid or liquid additive commonly used for formulation purposes.

In a preferred embodiment the inventive active compound combinations contain as additional component soybean oil methyl ester in an amount of 0,05 to 0,5 % w/w.

The inventive active compound combinations or compositions can be used as such or, depending on their particular physical and/or chemical properties, in the form of their formulations or the use forms prepared therefrom, such as aerosols, capsule suspensions, cold-fogging concentrates, warm-fogging concentrates, encapsulated granules, fine granules, flowable concentrates for the treatment of seed, ready-to-use solutions, dustable powders, emulsifiable concentrates, oil-in-water emulsions, water-in-oil emulsions, macrogranules, microgranules, oil-dispersible powders, oil-miscible flowable concentrates, oil-miscible liquids, gas (under pressure), gas generating product, foams, pastes, pesticide coated seed, suspension concentrates, suspoemulsion concentrates, soluble concentrates, suspensions, wettable powders, soluble powders, dusts and granules, water-soluble and water-dispersible granules or tablets, water-soluble and water-dispersible powders for the treatment of seed, wettable powders, natural products and synthetic substances impregnated with active ingredient, and also microencapsulations in polymeric substances and in coating materials for seed, and also ULV cold-fogging and warm-fogging formulations.

The inventive compositions include not only formulations which are already ready for use and can be applied with a suitable apparatus to the plant or the seed, but also commercial concentrates which have to be diluted with water prior to use. Customary applications are for example dilution in water and subsequent spraying of the resulting spray liquor, application after dilution in oil, direct application without dilution, seed treatment or soil application of granules.

The inventive compositions and formulations generally contain between 0.05 and 99 % by weight, 0.01 and 98 % by weight, preferably between 0.1 and 95 % by weight, more preferably between 0.5 and 90 % of active ingredient, most preferably between 10 and 70 % by weight.

The contents of active ingredient in the application forms prepared from the commercial formulations may vary in a broad range. The concentration of the active ingredients in the application forms is generally between 0.000001 to 95 % by weight, preferably between 0.0001 and 2 % by weight.

The formulations mentioned can be prepared in a manner known per se, for example by mixing the active ingredients with at least one customary extender, solvent or diluent, adjuvant, emulsifier, dispersant, and/or binder or fixative, wetting agent, water repellent, if appropriate desiccants and UV stabilizers and, if appropriate, dyes and pigments, antifoams, preservatives, inorganic and organic thickeners, adhesives, gibberellins and also further processing auxiliaries and also water. Depending on the formulation type to be prepared further processing steps are necessary, e.g. wet grinding, dry grinding and granulation.

The inventive active compound combinations may be present as such or in their (commercial) formulations and in the use forms prepared from these formulations as a mixture with other (known) active ingredients, such as insecticides, attractants, sterilants, bactericides, acaricides, nematicides, fungicides, growth regulators, herbicides, fertilizers, safeners and/or semiochemicals.

The inventive treatment of the plants and plant parts with the active compound combinations or compositions is effected directly or by action on their surroundings, habitat or storage space by the customary treatment methods, for example by dipping, spraying, atomizing, irrigating, evaporating, dusting, fogging, broadcasting, foaming, painting, spreading-on, watering (drenching), drip irrigating and, in the case of propagation material, especially in the case of seeds, also by dry seed treatment, wet seed treatment, slurry treatment, incrustation, coating with one or more coats, etc. It is also possible to deploy the active compound combinations by the ultra-low volume method or to inject the active compound combination preparation into the soil.

Plant/Crop Protection

The inventive active compound combinations or compositions have potent microbicidal activity and can be used for control of harmful microorganisms, such as phytopathogenic fungi, in crop protection and in the protection of materials.

The invention also relates to a method for controlling harmful microorganisms, comprising applying the active compound combination or the crop protection composition to the plant or the phytopathogenic fungi or the habitat of the plant or the habitat of the phytopathogenic fungi.

Fungicides can be used in crop protection for control of phytopathogenic fungi. They are characterized by an outstanding efficacy against a broad spectrum of phytopathogenic fungi, including soilborne pathogens, which are in particular members of the classes *Plasmodiophoromycetes*, *Peronosporomycetes* (Syn. *Oomycetes*), *Chytridiomycetes*, *Zygomycetes*, *Ascomycetes*, *Basidiomycetes* and *Deuteromycetes* (Syn. *Fungi imperfecti*). Some fungicides are systemically active and can be used in plant protection as foliar,

seed dressing or soil fungicide. Furthermore, they are suitable for combating fungi, which inter alia infest wood or roots of plant.

Bactericides can be used in crop protection for control of *Pseudomonadaceae*, *Rhizobiaceae*, *Enterobacteriaceae*, *Corynebacteriaceae* and *Streptomycetaceae*.

The present invention is directed to the use of the active compound combinations or compositions according to the invention for the treatment of soybean diseases. The following diseases of soybeans can be controlled with preference: Fungal diseases on leaves, stems, pods and seeds caused, for example, by *Alternaria* leaf spot (*Alternaria spec. atrans tenuissima*), Anthracnose (*Colletotrichum gloeosporoides dematium var. truncatum*), brown spot (*Septoria glycines*), cercospora leaf spot and blight (*Cercospora kikuchii*), choanephora leaf blight (*Choanephora infundibulifera trispora* (Syn.)), dactuliophora leaf spot (*Dactuliophora glycines*), downy mildew (*Peronospora manshurica*), drechslera blight (*Drechslera glycini*), frogeye leaf spot (*Cercospora sojina*), leptosphaerulina leaf spot (*Leptosphaerulina trifolii*), phyllostica leaf spot (*Phyllosticta sojaecola*), pod and stem blight (*Phomopsis sojae*), powdery mildew (*Microsphaera diffusa*), pyrenochaeta leaf spot (*Pyrenochaeta glycines*), rhizoctonia aerial, foliage, and web blight (*Rhizoctonia solani*), rust (*Phakopsora pachyrhizi*, *Phakopsora meibomiae*), scab (*Sphaceloma glycines*), stemphylium leaf blight (*Stemphylium botryosum*), target spot (*Corynespora cassiicola*). Fungal diseases on roots and the stem base caused, for example, by black root rot (*Calonectria crotalariae*), charcoal rot (*Macrophomina phaseolina*), fusarium blight or wilt, root rot, and pod and collar rot (*Fusarium oxysporum*, *Fusarium orthoceras*, *Fusarium semitectum*, *Fusarium equiseti*), mycoleptodiscus root rot (*Mycoleptodiscus terrestris*), neocosmospora (*Neocosmospora vasinfecta*), pod and stem blight (*Diaporthe phaseolorum*), stem canker (*Diaporthe phaseolorum var. caulivora*), phytophthora rot (*Phytophthora megasperma*), brown stem rot (*Phialophora gregata*), pythium rot (*Pythium aphanidermatum*, *Pythium irregulare*, *Pythium debaryanum*, *Pythium myriotylum*, *Pythium ultimum*), rhizoctonia root rot, stem decay, and damping-off (*Rhizoctonia solani*), sclerotinia stem decay (*Sclerotinia sclerotiorum*), sclerotinia southern blight (*Sclerotinia rolfsii*), thielaviopsis root rot (*Thielaviopsis basicola*).

Most preference is given to the following soybean diseases: *Cercospora kikuchii, Cercospora sojina; Colletotrichum gloeosporoides dematium var. truncatum; Corynespora casiicola; Diaporthe phaseolorum; Microsphaera diffusa; Peronospora manshurica; Phakopsora* species, for example *Phakopsora pachyrhizi* and *Phakopsora meibomiae* (*soybean rust*); *Rhizoctonia solani*; *Sclerotinia sclerotiorum; Septoria spp.* e.g. *Septoria glycines, Thielaviopsis basicola.*

Especially preferred are *Phakopsora pachyrhizi, Corynespora casiicola* and *Phakopsora meibomiae* (*soybean rust*).

The fact that the active compound combinations or compositions are well tolerated by plants at the concentrations required for controlling plant diseases allows the treatment of above-ground parts of plants, of propagation stock and seeds, and of the soil.

According to the invention all plants and plant parts can be treated. By "plants" is meant all plants and plant populations such as desirable and undesirable wild plants, cultivars and plant varieties (whether or not protectable by plant variety or plant breeder's rights). Cultivars and plant varieties can be plants obtained by conventional propagation and breeding methods which can be assisted or supplemented by one or more biotechnological methods such as by use of double haploids, protoplast fusion, random and directed mutagenesis, molecular or genetic markers or by bioengineering and genetic engineering methods. By "plant parts" is meant all above ground and below ground parts and organs of plants such as shoot, leaf, blossom and root, whereby for example leaves, needles, stems, branches, blossoms, fruiting bodies, fruits and seed as well as roots, corms and rhizomes are listed. Crops and vegetative and generative propagating material, for example cuttings, corms, rhizomes, runners and seeds also belong to plant parts.

The inventive active compound combinations or compositions, when they are well tolerated by plants, have favourable homeotherm toxicity and are well tolerated by the environment, are suitable for protecting plants and plant organs, for enhancing harvest yields, for improving the quality of the harvested material. They can preferably be used as crop protection compositions. They are active against normally sensitive and resistant species and against all or some stages of development.

Plants which can be treated in accordance with the invention include the following main crop plants: maize, soya bean, alfalfa, cotton, sunflower, *Brassica* oil seeds such as *Brassica napus* (e.g. canola, rapeseed), *Brassica rapa*, *B. juncea* (e.g. (field) mustard) and *Brassica carinata*, *Arecaceae sp.* (e.g. oilpalm, coconut), rice, wheat, sugar beet, sugar cane, oats, rye, barley, millet and sorghum, triticale, flax, nuts, grapes and vine and various fruit and vegetables from various botanic taxa, e.g. *Rosaceae sp.* (e.g. pome fruits such as apples and pears, but also stone fruits such as apricots, cherries, almonds, plums and peaches, and berry fruits such as strawberries, raspberries, red and black currant and gooseberry), *Ribesioidae sp.*, *Juglandaceae sp.*, *Betulaceae sp.*, *Anacardiaceae sp.*, *Fagaceae sp.*, *Moraceae sp.*, *Oleaceae sp.* (e.g. olive tree), *Actinidaceae sp.*, *Lauraceae sp.* (e.g. avocado, cinnamon, camphor), *Musaceae sp.* (e.g. banana trees and plantations), *Rubiaceae sp.* (e.g. coffee), *Theaceae sp.* (e.g. tea), *Sterculiceae sp.*, *Rutaceae sp.* (e.g. lemons, oranges, mandarins and grapefruit); *Solanaceae sp.* (e.g. tomatoes, potatoes, peppers, capsicum, aubergines, tobacco), *Liliaceae sp.*, *Compositae sp.* (e.g. lettuce, artichokes and chicory – including root chicory, endive or common chicory), *Umbelliferae sp.* (e.g. carrots, parsley, celery and celeriac), *Cucurbitaceae sp.* (e.g. cucumbers – including gherkins, pumpkins, watermelons, calabashes and melons), *Alliaceae sp.* (e.g. leeks and onions), *Cruciferae sp.* (e.g. white cabbage, red cabbage, broccoli, cauliflower, Brussels sprouts, pak choi, kohlrabi, radishes, horseradish, cress and chinese cabbage), *Leguminosae sp.* (e.g. peanuts, peas, lentils and beans – e.g. common beans and broad beans), *Chenopodiaceae sp.* (e.g. Swiss chard, fodder beet, spinach, beetroot), *Linaceae sp.* (e.g. hemp), *Cannabeacea sp.* (e.g. cannabis), *Malvaceae sp.* (e.g. okra,

cocoa), *Papaveraceae* (e.g. poppy), *Asparagaceae* (e.g. asparagus); useful plants and ornamental plants in the garden and woods including turf, lawn, grass and *Stevia rebaudiana*; and in each case genetically modified types of these plants.

The preferred crop plant is soya bean (*Glycine max* (L.) Merrill).

Plant Growth Regulation

In some cases, the active compound combinations or compositions can, at particular concentrations or application rates, also be used as herbicides, safeners, growth regulators or agents to improve plant properties, or as microbicides, for example as fungicides, antimycotics, bactericides, viricides (including compositions against viroids) or as compositions against MLO (Mycoplasma-like organisms) and RLO (Rickettsia-like organisms). If appropriate, they can also be used as intermediates or precursors for the synthesis of other active ingredients.

The inventive active compound combinations intervene in the metabolism of the plants and can therefore also be used as growth regulators.

Plant growth regulators may exert various effects on plants. The effect of the substances depends essentially on the time of application in relation to the developmental stage of the plant, and also on the amounts of active compound combination or composition applied to the plants or their environment and on the type of application. In each case, growth regulators should have a particular desired effect on the crop plants.

Plant growth-regulating compounds can be used, for example, to inhibit the vegetative growth of the plants. Such inhibition of growth is of economic interest, for example, in the case of grasses, since it is thus possible to reduce the frequency of grass cutting in ornamental gardens, parks and sport facilities, on roadsides, at airports or in fruit crops. Also of significance is the inhibition of the growth of herbaceous and woody plants on roadsides and in the vicinity of pipelines or overhead cables, or quite generally in areas where vigorous plant growth is unwanted.

Also important is the use of growth regulators for inhibition of the longitudinal growth of cereal. This reduces or completely eliminates the risk of lodging of the plants prior to harvest. In addition, growth regulators in the case of cereals can strengthen the culm, which also counteracts lodging. The employment of growth regulators for shortening and strengthening culms allows the deployment of higher fertilizer volumes to increase the yield, without any risk of lodging of the cereal crop.

In many crop plants, inhibition of vegetative growth allows denser planting, and it is thus possible to achieve higher yields based on the soil surface. Another advantage of the smaller plants obtained in this way is that the crop is easier to cultivate and harvest.

Inhibition of the vegetative plant growth may also lead to enhanced yields because the nutrients and assimilates are of more benefit to flower and fruit formation than to the vegetative parts of the plants.

Frequently, growth regulators can also be used to promote vegetative growth. This is of great benefit when harvesting the vegetative plant parts. However, promoting vegetative growth may also promote generative growth in that more assimilates are formed, resulting in more or larger fruits.

In some cases, yield increases may be achieved by manipulating the metabolism of the plant, without any detectable changes in vegetative growth. In addition, growth regulators can be used to alter the composite of the plants, which in turn may result in an improvement in quality of the harvested products. For example, it is possible to increase the sugar content in sugar beet, sugar cane, pineapples and in citrus fruit, or to increase the protein content in soya or cereals. It is also possible, for example, to use growth regulators to inhibit the degradation of desirable ingredients, for example sugar in sugar beet or sugar cane, before or after harvest. It is also possible to positively influence the production or the elimination of secondary plant ingredients. One example is the stimulation of the flow of latex in rubber trees.

Under the influence of growth regulators, parthenocarpic fruits may be formed. In addition, it is possible to influence the sex of the flowers. It is also possible to produce sterile pollen, which is of great importance in the breeding and production of hybrid seed.

Use of growth regulators can control the branching of the plants. On the one hand, by breaking apical dominance, it is possible to promote the development of side shoots, which may be highly desirable particularly in the cultivation of ornamental plants, also in combination with an inhibition of growth. On the other hand, however, it is also possible to inhibit the growth of the side shoots. This effect is of particular interest, for example, in the cultivation of tobacco or in the cultivation of tomatoes.

Under the influence of growth regulators, the amount of leaves on the plants can be controlled such that defoliation of the plants is achieved at a desired time. Such defoliation plays a major role in the mechanical harvesting of cotton, but is also of interest for facilitating harvesting in other crops, for example in viticulture. Defoliation of the plants can also be undertaken to lower the transpiration of the plants before they are transplanted.

Growth regulators can likewise be used to regulate fruit dehiscence. On the one hand, it is possible to prevent premature fruit dehiscence. On the other hand, it is also possible to promote fruit dehiscence or even flower abortion to achieve a desired mass ("thinning"), in order to eliminate alternation. Alternation is understood to mean the characteristic of some fruit species, for endogenous reasons, to deliver very different yields from year to year. Finally, it is possible to use growth regulators at the time of harvest to reduce the forces required to detach the fruits, in order to allow mechanical harvesting or to facilitate manual harvesting.

Growth regulators can also be used to achieve faster or else delayed ripening of the harvested material before or after harvest. This is particularly advantageous as it allows optimal adjustment to the requirements of the market. Moreover, growth regulators in some cases can improve the fruit colour. In addition, growth regulators can also be used to concentrate maturation within a certain period of time. This establishes the prerequisites for complete mechanical or manual harvesting in a single operation, for example in the case of tobacco, tomatoes or coffee.

By using growth regulators, it is additionally possible to influence the resting of seed or buds of the plants, such that plants such as pineapple or ornamental plants in nurseries, for example, germinate, sprout or flower at a time when they are normally not inclined to do so. In areas where there is a risk of frost, it may be desirable to delay budding or germination of seeds with the aid of growth regulators, in order to avoid damage resulting from late frosts.

Finally, growth regulators can induce resistance of the plants to frost, drought or high salinity of the soil. This allows the cultivation of plants in regions which are normally unsuitable for this purpose.

Resistance Induction / Plant Health and other effects

The active compound combinations or compositions according to the invention also exhibit a potent strengthening effect in plants. Accordingly, they can be used for mobilizing the defences of the plant against attack by undesirable microorganisms.

Plant-strengthening (resistance-inducing) substances are to be understood as meaning, in the present context, those substances which are capable of stimulating the defence system of plants in such a way that the treated plants, when subsequently inoculated with undesirable microorganisms, develop a high degree of resistance to these microorganisms.

The active compound combinations or compositions according to the invention are also suitable for increasing the yield of crops. In addition, they show reduced toxicity and are well tolerated by plants.

Further, in context with the present invention plant physiology effects comprise the following:

Abiotic stress tolerance, comprising temperature tolerance, drought tolerance and recovery after drought stress, water use efficiency (correlating to reduced water consumption), flood tolerance, ozone stress and UV tolerance, tolerance towards chemicals like heavy metals, salts, pesticides (safener) etc..

Biotic stress tolerance, comprising increased fungal resistance and increased resistance against nematodes, viruses and bacteria. In context with the present invention, biotic stress tolerance preferably comprises increased fungal resistance.

Increased plant vigor, comprising plant health / plant quality and seed vigor, reduced stand failure, improved appearance, increased recovery, improved greening effect and improved photosynthetic efficiency.

Effects on plant hormones and/or functional enzymes.

Effects on growth regulators (promoters), comprising earlier germination, better emergence, more developed root system and/or improved root growth, increased ability of tillering, more productive tillers, earlier flowering, increased plant height and/or biomass, shorting of stems, improvements in shoot growth, number of kernels/ear, number of ears/m^2, number of stolons and/or number of flowers, enhanced harvest index, bigger leaves, less dead basal leaves, improved phyllotaxy, earlier maturation / earlier fruit finish, homogenous riping, increased duration of grain filling, better fruit finish, bigger fruit/vegetable size, sprouting resistance and reduced lodging.

Increased yield, referring to total biomass per hectare, yield per hectare, kernel/fruit weight, seed size and/or hectolitre weight as well as to increased product quality, comprising:

Improved processability relating to size distribution (kernel, fruit, etc.), homogenous riping, grain moisture, better milling, better vinification, better brewing, increased juice yield, harvestability, digestibility, sedimentation value, falling number, pod stability, storage stability, improved fiber length/strength/uniformity, increase of milk and/or meet quality of silage fed animals, adaption to cooking and frying;

Further comprising improved marketability relating to improved fruit/grain quality, size distribution (kernel, fruit, etc.), increased storage / shelf-life, firmness / softness, taste (aroma, texture, etc.), grade (size, shape, number of berries, etc.), number of berries/fruits per bunch, crispness, freshness, coverage with wax, frequency of physiological disorders, colour, etc.;

Further comprising increased desired ingredients such as e.g. protein content, fatty acids, oil content, oil quality, aminoacid composition, sugar content, acid content (pH), sugar/acid ratio (Brix), polyphenols, starch content, nutritional quality, gluten content/index, energy content, taste, etc.;

And further comprising decreased undesired ingredients such as e.g. less mycotoxines, less aflatoxines, geosmin level, phenolic aromas, lacchase, polyphenol oxidases and peroxidases, nitrate content etc.

Sustainable agriculture, comprising nutrient use efficiency, especially nitrogen (N)-use efficiency, phosphours (P)-use efficiency, water use efficiency, improved transpiration, respiration and/or CO_2 assimilation rate, better nodulation, improved Ca-metabolism etc..

Delayed senescence, comprising improvement of plant physiology which is manifested, for example, in a longer grain filling phase, leading to higher yield, a longer duration of green leaf colouration of the plant

and thus comprising colour (greening), water content or dryness. Accordingly, in the context of the present invention, it has been found that the specific inventive application of the active compound combination makes it possible to prolong the green leaf area duration, which delays the maturation (senescence) of the plant. The main advantage to the farmer is a longer grain filling phase leading to higher yield. There is also an advantage to the farmer on the basis of greater flexibility in the harvesting time.

Therein "sedimentation value" is a measure for protein quality and describes according to Zeleny (Zeleny value) the degree of sedimentation of flour suspended in a lactic acid solution during a standard time interval. This is taken as a measure of the baking quality. Swelling of the gluten fraction of flour in lactic acid solution affects the rate of sedimentation of a flour suspension. Both a higher gluten content and a better gluten quality give rise to slower sedimentation and higher Zeleny test values. The sedimentation value of flour depends on the wheat protein composite and is mostly correlated to the protein content, the wheat hardness, and the volume of pan and hearth loaves. A stronger correlation between loaf volume and Zeleny sedimentation volume compared to SDS sedimentation volume could be due to the protein content influencing both the volume and Zeleny value (*Czech J. Food Sci. Vol. 21, No. 3: 91–96,* 2000).

Further the "falling number" as mentioned herein is a measure for the baking quality of cereals, especially of wheat. The falling number test indicates that sprout damage may have occurred. It means that changes to the physical properties of the starch portion of the wheat kernel has already happened. Therein, the falling number instrument analyzes viscosity by measuring the resistance of a flour and water paste to a falling plunger. The time (in seconds) for this to happen is known as the falling number. The falling number results are recorded as an index of enzyme activity in a wheat or flour sample and results are expressed in time as seconds. A high falling number (for example, above 300 seconds) indicates minimal enzyme activity and sound quality wheat or flour. A low falling number (for example, below 250 seconds) indicates substantial enzyme activity and sprout-damaged wheat or flour.

The term "more developed root system" / "improved root growth" refers to longer root system, deeper root growth, faster root growth, higher root dry/fresh weight, higher root volume, larger root surface area, bigger root diameter, higher root stability, more root branching, higher number of root hairs, and/or more root tips and can be measured by analyzing the root architecture with suitable methodologies and Image analysis programmes (e.g. WinRhizo).

The term "crop water use efficiency" refers technically to the mass of agriculture produce per unit water consumed and economically to the value of product(s) produced per unit water volume consumed and can e.g. be measured in terms of yield per ha, biomass of the plants, thousand-kernel mass, and the number of ears per m2.

The term "nitrogen-use efficiency" refers technically to the mass of agriculture produce per unit nitrogen consumed and economically to the value of product(s) produced per unit nitrogen consumed, reflecting uptake and utilization efficiency.

Improvement in greening / improved colour and improved photosynthetic efficiency as well as the delay of senescence can be measured with well-known techniques such as a HandyPea system (Hansatech). Fv/Fm is a parameter widely used to indicate the maximum quantum efficiency of photosystem II (PSII). This parameter is widely considered to be a selective indication of plant photosynthetic performance with healthy samples typically achieving a maximum Fv/Fm value of approx. 0.85. Values lower than this will be observed if a sample has been exposed to some type of biotic or abiotic stress factor which has reduced the capacity for photochemical quenching of energy within PSII. Fv/Fm is presented as a ratio of variable fluorescence (Fv) over the maximum fluorescence value (Fm). The Performance Index is essentially an indicator of sample vitality. (See e.g. *Advanced Techniques in Soil Microbiology*, 2007, *11*, 319-341; *Applied Soil Ecology*, 2000, *15*, 169-182.)

The improvement in greening / improved colour and improved photosynthetic efficiency as well as the delay of senescence can also be assessed by measurement of the net photosynthetic rate (Pn), measurement of the chlorophyll content, e.g. by the pigment extraction method of Ziegler and Ehle, measurement of the photochemical efficiency (Fv/Fm ratio), determination of shoot growth and final root and/or canopy biomass, determination of tiller density as well as of root mortality.

Within the context of the present invention preference is given to improving plant physiology effects which are selected from the group comprising: enhanced root growth / more developed root system, improved greening, improved water use efficiency (correlating to reduced water consumption), improved nutrient use efficiency, comprising especially improved nitrogen (N)-use efficiency, delayed senescence and enhanced yield.

Within the enhancement of yield preference is given as to an improvement in the sedimentation value and the falling number as well as to the improvement of the protein and sugar content – especially with plants selected from the group of cereals (preferably wheat).

Preferably the novel use of the fungicidal active compound combinations or compositions of the present invention relates to a combined use of a) reducing damage of plants and plant parts or losses in harvested fruits or vegetables caused by phytopathogenic fungi by controlling such phytopathogenic fungi, with or without resistance management, and b) at least one of enhanced root growth, improved greening, improved water use efficiency, delayed senescence and enhanced yield.

Seed Treatment

The invention furthermore includes a method for treating seed.

The invention further relates to seed which has been treated by one of the methods described in the previous paragraph. The inventive seeds are employed in methods for the protection of seed from harmful microorganisms. In these methods, seed treated with at least one inventive active ingredient is used.

The inventive active combinations or compositions are also suitable for treating seed. A large part of the damage to crop plants caused by harmful organisms is triggered by the infection of the seed during storage or after sowing, and also during and after germination of the plant. This phase is particularly critical since the roots and shoots of the growing plant are particularly sensitive, and even minor damage may result in the death of the plant. There is therefore a great interest in protecting the seed and the germinating plant by using appropriate compositions.

The control of phytopathogenic fungi by treating the seed of plants has been known for a long time and is the subject of constant improvements. However, the treatment of seed entails a series of problems which cannot always be solved in a satisfactory manner. For instance, it is desirable to develop methods for protecting the seed and the germinating plant, which dispense with, or at least significantly reduce, the additional deployment of crop protection compositions after planting or after emergence of the plants. It is also desirable to optimize the amount of the active ingredient used so as to provide the best possible protection for the seed and the germinating plant from attack by phytopathogenic fungi, but without damaging the plant itself by the active ingredient employed. In particular, methods for the treatment of seed should also take account of the intrinsic fungicidal properties of transgenic plants in order to achieve optimal protection of the seed and the germinating plant with a minimum expenditure of crop protection compositions.

The present invention therefore also relates to a method for protection of seed and germinating plants from attack by phytopathogenic fungi, by treating the seed with an inventive combination or composition. The invention likewise relates to the use of the inventive combinations or compositions for treatment of seed to protect the seed and the germinating plant from phytopathogenic fungi. The invention further relates to seed which has been treated with an inventive combination or composition for protection from phytopathogenic fungi.

The control of phytopathogenic fungi which damage plants post-emergence is effected primarily by treating the soil and the above-ground parts of plants with crop protection combinations or compositions. Owing to the concerns regarding a possible influence of the crop protection combinations or compositions on the environment and the health of humans and animals, there are efforts to reduce the amount of active ingredients deployed.

One of the advantages of the present invention is that the particular systemic properties of the inventive active combinations or compositions mean that treatment of the seed with these active combinations or compositions not only protects the seed itself, but also the resulting plants after emergence, from

phytopathogenic fungi. In this way, the immediate treatment of the crop at the time of sowing or shortly thereafter can be dispensed with.

It is likewise considered to be advantageous that the inventive combinations or compositions can especially also be used with transgenic seed, in which case the plant growing from this seed is capable of expressing a protein which acts against pests. By virtue of the treatment of such seed with the combinations or compositions, merely the expression of the protein, for example an insecticidal protein, can control certain pests. Surprisingly, a further synergistic effect can be observed in this case, which additionally increases the effectiveness for protection against attack by pests.

The inventive combinations or compositions are suitable for protecting seed of any plant variety which is used in agriculture, in greenhouses, in forests or in horticulture and viticulture. In particular, this is the seed of cereals (such as wheat, barley, rye, triticale, sorghum/millet and oats), maize, cotton, soya beans, rice, potatoes, sunflower, bean, coffee, beet (for example sugar beet and fodder beet), peanut, oilseed rape, poppy, olive, coconut, cocoa, sugar cane, tobacco, vegetables (such as tomato, cucumbers, onions and lettuce), turf and ornamentals (see also below). The treatment of the seed of cereals (such as wheat, barley, rye, triticale and oats), maize and rice is of particular significance.

As also described below, the treatment of transgenic seed with the inventive combinations or compositions is of particular significance. This relates to the seed of plants containing at least one heterologous gene. Definition and examples of suitable heterologous genes are given below.

In the context of the present invention, the inventive combination or composition is applied to the seed alone or in a suitable formulation. Preferably, the seed is treated in a state in which it is sufficiently stable for no damage to occur in the course of treatment. In general, the seed can be treated at any time between harvest and sowing. It is customary to use seed which has been separated from the plant and freed from cobs, shells, stalks, coats, hairs or the flesh of the fruits. For example, it is possible to use seed which has been harvested, cleaned and dried down to a moisture content of less than 15 % by weight. Alternatively, it is also possible to use seed which, after drying, for example, has been treated with water and then dried again.

When treating the seed, care must generally be taken that the amount of the inventive combination or composition applied to the seed and/or the amount of further additives is selected such that the germination of the seed is not impaired, or that the resulting plant is not damaged. This has to be borne in mind in particular in the case of active ingredients which can have phytotoxic effects at certain application rates.

The inventive combination or composition can be applied directly, i.e. without containing any other components and without having been diluted. In general, it is preferable to apply the combination or composition to the seed in the form of a suitable formulation. Suitable formulations and methods for seed treatment are known to those skilled in the art and are described, for example, in the following documents:

US 4,272,417, US 4,245,432, US 4,808,430, US 5,876,739, US 2003/0176428 A1, WO 2002/080675, WO 2002/028186.

The active ingredients usable in accordance with the invention can be converted to the customary seed dressing formulations, such as solutions, emulsions, suspensions, powders, foams, slurries or other coating compositions for seed, and also ULV formulations.

These formulations are prepared in a known manner, by mixing the active ingredients with customary additives, for example customary extenders and also solvents or diluents, dyes, wetting agents, dispersants, emulsifiers, antifoams, preservatives, secondary thickeners, adhesives, gibberellins and also water.

Useful dyes which may be present in the seed dressing formulations usable in accordance with the invention are all dyes which are customary for such purposes. It is possible to use either pigments, which are sparingly soluble in water, or dyes, which are soluble in water. Examples include the dyes known by the names Rhodamine B, C.I. Pigment Red 112 and C.I. Solvent Red 1.

Useful wetting agents which may be present in the seed dressing formulations usable in accordance with the invention are all substances which promote wetting and which are conventionally used for the formulation of active agrochemical ingredients. Preference is given to using alkyl naphthalenesulphonates, such as diisopropyl or diisobutyl naphthalenesulphonates.

Useful dispersants and/or emulsifiers which may be present in the seed dressing formulations usable in accordance with the invention are all nonionic, anionic and cationic dispersants conventionally used for the formulation of active agrochemical ingredients. Usable with preference are nonionic or anionic dispersants or mixtures of nonionic or anionic dispersants. Suitable nonionic dispersants include especially ethylene oxide/propylene oxide block polymers, alkylphenol polyglycol ethers and tristryrylphenol polyglycol ether, and the phosphated or sulphated derivatives thereof. Suitable anionic dispersants are especially lignosulphonates, polyacrylic acid salts and arylsulphonate/formaldehyde condensates.

Antifoams which may be present in the seed dressing formulations usable in accordance with the invention are all foam-inhibiting substances conventionally used for the formulation of active agrochemical ingredients. Silicone antifoams and magnesium stearate can be used with preference.

Preservatives which may be present in the seed dressing formulations usable in accordance with the invention are all substances usable for such purposes in agrochemical compositions. Examples include dichlorophene and benzyl alcohol hemiformal.

Secondary thickeners which may be present in the seed dressing formulations usable in accordance with the invention are all substances usable for such purposes in agrochemical compositions. Preferred examples include cellulose derivatives, acrylic acid derivatives, xanthan, modified clays and finely divided silica.

Adhesives which may be present in the seed dressing formulations usable in accordance with the invention are all customary binders usable in seed dressing products. Preferred examples include polyvinylpyrrolidone, polyvinyl acetate, polyvinyl alcohol and tylose.

The gibberellins which may be present in the seed dressing formulations usable in accordance with the invention may preferably be gibberellins A1, A3 (= gibberellic acid), A4 and A7; particular preference is given to using gibberellic acid. The gibberellins are known (cf. R. Wegler "Chemie der Pflanzenschutz- und Schädlingsbekämpfungsmittel" [Chemistry of the Crop Protection Compositions and Pesticides], vol. 2, Springer Verlag, 1970, p. 401-412).

The seed dressing formulations usable in accordance with the invention can be used, either directly or after previously having been diluted with water, for the treatment of a wide range of different seed, including the seed of transgenic plants. In this case, additional synergistic effects may also occur in interaction with the substances formed by expression.

For treatment of seed with the seed dressing formulations usable in accordance with the invention, or the preparations prepared therefrom by adding water, all mixing units usable customarily for the seed dressing are useful. Specifically, the procedure in the seed dressing is to place the seed into a mixer, to add the particular desired amount of seed dressing formulations, either as such or after prior dilution with water, and to mix everything until the formulation is distributed homogeneously on the seed. If appropriate, this is followed by a drying process.

Mycotoxins

In addition, the inventive active compound combinations or compositions can reduce the mycotoxin content in the harvested material and the foods and feeds prepared therefrom. Mycotoxins include particularly, but not exclusively, the following: deoxynivalenol (DON), nivalenol, 15-Ac-DON, 3-Ac-DON, T2- and HT2-toxin, fumonisins, zearalenon, moniliformin, fusarin, diaceotoxyscirpenol (DAS), beauvericin, enniatin, fusaroproliferin, fusarenol, ochratoxins, patulin, ergot alkaloids and aflatoxins which can be produced, for example, by the following fungi: *Fusarium* spec., such as *F. acuminatum*, *F. asiaticum*, *F. avenaceum*, *F. crookwellense*, *F. culmorum*, *F. graminearum* (*Gibberella zeae*), *F. equiseti*, *F. fujikoroi*, *F. musarum*, *F. oxysporum*, *F. proliferatum*, *F. poae*, *F. pseudograminearum*, *F. sambucinum*, *F. scirpi*, *F. semitectum*, *F. solani*, *F. sporotrichoides*, *F. langsethiae*, *F. subglutinans*, *F. tricinctum*, *F. verticillioides* etc., and also by *Aspergillus* spec., such as *A. flavus*, *A. parasiticus*, *A. nomius*, *A. ochraceus*, *A. clavatus*, *A. terreus*, *A. versicolor*, *Penicillium* spec., such as *P. verrucosum*, *P. viridicatum*, *P. citrinum*, *P. expansum*, *P. claviforme*, *P. roqueforti*, *Claviceps* spec., such as *C. purpurea*, *C. fusiformis*, *C. paspali*, *C. africana*, *Stachybotrys* spec. and others.

Material Protection

The inventive active compound combinations or compositions can also be used in the protection of materials, for protection of industrial materials against attack and destruction by harmful microorganisms, for example fungi and insects.

In addition, the active compound combinations or compositions can be used as antifouling compositions, alone or in combinations with other active ingredients.

Industrial materials in the present context are understood to mean inanimate materials which have been prepared for use in industry. For example, industrial materials which are to be protected by inventive active compound combinations from microbial alteration or destruction may be adhesives, glues, paper, wallpaper and board/cardboard, textiles, carpets, leather, wood, fibers and tissues, paints and plastic articles, cooling lubricants and other materials which can be infected with or destroyed by microorganisms. Parts of production plants and buildings, for example cooling-water circuits, cooling and heating systems and ventilation and air-conditioning units, which may be impaired by the proliferation of microorganisms may also be mentioned within the scope of the materials to be protected. Industrial materials within the scope of the present invention preferably include adhesives, sizes, paper and card, leather, wood, paints, cooling lubricants and heat transfer fluids, more preferably wood.

The inventive active compound combinations or compositions may prevent adverse effects, such as rotting, decay, discoloration, decoloration or formation of mould.

In the case of treatment of wood the active compound combinations or compositions according to the invention may also be used against fungal diseases liable to grow on or inside timber. The term “timber” means all types of species of wood, and all types of working of this wood intended for construction, for example solid wood, highdensity wood, laminated wood, and plywood. The method for treating timber according to the invention mainly consists in contacting one or more active compound combinations or compositions according to the invention; this includes for example direct application, spraying, dipping, injection or any other suitable means.

In addition, the active compound combinations or compositions can be used to protect objects which come into contact with saltwater or brackish water, especially hulls, screens, nets, buildings, moorings and signalling systems, from fouling.

The inventive method for controlling phytopathogenic fungi can also be employed for protecting storage goods. Storage goods are understood to mean natural substances of vegetable or animal origin or processed products thereof which are of natural origin, and for which long-term protection is desired. Storage goods of vegetable origin, for example plants or plant parts, such as stems, leaves, tubers, seeds, fruits, grains, can be protected freshly harvested or after processing by (pre)drying, moistening, comminuting, grinding, pressing

or roasting. Storage goods also include timber, both unprocessed, such as construction timber, electricity poles and barriers, or in the form of finished products, such as furniture. Storage goods of animal origin are, for example, hides, leather, furs and hairs. The inventive active compound combinations or compositions may prevent adverse effects, such as rotting, decay, discoloration, decoloration or formation of mould.

Microorganisms capable of degrading or altering the industrial materials include, for example, bacteria, fungi, yeasts, algae and slime organisms. The inventive active compound combinations or compositions preferably act against fungi, especially moulds, wood-discoloring and wood-destroying fungi (*Ascomycetes, Basidiomycetes*, *Deuteromycetes* and *Zygomycetes*), and against slime organisms and algae. Examples include microorganisms of the following genera: *Alternaria*, such as *Alternaria tenuis*; *Aspergillus*, such as *Aspergillus niger*; *Chaetomium*, such as *Chaetomium globosum*; *Coniophora*, such as *Coniophora puetana*; *Lentinus*, such as *Lentinus tigrinus*; *Penicillium*, such as *Penicillium glaucum*; *Polyporus*, such as *Polyporus versicolor*; *Aureobasidium*, such as *Aureobasidium pullulans*; *Sclerophoma*, such as *Sclerophoma pityophila*; *Trichoderma*, such as *Trichoderma viride*; *Ophiostoma* spp., *Ceratocystis* spp., *Humicola* spp., *Petriella* spp., *Trichurus* spp., *Coriolus* spp., *Gloeophyllum* spp., *Pleurotus* spp., *Poria* spp., *Serpula* spp. and *Tyromyces* spp., *Cladosporium* spp., *Paecilomyces* spp. *Mucor* spp., *Escherichia*, such as *Escherichia coli*; *Pseudomonas*, such as *Pseudomonas aeruginosa*; *Staphylococcus*, such as *Staphylococcus aureus*, *Candida* spp. and *Saccharomyces* spp., such as *Saccharomyces cerevisae.*

Antimycotic Activity

In addition, the inventive active compound combinationsou compositions also have very good antimycotic activity. They have a very broad antimycotic activity spectrum, especially against dermatophytes and yeasts, moulds and diphasic fungi (for example against *Candida* species, such as *C. albicans*, *C. glabrata*), and *Epidermophyton floccosum*, *Aspergillus* species, such as *A. niger* and *A. fumigatus*, *Trichophyton* species, such as *T. mentagrophytes*, *Microsporon* species such as *M. canis* and *M. audouinii*. The list of these fungi by no means constitutes a restriction of the mycotic spectrum covered, and is merely of illustrative character.

The inventive active compound combinations or compositions can therefore be used both in medical and in non-medical applications

Genetically modified organisms

As already mentioned above, it is possible to treat all plants and their parts in accordance with the invention. In a preferred embodiment, wild plant species and plant cultivars, or those obtained by conventional biological breeding methods, such as crossing or protoplast fusion, and also parts thereof, are treated. In a further preferred embodiment, transgenic plants and plant cultivars obtained by genetic engineering methods, if appropriate in combination with conventional methods (Genetically Modified Organisms), and parts thereof are treated. The terms “parts” or “parts of plants” or “plant parts” have been explained above. More preferably, plants of the plant cultivars which are commercially available or are in

use are treated in accordance with the invention. Plant cultivars are understood to mean plants which have new properties ("traits") and have been obtained by conventional breeding, by mutagenesis or by recombinant DNA techniques. They can be cultivars, varieties, bio- or genotypes.

The method of treatment according to the invention can be used in the treatment of genetically modified organisms (GMOs), e.g. plants or seeds. Genetically modified plants (or transgenic plants) are plants of which a heterologous gene has been stably integrated into genome. The expression "heterologous gene" essentially means a gene which is provided or assembled outside the plant and when introduced in the nuclear, chloroplastic or mitochondrial genome gives the transformed plant new or improved agronomic or other properties by expressing a protein or polypeptide of interest or by downregulating or silencing other gene(s) which are present in the plant (using for example, antisense technology, cosuppression technology, RNA interference – RNAi – technology or microRNA – miRNA - technology). A heterologous gene that is located in the genome is also called a transgene. A transgene that is defined by its particular location in the plant genome is called a transformation or transgenic event.

Plants and plant cultivars which are preferably to be treated according to the invention include all plants which have genetic material which impart particularly advantageous, useful traits to these plants (whether obtained by breeding and/or biotechnological means).

Plants and plant cultivars which are also preferably to be treated according to the invention are resistant against one or more biotic stresses, i.e. said plants show a better defense against animal and microbial pests, such as against nematodes, insects, mites, phytopathogenic fungi, bacteria, viruses and/or viroids.

Plants and plant cultivars which may also be treated according to the invention are those plants which are resistant to one or more abiotic stresses. Abiotic stress conditions may include, for example, drought, cold temperature exposure, heat exposure, osmotic stress, flooding, increased soil salinity, increased mineral exposure, ozone exposure, high light exposure, limited availability of nitrogen nutrients, limited availability of phosphorus nutrients, shade avoidance.

Plants and plant cultivars which may also be treated according to the invention, are those plants characterized by enhanced yield characteristics. Increased yield in said plants can be the result of, for example, improved plant physiology, growth and development, such as water use efficiency, water retention efficiency, improved nitrogen use, enhanced carbon assimilation, improved photosynthesis, increased germination efficiency and accelerated maturation. Yield can furthermore be affected by improved plant architecture (under stress and non-stress conditions), including but not limited to, early flowering, flowering control for hybrid seed production, seedling vigor, plant size, internode number and distance, root growth, seed size, fruit size, pod size, pod or ear number, seed number per pod or ear, seed mass, enhanced seed filling, reduced seed dispersal, reduced pod dehiscence and lodging resistance. Further yield traits include seed composition, such as carbohydrate content and composition for example

cotton or starch, protein content, oil content and composition, nutritional value, reduction in anti-nutritional compounds, improved processability and better storage stability.

Plants that may be treated according to the invention are hybrid plants that already express the characteristic of heterosis or hybrid vigor which results in generally higher yield, vigor, health and resistance towards biotic and abiotic stresses).

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may be treated according to the invention are herbicide-tolerant plants, i.e. plants made tolerant to one or more given herbicides. Such plants can be obtained either by genetic transformation, or by selection of plants containing a mutation imparting such herbicide tolerance.

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are insect-resistant transgenic plants, i.e. plants made resistant to attack by certain target insects. Such plants can be obtained by genetic transformation, or by selection of plants containing a mutation imparting such insect resistance.

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are tolerant to abiotic stresses. Such plants can be obtained by genetic transformation, or by selection of plants containing a mutation imparting such stress resistance.

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention show altered quantity, quality and/or storage-stability of the harvested product and/or altered properties of specific ingredients of the harvested product.

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as cotton plants, with altered fiber characteristics. Such plants can be obtained by genetic transformation, or by selection of plants contain a mutation imparting such altered fiber characteristics.

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as oilseed rape or related Brassica plants, with altered oil profile characteristics. Such plants can be obtained by genetic transformation, or by selection of plants contain a mutation imparting such altered oil profile characteristics.

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as oilseed rape or related Brassica plants, with altered seed shattering characteristics. Such plants can be obtained by genetic transformation, or by selection of plants contain a mutation imparting such altered seed shattering characteristics and include plants such as oilseed rape plants with delayed or reduced seed shattering.

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as Tobacco plants, with altered post-translational protein modification patterns.

The following examples are intended to illustrate the present invention.

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Examples:

A) Measurement of Phytotoxicity Reduction in the Field

The assessment of phytoxicity was done by using a scale of percentage varying between 0 – 100%. The scale means the estimation (%) of the plot injured by the fungicides spraying. When there is no phytotoxicity in the plot the number will be 0. As much as the injuries in the plot are increasing the number are getting bigger.

In all trials an untreated plot was set up that did not receive fungicide spraying in order to compare with the other treatments. For this evaluation the whole plot was assessed, excluding the borders (beginning and end of the plot), to get an estimation number (3, 5, 8, 12, 25%) of phytotoxicity. The assessment must be done in each reapplication and the interval of each assessment is 7 days. The results show an average percentage of injury (phyto) of each treatment.

The codes ABC means the number of applications.

Application A = application 1, B = application 2, C = application 3

The following active ingredients were used:

Aureo®: methylated soybean oil (EC 720)

Fox®: Prothioconazole (175 g/L) plus Trifloxytrobin (150 g/L)

Horos® Tebuconazole (200 g/L) plus Picoxystrobin (120 g/L)

Nimbus®: Mineral oil

Tabel 1: Mitigation studies program to reduce phytotoxicity caused by fungicides in soybean crop

		Ex. 1	**Ex. 2**	**Ex. 3**	**Ex. 4**	**Ex. 5**
Aactive Ingredient	**Application rate**	**14 DAC PR**	**14 DAC SP**	**14 DAC RS**	**14 DAC MT**	**14 DAC RS**
Un-treated	0	0	0	0	0	0
Fox®, 0,4 L/ha Aureo®, 0,25% v/v	Prothioconazole 70 g/ha Trifloxystrobin	1	3	0	7	3

ABC	60 g/ha					
Fox® 0,8 L/ha Aureo® 0,25% v/v ABC	Prothioconazole 140 g/ha Trifloxystrobin 120 g/ha	2	6	0	11	15
Fox® 0,4 L/ha Mancozeb 1,0 kg/ha ABC	Prothioconazole 70 g/ha Trifloxystrobin 60 g/ha Mancozeb 1000g/ha	0	0	0	6	3
Fox® 0,4 L/ha Mancozeb 1,5 kg/ha ABC	Prothioconazole 70 g/ha Trifloxystrobin 60 g/ha Mancozeb 1500g/ha	0	2	0	4	3
Horos® 0,5 L/ha Nimbus® 0,6 L/ha ABC	Tebuconazole 100 g/ha Picoxystrobin 60 g/ha	2	4	2	11	10

Continue Table 1:

Ex. 6	**Ex. 7**	**Ex. 8**	**Ex. 9**	**Ex. 10**	

Aactive Ingredient	**Application rate**	**14 DAC MS**	**14 DAC MS**	**21 DAC MS**	**14 DAC PR**	**21 DAC GO**	**Ø**
Un-treated	0	0	0	0	0	0	**0**
Fox®, 0,4 L/ha Aureo® 0,25% v/v ABC	Prothioconazole 70 g/ha Trifloxystrobin 60 g/ha	14	10	11	0	2	**5**
Fox® 0,8 L/ha Aureo® 0,25% v/v ABC	Prothioconazole 140 g/ha Trifloxystrobin 120 g/ha	27	17	25	10	7	**12**
Fox® 0,4 L/ha Mancozeb 1,0 kg/ha ABC	Prothioconazole 70 g/ha Trifloxystrobin 60 g/ha Mancozeb1000g /ha	5	1	4	2	2	**2**
Fox® 0,4 L/ha Mancozeb 1,5 kg/ha ABC	Prothioconazole 70 g/ha Trifloxystrobin 60 g/ha Mancozeb 1500g/ha	6	1	1	0	1	**2**
Horos® 0,5 L/ha Nimbus® 0,6 L/ha	Tebuconazole 100 g/ha Picoxystrobin	28	16	22	10	4	**11**

ABC	60 g/ha						

Table 1 shows the percentage (%) of phytotoxicity 14 and 21 DAC (Days after application C). The 10 trials were performed in different states of Brazil:

PR: Paraná, **SP**: São Paulo, **RS**: Rio Grande do Sul, **MT**: Mato Grosso, **MS**: Mato Grosso do Sul, **GO**: Goiás

Ø: Arithmetic mean

Fungicidal effect of the composition according to the invention on the soybean disease *Corynespora cassicola*:

Table 2: Fungicidal effect on *Corynespora cassicola*

Active Ingredient	**% Abott**
Fox® 0,4 L/ha Aureo® 0,25 % v/v	64
Fox® 0,8 L/ha Aureo® 0,25 % v/v	77
Fox® 0,4 L/ha Mancozeb® 1 kg/ha Aureo® 0,25 % v/v	76
Fox® 0,4 L/ha Mancozeb® 1,5 kg/ha Aureo® 0,25 % v/v	77
Horos® 0,5 L/ha Nimbus® 0,6 L/ha	39

In **Table 2** it could be observed that the treatment Fox® 0,4 L/ha + Aureo® 0,25% v/v provide 64% of control (% ABBOTT) and the treatments using Mancozeb (1 and 1,5 Kg/ha) in addition to Fox® 0,4 L/ha + Aureo® 0,25% v/v provide 76 and 77% of control.

B) Measurement of Phytotoxicity Reduction in the Greenhouse

Plant:

- soybean, var. Merlin
- grown in field soil a) under high (UV near) or b) low (HQI-lamps) light conditions in a greenhouse. Treatment at R1 (beginning of bloom)

Treatments (whole plant):

UTC

Fox® SC 325 (PTZ 175 + TFX 150): 0.4 L/ha,

0.8 L/ha

Antracol® WG 70 (PPB): 0.75 kg/ha

1.5 kg/ha

Fox® SC 325 + Antracol WG: 0.4 + 1.5

0.8 + 0.75

0.8 + 1.5

all treatments including 0.2% Aureo EC 720.

Compounds were applied with 400 l water /ha to ensure full coverage of the plants.

Evaluation:

Sum of % leaf damage on 2nd and 3rd Trifoliate, 7 days after treatment.

Results:

a) Plants grown under HQI greenhouse light

	Applied Dose [l or kg/ha]	**Sum PTX 2nd Trifoliate**	**Sum PTX 3rd Trifoliate**	**Sum PTX 2nd and 3rd Trifoliate**
Untreated Control	0	0	0	**0**

Fox® SC 325	0.4	26	50	**76**
Antracol® WG 70	1.5	0	0	**0**
Fox® SC 325 + Antracol® WG 70	0.4 + 1.5	39	18	**57**

b) Plants grown under high UV greenhouse light

	Applied Dose [l or kg/ha]	**Sum PTX 2nd Trifoliate**	**Sum PTX 3rd Trifoliate**	**Sum PTX 2nd and 3rd Trifoliate**
Untreated Control	0	0	0	**0**
Fox® SC 325	0.8	109	117	**226**
Antracol® WG 70	1.5	0	0	**0**
Fox® SC 325 + Antracol WG 70	0.8 + 0.75	60	82	**142**
Fox® SC 325 + Antracol® WG 70	0.8 + 1.5	119	64	**182**

Claims:

1. Method for reducing the phytotoxicity of a fungicidal composition, comprising at least prothiocanazole and trifloxystrobin, on soya plants, characterized in that multisite fungicides compounds capable to have a multisite action are added to the fungicidal composition.

2. Method according to Claim 1, characterized in that multisite fungicides compounds capable to have a multisite action are selected from the group consisting of chlorothalonil, mancozeb, metiram, metiram zinc, propineb, sulfur and sulfur preparations including calcium polysulfide.

3. Use of multisite fungicides compounds capable to have a multisite action for reducing the phytotoxicity of the fungicidal composition comprising prothiocanazole and trifloxystrobin on soya plants.

4. Fungicidal combinations comprising prothiocanazole and trifloxystrobin and at least one multisite fungicide compound capable to have a multisite action.

5. Fungicidal combinations according to claim according to Claim 4, characterized in that the multisite fungicide compound capable to have a multisite action is mancozeb.

6. Fungicidal combinations according to claim according to Claim 4, characterized in that the multisite fungicide compound capable to have a multisite action is propineb.

7. Composition comprising the fungicidal combination according to Claim 4 and at least one agriculturally suitable additive.

8. Method for reducing damage of plants and plant parts or losses in harvested fruits or vegetables caused by phytopathogenic fungi by controlling such phytopathogenic fungi, comprising applying the active compound combination according to Claim 4 or the composition according to Claim 7 to the plant or the phytopathogenic fungi or the habitat of the plant or the habitat of the phytopathogenic fungi.

9. Method for curatively or preventively controlling phytopathogenic fungi comprising the use of an active compound combination according to Claim 4 or a composition according to Claim 7 for control of soybean diseases.

10. Method according to Claim 9 characterized in that soybean diseases are *Cercospora kikuchii, Cercospora sojina; Colletotrichum gloeosporoides dematium var. truncatum; Corynespora casiicola; Diaporthe phaseolorum; Microsphaera diffusa; Peronospora manshurica; Phakopsora* species, for example *Phakopsora pachyrhizi* and *Phakopsora meibomiae* (*soybean rust*); *Rhizoctonia solani*; *Sclerotinia sclerotiorum; Septoria spp.* e.g. *Septoria glycines, Thielaviopsis basicola.*

11. Use of active compound combinations according to Claim 4 or compositions according to Claim 7 for the treatment of transgenic plants.

12. Use of active compound combinations according to Claim 4 or compositions according to Claim 7 for the treatment of seed, comprising contacting said seeds with the active compound combinations or compositions.

13. Seed treated with active compound combinations according to Claim 4 or crop protection compositions according to Claim 7.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/064346

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01N37/50 A01N43/653 A01N25/32 A01N25/00 A01N37/34
A01N47/14 A01N59/16 A01N59/02 A01P3/00
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01N

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2012/139889 A1 (BAYER CROPSCIENCE AG [DE]; WACHENDORFF-NEUMANN ULRIKE [DE]; WETCHOLOWS) 18 October 2012 (2012-10-18) examples; table 41	4,7,8
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X	WO 2015/079334 A1 (UPL LTD [IN]) 4 June 2015 (2015-06-04) abstract page 1, paragraph 1 page 12, paragraph 2 page 13, paragraph 2 page 20, paragraph 5	4,5,7-13

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 July 2016	28/07/2016

Name and mailing address of the ISA/	Authorized officer
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Claudia Godoy ET AL: "Eficiência de fungicidas para o controle da ferrugem-asiática da soja, Phakopsora pachyrhizi, na safra 2013/14: resultados sumarizados dos ensaios cooperativos", Circular Técnica 103, 1 January 2014 (2014-01-01), pages 1-7, XP055207300, Retrieved from the Internet: URL:http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0034-71672001000400005 [retrieved on 2015-08-11] figures 1-2; tables 2-3 page 4, column 1, paragraph 3 page 4, last paragraph - page 5, column 1, paragraph 2 -----	1-13
A	LUÍS HENRIQUE CARREGAL PEREIRA DA SILVA ET AL: "Control of Asian soybean rust with mancozeb, a multi-site fungicide", SUMMA PHYTOPATHOLOGICA, vol. 41, no. 1, 1 March 2015 (2015-03-01), pages 64-67, XP055207290, ISSN: 0100-5405, DOI: 10.1590/0100-5405/1957 abstract page 65, column 1, paragraph 4 - paragraph 6 page 67, column 1, paragraph 1 - paragraph 2 -----	1-13
A	"FOX", , 1 January 2014 (2014-01-01), pages 1-12, XP055207285, Retrieved from the Internet: URL:http://www.adapar.pr.gov.br/arquivos/File/defis/DFI/Bulas/Fungicidas/fox.pdf [retrieved on 2015-08-11] title "COMPOSICÃO"; page 1 page 3 title "INFORMACÕES PARA O MANEJO DE RESISTÊNCIA"; page 5 -----	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/064346

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