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(54) Title: COMPOSITION COMPRISING A PESTICIDAL TERPENE MIXTURE AND A BIOLOGICAL CONTROL AGENT

(57) Abstract: The present invention relates to a composition comprising a) a pesticidal terpene mixture comprising, as pesticidally active chemical compounds, α-terpinene, p-cymene and limonene and b) at least one biological control agent selected from specific microorganisms and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens in a synergistically effective amount. Furthermore, the present invention relates to the use of this composition as well as a method for reducing overall damage of plants and plant parts.

Composition comprising a pesticidal terpene mixture and a biological control agent

The present invention relates to a composition comprising a pesticidal terpene mixture and at least one biological control agent selected from specific microorganisms and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens in a synergistically effective amount. Furthermore, the present invention relates to the use of this composition as well as a method for reducing overall damage of plants and plant parts.

Synthetic insecticides or fungicides often are non-specific and therefore can act on organisms other than the target organisms, including other naturally occurring beneficial organisms. Because of their chemical nature, they may be also toxic and non-biodegradable. Consumers worldwide are increasingly conscious of the potential environmental and health problems associated with the residuals of chemicals, particularly in food products. This has resulted in growing consumer pressure to reduce the use or at least the quantity of chemical (i. e. synthetic) pesticides. Thus, there is a need to manage food chain requirements while still allowing effective pest control.

A further problem arising with the use of synthetic insecticides or fungicides is that the repeated and exclusive application of an insecticide or fungicides often leads to selection of resistant animal pests or microorganisms. Normally, such strains are also cross-resistant against other active ingredients having the same mode of action. An effective control of the pathogens with said active compounds is then not possible any longer. However, active ingredients having new mechanisms of action are difficult and expensive to develop.

The risk of resistance development in pathogen populations as well as environmental and human health concerns have fostered interest in identifying alternatives to synthetic insecticides and fungicides for managing plant pests and diseases.

Natural insecticides are one approach for solving the above-mentioned problems. However, they are still not entirely satisfactory.

The use of biological control agents (BCAs) is another alternative. However, the effectiveness of most BCAs is not at the same level as for conventional insecticides and fungicides, especially in case of severe infection pressure. Consequently, known biological control agents, their mutants and metabolites produced by them are, in particular in low application rates, not entirely satisfactory.

Thus, there is a constant need for developing new, alternative plant protection agents which in some areas at least help to fulfill the above-mentioned requirements.

A known simulated natural pesticide is Requiem®, which contains a mixture of three terpenes, i.e. α-terpinene, p-cymene and limonene, as pesticidally active ingredients. It is disclosed in US 2010/0316738 corresponding to WO 2010/144919 and the references cited therein, which are incorporated herein by reference. WO 2010/144919 also discloses the use of the terpene mixture disclosed in this document in combination with one or more additional pesticidally active ingredients against plant pests, such as a carrier, a solvent or another pesticide such as another insecticide or biopesticide. Examples for additional pesticides which are disclosed in the document are fungicides, insecticides, miticides or acaricides, bactericides and the like as well as combinations thereof.

The use of extracts comprising these three terpenes obtained from *Chenopodium ambrosioides* for controlling insect or mite infestation on plants is known, including the use of such extracts that include natural terpenes isolated form *Chenopodium*. See e.g. US 2003/0091657 and US 2009/0030087, WO 2001/067868 and WO 2004/006679 and William Quarles (1192) Botanical Pesticides from Chenopodium, The IPM Practitioner Volume XIV, Number 2, 11 pages; and Lorenzo Sagero-Nieves (Mar/Apr 1995) Volatile Constituents from the Leaves of Chenopodium ambrosioides L., J. Essent. Oil Res. 7:221-223.

In view of this, it was in particular an object of the present invention to provide compositions which exhibit activity against insects, mites, nematodes and/or phytopathogens. Moreover, it was a further particular object of the present invention, to reduce the application rates and broaden the activity spectrum of the biological control agents or the insecticides, and thereby to provide a composition which, preferably at a reduced total amount of active compounds applied, has improved activity against insects, mites, nematodes and/or phytopathogens. In particular, it was a further object of the present invention to provide a composition which, when applied to a crop, results in a decreased amount of residues in the crop, thereby reducing the risk of resistance formation and nevertheless provides efficient pest and/or disease control.

Accordingly, it was found that these objectives are at least partly solved by the compositions according to the invention as defined in the following. The composition according to the present invention preferably fulfills the above-described needs. It has been discovered surprisingly that the application of the compositions according to the present invention in a simultaneous or sequential way to plants, plant parts, harvested fruits, vegetables and/or plant's locus of growth preferably allows better control of insects, mites, nematodes and/or phytopathogens than it is possible with the pesticidal terpene mixture and with the individual strains, their mutants and/or their metabolites produced by the strains on the other hand, alone (synergistic mixtures). By applying the pesticidal terpene mixture and the the strains, their mutants and/or their metabolites produced by the strains according to the invention, the activity against insects, mites, nematodes and/or phytopathogens is preferably increased in a super additive manner. Preferably, the application of the composition according to the invention induces an increase in the activity against phytopathogens in a superadditive manner.

As a consequence, the compositions according to the present invention preferably allow reduced total amounts of the pesticidal terpene mixture to be used and thus the crops which have been treated by these compositions preferably show lowered amounts of residues in the crops treated with them. Further, the risk of resistance formation of animal pests is reduced.

The present invention is directed to a composition comprising a pesticidal terpene mixture comprising the three terpenes α-terpinene, p-cymene and limonene, and optionally minor terpene ingredients and impurities, which are e.g. found in essential oil extracts from *Chenopodium ambrosioides* near *ambrosioides* such as thymol, carvacrol, carvone, carveol, and/or nerol, and at least one biological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens in synergistically effective amounts.

Furthermore, the present invention relates to a kit of parts comprising the pesticidal terpene mixture comprising the three terpenes as mentioned before and at least one biological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens. The present invention is further directed to the use of said composition as an insecticide, and/or miticide, and/or nematicide and/or fungicide. Moreover, it is directed to the use of said composition for reducing overall damage of plants and plant parts as well as losses in harvested fruits or vegetables caused by insects, mites, nematodes and/or phytopathogens.

Additionally, the present invention provides a method for reducing overall damage of plants and plant parts as well as losses in harvested fruits or vegetables caused by insects, mites, nematodes and/or phytopathogens.

Pesticidal terpene mixture

In general "pesticidal" means the ability of a substance to increase mortality or inhibit the growth rate of plant pests. The term is used herein, to describe the property of a substance to exhibit activity against insects, mites, nematodes and/or phytopathogens. In the sense of the present invention the term "pests" include insects, mites, nematodes and/or phytopathogens.

"Insecticides" as well as the term "insecticidal" refers to the ability of a substance to increase mortality or inhibit growth rate of insects. As used herein, the term "insects" includes all organisms in the class "Insecta". The term "pre-adult" insects refers to any form of an organism prior to the adult stage, including, for example, eggs, larvae, and nymphs.

"Nematicides" and "nematicidal" refers to the ability of a substance to increase mortality or inhibit the growth rate of nematodes. In general, the term "nematode" comprises eggs, larvae, juvenile and mature forms of said organism.

"Acaricide" and "acaricidal" refers to the ability of a substance to increase mortality or inhibit growth rate of ectoparasites belonging to the class Arachnida, sub-class Acari.

The pesticidal terpene mixture of the invention comprises, as essential components, the terpenes α-terpinene, p-cymene and limonene.

The pesticidal mixture according to the invention may be obtained from any source such as, for example, as an extract from *Chenopodium ambrosioides* near *ambrosioides*, or as an extract from another plant genus/species that produces such terpenes, or produced synthetically (i.e. by a chemical synthesis process), and/or as a compound produced naturally by any organism (i.e. as a compound separate from an extract per se). The three terpenes may be from natural extracts obtained from *Chenopodium ambrosioides* near *ambrosioides*, or they are from natural analogs of such terpenes as extract from other plant species or other organisms. They may all three be synthetic versions of the terpenes obtainable from *Chenopodium ambrosioides* near *ambrosioides* or other plant species or other organisms. They may further be any possible combination of natural and/or synthetic versions of the three terpenes. Finally, the three terpenes can be obtained from any source or by any means except from an extract of *Chenopodium ambrosioides* near *ambrosioides.*

Limonene exists in two enantiomeric forms, d- and l-limonene, which are both included in the invention.

The pesticidal terpene mixture of the invention may, in a preferable embodiment, include only the essential oil extracts from or based on those found in *Chenopodium ambrosioides* near *ambrosioides.* It may aslo include only a synthetic blend simulating the essential oil extract from or based on those found in *Chenopodium ambrosioides* near *ambrosioides.* Further, it may include a mixture of the essential oil extract and the synthetic blend. It may be "normalized" by adding specific amounts of synthetic versions of one or more of the terpene compounds found in the natural extract and/or synthetic terpenes so as to produce a composition with a set ratio of the three terpenes.

More preferably, the pesticidal terpene mixture of the invention comprises the three substantially pure terpenes α-terpinene, p-cymene and limonene. Preferably, the pesticidal terpene mixture does not contain thymol, carvacrol, carvone, carveol (cis and trans), nerol and/or γ-terpinene, which are present in the extract from *Chenopodium ambrosioides* near *ambrosioides* at low levels. More preferably, the pesticidal terpene mixture does not contain said five terpenes and does not contain any other essential oils except those other essential oils that are present as minor impurities in the substantially pure α-terpinene, p-cymene and limonene. In the most preferred embodiment the pesticidal terpene mixture does not contain essential oils other than α-terpinene, p-cymene and limonene.

It is particularly preferred that the pesticidal terpene mixture of the invention does not comprise the bicyclic monoterpene ascaridole due to the mammalian toxicity of this compound which can be present in natural extracts from *Chenopodium ambrosioides* depending on the cultivar and the growing conditions.

In particular embodiments, the simulated blends in the above compositions are not from an extract of *Chenopodium ambrosioides* or from an extract of *Chenopodium*.

In one embodiment, the pesticidally active compositions of the present invention only include the essential oil extracts from or based on those found in *Chenopodium ambrosioides* near *ambrosioides*. In another embodiment, the pesticidally active compositions ofthe present invention only include a synthetic blend simulating the essential oil extract from or based on those found in *Chenopodium ambrosioides* near *ambrosioides*. In another embodiment, the pesticidally active compositions of the present invention include a mixture of the essential oil extract and the synthetic blend. In some embodiments, the compositions to be applied to plants as a protectant are "normalized" by adding specific amounts of synthetic versions of one or more of the terpene compounds found in the natural extract and/or synthetic terpenes so as to produce a composition with a set ratio of the three terpenes, such as the ratio observed in certain standardized or preferred natural extracts from or based on those found in *Chenopodium*. In still other embodiments, the compositions used in the methods of the present invention are reconstituted, as explained more herein.

In some embodiments, the simulated blends simulating the *Chenopodium* extract consist essentially of natural analogs of such terpenes trom other plant species or other organisms, and/or the synthetic versions of such terpenes. In some embodiments, simulated blends comprise the three substantially pure α-terpinene, p-cymene and Iimonene, optionally with at least one volume filler that replaces the volume taken up by the minor components normally present in the extract of *Chenopodium ambrosioides* near a*mbrosioides*.

In further embodiments, the simulated blends consist essentially of α-terpinene, p-cymene and Iimonene, and an oil wherein the α-terpinene, p-cymene and Iimonene are substantially pure and are not obtained from a *Chenopodium* extract, and wherein the excipient is not an essential oil.

In some embodiments the Iimonene is prepared from citrus peels or pines by cold press method.

The concentration of the α-terpinene in the pesticidal terpene mixture of the invention ranges from about 30 to about 70 %, preferably 35 % to 45 % and most preferably about 39 % by weight, the concentration of p-cymene in the pesticidal terpene mixture ranges from about 10 % to about 30 %, preferably from about 15 % to about 25 % and most preferably about 17 % by weight, and the concentration of limonene in the pesticidal terpene mixture ranges from about 1 % to about 20 %, preferably from about 5 % to about 15 % by weight and most preferably about 12 %, all based on the terpene mixture. In the most

preferable embodiment of the invention, the absolute concentrations of α-terpinene is about 36 %, that of p-cymene is about 14.9 % and that of limonene is about 11.4 % by weight, all based on the pesticidal terpene mixture. Preferably, the relative ratio of α-terpinene, p-cymene and limonene in the pesticidal terpene mixture is 35-45 α-terpinene to about 12-20 p-cymene to about 10-15 limonene. Examples for preferable relative ratios of α-terpinene, p-cymene and limonene are 39:17:12, or about 40:15:12, or about 36:14.9:11.4, or about 10.175:3.9:3.05.

In some embodiments, the concentration of substantially pure α-terpinene in the compositions is about 39% by weight; the concentration of substantially pure p-cymene in the compositions is about 17% by weight, and the concentration of substantially pure limonene in the compositions is about 12% by weight.

According to the invention the concentration of each pesticidally active terpene can be higher or lower than in the essential oil extract from *Chenopodium ambrosioides* near *ambrosioides*, but roughly maintaining the relative ratio to each other as in the essential oil extract.

The pesticidal terpene mixture of the invention can be obtained as an extract from *Chenopodium ambrosioides* near *ambrosoides*, as described in US 2009/0091657 and US 2009/0030087 as well as WO 2001/067868 and WO 2004/006679. It is also described in detail in US 61/213,470, US 61/246,872, US 61/247,885, US 61/256,257, US 61/286,314 and US 61/329,020, and it can be obtained as disclosed in US 2010/0316738 corresponding to WO 2012/14419. The disclosure of these documents is incorporated herein by reference.

α-Terpinene, p-cymene and limonene are publicly available, can be produced synthetically using known methods or can be purified from various plant extracts according to methods generally known in the art. Further, all three of the terpenes are commercially available (e.g. Sigma-Aldrich®, Acros Organics, MP Biomedicals, Merck Chemicals).

At least the following plant species produce α-terpinene: *Anethum graceolens, Artemisia argyi, Cuminum cyminum, Elattaria cardamonum, Melaleuca alternifolia, Cardamom spp.* and *Origanum majorana*.

At least the following plant species produce limonene, including d-limonene: *Anethum graceolens, Anethum sowa, Carum carvi, Citrus, Foeniculum vulgare, Mentha piperita* and *Peppermint*. Limonene may be obtained by steam distillation after alkali treatment of citrus peels and pulp, and also by fractionation of orange oil.

At least the following plant species produce p-cymene: *Coridothymus sativum, Coridothymus captitatus, Cuminum cyminum, Origanum vulgare* and *Thymus vulgaris*. Additional plants that produce the three terpenes are known in the art.

Essential oils and/or certain fractions of essential oils (e.g. certain terpenes) can be extracted from a plant by distillation.

"Essential oils" means the volatile, aromatic oils obtained by steam or hydrodestillation of plant material and may include, but are not restricted to, being primarily composed of terpenes and their oxygenated derivatives. Essential oils can be obtained from, for example, flowers, leaves, seeds, roots, stems, bark, wood etc. Extraction and distillation methods of essential oils are known in the art.

A particularly preferable pesticidal terpene mixture of the invention is commercially available from the company AgraQuest under the trade name Requiem®. Preferably, this commercial product is used as pesticidal terpene mixture according to the invention. Besides the three terpenes α-terpinene, p-cymene and limonene, Requiem® contains excipients, solvents and other ingredients. In the following, all amounts of the "pesticidal terpene mixture of the invention" mentioned in connection with Requiem®, refer to the amount of the three terpenes contained in Requiem®, and not to the amount of the complete product Requiem®.

Biological control agents

As used herein, "biological control" is defined as control of a pathogen and/or insect and/or an acarid and/or a nematode by the use of a second organism. Known mechanisms of biological control include enteric bacteria that control root rot by out-competing fungi for space on the surface of the root. Bacterial toxins, such as antibiotics, have been used to control pathogens. The toxin can be isolated and applied directly to the plant or the bacterial species may be administered so it produces the toxin in situ.

Biological control agents include in particular bacteria, fungi or yeasts, protozoa, viruses, entomopathogenic nematodes, Inoculants and botanicals and/or mutants of them having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens.

According to the invention, biological control agents which are summarized under the term "bacteria" include spore-forming, root-colonizing bacteria, or bacteria and their metabolites useful as biological insecticdes, -nematicdes, miticides, or -fungicide or soil amendments improving plant health and growth. Examples of such bacteria to be used or employed according to the invention are (The numbering is used throughout the complete following description of the invention):

(1.1) *Agrobacterium radiobacter*, (1.2) *Bacillus acidocaldarius*, (1.3) *Bacillus acidoterrestris*, (1.4) *Bacillus agri*, (1.5) *Bacillus aizawai*, (1.6) *Bacillus albolactis*, (1.7) *Bacillus alcalophilus*, (1.8) *Bacillus alvei*, (1.9) *Bacillus aminoglucosidicus*, (1.10) *Bacillus aminovorans*, (1.11) *Bacillus amylolyticus* (also

known as Paenibacillus amylolyticus) (1.12) *Bacillus amyloliquefaciens*, in particular strain IN937a, or strain FZB42 (product known as RhizoVital®), or strain B3, (1.13) *Bacillus aneurinolyticus*, (1.14) *Bacillus atrophaeus*, (1.15) *Bacillus azotoformans* , (1.16) *Bacillus badius* , (1.17) *Bacillus cereus* (synonyms: *Bacillus endorhythmos*, *Bacillus medusa*), in particular spores of *B. cereus* strain CNCM I-1562 (cf. US 6,406,690), (1.18) *Bacillus chitinosporus*, (1.19*)* *Bacillus circulans* (1.20) *Bacillus coagulans*, (1.21) *Bacillus endoparasiticus* (1.22) *Bacillus fastidiosus*, (1.23) *Bacillus firmus*, in particular strain I-1582 (products known as Bionem, Votivo, Flocter), (1.24) *Bacillus kurstaki* , (1.25) *Bacillus lacticola* , (1.26) *Bacillus lactimorbus*, (1.27) *Bacillus lactis*, (1.28) *Bacillus laterosporus* (also known as *Brevibacillus laterosporus*), (1.29) *Bacillus lautus*, (1.30) Bacillus lentimorbus, (1.31) *Bacillus lentus*, (1.32) *Bacillus licheniformis*, (1.33) *Bacillus maroccanus*, (1.34) *Bacillus megaterium* (products known as BioArc), (1.35) *Bacillus metiens*, (1.36) *Bacillus mycoides* isolate J, (1.37) *Bacillus natto*, (1.38) *Bacillus nematocida*, (1.39) *Bacillus nigrificans*, (1.40) *Bacillus nigrum*, (1.41) *Bacillus pantothenticus*, (1.42) *Bacillus popillae* (products known as Cronox), (1.43) *Bacillus psychrosaccharolyticus*, (1.44) *Bacillus pumilus*, in particular strain GB34 (products known as Yield Shield®,) and strain QST2808 (products known as Sonata QST 2808®), (1.45) *Bacillus siamensis*, (1.46) *Bacillus smithii*, (1.47) *Bacillus sphaericus* (products known as VectoLexs®), (1.48) *Bacillus subtilis*, in particular strain GB03 (products known as Kodiak®), strain QST 713 (products known as Serenade QST 713®), strain AQ30002 (aka QST30002; NRRL Accession No. B-50421, known from WO 2012/087980, which is incorporated herein by reference), strain AQ30004 (aka QST30004; NRRL Accession No. B-50455, known from WO 2012/087980, which is incorporated herein by reference), or *B. subtilis var. amyloliquefaciens* strain FZB24 (products known as Taegro®), (1.49) *Bacillus thuringiensis*, in particular *B. thuringiensis var. israelensis* (products known as VectoBac®) or *B. thuringiensis subsp. aizawai* strain ABTS-1857 (products known as XenTari®), or *B. thuringiensis subsp. kurstaki* strain HD-1 (products known as Dipel® ES) or *B. thuringiensis subsp. tenebrionis* strain NB 176 (products known as Novodor® FC), or *B. th. var. aegyptii* (products known as Agerin) , or *B. th. var. colmeri* (products known as TianBaoBTc) , or *B. th. var. darmstadiensis* (products known as Baciturin, Kolepterin) , or *B. th. var. dendrolimus* (products known as Dendrobacillin) , or *B. th. var. galleriae* ((products known as Enterobactin) , or *B. th. var. japonensis* (products known as Buihunter) , or *B.th. subsp. Morrisoni*, or *B. th. var. san diego*, or *B. th. subsp. thuringiensis* strain MPPL002, or *B. th. var. thuringiensis* (products known as Bikol), *or B. th. var 7216* (products known as Amactic, Pethian), or *B. th. var T36* (products known as Cahat), (1.50) *Bacillus uniflagellatus*, (1.51) *Bradyrhizobium japonicum* (Symbiont, products known as SoySelect), (1.52) *Brevibacillus brevis* (formerly *Bacillus brevis*), in particular strains SS86-3, SS86-4, SS86-5, 2904, (1.53) *Brevibacillus laterosporus* (formerly *Bacillus laterosporus*), in particular strains 64, 1111, 1645, 1647, (1.54) *Chromobacterium subtsugae*, in particular strain PRAA4-1T (products known as Gandevo), (1.55) *Delftia acidovorans*, in particular strain RAY209 (products known as BioBoost®), (1.56) *Lactobacillus acidophilus* (products known as Fruitsan), (1.57) *Lysobacter antibioticus*, in particular strain 13-1 (cf. Biological Control 2008, 45, 288-296), (1.58) *Lysobacter enzymogenes*, in particular strain C3 (cf. J Nematol. 2006 June; 38(2): 233–239), (1.59) *Paenibacillus*

alvei, in particular strains III3DT-1A, III2E, 46C3, 2771 (Bacillus genetic stock center, Nov 2001), (1.60) *Paenibacillus polymyxa*, (1.61) *Paenibacillus popilliae* (formerly *Bacillus popilliae*), (1.62) *Pantoea agglomerans*, (1.63) *Pasteuria penetrans* (formerly *Bacillus penetrans*), products known as Pasteuria wettable powder, (1.64) *Pasteuria usgae* (products known as Econem™), (1.65) *Pectobacterium carotovorum* (formerly *Erwinia carotovora)* products known as BioKeeper, (1.66) *Pseudomonas aeruginosa* (products known as Guiticid), (1.67) *Pseudomonas aureofaciens* (products known as Agate-25K), (1.68) *Pseudomonas cepacia* (formerly known as Burkholderia cepacia), in particular strains M54 or J82, (1.69) *Pseudomonas chlororaphis*, in particular strain MA 342 (products known as Cedomon), (1.70) *Pseudomonas fluorescens* (products known as Sudozone), (1.71) *Pseudomonas proradix* (products known as Proradix®), (1.72) *Pseudomonas putida* (products known as Nematsid, (1.73*)* *Pseudomonas resinovorans* (products known as Solanacure), (1.74) *Pseudomonas syringae* (products known as Biosave), (1.75) *Serratia entomophila* (products known as invade), (1.76) *Serratia marcescens*, in particularstrain SRM (MTCC8708) or strain R35, (1.77) *Streptomyces candidus* (products known as BioAid™), (1.78) *Streptomyces colombiensis* (products known as Mycoside), (1.79) *Streptomyces galbus*, in particular strain K61 (products known as Mycostop®, cf. Crop Protection 2006, 25, 468-475) or strain QST 6047, (1.80) *Streptomyces goshikiensis* (products known as Safegro), (1.81) *Streptomyces griseoviridis* (products known as Mycostop®, cf. Microbial db of Canada), (1.82) *Streptomyces lavendulae* (products known as Phytolavin-300, (1.83) *Streptomyces lydicus*, in particular strain WYCD108 (products known as ActinovateSP) or strain WYEC108 (products known as Actino-iron), (1.84) *Streptomyces prasinus* (cf. "Prasinons A and B: potent insecticides from *Streptomyces prasinus*" Applied microbiology 1973 Nov), (1.85) *Streptomyces rimosus* (products known as Rhitovit), (1.86) *Streptomyces saraceticus* (products known as Clanda), (1.87) *Streptomyces venezuelae,* (1.88) *Xanthomonas campestris* (herbicidal activity), (1.89) *Xenorhabdus luminescens*, (1.90) and *Xenorhabdus nematophila.*

Preferred bacteria are:

(1.12) *Bacillus amyloliquefaciens*, in particular strain IN937a, or strain FZB42 (product known as RhizoVital®),

(1.14) *Bacillus atrophaeus*,

(1.17) *Bacillus cereus* (synonyms: *Bacillus endorhythmos*, *Bacillus medusa*), in particular spores of *B. cereus* strain CNCM I-1562 (cf. US 6,406,690), (1.18) *Bacillus chitinosporus*, (1.19*)* *Bacillus circulans* (1.20) *Bacillus coagulans*,

(1.23) *Bacillus firmus*, in particular strain I-1582 (products known as Bionem, Votivo, Flocter),

(1.42) *Bacillus popillae* (products known as Cronox),

(1.44) *Bacillus pumilus*, in particular strain GB34 (products known as Yield Shield®,) and strain QST2808 (products known as Sonata QST 2808®), (1.47) *Bacillus sphaericus* (products known as VectoLexs®), (1.48) *Bacillus subtilis*, in particular strain GB03 (products known as Kodiak®), strain QST 713 (products known as Serenade QST 713®), strain AQ30002 (aka QST30002; NRRL Accession

No. B-50421, known from WO 2012/087980, which is incorporated herein by reference), strain AQ30004 (aka QST30004; NRRL Accession No. B-50455, known from WO 2012/087980, which is incorporated herein by reference), or *B. subtilis var. amyloliquefaciens* strain FZB24 (products known as Taegro®), (1.49) *Bacillus thuringiensis*, in particular *B. thuringiensis var. israelensis* (products known as VectoBac®) or *B. thuringiensis subsp. aizawai* strain ABTS-1857 (products known as XenTari®), or *B. thuringiensis subsp. kurstaki* strain HD-1 (products known as Dipel® ES) or *B. thuringiensis subsp. tenebrionis* strain NB 176 (products known as Novodor® FC), or *B. th. var. aegyptii* (products known as Agerin) , or *B. th. var. colmeri* (products known as TianBaoBTc) , or *B. th. var. darmstadiensis* (products known as Baciturin, Kolepterin) , or *B. th. var. dendrolimus* (products known as Dendrobacillin) , or *B. th. var. galleriae* ((products known as Enterobactin) , or *B. th. var. japonensis* (products known as Buihunter) , or *B.th. subsp. Morrisoni*, or *B. th. var. san diego*, or *B. th. subsp. thuringiensis* strain MPPL002, or *B. th. var. thuringiensis* (products known as Bikol), *or B. th. var 7216* (products known as Amactic, Pethian), or *B. th. var T36* (products known as Cahat), (1.50) *Bacillus uniflagellatus*, (1.52) *Brevibacillus brevis* (formerly *Bacillus brevis*), in particular strains SS86-3, SS86-4, SS86-5, 2904, (1.53) *Brevibacillus laterosporus* (formerly *Bacillus laterosporus*), in particular strains 64, 1111, 1645, 1647, (1.54) *Chromobacterium subtsugae*, in particular strain PRAA4-1T (products known as Gandevo), (1.55) *Delftia acidovorans*, in particular strain RAY209 (products known as BioBoost®), (1.56) *Lactobacillus acidophilus* (products known as Fruitsan), (1.57) *Lysobacter antibioticus*, in particular strain 13-1 (cf. Biological Control 2008, 45, 288-296),*Pectobacterium carotovorum* (formerly *Erwinia carotovora)* products known as BioKeeper, *Streptomyces griseoviridis* (products known as Mycostop®)

Particularly preferred bacteria are:

(1.23) *Bacillus firmus*, in particular strain I-1582 (products known as Bionem, Votivo, Flocter), disclosed in US 6,406,690 (which is herein incorporated by reference),

(1.44) *Bacillus pumilus*, in particular strain GB34 (products known as Yield Shield®,) and strain QST2808 (products known as Sonata QST 2808®), (1.48) *Bacillus subtilis*, in particular strain GB03 (products known as Kodiak®, c.f. US EPA, Pesticide Fact Sheet -- Bacillus subtilis GB03 1992), strain QST 713 (products known as Serenade QST 713®), strain AQ30002 (aka QST30002; NRRL Accession No. B-50421, known from WO 2012/087980, which is incorporated herein by reference), and strain AQ30004 (aka QST30004; NRRL Accession No. B-50455, known from WO 2012/087980, which is incorporated herein by reference).According to the invention biological control agents that are summarized under the term "fungi" or "yeasts" are as examples the following organisms and and/or mutants of them having all identifying characteristics of the respective strain, and/or metabolites produced by the respective strain that exhibit activity against insects, mites, nematodes and/or phytopathogens (the numbering is used in the complete description):

(2.1) *Ampelomyces quisqualis*, in particular strain AQ 10 (product known as AQ 10®), (2.2) *Aureobasidium pullulans*, in particular blastospores of strain DSM14940 or blastospores of strain DSM 14941 or mixtures thereof (product known as Blossom Protect®), (2.3) *Aschersonia aleyrodes*, (2.4) *Aspergillus flavus*, in particular strain NRRL 21882 (products known as Afla-Guard®), (2.5) *Arthrobotrys superba* (Corda 1839), (2.6) *Beauveria bassiana*, in particular strain ATCC 74040 (products known as Naturalis®) and strain GHA (products known as Mycotrol, BotaniGard), (2.7) *Beauveria brongniartii* (products known as Beaupro), (2.8) *Candida oleophila*, in particular strain O (products known as Nexy ®, Aspire), (2.9) *Chaetomium cupreum* (products known as Ketocin), (2.10) *Cladosporium cladosporioides*, in particular strain H39, (2.11) *Conidiobolus obscurus*, (2.12) *Coniothyrium minitans*, in particular strain CON/M/91-8 (products known as Contans ®), (2.13) *Dilophosphora alopecuri* (products known as Twist Fungus ®), (2.14) *Entomophthora virulenta* (products known as Vektor), (2.15) *Fusarium oxysporum*, in particular strain Fo47 (non-pathogenic) (products known as Fusaclean), (2.16) *Gliocladium catenulatum*, in particular strain J1446 (products known as Prestop ® or Primastop), (2.17) *Hirsutella thompsonii* (products known as Mycohit or ABTEC), (2.18) *Lagenidium giganteum* (products known as Laginex® by AgraQuest, Inc.), (2.19) *Lecanicillium lecanii* (formerly known as *Verticillium lecanii*), in particular conidia of strain KV01 (products known as Mycotal®, Vertalec®), (2.20) *Metarhizium anisopliae*, in particular strain F52 (products known as BIO 1020 or Met52), or *M. a. var acridum* (products known as Green Muscle), (2.21) *Metarhizium flavoviride*, (2.22) *Metschnikovia fructicola*, in particular the strain NRRL Y-30752 (product known as Shemer ®), (2.23) *Microsphaeropsis ochracea* (products known as Microx®), (2.24) *Mucor haemelis* (product known as BioAvard), (2.25) *Muscodor albus*, in particular strain QST 20799 (products known as Arabesque™ or Andante™), (2.26) *Myrothecium verrucaria*, in particular strain AARC-0255 (products known as DiTera™), (2.27) *Nomuraea rileyi*, in particular strains SA86101, GU87401, SR86151, CG128 and VA9101 (products known as Kongo®), (2.28) *Ophiostoma piliferum*, in particular strain D97 (products known as Sylvanex), (2.29) *Paecilomyces fumosoreus*, in particular strain apopka 97 (products known as PreFeRal), (2.30) *Paecilomyces lilacinus*, in particular spores of *P. lilacinus* strain 251 (products known as BioAct®, cf. *Crop Protection* 2008, *27*, 352-361), (2.31) *Paecilomyces variotii*, in particular strain Q-09 (products known as Nemaquim), (2.32) *Pandora delphacis*, (2.33) *Penicillium bilaii*, in particular strain ATCC22348 (products known as JumpStart®, PB-50, Provide), (2.34) *Penicillium vermiculatum* (products known as Vermiculen), (2.35) *Phlebiopsis (=Phlebia = Peniophora) gigantea* (products known as Rotstop), (2.36) *Pichia anomala*, in particular strain WRL-076, (2.37) *Pochonia chlamydosporia*, (2.38) *Pseudozyma flocculosa*, in particular strain PF-A22 UL (products known as Sporodex ® L), (2.39) *Pythium oligandrum*, in particular strain DV74 (products known as Polyversum), (2.40) *Sporothrix insectorum* (products known as Sporothrix), (2.41) Talaromyces flavus, (2.42) *Trichoderma album* (products known as Bio-Zeid), (2.43) *Trichoderma asperellum*, in particular strain ICC 012 (products known as Bioten ®), (2.44) *Trichoderma gamsii (*formerly *T. viride*), in particular mycelial fragments,conidia & chlamydospores of strain ICC080 (products known as Bioderma), (2.45) *Trichoderma harmatum*, (2.46) *Trichoderma harzianum*, in

particular *T. harzianum T39* (products known as Trichodex ®), (2.47) *Trichoderma koningii* (products known as Trikot-S Plus), (2.48) *Trichoderma lignorum* (products known as Mycobac), (2.49) *Trichoderma polysporum*, in particular strain IMI 206039, (2.50) *Trichoderma* virens (formerly *Gliocladium virens*), (products known as SoilGard), (2.51) *Tsukamurella paurometabola* (products known as HeberNem®), (2.52) *Ulocladium oudemansii* (products known as Botry-Zen), (2.53) *Verticillium albo-atrum*, in particular strain WCS850, (2.54) *Verticillium chlamydosporium* (products known as Varsha), (2.55) *Verticillium dahliae* (products known as Dutch Trig), and (2.56) *Zoophtora radicans.*

Preferred fungi are:

(2.6) *Beauveria bassiana*, in particular strain ATCC 74040 (products known as Naturalis®) and strain GHA (products known as Mycotrol, BotaniGard), (2.7) *Beauveria brongniartii* (products known as Beaupro),

(2.17) *Hirsutella thompsonii* (products known as Mycohit or ABTEC),

(2.26) *Myrothecium verrucaria*, in particular strain AARC-0255 (products known as DiTera™),

(2.51) *Tsukamurella paurometabola* (products known as HeberNem®).

According to the invention biological control agents that are summarized under the term "protozoas" are the following examples (the numbering is used in the complete description):

(3.1) *Nosema locustae* (products known as NoloBait), (3.2) *Thelohania solenopsis* and (3.3) *Vairimorpha spp.*.

According to the invention biological control agents that are summarized under the term "viruses" are the following examples. They include mutants of them having all identifying characteristics of the respective strain, and/or metabolites produced by the respective strain that exhibit activity against insects, mites, nematodes and/or phytopathogens (the numbering is used in the complete description):

(4.1) *Adoxophyes orana* (summer fruit tortrix) granulosis virus (GV), (product known as BIOFA - Capex®), (4.2) *Agrotis segetum* (turnip moth) nuclear polyhedrosis virus (NPV), (4.3) *Anticarsia gemmatalis* (Woolly pyrol moth) mNPV (products known as Polygen), (4.4) *Autographa californica* (Alfalfa Looper) mNPV (products known as VPN80 from Agricola El Sol), (4.5) *Biston suppressaria* (tea looper) NPV, (4.6) *Bombyx mori* (silkworm) NPV, (4.7) *Cryptophlebia leucotreta* (false codling moth) *GV (products known as Cryptex),* (4.8) *Cydia pomonella* (Codling moth) granulosis virus (GV) (product known as Madex Plus), (4.9) *Dendrolimus punctatus* (Masson pine moth) CPV, (4.10) *Helicoverpa armigera* NPV (product known as AgBiTech - ViVUS Max), 4.11) *Helicoverpa* (previously *Heliothis) zea* (corn earworm) NPV (products known as Elcar), (4.12) *Leucoma salicis*

(satin moth) NPV, (4.13) *Lymantria dispar* (gypsy moth) NPV (products known as Gypcheck), (4.14) *Neodiprion abietis* (balsam-fir sawfly) NPV (products known as Abietiv), (4.15) *Neodiprion lecontei* (red-headed pinesawfly) NPV (products known as Lecontvirus), (4.16) *Neodiprion sertifer* (Pine sawfly) NPV (products known as Neocheck-S), (4.17) *Orgyia pseudotsugata* (Douglas-fir tussock moth) NPV (products known as Virtuss), (4.18) *Phthorimaea operculella* (tobacco leaf miner) GV (products known as Matapol), (4.19) *Pieris rapae* (small white) GV , (4.20) *Plutella xylostella* (diamondback moth) GV (products known as Plutec), (4.21) *Spodoptera albula* (gray-streaked armywom moth) mNPV (products known as VPN 82), (4.22) *Spodoptera exempta* (true armyworm) mNPV (products known as Spodec), (4.23) *Spodoptera exigua* (sugarbeet armyworm) mNPV (products known as Spexit from Andermatt Biocontrol), (4.24) *Spodoptera frugiperd*a (fall armyworm) mNPV (products known as Baculovirus VPN), (4.25) *Spodoptera littoralis* (tobacco cutworm) NPV (procucts known as Spodoptrin from NPP Calliope France), and (4.26) *Spodoptera litura* (oriental leafworm moth) NPV (products known as Littovir).

According to the invention biological control agents that are summarized under the term "entomopathogenic nematodes" are (the numbering is used in the complete description):

(5.1) *Abbreviata caucasica*, (5.2) *Acuaria spp.*, (5.3) *Agamermis decaudata,* (5.4) *Allantonema spp.*, (5.5) *Amphimermis spp.*, (5.6) *Beddingia (= Deladenus) siridicola*, (5.7) *Bovienema spp.*, (5.7a) *Cameronia spp.,* (5.8) *Chitwoodiella ovofilamenta*, (5.9) *Contortylenchus spp.*, (5.10) *Culicimermis spp.,* (5.11) *Diplotriaena spp.*, (5.12) *Empidomermis spp.*, (5.13) *Filipjevimermis leipsandra,* (5.14) *Gastromermis spp.*, (5.15) *Gongylonema spp.*, (5.16) *Gynopoecilia pseudovipara,* (5.17) *Heterorhabditis spp.*, in particular *Heterorhabditis bacteriophora* (products known as B-Green), or *Heterorhabditis baujardi*, or *Heterorhabditis heliothidis* (products known as Nematon), or *Heterorhabditis indica, Heterorhabditis marelatus, Heterorhabditis megidis, Heterorhabditis zealandica,* (5.18) *Hexamermis spp.*, (5.19) *Hydromermis spp.*, (5.20) *Isomermis spp.*, (5.21) *Limnomermis spp.,* (5.22) *Maupasina weissi*, (5.23) *Mermis nigrescens*, (5.24) *Mesomermis spp.*, (5.25) *Neomesomermis spp.*, (5.26) *Neoparasitylenchus rugulosi*, (5.27) *Octomyomermis spp.*, (5.28) *Parasitaphelenchus spp.*, (5.29) *Parasitorhabditis spp.*, (5.30) *Parasitylenchus spp.,* (5.31) *Perutilimermis culicis*, (5.32) *Phasmarhabditis hermaphrodita*, (5.33) Physaloptera spp., (5.34) *Protrellatus spp.*, (5.35) *Pterygodermatites spp.*, (5.36) *Romanomermis spp.*, (5.37) *Seuratum cadarachense*, (5.38) *Sphaerulariopsis spp.*, (5.39) *Spirura guianensis*, (5.40) *Steinernema spp.* (= *Neoaplectana spp.*), in particular *Steinernema carpocapsae* (products known as Biocontrol), or *Steinernema feltiae* (= *Neoaplectana carpocapsae*), (products known as Nemasys®), or *Steinernema glaseri* (procucts known as Biotopia), or *Steinernema kraussei* (products known as Larvesure), or *Steinernema riobrave* (products known as Biovector), or *Steinernema scapterisci* (products known as Nematac S), or *Steinernema scarabaei, or Steinernema siamkayai,* (5.41) *Strelkovimermis peterseni*, (5.42) *Subulura spp.*, (5.43) *Sulphuretylenchus elongatus*, and (5.44) *Tetrameres spp.*.

According to the invention biological control agents that are summarized under the term "inoculants" are the following examples (the numbering is used in the complete description):

(C6.1) *Agrobacterium spp.*, (C6.2) *Azorhizobium caulinodans*, (C6.3) *Azospirillum spp.*, (C6.4) *Azotobacter spp.*, (C6.5) *Bradyrhizobium spp.*, (C6.6) *Burkholderia spp.*, in particular *Burkholderia cepacia* (formerly *Pseudomonas cepacia*), (C6.7) *Gigaspora spp.*, in particular *Gigaspora margarita*, or *Gigaspora monosporum*, (C6.8) *Glomus spp.*, in particular *Glomus aggregatum*, or *Glomus brasilianum*, or *Glomus clarum*, or *Glomus deserticola*, or *Glomus etunicatum*, or *Glomus intraradices*, or *Glomus monosporus*, or *Glomus mosseae*, (C6.9) *Laccaria spp.*, in particular *Laccaria bicolor*, or *Laccaria laccata*, (C6.10) *Lactobacillus buchneri*, (C6.11) *Paraglomus spp.*, (C6.12) *Pisolithus tinctorus*, (C6.13) *Pseudomonas spp.*, (C6.14) *Rhizobium spp.*, in particular *Rhizobium fredii*, or *Rhizobium leguminosarum*, or *Rhizobium loti*, or *Rhizobium meliloti*, or *Rhizobium trifolii*, or *Rhizobium tropici*, (C.6.15) *Rhizopogon amylopogon*, or *Rhizopogon fulvigleba*, or *Rhizopogon luteolus*, or *Rhizopogon tinctorus*, or *Rhizopogon villosullus*, or (C.6.16) *Scleroderma spp.*, in particular *Scleroderma cepa*, or *Scleroderma citrinum*, (C6.17) *Suillus spp.*, in particular *Suillus granulates*, or *Suillus punctatapies* and (C6.18) *Streptomyces spp.*

According to one embodiment of the present invention the biological control agent comprises not only the isolated, pure cultures of the respective microorganisms, but also their suspensions in a whole broth culture or a metabolite-containing supernatant or a purified metabolite obtained from whole broth culture of the strain. “Whole broth culture” refers to a liquid culture containing both cells and media. “Supernatant” refers to the liquid broth remaining when cells grown in broth are removed by centrifugation, filtration, sedimentation, or other means well known in the art.

The above-mentioned metabolites produced by the nonpathogenic microorganisms include antibiotics, enzymes, siderophores and growth promoting agents, for example zwittermicin-A, kanosamine, polyoxine, enzymes such as α-amylase, chitinases, and pektinases, phytohormones and precursors thereof, such as auxines, gibberlin-like substacnes, cytokinin-like compounds, lipopeptides such as iturins, plipastatins or surfactins, e.g. agrastatin A, bacillomycin D, bacilysin, difficidin, macrolactin, fengycin, bacilysin and bacilaene. Preferred metabolites of the above listed lipopeptides, in particular produce by *Bacillus pumilus* (NRRL Accession No. B-30087), *Bacillus subtilis* AQ713 (NRRL Accession No. B-21661), *Bacillus subtilis* strain AQ30002 (aka QST30002; NRRL Accession No. B-50421), or *Bacillus subtilis* strain AQ30004 (aka QST30004; NRRL Accession No. B-50455,).

According to the invention, the biological control agent may be employed or used in any physiologic state such as active or dormant.

Compositions according to the present invention

According to the present invention the composition comprises the pesticidal terpene mixture and at least one biological control agent in a synergistically effective amount.

A "synergistically effective amount" according to the present invention represents a quantitiy of a combination of pesticidal terpene mixture and a biological control agent that is statistically significantly more effective against insects, mites, nematodes and/or phytopatheogens than the pesticidal terpene mixture or the biological control agent only.

The present invention comprises each and every combination of each of the biological control agents mentioned above with the pesticidal terpene mixture.

In the following the pesticidal terpene mixture is namend P.

Preferred combinations of the pesticidal terpene mixture with bacteria are P+1.12, P+1.14, P+1.17, P+1.18, P+1.19, P+1.20, P+1.23, P+1.42, P+1.44, P+1.47, P+1.48, P+1.49, P+1.50, P+1.52, P+1.53, P+1.55, P+1.56, P+1.57,

Particularly preferred combinations of the pesticidal terpene mixture with bacteria are P+1.23, P+1.44 and P+1.48.

Preferred combinations of the pesticidal terpene mixture with fungi are P+2.6, P+2.7, P+2.17, P+2.26, P+2.51.

Preferred combinations of the pesticidal terpene mixture with protozoas are P+3.1, P+3.2, P+3.3.

Preferred combination of the pesticidal terpene mixture with viruses are P+4.1, P+4.2, P+4.3, P+4.4, P+4.5, P+4.6, P+4.7, P+4.8, P+4.9, P+4.10, P+4.11, P+4.12, P+4.13, P+4.14, P+4.15, P+4.16, P+4.17, P+4.18, P+4.19, P+4.20, P+4.21, P+4.22, P+4.23, P+4.24, P+4.25, P+4.26.

Preferred combinations of the pesticidal terpene mixture with entomopathogenic nematodes are P+5.1, P+5.2, P+5.3, P+5.4, P+5.5, P+5.6, P+5.7, P+5.7a, P+5.8, P+5.9, P+5.10, P+5.11, P+5.12, P+5.13, P+5.14, P+5.15, P+5.16, P+5.17, P+5.18, P+5.19, P+5.20, P+5.21, P+5.22, P+5.23, P+5.24, P+5.25, P+5.26, P+5.27, P+5.28, P+5.29, P+5.30, P+5.31, P+5.32, P+5.33, P+5.34, P+5.35, P+5.36, P+5.37, P+5.38, P+5.39, P+5.40, P+5.41, P+5.42, P+5.43, P+5.44.

Preferred combinations of the pesticidal terpene mixture with inoculants are P+C6.1, P+C6.2, P+C6.3, P+C6.4, P+C6.5, P+C6.6, P+C6.7, P+C6.8, P+C6.9, P+C6.10, P+C6.11, P+C6.12, P+C6.13, P+C6.14, P+C.6.15, P+C.6.16, P+C6.17, P+C6.18.

Preferably, in the above combinations the pesticidal terpene mixture is Requiem®.

In a preferred embodiment the composition according to the present invention comprises at least one additional fungicide and/or at least one insecticide, with the provisio that the pesticidal terpene mixture, the insecticide and the fungicide are not identical.

The term "active compound" or "active ingredient" is used in the present description to designate the pesticidal terpene mixture, the at least one biological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens , the at least one insecticide and the at least one fungicide .

Fungicide

In general, "fungicidal" means the ability of a substance to increase mortality or inhibit the growth rate of fungi.

The term "fungus" or "fungi" includes a wide variety of nucleated sporebearing organisms that are devoid of chlorophyll. Examples of fungi include yeasts, molds, mildews, rusts, and mushrooms.

(1) Inhibitors of the ergosterol biosynthesis, for example (F1) aldimorph (1704-28-5), (F2) azaconazole (60207-31-0), (F3) bitertanol (55179-31-2), (F4) bromuconazole (116255-48-2), (F5) cyproconazole (113096-99-4), (F6) diclobutrazole (75736-33-3), (F7) difenoconazole (119446-68-3), (F8) diniconazole (83657-24-3), (F9) diniconazole-M (83657-18-5), (F10) dodemorph (1593-77-7), (F11) dodemorph acetate (31717-87-0), (F12) epoxiconazole (106325-08-0), (F13) etaconazole (60207-93-4), (F14) fenarimol (60168-88-9), (F15) fenbuconazole (114369-43-6), (F16) fenhexamid (126833-17-8), (F17) fenpropidin (67306-00-7), (F18) fenpropimorph (67306-03-0), (F19) fluquinconazole (136426-54-5), (F20) flurprimidol (56425-91-3), (F21) flusilazole (85509-19-9), (F22) flutriafol (76674-21-0), (F23) furconazole (112839-33-5), (F24) furconazole-cis (112839-32-4), (F25) hexaconazole (79983-71-4), (F26) imazalil (60534-80-7), (F27) imazalil sulfate (58594-72-2), (F28) imibenconazole (86598-92-7), (F29) ipconazole (125225-28-7), (F30) metconazole (125116-23-6), (F31) myclobutanil (88671-89-0), (F32) naftifine (65472-88-0), (F33) nuarimol (63284-71-9), (F34) oxpoconazole (174212-12-5), (F35) paclobutrazol (76738-62-0), (F36) pefurazoate (101903-30-4), (F37) penconazole (66246-88-6), (F38) piperalin (3478-94-2), (F39) prochloraz (67747-09-5), (F40) propiconazole (60207-90-1), (F41) prothioconazole (178928-70-6), (F42) pyributicarb (88678-67-5), (F43) pyrifenox (88283-41-4), (F44) quinconazole (103970-75-8), (F45) simeconazole (149508-90-7), (F46) spiroxamine (118134-30-8), (F47) tebuconazole (107534-96-3), (F48) terbinafine (91161-71-6), (F49) tetraconazole (112281-77-3), (F50) triadimefon (43121-43-3), (F51) triadimenol (89482-17-7), (F52) tridemorph (81412-43-3), (F53)

triflumizole (68694-11-1), (F54) triforine (26644-46-2), (F55) triticonazole (131983-72-7), (F56) uniconazole (83657-22-1), (F57) uniconazole-p (83657-17-4), (F58) viniconazole (77174-66-4), (F59) voriconazole (137234-62-9), (F60) 1-(4-chlorophenyl)-2-(1H-1,2,4-triazol-1-yl)cycloheptanol (129586-32-9), (F61) methyl 1-(2,2-dimethyl-2,3-dihydro-1H-inden-1-yl)-1H-imidazole-5-carboxylate (110323-95-0), (F62) N'-{5-(difluoromethyl)-2-methyl-4-[3-(trimethylsilyl)propoxy]phenyl}-N-ethyl-N-methylimidoformamide, (F63) N-ethyl-N-methyl-N'-{2-methyl-5-(trifluoromethyl)-4-[3-(trimethylsilyl)propoxy]phenyl}imidoformamide, (F64) O-[1-(4-methoxyphenoxy)-3,3-dimethylbutan-2-yl] 1H-imidazole-1-carbothioate (111226-71-2);

(2) inhibitors of the respiratory chain at complex I or II, for example (F65) bixafen (581809-46-3), (F66) boscalid (188425-85-6), (F67) carboxin (5234-68-4), (F68) diflumetorim (130339-07-0), (F69) fenfuram (24691-80-3), (F70) fluopyram (658066-35-4), (F71) flutolanil (66332-96-5), (F72) fluxapyroxad (907204-31-3), (F73) furametpyr (123572-88-3), (F74) furmecyclox (60568-05-0), (F75) isopyrazam (mixture of syn-epimeric racemate 1RS,4SR,9RS and anti-epimeric racemate 1RS,4SR,9SR) (881685-58-1), (F76) isopyrazam (anti-epimeric racemate 1RS,4SR,9SR), (F77) isopyrazam (anti-epimeric enantiomer 1R,4S,9S), (F78) isopyrazam (anti-epimeric enantiomer 1S,4R,9R), (F79) isopyrazam (syn epimeric racemate 1RS,4SR,9RS), (F80) isopyrazam (syn-epimeric enantiomer 1R,4S,9R), (F81) isopyrazam (syn-epimeric enantiomer 1S,4R,9S), (F82) mepronil (55814-41-0), (F83) oxycarboxin (5259-88-1), (F84) penflufen (494793-67-8), (F85) penthiopyrad (183675-82-3), (F86) sedaxane (874967-67-6), (F87) thifluzamide (130000-40-7), (F88) 1-methyl-N-[2-(1,1,2,2-tetrafluoroethoxy)phenyl]-3-(trifluoromethyl)-1H-pyrazole-4-carboxamide, (F89) 3-(difluoromethyl)-1-methyl-N-[2-(1,1,2,2-tetrafluoroethoxy)phenyl]-1H-pyrazole-4-carboxamide, (F90) 3-(difluoromethyl)-N-[4-fluoro-2-(1,1,2,3,3,3-hexafluoropropoxy)phenyl]-1-methyl-1H-pyrazole-4-carboxamide, (F91) N-[1-(2,4-dichlorophenyl)-1-methoxypropan-2-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide (1092400-95-7), (F92) 5,8-difluoro-N-[2-(2-fluoro-4-{[4-(trifluoromethyl)pyridin-2-yl]oxy}phenyl)ethyl]quinazolin-4-amine (1210070-84-0), (F93) benzovindiflupyr, (F94) N-[(1S,4R)-9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (F95) N-[(1R,4S)-9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (F96) 3-(Difluormethyl)-1-methyl-N-(1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, (F97) 1,3,5-Trimethyl-N-(1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, (F98) 1-Methyl-3-(trifluormethyl)-N-(1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, (F99) 1-Methyl-3-(trifluormethyl)-N-[(1S)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F100) 1-Methyl-3-(trifluormethyl)-N-[(1R)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F101) 3-(Difluormethyl)-1-methyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F102) 3-(Difluormethyl)-1-methyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F103) 1,3,5-Trimethyl-N-[(3R)-1,1,3-trimethyl-2,3-

dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F104) 1,3,5-Trimethyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid;

(3) inhibitors of the respiratory chain at complex III, for example (F105) ametoctradin (865318-97-4), (F106) amisulbrom (348635-87-0), (F107) azoxystrobin (131860-33-8), (F108) cyazofamid (120116-88-3), (F109) coumethoxystrobin (850881-30-0), (F110) coumoxystrobin (850881-70-8), (F111) dimoxystrobin (141600-52-4), (F112) enestroburin (238410-11-2), (F113) famoxadone (131807-57-3), (F114) fenamidone (161326-34-7), (F115) fenoxystrobin (918162-02-4), (F116) fluoxastrobin (361377-29-9), (F117) kresoxim-methyl (143390-89-0), (F118) metominostrobin (133408-50-1), (F119) orysastrobin (189892-69-1), (F120) picoxystrobin (117428-22-5), (F121) pyraclostrobin (175013-18-0), (F122) pyrametostrobin (915410-70-7), (F123) pyraoxystrobin (862588-11-2), (F124) pyribencarb (799247-52-2), (F125) triclopyricarb (902760-40-1), (F126) trifloxystrobin (141517-21-7), (F127) (2E)-2-(2-{[6-(3-chloro-2-methylphenoxy)-5-fluoropyrimidin-4-yl]oxy}phenyl)-2-(methoxyimino)-N-methylethanamide, (F128) (2E)-2-(methoxyimino)-N-methyl-2-(2-{[({(1E)-1-[3-(trifluoromethyl)phenyl]ethylidene}amino)oxy]methyl}phenyl)ethanamide, (F129) (2E)-2-(methoxyimino)-N-methyl-2-{2-[(E)-({1-[3-(trifluoromethyl)phenyl]ethoxy}imino)methyl]phenyl}ethanamide (158169-73-4), (F130) (2E)-2-{2-[({[(1E)-1-(3-{[(E)-1-fluoro-2-phenylethenyl]oxy}phenyl)ethylidene]amino}oxy)methyl]phenyl}-2-(methoxyimino)-N-methylethanamide (326896-28-0), (F131) (2E)-2-{2-[({[(2E,3E)-4-(2,6-dichlorophenyl)but-3-en-2-ylidene]amino}oxy)methyl]phenyl}-2-(methoxyimino)-N-methylethanamide, (F132) 2-chloro-N-(1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)pyridine-3-carboxamide (119899-14-8), (F133) 5-methoxy-2-methyl-4-(2-{[({(1E)-1-[3-(trifluoromethyl)phenyl]ethylidene}amino)oxy]methyl}phenyl)-2,4-dihydro-3H-1,2,4-triazol-3-one, (F134) methyl (2E)-2-{2-[({cyclopropyl[(4-methoxyphenyl)imino]methyl}sulfanyl)methyl]phenyl}-3-methoxyprop-2-enoate (149601-03-6), (F135) N-(3-ethyl-3,5,5-trimethylcyclohexyl)-3-(formylamino)-2-hydroxybenzamide (226551-21-9), (F136) 2-{2-[(2,5-dimethylphenoxy)methyl]phenyl}-2-methoxy-N-methylacetamide (173662-97-0), (F137) (2R)-2-{2-[(2,5-dimethylphenoxy)methyl]phenyl}-2-methoxy-N-methylacetamide (394657-24-0);

(4) Inhibitors of the mitosis and cell division, for example (F138) benomyl (17804-35-2), (F139) carbendazim (10605-21-7), (F140) chlorfenazole (3574-96-7), (F141) diethofencarb (87130-20-9), (F142) ethaboxam (162650-77-3), (F143) fluopicolide (239110-15-7), (F144) fuberidazole (3878-19-1), (F145) pencycuron (66063-05-6), (F146) thiabendazole (148-79-8), (F147) thiophanate-methyl (23564-05-8), (F148) thiophanate (23564-06-9), (F149) zoxamide (156052-68-5), (F150) 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)[1,2,4]triazolo[1,5-a]pyrimidine (214706-53-3), (F151) 3-chloro-5-(6-chloropyridin-3-yl)-6-methyl-4-(2,4,6-trifluorophenyl)pyridazine (1002756-87-7);

(5) Compounds capable to have a multisite action, like for example (F152) bordeaux mixture (8011-63-0), (F153) captafol (2425-06-1), (F154) captan (133-06-2), (F155) chlorothalonil (1897-45-6), (F156)

copper hydroxide (20427-59-2), (F157) copper naphthenate (1338-02-9), (F158) copper oxide (1317-39-1), (F159) copper oxychloride (1332-40-7), (F160) copper(2+) sulfate (7758-98-7), (F161) dichlofluanid (1085-98-9), (F162) dithianon (3347-22-6), (F163) dodine (2439-10-3), (F164) dodine free base, (F165) ferbam (14484-64-1), (F166) fluorofolpet (719-96-0), (F167) folpet (133-07-3), (F168) guazatine (108173-90-6), (F169) guazatine acetate, (F170) iminoctadine (13516-27-3), (F171) iminoctadine albesilate (169202-06-6), (F172) iminoctadine triacetate (57520-17-9), (F173) mancopper (53988-93-5), (F174) mancozeb (8018-01-7), (F175) maneb (12427-38-2), (F176) metiram (9006-42-2), (F177) metiram zinc (9006-42-2), (F178) oxine-copper (10380-28-6), (F179) propamidine (104-32-5), (F180) propineb (12071-83-9), (F181) sulphur and sulphur preparations including calcium polysulphide (7704-34-9), (F182) thiram (137-26-8), (F183) tolylfluanid (731-27-1), (F184) zineb (12122-67-7), (F185) ziram (137-30-4);

(6) Compounds capable to induce a host defence, like for example (F186) acibenzolar-S-methyl (135158-54-2), (F187) isotianil (224049-04-1), (F188) probenazole (27605-76-1), (F189) tiadinil (223580-51-6);

(7) Inhibitors of the amino acid and/or protein biosynthesis, for example (F190) andoprim (23951-85-1), (F191) blasticidin-S (2079-00-7), (F192) cyprodinil (121552-61-2), (F193) kasugamycin (6980-18-3), (F194) kasugamycin hydrochloride hydrate (19408-46-9), (F195) mepanipyrim (110235-47-7), (F196) pyrimethanil (53112-28-0), (F197) 3-(5-fluoro-3,3,4,4-tetramethyl-3,4-dihydroisoquinolin-1-yl)quinoline (861647-32-7);

(8) Inhibitors of the ATP production, for example (F198) fentin acetate (900-95-8), (F199) fentin chloride (639-58-7), (F200) fentin hydroxide (76-87-9), (F201) silthiofam (175217-20-6);

(9) Inhibitors of the cell wall synthesis, for example (F202) benthiavalicarb (177406-68-7), (F203) dimethomorph (110488-70-5), (F204) flumorph (211867-47-9), (F205) iprovalicarb (140923-17-7), (F206) mandipropamid (374726-62-2), (F207) polyoxins (11113-80-7), (F208) polyoxorim (22976-86-9), (F209) validamycin A (37248-47-8), (F210) valifenalate (283159-94-4; 283159-90-0);

(10) Inhibitors of the lipid and membrane synthesis, for example (F211) biphenyl (92-52-4), (F212) chloroneb (2675-77-6), (F213) dicloran (99-30-9), (F214) edifenphos (17109-49-8), (F215) etridiazole (2593-15-9), (F216) iodocarb (55406-53-6), (F217) iprobenfos (26087-47-8), (F218) isoprothiolane (50512-35-1), (F219) propamocarb (25606-41-1), (F220) propamocarb hydrochloride (25606-41-1), (F221) prothiocarb (19622-08-3), (F222) pyrazophos (13457-18-6), (F223) quintozene (82-68-8), (F224) tecnazene (117-18-0), (F225) tolclofos-methyl (57018-04-9);

(11) Inhibitors of the melanine biosynthesis, for example (F226) carpropamid (104030-54-8), (F227) diclocymet (139920-32-4), (F228) fenoxanil (115852-48-7), (F229) phthalide (27355-22-2), (F230)

pyroquilon (57369-32-1), (F231) tricyclazole (41814-78-2), (F232) 2,2,2-trifluoroethyl {3-methyl-1-[(4-methylbenzoyl)amino]butan-2-yl}carbamate (851524-22-6);

(12) Inhibitors of the nucleic acid synthesis, for example (F233) benalaxyl (71626-11-4), (F234) benalaxyl-M (kiralaxyl) (98243-83-5), (F235) bupirimate (41483-43-6), (F236) clozylacon (67932-85-8), (F237) dimethirimol (5221-53-4), (F238) ethirimol (23947-60-6), (F239) furalaxyl (57646-30-7), (F240) hymexazol (10004-44-1), (F241) metalaxyl (57837-19-1), (F242) metalaxyl-M (mefenoxam) (70630-17-0), (F243) ofurace (58810-48-3), (F244) oxadixyl (77732-09-3), (F245) oxolinic acid (14698-29-4);

(13) Inhibitors of the signal transduction, for example (F246) chlozolinate (84332-86-5), (F247) fenpiclonil (74738-17-3), (F248) fludioxonil (131341-86-1), (F249) iprodione (36734-19-7), (F250) procymidone (32809-16-8), (F251) quinoxyfen (124495-18-7), (F252) vinclozolin (50471-44-8);

(14) Compounds capable to act as an uncoupler, like for example (F253) binapacryl (485-31-4), (F254) dinocap (131-72-6), (F255) ferimzone (89269-64-7), (F256) fluazinam (79622-59-6), (F257) meptyldinocap (131-72-6);

(15) Further compounds, like for example (F258) benthiazole (21564-17-0), (F259) bethoxazin (163269-30-5), (F260) capsimycin (70694-08-5), (F261) carvone (99-49-0), (F262) chinomethionat (2439-01-2), (F263) pyriofenone (chlazafenone) (688046-61-9), (F264) cufraneb (11096-18-7), (F265) cyflufenamid (180409-60-3), (F266) cymoxanil (57966-95-7), (F267) cyprosulfamide (221667-31-8), (F268) dazomet (533-74-4), (F269) debacarb (62732-91-6), (F270) dichlorophen (97-23-4), (F271) diclomezine (62865-36-5), (F272) difenzoquat (49866-87-7), (F273) difenzoquat methylsulphate (43222-48-6), (F724) diphenylamine (122-39-4), (F275) ecomate, (F276) fenpyrazamine (473798-59-3), (F277) flumetover (154025-04-4), (F278) fluoroimide (41205-21-4), (F279) flusulfamide (106917-52-6), (F280) flutianil (304900-25-2), (F281) fosetyl-aluminium (39148-24-8), (F282) fosetyl-calcium, (F283) fosetyl-sodium (39148-16-8), (F284) hexachlorobenzene (118-74-1), (F285) irumamycin (81604-73-1), (F286) methasulfocarb (66952-49-6), (F287) methyl isothiocyanate (556-61-6), (F288) metrafenone (220899-03-6), (F289) mildiomycin (67527-71-3), (F290) natamycin (7681-93-8), (F291) nickel dimethyldithiocarbamate (15521-65-0), (F292) nitrothal-isopropyl (10552-74-6), (F293) octhilinone (26530-20-1), (F294) oxamocarb (917242-12-7), (F295) oxyfenthiin (34407-87-9), (F296) pentachlorophenol and salts (87-86-5), (F297) phenothrin, (F298) phosphorous acid and its salts (13598-36-2), (F299) propamocarb-fosetylate, (F300) propanosine-sodium (88498-02-6), (F301) proquinazid (189278-12-4), (F302) pyrimorph (868390-90-3), (F303) (2E)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-1-(morpholin-4-yl)prop-2-en-1-one (1231776-28-5), (F304) (2Z)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-1-(morpholin-4-yl)prop-2-en-1-one (1231776-29-6), (F305) pyrrolnitrine (1018-71-9), (F306) tebufloquin (376645-78-2), (F307) tecloftalam (76280-91-6), (F308) tolnifanide (304911-98-6), (F309) triazoxide (72459-58-6), (F310) trichlamide (70193-21-4), (F311)

zarilamid (84527-51-5), (F312) (3S,6S,7R,8R)-8-benzyl-3-[({3-[(isobutyryloxy)methoxy]-4-methoxypyridin-2-yl}carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl 2-methylpropanoate (517875-34-2), (F313) 1-(4-{4-[(5R)-5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone (1003319-79-6), (F314) 1-(4-{4-[(5S)-5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone (1003319-80-9), (F315) 1-(4-{4-[5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone (1003318-67-9), (F316) 1-(4-methoxyphenoxy)-3,3-dimethylbutan-2-yl 1H-imidazole-1-carboxylate (111227-17-9), (F317) 2,3,5,6-tetrachloro-4-(methylsulfonyl)pyridine (13108-52-6), (F318) 2,3-dibutyl-6-chlorothieno[2,3-d]pyrimidin-4(3H)-one (221451-58-7), (F319) 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone, (F320) 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-1-(4-{4-[(5R)-5-phenyl-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)ethanone (1003316-53-7), (F321) 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-1-(4-{4-[(5S)-5-phenyl-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)ethanone (1003316-54-8), (F322) 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-1-{4-[4-(5-phenyl-4,5-dihydro-1,2-oxazol-3-yl)-1,3-thiazol-2-yl]piperidin-1-yl}ethanone (1003316-51-5), (F323) 2-butoxy-6-iodo-3-propyl-4H-chromen-4-one, (F324) 2-chloro-5-[2-chloro-1-(2,6-difluoro-4-methoxyphenyl)-4-methyl-1H-imidazol-5-yl]pyridine, (F325) 2-phenylphenol and salts (90-43-7), (F326) 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinoline (861647-85-0), (F327) 3,4,5-trichloropyridine-2,6-dicarbonitrile (17824-85-0), (F328) 3-[5-(4-chlorophenyl)-2,3-dimethyl-1,2-oxazolidin-3-yl]pyridine, (F329) 3-chloro-5-(4-chlorophenyl)-4-(2,6-difluorophenyl)-6-methylpyridazine, (F330) 4-(4-chlorophenyl)-5-(2,6-difluorophenyl)-3,6-dimethylpyridazine, (F331) 5-amino-1,3,4-thiadiazole-2-thiol, (F332) 5-chloro-N'-phenyl-N'-(prop-2-yn-1-yl)thiophene-2-sulfonohydrazide (134-31-6), (F333) 5-fluoro-2-[(4-fluorobenzyl)oxy]pyrimidin-4-amine (1174376-11-4), (F334) 5-fluoro-2-[(4-methylbenzyl)oxy]pyrimidin-4-amine (1174376-25-0), (F335) 5-methyl-6-octyl[1,2,4]triazolo[1,5-a]pyrimidin-7-amine, (F336) ethyl (2Z)-3-amino-2-cyano-3-phenylprop-2-enoate, (F337) N'-(4-{[3-(4-chlorobenzyl)-1,2,4-thiadiazol-5-yl]oxy}-2,5-dimethylphenyl)-N-ethyl-N-methylimidoformamide, (F338) N-(4-chlorobenzyl)-3-[3-methoxy-4-(prop-2-yn-1-yloxy)phenyl]propanamide, (F339) N-[(4-chlorophenyl)(cyano)methyl]-3-[3-methoxy-4-(prop-2-yn-1-yloxy)phenyl]propanamide, (F340) N-[(5-bromo-3-chloropyridin-2-yl)methyl]-2,4-dichloropyridine-3-carboxamide, (F341) N-[1-(5-bromo-3-chloropyridin-2-yl)ethyl]-2,4-dichloropyridine-3-carboxamide, (F342) N-[1-(5-bromo-3-chloropyridin-2-yl)ethyl]-2-fluoro-4-iodopyridine-3-carboxamide, (F343) N-{(E)-[(cyclopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl}-2-phenylacetamide (221201-92-9), (F344) N-{(Z)-[(cyclopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl}-2-phenylacetamide (221201-92-9), (F345) N'-{4-[(3-tert-butyl-4-cyano-1,2-thiazol-5-yl)oxy]-2-chloro-5-methylphenyl}-N-ethyl-N-methylimidoformamide, (F346) N-methyl-2-(1-{[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-N-(1,2,3,4-tetrahydronaphthalen-1-yl)-1,3-thiazole-4-carboxamide (922514-49-6), (F347) N-methyl-2-(1-{[5-methyl-3-(trifluoromethyl)-

1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-N-[(1R)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide (922514-07-6), (F348) N-methyl-2-(1-{[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-N-[(1S)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide (922514-48-5), (F349) pentyl {6-[({[(1-methyl-1H-tetrazol-5-yl)(phenyl)methylidene]amino}oxy)methyl]pyridin-2-yl}carbamate, (F350) phenazine-1-carboxylic acid, (F351) quinolin-8-ol (134-31-6), (F352) quinolin-8-ol sulfate (2:1) (134-31-6), (F353) tert-butyl {6-[({[(1-methyl-1H-tetrazol-5-yl)(phenyl)methylene]amino}oxy)methyl]pyridin-2-yl}carbamate;

(16) Further compounds, like for example (F354) 1-methyl-3-(trifluoromethyl)-N-[2'-(trifluoromethyl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, (F355) N-(4'-chlorobiphenyl-2-yl)-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (F356) N-(2',4'-dichlorobiphenyl-2-yl)-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (F357) 3-(difluoromethyl)-1-methyl-N-[4'-(trifluoromethyl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, (F358) N-(2',5'-difluorobiphenyl-2-yl)-1-methyl-3-(trifluoromethyl)-1H-pyrazole-4-carboxamide, (F359) 3-(difluoromethyl)-1-methyl-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, (F360) 5-fluoro-1,3-dimethyl-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, (F361) 2-chloro-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, (F362) 3-(difluoromethyl)-N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, (F363) N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide, (F364) 3-(difluoromethyl)-N-(4'-ethynylbiphenyl-2-yl)-1-methyl-1H-pyrazole-4-carboxamide, (F365) N-(4'-ethynylbiphenyl-2-yl)-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide, (F366) 2-chloro-N-(4'-ethynylbiphenyl-2-yl)pyridine-3-carboxamide, (F367) 2-chloro-N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, (F368) 4-(difluoromethyl)-2-methyl-N-[4'-(trifluoromethyl)biphenyl-2-yl]-1,3-thiazole-5-carboxamide, (F369) 5-fluoro-N-[4'-(3-hydroxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]-1,3-dimethyl-1H-pyrazole-4-carboxamide, (F370) 2-chloro-N-[4'-(3-hydroxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, (F371) 3-(difluoromethyl)-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, (F372) 5-fluoro-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]-1,3-dimethyl-1H-pyrazole-4-carboxamide, (F373) 2-chloro-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, (F374) (5-bromo-2-methoxy-4-methylpyridin-3-yl)(2,3,4-trimethoxy-6-methylphenyl)methanone, (F375) N-[2-(4-{[3-(4-chlorophenyl)prop-2-yn-1-yl]oxy}-3-methoxyphenyl)ethyl]-N2-(methylsulfonyl)valinamide (220706-93-4), (F376) 4-oxo-4-[(2-phenylethyl)amino]butanoic acid, (F377) but-3-yn-1-yl {6-[({[(Z)-(1-methyl-1H-tetrazol-5-yl)(phenyl)methylene]amino}oxy)methyl]pyridin-2-yl}carbamate, (F378) 4-Amino-5-fluorpyrimidin-2-ol (mesomeric form: 6-Amino-5-fluorpyrimidin-2(1H)-on), (F379) propyl 3,4,5-trihydroxybenzoate and (F380) Oryzastrobin.

All named fungicides of the classes (1) to (16) (i. e. F1 to F380) can, if their functional groups enable this, optionally form salts with suitable bases or acids.

In a preferred embodiment of the present invention the fungicide is a synthetic fungicide. As used herein, the term "synthetic" defines a compound that has not been obtained from a biological control agent. Especially a synthetic fungicide is no metabolite of the biological control agents according to the present invention.

According to a preferred embodiment of the present invention fungicide is selected from the group consisting of

(1) inhibitors of the ergosterol biosynthesis, for example (F3) bitertanol, (F4) bromuconazole (116255-48-2), (F5) cyproconazole (113096-99-4), (F7) difenoconazole (119446-68-3), (F12) epoxiconazole (106325-08-0), (F16) fenhexamid (126833-17-8), (F17) fenpropidin (67306-00-7), (F18) fenpropimorph (67306-03-0), (F19) fluquinconazole (136426-54-5), (F22) flutriafol, (F26) imazalil, (F29) ipconazole (125225-28-7), (F30) metconazole (125116-23-6), (F31) myclobutanil (88671-89-0), (F37) penconazole (66246-88-6), (F39) prochloraz (67747-09-5), (F40) propiconazole (60207-90-1), (F41) prothioconazole (178928-70-6), (F44) quinconazole (103970-75-8), (F46) spiroxamine (118134-30-8), (F47) tebuconazole (107534-96-3), (F51) triadimenol (89482-17-7), (F55) triticonazole (131983-72-7);

(2) inhibitors of the respiratory chain at complex I or II, for example (F65) bixafen (581809-46-3), (F66) boscalid (188425-85-6), (F67) carboxin (5234-68-4), (F70) fluopyram (658066-35-4), (F71) flutolanil (66332-96-5), (F72) fluxapyroxad (907204-31-3), (F73) furametpyr (123572-88-3), (F75) isopyrazam (mixture of syn-epimeric racemate 1RS,4SR,9RS and anti-epimeric racemate 1RS,4SR,9SR) (881685-58-1), (F76) isopyrazam (anti-epimeric racemate 1RS,4SR,9SR), (F77) isopyrazam (anti-epimeric enantiomer 1R,4S,9S), (F78) isopyrazam (anti-epimeric enantiomer 1S,4R,9R), (F79) isopyrazam (syn epimeric racemate 1RS,4SR,9RS), (F80) isopyrazam (syn-epimeric enantiomer 1R,4S,9R), (F81) isopyrazam (syn-epimeric enantiomer 1S,4R,9S), (F84) penflufen (494793-67-8), (F85) penthiopyrad (183675-82-3), (F86) sedaxane (874967-67-6), (F87) thifluzamide (130000-40-7), (F91) N-[1-(2,4-dichlorophenyl)-1-methoxypropan-2-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide (1092400-95-7), (F98) 1-Methyl-3-(trifluormethyl)-N-(1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, (F99) 1-Methyl-3-(trifluormethyl)-N-[(1S)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F100) 1-Methyl-3-(trifluormethyl)-N-[(1R)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F101) 3-(Difluormethyl)-1-methyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F102) 3-(Difluormethyl)-1-methyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid;

(3) inhibitors of the respiratory chain at complex III, for example (F105) ametoctradin (865318-97-4), (F106) amisulbrom (348635-87-0), (F107) azoxystrobin (131860-33-8), (F108) cyazofamid (120116-88-3), (F111) dimoxystrobin (141600-52-4), (F112) enestroburin (238410-11-2), (F113) famoxadone (131807-57-3), (F114) fenamidone (161326-34-7), (F116) fluoxastrobin (361377-29-9), (F117) kresoxim-methyl (143390-89-0), (F118) metominostrobin (133408-50-1), (F119) orysastrobin (189892-

69-1), (F120) picoxystrobin (117428-22-5), (F121) pyraclostrobin (175013-18-0), (F124) pyribencarb (799247-52-2), (F126) trifloxystrobin (141517-21-7);

(4) Inhibitors of the mitosis and cell division, for example (F139) carbendazim (10605-21-7), (F140) chlorfenazole (3574-96-7), (F141) diethofencarb (87130-20-9), (F142) ethaboxam (162650-77-3), (F143) fluopicolide, (F144) fuberidazole (3878-19-1), (F145) pencycuron (66063-05-6), (F147) thiophanate-methyl (23564-05-8), (F149) zoxamide (156052-68-5);

(5) Compounds capable to have a multisite action, like for example (F154) captan (133-06-2), (F155) chlorothalonil (1897-45-6), (F156) copper hydroxide (20427-59-2), (F159) copper oxychloride (1332-40-7), (F162) dithianon (3347-22-6), (F163) dodine (2439-10-3), (F167) folpet (133-07-3), (F168) guazatine (108173-90-6), (F172) iminoctadine triacetate (57520-17-9), (F174) mancozeb (8018-01-7), (F180) propineb (12071-83-9), (F181) sulphur and sulphur preparations including calcium polysulphide (7704-34-9), (F182) thiram (137-26-8);

(6) Compounds capable to induce a host defence, like for example (F186) acibenzolar-S-methyl (135158-54-2), (F187) isotianil (224049-04-1), (F189) tiadinil (223580-51-6);

(7) Inhibitors of the amino acid and/or protein biosynthesis, for example (F192) cyprodinil (121552-61-2), (F196) pyrimethanil (53112-28-0);

(9) Inhibitors of the cell wall synthesis, for example (F202) benthiavalicarb (177406-68-7), (F203) dimethomorph (110488-70-5), (F205) iprovalicarb (140923-17-7), (F206) mandipropamid (374726-62-2), (F210) valifenalate (283159-94-4; 283159-90-0);

(10) Inhibitors of the lipid and membrane synthesis, for example (F216) iodocarb (55406-53-6), (F217) iprobenfos (26087-47-8), (F220) propamocarb hydrochloride (25606-41-1), (F225) tolclofos-methyl;

11) Inhibitors of the melanine biosynthesis, for example (F226) carpropamid

(12) Inhibitors of the nucleic acid synthesis, for example (F233) benalaxyl (71626-11-4), (F234) benalaxyl-M (kiralaxyl) (98243-83-5), (F239) furalaxyl (57646-30-7), (F240) hymexazol (10004-44-1), (F241) metalaxyl (57837-19-1), (F242) metalaxyl-M (mefenoxam) (70630-17-0), (F244) oxadixyl (77732-09-3);

(13) Inhibitors of the signal transduction, for example (F247) fenpiclonil (74738-17-3), (F248) fludioxonil (131341-86-1), (F249) iprodione (36734-19-7), (F251) quinoxyfen (124495-18-7), (F252) vinclozolin (50471-44-8);

(14) Compounds capable to act as an uncoupler, like for example (F256) fluazinam (79622-59-6);

(15) Further compounds, like for example (F266) cymoxanil (57966-95-7), (F280) flutianil (304900-25-2), (F281) fosetyl-aluminium (39148-24-8), (F286) methasulfocarb (66952-49-6), (F287) methyl isothiocyanate (556-61-6), (F288) metrafenone (220899-03-6), (F298) phosphorous acid and its salts (13598-36-2), (F301) proquinazid (189278-12-4), (F309) triazoxide (72459-58-6) and (F319) 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone.

In one embodiment of the present invention, fungizide (I), e.g., the fungizide for use in seed treatment is selected from the group consisting of Carbendazim (F139), Carboxin (F67), Difenoconazole (F7), Fludioxonil (F248), Fluquinconazole (F19), Fluxapyroxad (F72), Ipconazole (F29), Isotianil (F187), Mefenoxam (F242), Metalaxyl (F241), Pencycuron (F145), Penflufen (F84), Prothioconazole (F41), Prochloraz (F39), Pyraclostrobin (F121), Sedaxane (F86), Silthiofam (F201), Tebuconazole (F47), Thiram (F182), Trifloxystrobin (F126), and Triticonazole (F55).

Preferably, the fungicide is selected from the group consisting of F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35, F36, F37, F38, F39, F40, F41, F42, F43, F45, F46, F47, F48, F49, F50, F51, F52, F53, F54, F55, F56, F57, F58, F59, F60, F61, F62, F63, F64, F65, F66, F67, F68, F69, F70, F71, F72, F73, F74, F75, F76, F77, F78, F79, F80, F81, F82, F83, F84, F85, F86, F87, F88, F89, F90, F91, F92, F93, F94, F95, F96, F97, F98, F99, F100, F101, F102, F103, F104, F105, F106, F107, F108, F109, F110, F111, F112, F113, F114, F115, F116, F117, F118, F119, F120, F121, F122, F123, F124, F125, F126, F127, F128, F129, F130, F131, F132, F133, F134, F135, F136, F137, F138, F139, F140, F141, F142, F143, F144, F145, F146, F147, F148, F149, F150, F151, F152, F153, F154, F155, F156, F157, F158, F159, F160, F161, F162, F163, F164, F165, F166, F167, F168, F169, F170, F171, F172, F173, F174, F175, F176, F177, F178, F179, F180, F181, F182, F183, F184, F185, F186, F187, F188, F189, F190, F191, F192, F193, F194, F195, F196, F197, F198, F199, F200, F201, F202, F203, F204, F205, F206, F207, F208, F209, F210, F211, F212, F213, F214, F215, F216, F217, F218, F219, F220, F221, F222, F223, F224, F225, F226, F227, F228, F229, F230, F231, F232, F233, F234, F235, F236, F237, F238, F239, F240, F241, F242, F243, F244, F245, F246, F247, F248, F249, F250, F251, F252, F253, F254, F255, F256, F257, F258, F259, F260, F261, F262, F263, F264, F265, F266, F267, F268, F269, F270, F271, F272, F273, F274, F275, F276, F277, F278, F279, F280, F281, F282, F283, F284, F285, F286, F287, F288, F289, F290, F291, F292, F293, F294, F295, F296, F297, F298, F299, F300, F301, F302, F303, F304, F305, F306, F307, F308, F309, F310, F311, F312, F313, F314, F315, F316, F317, F318, F319, F320, F321, F322, F323, F324, F325, F326, F327, F328, F329, F330, F331, F332, F333, F334, F335, F336, F336, F337, F338, F339, F340, F341, F342, F343, F344, F345, F346, F347, F348, F349, F350, F351, F352, F353, F354, F355, F356, F357, F358, F359, F360, F361, F362, F363, F364, F365, F366, F367, F368, F369, F370, F371, F372, F373, F374, F375, F376, F377, F378, F379 and F380 as mentioned above.

In a preferred embodiment the fungicide is a synthetic fungicide.

According to a preferred embodiment of the present invention the fungicide is selected from the group consisting of F3, F4, F5, F7, F12, F16, F17, F18, F19, F22, F26, F29, F30, F31, F37, F39, F40, F41, F44, F46, F47, F51, F55, F66, F67, F70, F71, F72, F73, F75, F76, F77, F78, F79, F80, F81, F84, F85, F86, F87, F98, F99, F100, F101, F102, F105, F106, F107, F108, F111, F112, F113, F114, F116, F117, F118, F119, F120, F121, F124, F126, F139, F140, F141, F142, F143, F144, F145, F147, F149, F154, F155, F156, F159, F162, F163, F167, F168, F172, F174, F180, F181, F182, F186, F187, F189, F192, F196, F201, F202, F203, F205, F206, F210, F216, F217, F220, F225, F226, F233, F234, F239, F240, F241, F242, F244, F247, F248, F249, F251, F252, F256, F266, F280, F281, F286, F287, F288, F298, F301, F309 and F319.

Insecticide

"Insecticides" as well as the term "insecticidal" refers to the ability of a substance to increase mortality or inhibit growth rate of insects. As used herein, the term "insects" includes all organisms in the class "Insecta". The term "pre-adult" insects refers to any form of an organism prior to the adult stage, including, for example, eggs, larvae, and nymphs.

"Nematicides" and "nematicidal" refers to the ability of a substance to increase mortality or inhibit the growth rate of nematodes. In general, the term "nematode" comprises eggs, larvae, juvenile and mature forms of said organism.

"Acaricide" and "acaricidal" refers to the ability of a substance to increase mortality or inhibit growth rate of ectoparasites belonging to the class *Arachnida*, sub-class *Acari*.

The insecticides specified herein by their "common name" are known and described, for example, in the Pesticide Manual ("The Pesticide Manual", 15th Ed., British Crop Protection Council 2009) or can be searched in the internet (e.g. http://www.alanwood.net/pesticides).

According to one embodiment of the present invention preferred insecticides are selected from the group consisting of

(1) Acetylcholinesterase (AChE) inhibitors, for example

carbamates, e.g. Alanycarb (I1), Aldicarb (I2), Bendiocarb (I3), Benfuracarb (I4), Butocarboxim (I5), Butoxycarboxim (I6), Carbaryl (I7), Carbofuran (I8), Carbosulfan (I9), Ethiofencarb (I10), Fenobucarb (I11), Formetanate (I12), Furathiocarb (I13), Isoprocarb (I14), Methiocarb (I15), Methomyl (I16), Metolcarb (I17), Oxamyl (I18), Pirimicarb (I19), Propoxur (I20), Thiodicarb (I21), Thiofanox (I22), Triazamate (I23), Trimethacarb (I24), XMC (I25), and Xylylcarb (I26); or

organophosphates, e.g. Acephate (I27), Azamethiphos (I28), Azinphos-ethyl (I29), Azinphos-methyl (I30), Cadusafos (I31), Chlorethoxyfos (I32), Chlorfenvinphos (I33), Chlormephos (I34), Chlorpyrifos (I35), Chlorpyrifos-methyl (I36), Coumaphos (I37), Cyanophos (I38), Demeton-S-methyl (I39), Diazinon (I40), Dichlorvos/DDVP (I41), Dicrotophos (I42), Dimethoate (I43), Dimethylvinphos (I44), Disulfoton (I45), EPN (I46), Ethion (I47), Ethoprophos (I48), Famphur (I49), Fenamiphos (I50), Fenitrothion (I51), Fenthion (I52), Fosthiazate (I53), Heptenophos (I54), Imicyafos (I55), Isofenphos (I56), Isopropyl O-(methoxyaminothio-phosphoryl) salicylate (I57), Isoxathion (I58), Malathion (I59), Mecarbam (I60), Methamidophos (I61), Methidathion (I62), Mevinphos (I63), Monocrotophos (I64), Naled (I65), Omethoate (I66), Oxydemeton-methyl (I67), Parathion (I68), Parathion-methyl (I69), Phenthoate (I70), Phorate (I71), Phosalone (I72), Phosmet (I73), Phosphamidon (I74), Phoxim (I75), Pirimiphos-methyl (I76), Profenofos (I77), Propetamphos (I78), Prothiofos (I79), Pyraclofos (I80), Pyridaphenthion (I81), Quinalphos (I82), Sulfotep (I83), Tebupirimfos (I84), Temephos (I85), Terbufos (I86), Tetrachlorvinphos (I87), Thiometon (I88), Triazophos (I89), Trichlorfon (I90), and Vamidothion (I91);

(2) GABA-gated chloride channel antagonists, for example

cyclodiene organochlorines, e.g. Chlordane (I92) and Endosulfan (I93); or

phenylpyrazoles (fiproles), e.g. Ethiprole (I94) and Fipronil (I95);

(3) Sodium channel modulators / voltage-dependent sodium channel blockers, for example pyrethroids, e.g. Acrinathrin (I96), Allethrin (I97), d-cis-trans Allethrin (I98), d-trans Allethrin (I99), Bifenthrin (I100), Bioallethrin (I101), Bioallethrin S-cyclopentenyl isomer (I102), Bioresmethrin (I103), Cycloprothrin (I104), Cyfluthrin (I105), beta-Cyfluthrin (I106), Cyhalothrin (I107), lambda-Cyhalothrin (I108), gamma-Cyhalothrin (I109), Cypermethrin (I110), alpha-Cypermethrin (I111), beta-Cypermethrin (I112), theta-Cypermethrin (I113), zeta-Cypermethrin (I114), Cyphenothrin [(1R)-trans isomers] (I115), Deltamethrin (I116), Empenthrin [(EZ)-(1R) isomers) (I117), Esfenvalerate (I118), Etofenprox (I119), Fenpropathrin (I120), Fenvalerate (I121), Flucythrinate (I122), Flumethrin (I123), tau-Fluvalinate (I124), Halfenprox (I125), Imiprothrin (I126), Kadethrin (I127), Permethrin (I128), Phenothrin [(1R)-trans isomer) (I129), Prallethrin (I130), Pyrethrine (pyrethrum) (I131), Resmethrin (I132), Silafluofen (I133), Tefluthrin (I134), Tetramethrin (I135), Tetramethrin [(1R) isomers)] (I136), Tralomethrin (I137), and Transfluthrin (I138); or DDT (I139); or Methoxychlor (I140);

(4) Nicotinic acetylcholine receptor (nAChR) agonists, for example neonicotinoids, e.g. Acetamiprid (I141), Clothianidin (I142), Dinotefuran (I143), Imidacloprid (I144), Nitenpyram (I145), and Thiacloprid (I146), and Thiamethoxam (I147); or Nicotine (I148); or Sulfoxaflor (I149).

(5) Nicotinic acetylcholine receptor (nAChR) allosteric activators, for example spinosyns, e.g. Spinetoram (I150) and Spinosad (I151);

(6) Chloride channel activators, for example avermectins/milbemycins, e.g. Abamectin (I152), Emamectin benzoate (I153), Lepimectin (I154), and Milbemectin (I155);

(7) Juvenile hormone mimics, for example juvenile hormon analogues, e.g. Hydroprene (I156), Kinoprene (I157), and Methoprene (I158); or Fenoxycarb (I159); or Pyriproxyfen (I160);

(8) Miscellaneous non-specific (multi-site) inhibitors, for example alkyl halides, e.g. Methyl bromide (I161) and other alkyl halides; or Chloropicrin (I162); or Sulfuryl fluoride (I163); or Borax (I164); or Tartar emetic (I165);

(9) Selective homopteran feeding blockers, e.g. Pymetrozine (I166); or Flonicamid (I167);

(10) Mite growth inhibitors, e.g. Clofentezine (I168), Hexythiazox (I169), and Diflovidazin (I170); or Etoxazole (I171);

(11) (11) Microbial disruptors of insect midgut membranes, e.g. *Bacillus thuringiensis subspecies israelensis* (I172), *Bacillus thuringiensis subspecies aizawai* (I173), *Bacillus thuringiensis subspecies kurstaki* (I174), *Bacillus thuringiensis subspecies tenebrionis* (I175), and B.t. Microbial disruptors of insect midgut membranes, e.g. B.t. crop proteins: Cry1Ab, Cry1Ac, Cry1Fa, Cry1A.105, Cry2Ab, Vip3A, mCry3A, Cry3Ab, Cry3Bb, Cry34 Ab1/35Ab1 (I176); or Bacillus sphaericus (I177);

(12) Inhibitors of mitochondrial ATP synthase, for example Diafenthiuron (I178); or organotin miticides, e.g. Azocyclotin (I179), Cyhexatin (I180), and Fenbutatin oxide (I181); or Propargite (I182); or Tetradifon (I183);

(13) Uncouplers of oxidative phoshorylation via disruption of the proton gradient, for example Chlorfenapyr (I184), DNOC (I185), and Sulfluramid (I186);

(14) Nicotinic acetylcholine receptor (nAChR) channel blockers, for example Bensultap (I187), Cartap hydrochloride (I188), Thiocyclam (I189), and Thiosultap-sodium (I190);

(15) Inhibitors of chitin biosynthesis, type 0, for example Bistrifluron (I191), Chlorfluazuron (I192), Diflubenzuron (I193), Flucycloxuron (I194), Flufenoxuron (I195), Hexaflumuron (I196), Lufenuron (I197), Novaluron (I198), Noviflumuron (I199), Teflubenzuron (I200), and Triflumuron (I201);

(16) Inhibitors of chitin biosynthesis, type 1, for example Buprofezin (I202);

(17) Moulting disruptors, for example Cyromazine (I203);

(18) Ecdysone receptor agonists, for example Chromafenozide (I204), Halofenozide (I205), Methoxyfenozide (I206), and Tebufenozide (I207);

(19) Octopamine receptor agonists, for example Amitraz (I208);

(20) Mitochondrial complex III electron transport inhibitors, for example Hydramethylnon (I209); or Acequinocyl (I210); or Fluacrypyrim (I211);

(21) Mitochondrial complex I electron transport inhibitors, for example

METI acaricides, e.g. Fenazaquin (I212), Fenpyroximate (I213), Pyrimidifen (I214), Pyridaben (I215), Tebufenpyrad (I216), and Tolfenpyrad (I217); or Rotenone (Derris) (I218);

(22) Voltage-dependent sodium channel blockers, e.g. Indoxacarb (I219); or Metaflumizone (I220);

(23) Inhibitors of acetyl CoA carboxylase, for example tetronic and tetramic acid derivatives, e.g. Spirodiclofen (I221), Spiromesifen (I222), and Spirotetramat (I223);

(24) Mitochondrial complex IV electron transport inhibitors, for example phosphines, e.g. Aluminium phosphide (I224), Calcium phosphide (I225), Phosphine (I226), and Zinc phosphide (I227); or Cyanide (I228);

(25) Mitochondrial complex II electron transport inhibitors, for example beta-ketonitrile derivatives, e.g. Cyenopyrafen (I229) and Cyflumetofen (I230);

(28) Ryanodine receptor modulators, for example diamides, e.g. Chlorantraniliprole (I231), Cyantraniliprole (I232), and Flubendiamide (I233);

Further active ingredients with unknown or uncertain mode of action, for example Amidoflumet (I234), Azadirachtin (I235), Benclothiaz (I236), Benzoximate (I237), Bifenazate (I238), Bromopropylate (I239), Chinomethionat (I240), Cryolite (I241), Dicofol (I242), Diflovidazin (I243), Fluensulfone (I244), Flufenerim (I245), Flufiprole (I246), Fluopyram (I247), Fufenozide (I248), Imidaclothiz (I249), Iprodione (I250), Meperfluthrin (I251), Pyridalyl (I252), Pyrifluquinazon (I253), Tetramethylfluthrin (I254), and iodomethane (I255); furthermore products based on Bacillus firmus (including but not limited to strain CNCM I-1582, such as, for example,VOTiVO™, BioNem) (I256) or one of the following known active ingredients: 3-bromo-N-{2-bromo-4-chloro-6-[(1-cyclopropyl-ethyl)carbamoyl]-phenyl}-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (I257) (known from WO2005/077934), 4-{[(6-bromopyridin-3-yl)methyl](2-fluoroethyl)amino}furan-2(5H)-one (I258) (known from WO2007/115644), 4-{[(6-fluoropyridin-3-yl)methyl](2,2-difluoroethyl)amino}furan-2(5H)-one (I259) (known from WO2007/115644), 4-{[(2-chloro-1,3-thiazol-5-yl)methyl](2-fluoroethyl)amino}furan-2(5H)-one (I260) (known from WO2007/115644), 4-{[(6-chlorpyridin-3-yl)methyl](2-fluoroethyl)amino}furan-2(5H)-one (I261) (known from WO2007/115644), Flupyradifurone (I262), 4-{[(6-chlor-5-fluoropyridin-3-yl)methyl](methyl)amino}-furan-2(5H)-one (I263) (known from WO2007/115643), 4-{[(5,6-dichloropyridin-3-yl)methyl](2-

fluoroethyl)amino}furan-2(5H)-one (I264) (known from WO2007/115646), 4-{[(6-chloro-5-fluoropyridin-3-yl)methyl](cyclopropyl)amino}-furan-2(5H)-one (I265) (known from WO2007/115643), 4-{[(6-chloropyridin-3-yl)methyl](cyclopropyl)amino}furan-2(5H)-one (I266) (known from EP-A-0 539 588), 4-{[(6-chlorpyridin-3-yl)methyl](methyl)amino}furan-2(5H)-one (I267) (known from EP-A-0 539 588), {[1-(6-chloropyridin-3-yl)ethyl](methyl)oxido-λ4-sulfanylidene}-cyanamide (I268) (known from WO2007/149134) and its diastereomers {[(1R)-1-(6-chloropyridin-3-yl)ethyl](methyl)oxido-λ4-sulfanylidene}cyanamide (A) (I269), and {[(1S)-1-(6-chloropyridin-3-yl)ethyl](methyl)oxido-λ4-sulfanylidene}cyanamide (B) (I270) (also known from WO2007/149134) as well as diastereomers [(R)-methyl(oxido){(1R)-1-[6-(trifluoromethyl)pyridin-3-yl]ethyl}-λ4-sulfanylidene]cyan-amide (A1) (I271), and [(S)-methyl(oxido){(1S)-1-[6-(trifluoromethyl)pyridin-3-yl]ethyl}-λ4-sulfanylidene]cyanamide (A2) (I272), referred to as group of diastereomers A (known from WO2010/074747, WO2010/074751), [(R)-methyl(oxido){(1S)-1-[6-(trifluoromethyl)pyridin-3-yl]ethyl}-λ4-sulfanylidene]-cyanamide (B1) (I273), and [(S)-methyl(oxido){(1R)-1-[6-(trifluoromethyl)pyridin-3-yl]ethyl}-λ4-sulfanylidene]cyanamide (B2) (I274), referred to as group of diastereomers B (also known from WO2010/074747, WO2010/074751), and 11-(4-chloro-2,6-dimethylphenyl)-12-hydroxy-1,4-dioxa-9-azadispiro[4.2.4.2]tetradec-11-en-10-one (I275) (known from WO2006/089633), 3-(4'-fluoro-2,4-dimethylbiphenyl-3-yl)-4-hydroxy-8-oxa-1-azaspiro[4.5]dec-3-en-2-one (I276) (known from WO2008/067911), 1-{2-fluoro-4-methyl-5-[(2,2,2-trifluorethyl)sulfinyl]phenyl}-3-(trifluoromethyl)-1H-1,2,4-triazol-5-amine (I277) (known from WO2006/043635), Afidopyropen [(3S,4aR,12R,12aS,12bS)-3-[(cyclopropylcarbonyl)oxy]-6,12-dihydroxy-4,12b-dimethyl-11-oxo-9-(pyridin-3-yl)-1,3,4,4a,5,6,6a,12,12a,12b-decahydro-2H,11H-benzo[f]pyrano[4,3-b]chromen-4-yl]methyl cyclopropane-carboxylate (I278) (known from WO2008/066153), 2-cyano-3-(difluoromethoxy)-N,N-dimethylbenzenesulfonamide (I279) (known from WO2006/056433), 2-cyano-3-(difluoromethoxy)-N-methylbenzenesulfonamide (I280) (known from WO2006/100288), 2-cyano-3-(difluoromethoxy)-N-ethylbenzenesulfonamide (I281) (known from WO2005/035486), 4-(difluoromethoxy)-N-ethyl-N-methyl-1,2-benzothiazol-3-amine 1,1-dioxide (I282) (known from WO2007/057407), N-[1-(2,3-dimethylphenyl)-2-(3,5-dimethylphenyl)ethyl]-4,5-dihydro-1,3-thiazol-2-amine (I283) (known from WO2008/104503), {1'-[(2E)-3-(4-chlorophenyl)prop-2-en-1-yl]-5-fluorospiro[indole-3,4'-piperidin]-1(2H)-yl}(2-chloropyridin-4-yl)methanone (I284) (known from WO2003/106457), 3-(2,5-dimethylphenyl)-4-hydroxy-8-methoxy-1,8-diazaspiro[4.5]dec-3-en-2-one (I285) (known from WO2009/049851), 3-(2,5-dimethylphenyl)-8-methoxy-2-oxo-1,8-diazaspiro[4.5]dec-3-en-4-yl ethyl carbonate (I286) (known from WO2009/049851), 4-(but-2-yn-1-yloxy)-6-(3,5-dimethylpiperidin-1-yl)-5-fluoropyrimidine (I287) (known from WO2004/099160), (2,2,3,3,4,4,5,5-octafluoropentyl)(3,3,3-trifluoropropyl)malononitrile (I288) (known from WO2005/063094), (2,2,3,3,4,4,5,5-octafluoropentyl)(3,3,4,4,4-pentafluoro-butyl)malononitrile (I289) (known from WO2005/063094), 8-[2-(cyclopropylmethoxy)-4-(trifluoromethyl)phenoxy]-3-[6-(trifluoromethyl)pyridazin-3-yl]-3-azabicyclo[3.2.1]octane (I290) (known from WO2007/040280), Flometoquin (I291), PF1364 (CAS-Reg.No. 1204776-60-2) (I292) (known from JP2010/018586), 5-[5-

(3,5-dichlorophenyl)-5-(trifluoromethyl)-4,5-dihydro-1,2-oxazol-3-yl]-2-(1H-1,2,4-triazol-1-yl)benzonitrile (I293) (known from WO2007/075459), 5-[5-(2-chloropyridin-4-yl)-5-(trifluoromethyl)-4,5-dihydro-1,2-oxazol-3-yl]-2-(1H-1,2,4-triazol-1-yl)benzo-nitrile (I294) (known from WO2007/075459), 4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4,5-dihydro-1,2-oxazol-3-yl]-2-methyl-N-{2-oxo-2-[(2,2,2-trifluoro-ethyl)amino]ethyl}benzamide (I295) (known from WO2005/085216), 4-{[(6-chloropyridin-3-yl)methyl](cyclopropyl)amino}-1,3-oxazol-2(5H)-one (I296), 4-{[(6-chloropyridin-3-yl)methyl](2,2-difluoroethyl)amino}-1,3-oxazol-2(5H)-one (I297), 4-{[(6-chloropyridin-3-yl)methyl](ethyl)amino}-1,3-oxazol-2(5H)-one (I298), 4-{[(6-chloropyridin-3-yl)methyl](methyl)amino}-1,3-oxazol-2(5H)-one (I299) (all known from WO2010/005692), Pyflubumide N-[4-(1,1,1,3,3,3-hexafluoro-2-methoxypropan-2-yl)-3-isobutylphenyl]-N-isobutyryl-1,3,5-trimethyl-1H-pyrazole-4-carboxamide (I300) (known from WO2002/096882), methyl 2-[2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)-5-chloro-3-methylbenzoyl]-2-methylhydrazinecarboxylate (I301) (known from WO2005/085216), methyl 2-[2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)-5-cyano-3-methylbenzoyl]-2-ethylhydrazinecarboxylate (I302) (known from WO2005/085216), methyl 2-[2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)-5-cyano-3-methylbenzoyl]-2-methylhydrazinecarboxylate (I303) (known from WO2005/085216), methyl 2-[3,5-dibromo-2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)benzoyl]-1,2-diethylhydrazine-carboxylate (I304) (known from WO2005/085216), methyl 2-[3,5-dibromo-2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)-benzoyl]-2-ethylhydrazinecarboxylate (I305) (known from WO2005/085216), (5RS,7RS;5RS,7SR)-1-(6-chloro-3-pyridylmethyl)-1,2,3,5,6,7-hexahydro-7-methyl-8-nitro-5-propoxyimidazo[1,2-a]pyridine (I306) (known from WO2007/101369), 2-{6-[2-(5-fluoropyridin-3-yl)-1,3-thiazol-5-yl]pyridin-2-yl}pyrimidine (I307) (known from WO2010/006713), 2-{6-[2-(pyridin-3-yl)-1,3-thiazol-5-yl]pyridin-2-yl}pyrimidine (I308) (known from WO2010/006713), 1-(3-chloropyridin-2-yl)-N-[4-cyano-2-methyl-6-(methylcarbamoyl)phenyl]-3-{[5-(trifluoromethyl)-1H-tetrazol-1-yl]methyl}-1H-pyrazole-5-carboxamide (I309) (known from WO2010/069502), 1-(3-chloropyridin-2-yl)-N-[4-cyano-2-methyl-6-(methylcarbamoyl)phenyl]-3-{[5-(trifluoromethyl)-2H-tetrazol-2-yl]methyl}-1H-pyrazole-5-carboxamide (I310) (known from WO2010/069502), N-[2-(tert-butylcarbamoyl)-4-cyano-6-methylphenyl]-1-(3-chloropyridin-2-yl)-3-{[5-(trifluoromethyl)-1H-tetrazol-1-yl]methyl}-1H-pyrazole-5-carboxamide (I311) (known from WO2010/069502), N-[2-(tert-butylcarbamoyl)-4-cyano-6-methylphenyl]-1-(3-chloropyridin-2-yl)-3-{[5-(trifluoromethyl)-2H-tetrazol-2-yl]methyl}-1H-pyrazole-5-carboxamide (I312) (known from WO2010/069502), (1E)-N-[(6-chloropyridin-3-yl)methyl]-N'-cyano-N-(2,2-difluoroethyl)ethan-imidamide (I313) (known from WO2008/009360), N-[2-(5-amino-1,3,4-thiadiazol-2-yl)-4-chloro-6-methylphenyl]-3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazole-5-carboxamide (I314) (known from CN102057925), and methyl 2-[3,5-dibromo-2-({[3-bromo-1-(3-chloropyridin-2-yl)-1H-pyrazol-5-yl]carbonyl}amino)benzoyl]-2-ethyl-1-methylhydrazinecarboxylate (I315) (known from WO2011/049233).

In a preferred embodiment of the present invention the insecticide is a synthetic insecticide. As used herein, the term "synthetic" defines a compound that has not been obtained from a natural source such as a plant, bacterium or other organism.

According to a preferred embodiment of the present invention the insecticide is selected from the group consisting of Abamectin (I152) , Acephate (I27), Acetamiprid (I141), Acrinathrin (I96), Afidopyropen (I278), Alpha-Cypermethrin (I111), Azadirachtin (I235), *Bacillus firmus* (I256), (Beta-Cyfluthrin (I106), Bifenthrin (I100), Buprofezin (I202), Clothianidin (I142), Chlorantraniliprole (I231), Chlorfenapyr (I184), Chlorpyrifos (I35), Carbofuran (I8), Cyantraniliprole (I232), Cyenopyrafen (I229), Cyflumentofen (I230), Cyfluthrin (I105), Cypermethrin (I110), Deltamethrin (I116), Diafenthiuron (I178), Dinotefuran (I143), Emamectin-benzoate (I153), Ethiprole (I94), Fenpyroximate (I213), Fipronil (I95), Flometoquin (I291), Flonicamid (I167), Flubendiamide (I233), Fluensulfone (I244), Fluopyram (I247), Flupyradifurone (I262), Gamma-Cyhalothrin (I109), Imidacloprid (I144), Indoxacarb (I219), Lambda-Cyhalothrin (I108), Lufenuron (I197), Metaflumizone (I220), Methiocarb (I15), Methoxyfenozide (I206), Milbemectin (I155), Profenofos (I77), Pyflubumide (I300), Pymetrozine (I166), Pyrifluquinazone (I253), Spinetoram (I150), Spinosad (I151), Spirodiclofen (I221), Spiromesifen (I222), Spirotetramate (I223), Sulfoxaflor (I149), Tebufenpyrad (I216), Tefluthrin (I134), Thiacloprid (I146), Thiamethoxam (I147), Thiodicarb (I21), Triflumuron (I201), 1-(3-chloropyridin-2-yl)-N-[4-cyano-2-methyl-6-(methylcarbamoyl)phenyl]-3-{[5-(trifluoromethyl)-1H-tetrazol-1-yl]methyl}-1H-pyrazole-5-carboxamide (I309) (known from WO2010/069502), 1-(3-chloropyridin-2-yl)-N-[4-cyano-2-methyl-6-(methylcarbamoyl)phenyl]-3-{[5-(trifluoromethyl)-2H-tetrazol-2-yl]methyl}-1H-pyrazole-5-carboxamide (I310) (known from WO2010/069502) and 1-{2-fluoro-4-methyl-5-[(2,2,2-trifluorethyl)sulfinyl]phenyl}-3-(trifluoromethyl)-1H-1,2,4-triazol-5-amine (I277), Afidopyropen (I278).

In one embodiment of the present invention, the insecticide, e.g. for seed treatment, is selected from the group consisting of Abamectin (I152), Carbofuran (I8), Clothianidin (I142), Cyazypyr , Cycloxaprid, Cypermethrin (I110), Ethiprole (I94), Fipronil (I95), Fluopyram (I247), Imidacloprid (I144), Methiocarb (I15), Rynaxypyr, Spinosad (I151), Sulfoxaflor (I149), Tefluthrin (I134), Thiametoxam (I147), Thiodicarb (I21).

Further additives

One aspect of the present invention is to provide a composition as described above additionally comprising at least one auxiliary selected from the group consisting of extenders, solvents, spontaneity promoters, carriers, emulsifiers, dispersants, frost protectants, thickeners and adjuvants. Those compositions are referred to as formulations.

Accordingly, in one aspect of the present invention such formulations, and application forms prepared from them, are provided as crop protection agents and/or pesticidal agents, such as drench, drip and spray liquors, comprising the composition of the invention. The application forms may comprise further crop protection agents and/or pesticidal agents, and/or activity-enhancing adjuvants such as penetrants, examples being vegetable oils such as, for example, rapeseed oil, sunflower oil, mineral oils such as, for example, liquid paraffins, alkyl esters of vegetable fatty acids, such as rapeseed oil or soybean oil methyl esters, or alkanol alkoxylates, and/or spreaders such as, for example, alkylsiloxanes and/or salts, examples being organic or inorganic ammonium or phosphonium salts, examples being ammonium sulphate or diammonium hydrogen phosphate, and/or retention promoters such as dioctyl sulphosuccinate or hydroxypropylguar polymers and/or humectants such as glycerol and/or fertilizers such as ammonium, potassium or phosphorous fertilizers, for example.

Examples of typical formulations include water-soluble liquids (SL), emulsifiable concentrates (EC), emulsions in water (EW), suspension concentrates (SC, SE, FS, OD), water-dispersible granules (WG), granules (GR) and capsule concentrates (CS); these and other possible types of formulation are described, for example, by Crop Life International and in Pesticide Specifications, Manual on development and use of FAO and WHO specifications for pesticides, FAO Plant Production and Protection Papers – 173, prepared by the FAO/WHO Joint Meeting on Pesticide Specifications, 2004, ISBN: 9251048576. The formulations may comprise active agrochemical compounds other than one or more active compounds of the invention.

The formulations or application forms in question preferably comprise auxiliaries, such as extenders, solvents, spontaneity promoters, carriers, emulsifiers, dispersants, frost protectants, biocides, thickeners and/or other auxiliaries, such as adjuvants, for example. An adjuvant in this context is a component which enhances the biological effect of the formulation, without the component itself having a biological effect. Examples of adjuvants are agents which promote the retention, spreading, attachment to the leaf surface, or penetration.

These formulations are produced in a known manner, for example by mixing the active compounds with auxiliaries such as, for example, extenders, solvents and/or solid carriers and/or further auxiliaries, such as, for example, surfactants. The formulations are prepared either in suitable plants or else before or during the application.

Suitable for use as auxiliaries are substances which are suitable for imparting to the formulation of the active compound or the application forms prepared from these formulations (such as, e.g., usable crop protection agents, such as spray liquors or seed dressings) particular properties such as certain physical, technical and/or biological properties.

Suitable extenders are, for example, water, polar and nonpolar organic chemical liquids, for example from the classes of the aromatic and non-aromatic hydrocarbons (such as paraffins, alkylbenzenes, alkylnaphthalenes, chlorobenzenes), the alcohols and polyols (which, if appropriate, may also be substituted, etherified and/or esterified), the ketones (such as acetone, cyclohexanone), esters (including fats and oils) and (poly)ethers, the unsubstituted and substituted amines, amides, lactams (such as N-alkylpyrrolidones) and lactones, the sulphones and sulphoxides (such as dimethyl sulphoxide).

If the extender used is water, it is also possible to employ, for example, organic solvents as auxiliary solvents. Essentially, suitable liquid solvents are: aromatics such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics and chlorinated aliphatic hydrocarbons such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons such as cyclohexane or paraffins, for example petroleum fractions, mineral and vegetable oils, alcohols such as butanol or glycol and also 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.

In principle it is possible to use all suitable solvents. Suitable solvents are, for example, aromatic hydrocarbons, such as xylene, toluene or alkylnaphthalenes, for example, chlorinated aromatic or aliphatic hydrocarbons, such as chlorobenzene, chloroethylene or methylene chloride, for example, aliphatic hydrocarbons, such as cyclohexane, for example, paraffins, petroleum fractions, mineral and vegetable oils, alcohols, such as methanol, ethanol, isopropanol, butanol or glycol, for example, and also their ethers and esters, ketones such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, for example, strongly polar solvents, such as dimethyl sulphoxide, and water.

All suitable carriers may in principle be used. Suitable carriers are in particular: for example, ammonium salts and ground natural minerals such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and ground synthetic minerals, such as finely divided silica, alumina and natural or synthetic silicates, resins, waxes and/or solid fertilizers. Mixtures of such carriers may likewise be used. Carriers suitable for granules include the following: for example, crushed and fractionated natural minerals such as calcite, marble, pumice, sepiolite, dolomite, and also synthetic granules of inorganic and organic meals, and also granules of organic material such as sawdust, paper, coconut shells, maize cobs and tobacco stalks.

Liquefied gaseous extenders or solvents may also be used. Particularly suitable are those extenders or carriers which at standard temperature and under standard pressure are gaseous, examples being aerosol propellants, such as halogenated hydrocarbons, and also butane, propane, nitrogen and carbon dioxide.

Examples of emulsifiers and/or foam-formers, dispersants or wetting agents having ionic or nonionic properties, or mixtures of these surface-active substances, 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, with substituted phenols (preferably alkylphenols or arylphenols), salts of sulphosuccinic esters, taurine derivatives (preferably alkyltaurates), phosphoric esters of polyethoxylated alcohols or phenols, fatty acid esters of polyols, and derivatives of the compounds containing sulphates, sulphonates and phosphates, examples being alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates, protein hydrolysates, lignin-sulphite waste liquors and methylcellulose. The presence of a surface-active substance is advantageous if one of the active compounds and/or one of the inert carriers is not soluble in water and if application takes place in water.

Further auxiliaries that may be present in the formulations and in the application forms derived from them include colorants such as inorganic pigments, examples being iron oxide, titanium oxide, Prussian Blue, and organic dyes, such as alizarin dyes, azo dyes and metal phthalocyanine dyes, and nutrients and trace nutrients, such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

Stabilizers, such as low-temperature stabilizers, preservatives, antioxidants, light stabilizers or other agents which improve chemical and/or physical stability may also be present. Additionally present may be foam-formers or defoamers.

Furthermore, the formulations and application forms derived from them may also comprise, as additional auxiliaries, stickers such as carboxymethylcellulose, natural and synthetic polymers in powder, granule or latex form, such as gum arabic, polyvinyl alcohol, polyvinyl acetate, and also natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids. Further possible auxiliaries include mineral and vegetable oils.

There may possibly be further auxiliaries present in the formulations and the application forms derived from them. Examples of such additives include fragrances, protective colloids, binders, adhesives, thickeners, thixotropic substances, penetrants, retention promoters, stabilizers, sequestrants, complexing agents, humectants and spreaders. Generally speaking, the active compounds may be combined with any solid or liquid additive commonly used for formulation purposes.

Suitable retention promoters include all those substances which reduce the dynamic surface tension, such as dioctyl sulphosuccinate, or increase the viscoelasticity, such as hydroxypropylguar polymers, for example.

Suitable penetrants in the present context include all those substances which are typically used in order to enhance the penetration of active agrochemical compounds into plants. Penetrants in this context are defined in that, from the (generally aqueous) application liquor and/or from the spray coating, they are able to penetrate the cuticle of the plant and thereby increase the mobility of the active compounds in the cuticle. This property can be determined using the method described in the literature (Baur et al., 1997,

Pesticide Science 51, 131-152). Examples include alcohol alkoxylates such as coconut fatty ethoxylate (10) or isotridecyl ethoxylate (12), fatty acid esters such as rapeseed or soybean oil methyl esters, fatty amine alkoxylates such as tallowamine ethoxylate (15), or ammonium and/or phosphonium salts such as ammonium sulphate or diammonium hydrogen phosphate, for example.

The formulations preferably comprise between 0.0001%and 98% by weight of active compound or, with particular preference, between 0.01% and 95% by weight of active compound, more preferably between 0.5% and 90% by weight of active compound, based on the weight of the formulation. The content of the active compound is defined as the sum of the pesticidal terpene mixture and thebiological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens, and fungicide and/or insecticide, if present.

The active compound content of the application forms (crop protection products) prepared from the formulations may vary within wide ranges. The active compound concentration of the application forms may be situated typically between 0.0001% and 95% by weight of active compound, preferably between 0.0001% and 1% by weight, based on the weight of the application form. Application takes place in a customary manner adapted to the application forms.

Furthermore, in one aspect of the present invention a kit of parts is provided comprising the pesticidal terpene mixture and at least one biological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens in a synergistically effective amount in a spatially separated arrangement.

In a futher embodiment of the present invention the above-mentioned kit of parts further comprises at least one additional fungicide and/or at least one insecticide, with the proviso that the pesticidal terpene mixture, insecticide and fungicide are not identical. The fungicide and/or the insecticide can be present either in the pesticidal terpene mixture component of the kit of parts or in the biological control agent (I) component of the kit of parts being spatially separated or in both of these components. Preferably, the fungicide and the insecticide are present in the pesticidal terpene mixture component. Insecticde and fungicide may be present in different components, e.g. the fungicide in the pesticidal terpene mixture component and the insecticide in the biological agent component and vice versa.

Moreover, the kit of parts according to the present invention can additionally comprise at least one auxiliary selected from the group consisting of extenders, solvents, spontaneity promoters, carriers, emulsifiers, dispersants, frost protectants, thickeners and adjuvants as mentioned below. This at least one auxiliary can be present either in the pesticidal terpene mixture component of the kit of parts or in

the biological control agent component of the kit of parts being spatially separated or in both of these components.

In another aspect of the present invention the composition as described above is used for reducing overall damage of plants and plant parts as well as losses in harvested fruits or vegetables caused by insects, mites, nematodes and/or phytopathogens.

Furthermore, in another aspect of the present invention the composition as described above increases the overall plant health.

The term "plant health" generally comprises various sorts of improvements of plants that are not connected to the control of pests. For example, advantageous properties that may be mentioned are improved crop characteristics including: emergence, crop yields, protein content, oil content, starch content, more developed root system, improved root growth, improved root size maintenance, improved root effectiveness, improved stress tolerance (e.g. against drought, heat, salt, UV, water, cold), reduced ethylene (reduced production and/or inhibition of reception), tillering increase, increase in plant height, bigger leaf blade, less dead basal leaves, stronger tillers, greener leaf color, pigment content, photosynthetic activity, less input needed (such as fertilizers or water), less seeds needed, more productive tillers, earlier flowering, early grain maturity, less plant verse (lodging), increased shoot growth, enhanced plant vigor, increased plant stand and early and better germination.

With regard to the use according to the present invention, improved plant health preferably refers to improved plant characteristics including: crop yield, more developed root system (improved root growth), improved root size maintenance, improved root effectiveness, tillering increase, increase in plant height, bigger leaf blade, less dead basal leaves, stronger tillers, greener leaf color, photosynthetic activity, more productive tillers, enhanced plant vigor, and increased plant stand.

With regard to the present invention, improved plant health preferably especially refers to improved plant properties selected from crop yield, more developed root system, improved root growth, improved root size maintenance, improved root effectiveness, tillering increase, and increase in plant height.

The effect of a composition according to the present invention on plant health health as defined herein can be determined by comparing plants which are grown under the same environmental conditions, whereby a part of said plants is treated with a composition according to the present invention and another part of said plants is not treated with a composition according to the present invention. Instead, said other part is not treated at all or treated with a placebo (i.e., an application without a composition according to the invention such as an application without all active ingredients (i.e. without a pesticidal terpene mixture as described herein and without a biological control agent as described herein), or an application without a pesticidal terpene mixture as described herein, or an application without a biological control agent as described herein.

The composition according to the present invention may be applied in any desired manner, such as in the form of a seed coating, soil drench, and/or directly in-furrow and/or as a foliar spray and applied either pre-emergence, post-emergence or both. In other words, the composition can be applied to the seed, the plant or to harvested fruits and vegetables or to the soil wherein the plant is growing or wherein it is desired to grow (plant's locus of growth).

Reducing the overall damage of plants and plant parts often results in healthier plants and/or in an increase in plant vigor and yield.

Preferably, the composition according to the present invention is used for treating conventional or transgenic plants or seed thereof.

In another aspect of the present invention a method for reducing overall damage of plants and plant parts as well as losses in harvested fruits or vegetables caused by insects, mites, nematodes and/or phytopathogens is provided comprising the step of simultaneously or sequentially applying the pesticidal terpene mixture and at least one biological control agent in a synergistically effective amount.

In a preferred embodiment of the present method the composition further comprises at least one fungicide.

Preferably, the at least one fungicide is a synthetic fungicide. More preferably, the fungicide is selected from the group of fungicides mentioned above.

In another preferred embodiment, the composition comprises at least one insecticide in addition to the fungicide or in place of the fungicide, provided that the insecticide, the fungicide and the pesticidal terpene mixture are not identical.

Preferably, the at least one insecticide is a synthetic insecticide. More preferably, the insecticide is selected from the group of insecticides mentioned above.

The method of the present invention includes the following application methods, namely both of the at least one biological control agent pesticidal terpene mixture mentioned before may be formulated into a single, stable composition with an agriculturally acceptable shelf life (so called "solo-formulation"), or being combined before or at the time of use (so called "combined-formulations").

If not mentioned otherwise, the expression "combination" stands for the various combinations of the pesticidal terpene mixture and the at least one biological control agent, and optionally the at least one fungicide and/or the at least one insecticide, in a solo-formulation, in a single "ready-mix" form, in a combined spray mixture composed from solo-formulations, such as a "tank-mix", and especially in a combined use of the single active ingredients when applied in a sequential manner, i.e. one after the other within a reasonably short period, such as a few hours or days, e.g. 2 hours to 7 days. The order of

applying the composition according to the present invention is not essential for working the present invention. Accordingly, the term "combination" also encompasses the presence of the pesticidal terpene mixture and the at least one biological control agent , and optionally the at least one fungicide and/or insecticide on or in a plant to be treated or its surrounding, habitat or storage space, e.g. after simultaneously or consecutively applying the pesticidal terpene mixture and the at least one biological control agent , and optionally the at least one fungicide and/or the at least one insecticide to a plant its surrounding, habitat or storage space.

If the pesticidal terpene mixture and the at least one biological control agent , and optionally the at least one fungicide and/or the at least one insecticide are employed or used in a sequential manner, it is preferred to treat the plants or plant parts (which includes seeds and plants emerging from the seed), harvested fruits and vegetables according to the following method: Firstly applying the pesticidal terpene mixture and optionally the at least one fungicide and/or the at least one insecticide on the plant or plant parts, and secondly applying the biological control agent to the same plant or plant parts. By this application manner the amount of residues of insecticides/fungicides on the plant upon harvesting is as low as possible. The time periods between the first and the second application within a (crop) growing cycle may vary and depend on the effect to be achieved. For example, the first application is done to prevent an infestation of the plant or plant parts with insects, mites, nematodes and/or phytopathogens (this is particularly the case when treating seeds) or to combat the infestation with insects, mites, nematodes and/or phytopathogens (this is particularly the case when treating plants and plant parts) and the second application is done to prevent or control the infestation with insects, mites, nematodes and/or phytopathogens. Control in this context means that the pesticidal terpene mixture is not able to fully exterminate the pests or phytopathogenic fungi but is able to keep the infestation on an acceptable level.

The present invention also provides methods of enhancing the killing, inhibiting, preventative and/or repelling activity of the compositions of the present invention by multiple applications. In some other embodiments, the compositions of the present invention are applied to a plant and/or plant part for two times, during any desired development stages or under any predetermined pest pressure, at an interval of about 1 hour, about 5 hours, ab out 10 hours, about 24 hours, about two days, about 3 days, about 4 days, about 5 days, about 1 week, about 10 days, about two weeks, about three weeks, about 1 month or more. Still in some embodiments, the compositions of the present invention are applied to a plant and/or plant part for more than two times, for example, 3 times, 4 times, 5 times, 6 times, 7 times, 8 times, 9 times, 10 times, or more, during any desired development stages or under any predetermined pest pressure, at an interval of about 1 hour, about 5 hours, about 10 hours, about 24 hours, about two days, about 3 days, about 4 days, about 5 days, about 1week, about 10 days, about two weeks, about three weeks, about 1 month or more. The intervals between each application can vary if it is desired. One skilled in the art will be able to determine the application times and length of interval depending on plant species, plant pest species, and other factors.

By following the before mentioned steps, a very low level of residues of the biological control agent , and optionally at least one fungicide and/or at least one insecticide on the treated plant, plant parts, and the harvested fruits and vegetables can be achieved.

If not mentioned otherwise the treatment of plants or plant parts (which includes seeds and plants emerging from the seed), harvested fruits and vegetables with the composition according to the invention is carried out directly or by action on their surroundings, habitat or storage space using customary treatment methods, for example dipping, spraying, atomizing, irrigating, evaporating, dusting, fogging, broadcasting, foaming, painting, spreading-on, watering (drenching), drip irrigating. It is furthermore possible to apply the pesticidal terpene mixture, the at least one biological control agent, and optionally the at least one fungicide and/or the at least one insecticide as solo-formulation or combined-formulations by the ultra-low volume method, or to inject the composition according to the present invention as a composition or as sole-formulations into the soil (in-furrow).

The term "plant to be treated" encompasses every part of a plant including its root system and the material - e.g., soil or nutrition medium - which is in a radius of at least 10 cm, 20 cm, 30 cm around the caulis or bole of a plant to be treated or which is at least 10 cm, 20 cm, 30 cm around the root system of said plant to be treated, respectively.

The amount of the pesticidal terpene mixture which is used or employed in combination with at least one biological control agent, optionally in the presence of at least one fungicide and/or the at least one insecticide, depends on the final formulation as well as size or type of the plant, plant parts, seeds, harvested fruits and vegetables to be treated. Usually, the pesticidal terpene mixture to be employed or used according to the invention is present in about 2 % to about 80 % (w/w), preferably in about 5 % to about 75 % (w/w), more preferably about 10 % to about 70 % (w/w) of its solo-formulation or combined- formulation with the at least one biological control agent, and optionally the fungicide and/or the at least one insecticide.

Also the amount of the at least one biological control agent which is used or employed in combination with the pesticidal terpene mixture, optionally in the presence of at least one fungicide and/or the at least one insecticide, depends on the final formulation as well as size or type of the plant, plant parts, seeds, harvested fruit or vegetable to be treated. Usually, the biological control agent to be employed or used according to the invention is present in about 0.1 % to about 80 % (w/w), preferably 1 % to about 60 % (w/w), more preferably about 10 % to about 50 % (w/w) of its solo-formulation or combined-formulation with the pesticidal terpene mixture, and optionally the at least one fungicide and/or the at least one insecticide.

The pesticidal terpene mixture and at least one biological control agent, and if present preferably also the fungicide and/or the insecticide are used or employed in a synergistic weight ratio. The skilled person is able to find out the synergistic weight ratios for the present invention by routine methods. The

skilled person understands that these ratios refer to the ratio within a combined-formulation as well as to the calculative ratio of the pesticidal terpene mixture described herein and the biological control agent when both components are applied as mono-formulations to a plant to be treated. The skilled person can calculate this ratio by simple mathematics since the volume and the amount of the pesticidal terpene mixture and biological control agent, respectively, in a mono-formulation is known to the skilled person.

The ratio can be calculated based on the amount of the at least one biological control agent, at the time point of applying said component of a combination according to the invention to a plant or plant part and the amount of a pesticidal terpene mixture shortly prior (e.g., 48 h, 24 h, 12 h, 6 h, 2 h, 1 h) or at the time point of applying said component of a combination according to the invention to a plant or plant part.

The application of the pesticidal terpene mixture and the at least one biological control agent to a plant or a plant part can take place simultaneously or at different times as long as both components are present on or in the plant after the application(s). In cases where the pesticidal terpene mixture and biological control agent are applied at different times and biological control agent is applied noticeable prior to the pesticidal terpene mixture, the skilled person can determine the concentration of biological control agent on/in a plant by chemical analysis known in the art, at the time point or shortly before the time point of applying the pesticidal terpene mixture. Vice versa, when the pesticidal terpene mixture is applied to a plant first, the concentration of the pesticidal terpene mixture can be determined using test which are also known in the art, at the time point or shortly before the time point of applying the biological control agent.

In particular, in one embodiment the synergistic weight ratio of the pesticidal terpene mixture and the at least biological control agent lies in the range of 1 : 1000 to 1000 : 1, preferably in the range of 1 : 500 to 500 : 1, more preferably in the range of 1 : 300 to 500 : 1. It has to be noted that these ratio ranges refer to the pesticidal terpene mixture (to be combined with at least one biological control agent or a preparation of at least one biological control agent). For example, a ratio of 100:1 means 100 weight parts of the pesticidal terpene mixture and 1 weight part of biological control agent are combined (either as a solo formulation, a combined formulation or by separate applications to plants so that the combination is formed on the plant).

It has to be noted that these ratio ranges refer to the biological control agent/spores preparation (to be combined with the pesticidal terpene mixture or of around 10^{10} cells/spores per gram preparation of said cells/spores. For example, a ratio of 100:1 means 100 weight parts of a biological control agent/spore preparation having a cell/ spore concentration of 10^{10} cells/spores per gram preparation and 1 weight part of pesticidal terpene mixture are combined (either as a solo formulation, a combined formulation or by separate applications to plants so that the combination is formed on the plant).

In another embodiment, the synergistic weight ratio of the at least one biological control agent/spore preparation to pesticidal terpene mixture is in the range of 1 : 100 to 20.000 : 1, preferably in the range

of 1:50 to 10.000:1 or even in the range of 1:50 to 1000:1. Once again the mentioned ratios ranges refer to biological control agent/spore preparations of biological control agents of around 10^{10} cells or spores per gram preparation of said biological control agent.

The cell/spore concentration of preparations can be determined by applying methods known in the art. To compare weight ratios of the biological control agent/ spore preparation to the pesticidal terpene mixture, the skilled person can easily determine the factor between a preparation having a biological control agent/spore concentration different from 10^{10} cells/spores per gram cell/spore preparation and a preparation having a biological control agent/ spore concentration of 10^{10} cells/spores per gram preparation to calculate whether a ratio of a biological control agent/spore preparation to fungicide (I) is within the scope of the above listed ratio ranges.

In one embodiment of the present invention, the concentration of the pesticidal terpene mixture after dispersal is at least 50 g/ha, such as 50 – 7500 g/ha, 50 – 2500 g/ha, 50 – 1500 g/ha; at least 250 g/ha (hectare), at least 500 g/ha or at least 800 g/ha.

The application rate of composition to be employed or used according to the present invention may vary. The skilled person is able to find the appropriate application rate by way of routine experiments.

In another aspect of the present invention a seed treated with the composition as described above is provided.

The control of insects, mites, nematodes and/or phytopathogens by treating the seed of plants has been known for a long time and is a subject of continual improvements. Nevertheless, the treatment of seed entails a series of problems which cannot always be solved in a satisfactory manner. Thus, it is desirable to develop methods for protecting the seed and the germinating plant that remove the need for, or at least significantly reduce, the additional delivery of crop protection compositions in the course of storage, after sowing or after the emergence of the plants. It is desirable, furthermore, to optimize the amount of active ingredient employed in such a way as to provide the best-possible protection to the seed and the germinating plant from attack by insects, mites, nematodes and/or phytopathogens, but without causing damage to the plant itself by the active ingredient employed. In particular, methods for treating seed ought also to take into consideration the intrinsic insecticidal and/or nematicidal properties of pest-resistant or pest-tolerant transgenic plants, in order to achieve optimum protection of the seed and of the germinating plant with a minimal use of crop protection compositions.

The present invention therefore also relates in particular to a method for protecting seed and germinating plants from attack by pests, by treating the seed with the pesticidal terpene mixture as defined above and a biological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens and optionally at least one fungicide and/or optionally at least oneinsecticide of the invention. The method of the invention for protecting seed and germinating plants

from attack by pests encompasses a method in which the seed is treated simultaneously in one operation with the pesticidal terpene mixture and the at least one biological control agent, and optionally the at least one fungicide and/or the at least one insecticide. It also encompasses a method in which the seed is treated at different times with the pesticidal terpene mixture and the at least one biological control agent, and optionally the at least one fungicideand/or the at least one insecticide.

The invention likewise relates to the use of the composition of the invention for treating seed for the purpose of protecting the seed and the resultant plant against insects, mites, nematodes and/or phytopathogens.

The invention also relates to seed which at the same time has been treated with pesticidal terpene mixture and at least one biological control agent, and optionally at least one fungicideand/or the at least one insecticide. The invention further relates to seed which has been treated at different times with the pesticidal terpene mixture and the at least one biological control agent and optionally the at least one fungicideand/or the at least one insecticde. In the case of seed which has been treated at different times with the pesticidal terpene mixture and the at least one biological control agent, and optionally the at least one fungicideand/or the at least one insecticide, the individual active ingredients in the composition of the invention may be present in different layers on the seed.

Furthermore, the invention relates to seed which, following treatment with the composition of the invention, is subjected to a film-coating process in order to prevent dust abrasion of the seed.

One of the advantages of the present invention is that, owing to the particular systemic properties of the compositions of the invention, the treatment of the seed with these compositions provides protection from insects, mites, nematodes and/or phytopathogens not only to the seed itself but also to the plants originating from the seed, after they have emerged. In this way, it may not be necessary to treat the crop directly at the time of sowing or shortly thereafter.

A further advantage is to be seen in the fact that, through the treatment of the seed with composition of the invention, germination and emergence of the treated seed may be promoted.

It is likewise considered to be advantageous composition of the invention may also be used, in particular, on transgenic seed.

It is also stated that the composition of the invention may be used in combination with agents of the signalling technology, as a result of which, for example, colonization with symbionts is improved, such as rhizobia, mycorrhiza and/or endophytic bacteria, for example, is enhanced, and/or nitrogen fixation is optimized.

The compositions of the invention are suitable for protecting seed of any variety of plant which is used in agriculture, in greenhouses, in forestry or in horticulture. More particularly, the seed in question is that of cereals (e.g. wheat, barley, rye, oats and millet), maize, cotton, soybeans, rice, potatoes, sunflower, coffee, tobacco, canola, oilseed rape, beets (e.g. sugar beet and fodder beet), peanuts, vegetables (e.g. tomato, cucumber, bean, brassicas, onions and lettuce), fruit plants, lawns and ornamentals. Particularly important is the treatment of the seed of cereals (such as wheat, barley, rye and oats) maize, soybeans, cotton, canola, oilseed rape and rice.

As already mentioned above, the treatment of transgenic seed with the composition of the invention is particularly important. The seed in question here is that of plants which generally contain at least one heterologous gene that controls the expression of a polypeptide having, in particular, insecticidal and/or nematicidal properties. These heterologous genes in transgenic seed may come from microorganisms such as *Bacillus, Rhizobium, Pseudomonas, Serratia, Trichoderma, Clavibacter, Glomus* or *Gliocladium*. The present invention is particularly suitable for the treatment of transgenic seed which contains at least one heterologous gene from *Bacillus sp.* With particular preference, the heterologous gene in question comes from *Bacillus thuringiensis*.

For the purposes of the present invention, the composition of the invention is applied alone or in a suitable formulation to the seed. The seed is preferably treated in a condition in which its stability is such that no damage occurs in the course of the treatment. Generally speaking, the seed may be treated at any point in time between harvesting and sowing. Typically, seed is used which has been separated from the plant and has had cobs, hulls, stems, husks, hair or pulp removed. Thus, for example, seed may be used that has been harvested, cleaned and dried to a moisture content of less than 15% by weight. Alternatively, seed can also be used that after drying has been treated with water, for example, and then dried again.

When treating seed it is necessary, generally speaking, to ensure that the amount of the composition of the invention, and/or of other additives, that is applied to the seed is selected such that the germination of the seed is not adversely affected, and/or that the plant which emerges from the seed is not damaged. This is the case in particular with active ingredients which may exhibit phytotoxic effects at certain application rates.

The compositions of the invention can be applied directly, in other words without comprising further components and without having been diluted. As a general rule, it is preferable to apply the compositions in the form of a suitable formulation to the seed. Suitable formulations and methods for seed treatment are known to the skilled person and are described in, for example, the following documents: US 4,272,417 A, US 4,245,432 A, US 4,808,430 A, US 5,876,739 A, US 2003/0176428 A1, WO 2002/080675 A1, WO 2002/028186 A2.

The combinations which can be used in accordance with the invention may be converted into 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 composition with customary adjuvants, such as, for example, customary extenders and also solvents or diluents, colorants, wetters, dispersants, emulsifiers, antifoams, preservatives, secondary thickeners, stickers, gibberellins, and also water.

Colorants which may be present in the seed-dressing formulations which can be used in accordance with the invention include all colorants which are customary for such purposes. In this context it is possible to use not only pigments, which are of low solubility in water, but also water-soluble dyes. Examples include the colorants known under the designations Rhodamin B, C.I. Pigment Red 112 and C.I. Solvent Red 1.

Wetters which may be present in the seed-dressing formulations which can be used in accordance with the invention include all of the substances which promote wetting and which are customary in the formulation of active agrochemical ingredients. Use may be made preferably of alkylnaphthalenesulphonates, such as diisopropyl- or diisobutyl-naphthalenesulphonates.

Dispersants and/or emulsifiers which may be present in the seed-dressing formulations which can be used in accordance with the invention include all of the nonionic, anionic and cationic dispersants that are customary in the formulation of active agrochemical ingredients. Use may be made preferably of nonionic or anionic dispersants or of mixtures of nonionic or anionic dispersants. Suitable nonionic dispersants are, in particular, ethylene oxide-propylene oxide block polymers, alkylphenol polyglycol ethers and also tristryrylphenol polyglycol ethers, and the phosphated or sulphated derivatives of these. Suitable anionic dispersants are, in particular, lignosulphonates, salts of polyacrylic acid, and arylsulphonate-formaldehyde condensates.

Antifoams which may be present in the seed-dressing formulations which can be used in accordance with the invention include all of the foam inhibitors that are customary in the formulation of active agrochemical ingredients. Use may be made preferably of silicone antifoams and magnesium stearate.

Preservatives which may be present in the seed-dressing formulations which can be used in accordance with the invention include all of the substances which can be employed for such purposes in agrochemical compositions. Examples include dichlorophen and benzyl alcohol hemiformal.

Secondary thickeners which may be present in the seed-dressing formulations which can be used in accordance with the invention include all substances which can be used for such purposes in agrochemical compositions. Those contemplated with preference include cellulose derivatives, acrylic acid derivatives, xanthan, modified clays and highly disperse silica.

Stickers which may be present in the seed-dressing formulations which can be used in accordance with the invention include all customary binders which can be used in seed-dressing products. Preferred mention may be made of polyvinylpyrrolidone, polyvinyl acetate, polyvinyl alcohol and tylose.

Gibberellins which may be present in the seed-dressing formulations which can be used in accordance with the invention include preferably the gibberellins A1, A3 (= gibberellic acid), A4 and A7, with gibberellic acid being used with particular preference. The gibberellins are known (cf. R. Wegler, "Chemie der Pflanzenschutz- und Schädlingsbekämpfungsmittel", Volume 2, Springer Verlag, 1970, pp. 401-412).

The seed-dressing formulations which can be used in accordance with the invention may be used, either directly or after prior dilution with water, to treat seed of any of a wide variety of types. Accordingly, the concentrates or the preparations obtainable from them by dilution with water may be employed to dress the seed of cereals, such as wheat, barley, rye, oats and triticale, and also the seed of maize, rice, oilseed rape, peas, beans, cotton, sunflowers and beets, or else the seed of any of a very wide variety of vegetables. The seed-dressing formulations which can be used in accordance with the invention, or their diluted preparations, may also be used to dress seed of transgenic plants. In that case, additional synergistic effects may occur in interaction with the substances formed through expression.

For the treatment of seed with the seed-dressing formulations which can be used in accordance with the invention, or with the preparations produced from them by addition of water, suitable mixing equipment includes all such equipment which can typically be employed for seed dressing. More particularly, the procedure when carrying out seed dressing is to place the seed in a mixer, to add the particular desired amount of seed-dressing formulations, either as such or following dilution with water beforehand, and to carry out mixing until the distribution of the formulation on the seed is uniform. This may be followed by a drying operation.

The application rate of the seed-dressing formulations which can be used in accordance with the invention may be varied within a relatively wide range. It is guided by the particular amount of the pesticidal terpene mixture and the at least one biological control agent in the formulations, and by the seed. The application rates in the case of the composition are situated generally at between 0.001 and 50 g per kilogram of seed, preferably between 0.01 and 15 g per kilogram of seed.

The compositions according to the invention, in exhibits insecticidal and nematicidal activity, in combination with good plant tolerance and favourable toxicity to warm-blooded animals and being tolerated well by the environment, are suitable for protecting plants and plant organs, for increasing harvest yields, for improving the quality of the harvested material and for controlling animal pests, in particular insects, arachnids, helminths, nematodes and molluscs, which are encountered in agriculture, in horticulture, in animal husbandry, in forests, in gardens and leisure facilities, in protection of stored

products and of materials, and in the hygiene sector. They can be preferably employed as plant protection agents. In particular, the present invention relates to the use of the composition according to the invention as insecticide and/or fungicide.

They are active against normally sensitive and resistant species and against all or some stages of development. The abovementioned pests include:

pests from the phylum Arthropoda, especially from the class Arachnida, for example, Acarus spp., Aceria sheldoni, Aculops spp., Aculus spp., Amblyomma spp., Amphitetranychus viennensis, Argas spp., Boophilus spp., Brevipalpus spp., Bryobia graminum, Bryobia praetiosa, Centruroides spp., Chorioptes spp., Dermanyssus gallinae, Dermatophagoides pteronyssinus, Dermatophagoides farinae, Dermacentor spp., Eotetranychus spp., Epitrimerus pyri, Eutetranychus spp., Eriophyes spp., Glycyphagus domesticus, Halotydeus destructor, Hemitarsonemus spp., Hyalomma spp., Ixodes spp., Latrodectus spp., Loxosceles spp., Metatetranychus spp., Neutrombicula autumnalis, Nuphersa spp., Oligonychus spp., Ornithodorus spp., Ornithonyssus spp., Panonychus spp., Phyllocoptruta oleivora, Polyphagotarsonemus latus, Psoroptes spp., Rhipicephalus spp., Rhizoglyphus spp., Sarcoptes spp., Scorpio maurus, Steneotarsonemus spp., Steneotarsonemus spinki, Tarsonemus spp., Tetranychus spp., Trombicula alfreddugesi, Vaejovis spp., Vasates lycopersici;

from the class Chilopoda, for example, Geophilus spp., Scutigera spp.;

from the order or the class Collembola, for example, Onychiurus armatus;

from the class Diplopoda, for example, Blaniulus guttulatus;

from the class Insecta, e.g. from the order Blattodea, for example, Blattella asahinai, Blattella germanica, Blatta orientalis, Leucophaea maderae, Panchlora spp., Parcoblatta spp., Periplaneta spp., Supella longipalpa;

from the order Coleoptera, for example, Acalymma vittatum, Acanthoscelides obtectus, Adoretus spp., Agelastica alni, Agriotes spp., Alphitobius diaperinus, Amphimallon solstitialis, Anobium punctatum, Anoplophora spp., Anthonomus spp., Anthrenus spp., Apion spp., Apogonia spp., Atomaria spp., Attagenus spp., Bruchidius obtectus, Bruchus spp., Cassida spp., Cerotoma trifurcata, Ceutorrhynchus spp., Chaetocnema spp., Cleonus mendicus, Conoderus spp., Cosmopolites spp., Costelytra zealandica, Ctenicera spp., Curculio spp., Cryptolestes ferrugineus, Cryptorhynchus lapathi, Cylindrocopturus spp., Dermestes spp., Diabrotica spp., Dichocrocis spp., Dicladispa armigera, Diloboderus spp., Epilachna spp., Epitrix spp., Faustinus spp., Gibbium psylloides, Gnathocerus cornutus, Hellula undalis, Heteronychus arator, Heteronyx spp., Hylamorpha elegans, Hylotrupes bajulus, Hypera postica, Hypomeces squamosus, Hypothenemus spp., Lachnosterna consanguinea, Lasioderma serricorne, Latheticus oryzae, Lathridius spp., Lema spp., Leptinotarsa decemlineata, Leucoptera spp.,

Lissorhoptrus oryzophilus, Lixus spp., Luperodes spp., Lyctus spp., Megascelis spp., Melanotus spp., Meligethes aeneus, Melolontha spp., Migdolus spp., Monochamus spp., Naupactus xanthographus, Necrobia spp., Niptus hololeucus, Oryctes rhinoceros, Oryzaephilus surinamensis, Oryzaphagus oryzae, Otiorrhynchus spp., Oxycetonia jucunda, Phaedon cochleariae, Phyllophaga spp., Phyllophaga helleri, Phyllotreta spp., Popillia japonica, Premnotrypes spp., Prostephanus truncatus, Psylliodes spp., Ptinus spp., Rhizobius ventralis, Rhizopertha dominica, Sitophilus spp., Sitophilus oryzae, Sphenophorus spp., Stegobium paniceum, Sternechus spp., Symphyletes spp., Tanymecus spp., Tenebrio molitor, Tenebrioides mauretanicus, Tribolium spp., Trogoderma spp., Tychius spp., Xylotrechus spp., Zabrus spp.;

from the order Diptera, for example, Aedes spp., Agromyza spp., Anastrepha spp., Anopheles spp., Asphondylia spp., Bactrocera spp., Bibio hortulanus, Calliphora erythrocephala, Calliphora vicina, Ceratitis capitata, Chironomus spp., Chrysomyia spp., Chrysops spp., Chrysozona pluvialis, Cochliomyia spp., Contarinia spp., Cordylobia anthropophaga, Cricotopus sylvestris, Culex spp., Culicoides spp., Culiseta spp., Cuterebra spp., Dacus oleae, Dasyneura spp., Delia spp., Dermatobia hominis, Drosophila spp., Echinocnemus spp., Fannia spp., Gasterophilus spp., Glossina spp., Haematopota spp., Hydrellia spp., Hydrellia griseola, Hylemya spp., Hippobosca spp., Hypoderma spp., Liriomyza spp., Lucilia spp., Lutzomyia spp., Mansonia spp., Musca spp., Oestrus spp., Oscinella frit, Paratanytarsus spp., Paralauterborniella subcincta, Pegomyia spp., Phlebotomus spp., Phorbia spp., Phormia spp., Piophila casei, Prodiplosis spp., Psila rosae, Rhagoletis spp., Sarcophaga spp., Simulium spp., Stomoxys spp., Tabanus spp., Tetanops spp., Tipula spp.;

from the order Heteroptera, for example, Anasa tristis, Antestiopsis spp., Boisea spp., Blissus spp., Calocoris spp., Campylomma livida, Cavelerius spp., Cimex spp., Collaria spp., Creontiades dilutus, Dasynus piperis, Dichelops furcatus, Diconocoris hewetti, Dysdercus spp., Euschistus spp., Eurygaster spp., Heliopeltis spp., Horcias nobilellus, Leptocorisa spp., Leptocorisa varicornis, Leptoglossus phyllopus, Lygus spp., Macropes excavatus, Miridae, Monalonion atratum, Nezara spp., Oebalus spp., Pentomidae, Piesma quadrata, Piezodorus spp., Psallus spp., Pseudacysta persea, Rhodnius spp., Sahlbergella singularis, Scaptocoris castanea, Scotinophora spp., Stephanitis nashi, Tibraca spp., Triatoma spp.;

from the order Homoptera, for example, Acizzia acaciaebaileyanae, Acizzia dodonaeae, Acizzia uncatoides, Acrida turrita, Acyrthosipon spp., Acrogonia spp., Aeneolamia spp., Agonoscena spp., Aleyrodes proletella, Aleurolobus barodensis, Aleurothrixus floccosus, Allocaridara malayensis, Amrasca spp., Anuraphis cardui, Aonidiella spp., Aphanostigma piri, Aphis spp., Arboridia apicalis, Arytainilla spp., Aspidiella spp., Aspidiotus spp., Atanus spp., Aulacorthum solani, Bemisia tabaci, Blastopsylla occidentalis, Boreioglycaspis melaleucae, Brachycaudus helichrysi, Brachycolus spp., Brevicoryne brassicae, Cacopsylla spp., Calligypona marginata, Carneocephala fulgida, Ceratovacuna lanigera, Cercopidae, Ceroplastes spp., Chaetosiphon fragaefolii, Chionaspis tegalensis, Chlorita onukii,

Chondracris rosea, Chromaphis juglandicola, Chrysomphalus ficus, Cicadulina mbila, Coccomytilus halli, Coccus spp., Cryptomyzus ribis, Cryptoneossa spp., Ctenarytaina spp., Dalbulus spp., Dialeurodes citri, Diaphorina citri, Diaspis spp., Drosicha spp., Dysaphis spp., Dysmicoccus spp., Empoasca spp., Eriosoma spp., Erythroneura spp., Eucalyptolyma spp., Euphyllura spp., Euscelis bilobatus, Ferrisia spp., Geococcus coffeae, Glycaspis spp., Heteropsylla cubana, Heteropsylla spinulosa, Homalodisca coagulata, Hyalopterus arundinis, Icerya spp., Idiocerus spp., Idioscopus spp., Laodelphax striatellus, Lecanium spp., Lepidosaphes spp., Lipaphis erysimi, Macrosiphum spp., Macrosteles facifrons, Mahanarva spp., Melanaphis sacchari, Metcalfiella spp., Metopolophium dirhodum, Monellia costalis, Monelliopsis pecanis, Myzus spp., Nasonovia ribisnigri, Nephotettix spp., Nettigoniclla spectra, Nilaparvata lugens, Oncometopia spp., Orthezia praelonga, Oxya chinensis, Pachypsylla spp., Parabemisia myricae, Paratrioza spp., Parlatoria spp., Pemphigus spp., Peregrinus maidis, Phenacoccus spp., Phloeomyzus passerinii, Phorodon humuli, Phylloxera spp., Pinnaspis aspidistrae, Planococcus spp., Prosopidopsylla flava, Protopulvinaria pyriformis, Pseudaulacaspis pentagona, Pseudococcus spp., Psyllopsis spp., Psylla spp., Pteromalus spp., Pyrilla spp., Quadraspidiotus spp., Quesada gigas, Rastrococcus spp., Rhopalosiphum spp., Saissetia spp., Scaphoideus titanus, Schizaphis graminum, Selenaspidus articulatus, Sogata spp., Sogatella furcifera, Sogatodes spp., Stictocephala festina, Siphoninus phillyreae, Tenalaphara malayensis, Tetragonocephela spp., Tinocallis caryaefoliae, Tomaspis spp., Toxoptera spp., Trialeurodes vaporariorum, Trioza spp., Typhlocyba spp., Unaspis spp., Viteus vitifolii, Zygina spp.;

from the order Hymenoptera, for example, Acromyrmex spp., Athalia spp., Atta spp., Diprion spp., Hoplocampa spp., Lasius spp., Monomorium pharaonis, Sirex spp., Solenopsis invicta, Tapinoma spp., Urocerus spp., Vespa spp., Xeris spp.;

from the order Isopoda, for example, Armadillidium vulgare, Oniscus asellus, Porcellio scaber;

from the order Isoptera, for example, Coptotermes spp., Cornitermes cumulans, Cryptotermes spp., Incisitermes spp., Microtermes obesi, Odontotermes spp., Reticulitermes spp.;

from the order Lepidoptera, for example, Achroia grisella, Acronicta major, Adoxophyes spp., Aedia leucomelas, Agrotis spp., Alabama spp., Amyelois transitella, Anarsia spp., Anticarsia spp., Argyroploce spp., Barathra brassicae, Borbo cinnara, Bucculatrix thurberiella, Bupalus piniarius, Busseola spp., Cacoecia spp., Caloptilia theivora, Capua reticulana, Carpocapsa pomonella, Carposina niponensis, Cheimatobia brumata, Chilo spp., Choristoneura spp., Clysia ambiguella, Cnaphalocerus spp., Cnaphalocrocis medinalis, Cnephasia spp., Conopomorpha spp., Conotrachelus spp., Copitarsia spp., Cydia spp., Dalaca noctuides, Diaphania spp., Diatraea saccharalis, Earias spp., Ecdytolopha aurantium, Elasmopalpus lignosellus, Eldana saccharina, Ephestia spp., Epinotia spp., Epiphyas postvittana, Etiella spp., Eulia spp., Eupoecilia ambiguella, Euproctis spp., Euxoa spp., Feltia spp., Galleria mellonella, Gracillaria spp., Grapholitha spp., Hedylepta spp., Helicoverpa spp., Heliothis spp.,

Hofmannophila pseudospretella, Homoeosoma spp., Homona spp., Hyponomeuta padella, Kakivoria flavofasciata, Laphygma spp., Laspeyresia molesta, Leucinodes orbonalis, Leucoptera spp., Lithocolletis spp., Lithophane antennata, Lobesia spp., Loxagrotis albicosta, Lymantria spp., Lyonetia spp., Malacosoma neustria, Maruca testulalis, Mamstra brassicae, Melanitis leda, Mocis spp., Monopis obviella, Mythimna separata, Nemapogon cloacellus, Nymphula spp., Oiketicus spp., Oria spp., Orthaga spp., Ostrinia spp., Oulema oryzae, Panolis flammea, Parnara spp., Pectinophora spp., Perileucoptera spp., Phthorimaea spp., Phyllocnistis citrella, Phyllonorycter spp., Pieris spp., Platynota stultana, Plodia interpunctella, Plusia spp., Plutella xylostella, Prays spp., Prodenia spp., Protoparce spp., Pseudaletia spp., Pseudaletia unipuncta, Pseudoplusia includens, Pyrausta nubilalis, Rachiplusia nu, Schoenobius spp., Scirpophaga spp., Scirpophaga innotata, Scotia segetum, Sesamia spp., Sesamia inferens, Sparganothis spp., Spodoptera spp., Spodoptera praefica, Stathmopoda spp., Stomopteryx subsecivella, Synanthedon spp., Tecia solanivora, Thermesia gemmatalis, Tinea cloacella, Tinea pellionella, Tineola bisselliella, Tortrix spp., Trichophaga tapetzella, Trichoplusia spp., Tryporyza incertulas, Tuta absoluta, Virachola spp.;

from the order Orthoptera or Saltatoria, for example, Acheta domesticus, Dichroplus spp., Gryllotalpa spp., Hieroglyphus spp., Locusta spp., Melanoplus spp., Schistocerca gregaria;

from the order Phthiraptera, for example, Damalinia spp., Haematopinus spp., Linognathus spp., Pediculus spp., Ptirus pubis, Trichodectes spp.;

from the order Psocoptera for example Lepinatus spp., Liposcelis spp.;

from the order Siphonaptera, for example, Ceratophyllus spp., Ctenocephalides spp., Pulex irritans, Tunga penetrans, Xenopsylla cheopsis;

from the order Thysanoptera, for example, Anaphothrips obscurus, Baliothrips biformis, Drepanothrips reuteri, Enneothrips flavens, Frankliniella spp., Heliothrips spp., Hercinothrips femoralis, Rhipiphorothrips cruentatus, Scirtothrips spp., Taeniothrips cardamomi, Thrips spp.;

from the order Zygentoma (=Thysanura), for example, Ctenolepisma spp., Lepisma saccharina, Lepismodes inquilinus, Thermobia domestica;

from the class Symphyla, for example, Scutigerella spp.;

pests from the phylum Mollusca, especially from the class Bivalvia, for example, Dreissena spp., and from the class Gastropoda, for example, Arion spp., Biomphalaria spp., Bulinus spp., Deroceras spp., Galba spp., Lymnaea spp., Oncomelania spp., Pomacea spp., Succinea spp.;

animal pests from the phylums Plathelminthes and Nematoda, for example, Ancylostoma duodenale, Ancylostoma ceylanicum, Acylostoma braziliensis, Ancylostoma spp., Ascaris spp., Brugia malayi,

Brugia timori, Bunostomum spp., Chabertia spp., Clonorchis spp., Cooperia spp., Dicrocoelium spp., Dictyocaulus filaria, Diphyllobothrium latum, Dracunculus medinensis, Echinococcus granulosus, Echinococcus multilocularis, Enterobius vermicularis, Faciola spp., Haemonchus spp., Heterakis spp., Hymenolepis nana, Hyostrongulus spp., Loa Loa, Nematodirus spp., Oesophagostomum spp., Opisthorchis spp., Onchocerca volvulus, Ostertagia spp., Paragonimus spp., Schistosomen spp., Strongyloides fuelleborni, Strongyloides stercoralis, Stronyloides spp., Taenia saginata, Taenia solium, Trichinella spiralis, Trichinella nativa, Trichinella britovi, Trichinella nelsoni, Trichinella pseudopsiralis, Trichostrongulus spp., Trichuris trichuria, Wuchereria bancrofti;

phytoparasitic pests from the phylum Nematoda, for example, Aphelenchoides spp., Bursaphelenchus spp., Ditylenchus spp., Globodera spp., Heterodera spp., Longidorus spp., Meloidogyne spp., Pratylenchus spp., Radopholus spp., Trichodorus spp., Tylenchulus spp., Xiphinema spp., Helicotylenchus spp., Tylenchorhynchus spp., Scutellonema spp., Paratrichodorus spp., Meloinema spp., Paraphelenchus spp., Aglenchus spp., Belonolaimus spp., Nacobbus spp., Rotylenchulus spp., Rotylenchus spp., Neotylenchus spp., Paraphelenchus spp., Dolichodorus spp., Hoplolaimus spp., Punctodera spp., Criconemella spp., Quinisulcius spp., Hemicycliophora spp., Anguina spp., Subanguina spp., Hemicriconemoides spp., Psilenchus spp., Pseudohalenchus spp., Criconemoides spp., Cacopaurus spp., Hirschmaniella spp, *Tetylenchus spp.*.

It is furthermore possible to control organisms from the subphylum Protozoa, especially from the order Coccidia, such as Eimeria spp.

Furthermore, the composition according to the present invention preferably has potent microbicidal activity and can be used for control of unwanted microorganisms, such as fungi and bacteria, in crop protection and in the protection of materials.

The invention also relates to a method for controlling unwanted microorganisms, characterized in that the inventive composition is applied to the phytopathogenic fungi, phytopathogenic bacteria and/or their habitat.

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*.

Non-limiting examples of pathogens of fungal diseases which can be treated in accordance with the invention include:

diseases caused by powdery mildew pathogens, for example *Blumeria* species, for example *Blumeria graminis*; *Podosphaera* species, for example *Podosphaera leucotricha*; *Sphaerotheca* species, for example *Sphaerotheca fuliginea*; *Uncinula* species, for example *Uncinula necator*;

diseases caused by rust disease pathogens, for example *Gymnosporangium* species, for example *Gymnosporangium sabinae*; *Hemileia* species, for example *Hemileia vastatrix*; *Phakopsora* species, for example *Phakopsora pachyrhizi* and *Phakopsora meibomiae*; *Puccinia* species, for example *Puccinia recondite*, *P. triticina*, *P. graminis* or *P. striiformis*; *Uromyces* species, for example *Uromyces appendiculatus*;

diseases caused by pathogens from the group of the *Oomycetes*, for example *Albugo* species, for example *Algubo candida*; *Bremia* species, for example *Bremia lactucae*; *Peronospora* species, for example *Peronospora pisi* or *P. brassicae*; Phytophthora species, for example *Phytophthora infestans*; *Plasmopara* species, for example *Plasmopara viticola*; *Pseudoperonospora* species, for example *Pseudoperonospora humuli* or *Pseudoperonospora cubensis*; Pythium species, for example *Pythium ultimum*;

leaf blotch diseases and leaf wilt diseases caused, for example, by *Alternaria* species, for example *Alternaria solani*; *Cercospora* species, for example *Cercospora beticola*; *Cladiosporium* species, for example *Cladiosporium cucumerinum*; *Cochliobolus* species, for example *Cochliobolus sativus* (conidia form: Drechslera, Syn: Helminthosporium), *Cochliobolus miyabeanus*; *Colletotrichum* species, for example *Colletotrichum lindemuthanium*; *Cycloconium* species, for example *Cycloconium oleaginum*; *Diaporthe* species, for example *Diaporthe citri*; *Elsinoe* species, for example *Elsinoe fawcettii*; *Gloeosporium* species, for example *Gloeosporium laeticolor*; *Glomerella* species, for example *Glomerella cingulata*; *Guignardia* species, for example *Guignardia bidwelli*; *Leptosphaeria* species, for example *Leptosphaeria maculans*, *Leptosphaeria nodorum*; *Magnaporthe* species, for example *Magnaporthe grisea*; *Microdochium* species, for example *Microdochium nivale*; *Mycosphaerella* species, for example *Mycosphaerella graminicola*, *M. arachidicola* and *M. fijiensis*; *Phaeosphaeria* species, for example *Phaeosphaeria nodorum*; *Pyrenophora* species, for example *Pyrenophora teres*, *Pyrenophora tritici repentis*; *Ramularia* species, for example *Ramularia collo-cygni*, *Ramularia areola*; *Rhynchosporium* species, for example *Rhynchosporium secalis*; *Septoria* species, for example *Septoria apii*, *Septoria lycopersii*; *Typhula* species, for example *Typhula incarnata*; *Venturia* species, for example *Venturia inaequalis*;

root and stem diseases caused, for example, by *Corticium* species, for example *Corticium graminearum*; *Fusarium* species, for example *Fusarium oxysporum*; *Gaeumannomyces* species, for example

Gaeumannomyces graminis; *Rhizoctonia* species, such as, for example *Rhizoctonia solani*; *Sarocladium* diseases caused for example by *Sarocladium oryzae*; *Sclerotium* diseases caused for example by *Sclerotium oryzae*; *Tapesia* species, for example *Tapesia acuformis*; *Thielaviopsis* species, for example *Thielaviopsis basicola*;

ear and panicle diseases (including corn cobs) caused, for example, by *Alternaria* species, for example *Alternaria* spp.; *Aspergillus* species, for example *Aspergillus flavus*; *Cladosporium* species, for example *Cladosporium cladosporioides*; *Claviceps* species, for example *Claviceps purpurea*; *Fusarium* species, for example *Fusarium culmorum*; *Gibberella* species, for example *Gibberella zeae*; *Monographella* species, for example *Monographella nivalis*; *Septoria* species, for example *Septoria nodorum*;

diseases caused by smut fungi, for example *Sphacelotheca* species, for example *Sphacelotheca reiliana*; *Tilletia* species, for example *Tilletia caries*, *T. controversa*; *Urocystis* species, for example *Urocystis occulta*; *Ustilago* species, for example *Ustilago nuda*, *U. nuda tritici*;

fruit rot caused, for example, by *Aspergillus* species, for example *Aspergillus flavus*; *Botrytis* species, for example *Botrytis cinerea*; *Penicillium* species, for example *Penicillium expansum* and *P. purpurogenum*; *Sclerotinia* species, for example *Sclerotinia sclerotiorum*; *Verticilium* species, for example *Verticilium alboatrum*;

seed and soilborne decay, mould, wilt, rot and damping-off diseases caused, for example, by *Alternaria* species, caused for example by *Alternaria brassicicola*; *Aphanomyces* species, caused for example by *Aphanomyces euteiches*; *Ascochyta* species, caused for example by *Ascochyta lentis*; *Aspergillus* species, caused for example by *Aspergillus flavus*; *Cladosporium* species, caused for example by *Cladosporium herbarum*; *Cochliobolus* species, caused for example by *Cochliobolus sativus*; (Conidiaform: Drechslera, Bipolaris Syn: Helminthosporium); *Colletotrichum* species, caused for example by *Colletotrichum coccodes*; *Fusarium* species, caused for example by *Fusarium culmorum*; *Gibberella* species, caused for example by *Gibberella zeae*; *Macrophomina* species, caused for example by *Macrophomina phaseolina*; *Monographella* species, caused for example by *Monographella nivalis*; *Penicillium* species, caused for example by *Penicillium expansum*; *Phoma* species, caused for example by *Phoma lingam*; *Phomopsis* species, caused for example by *Phomopsis sojae*; *Phytophthora* species, caused for example by *Phytophthora cactorum*; *Pyrenophora* species, caused for example by *Pyrenophora graminea*; *Pyricularia* species, caused for example by *Pyricularia oryzae*; *Pythium* species, caused for example by *Pythium ultimum*; *Rhizoctonia* species, caused for example by *Rhizoctonia solani*; *Rhizopus* species, caused for example by *Rhizopus oryzae*; *Sclerotium* species, caused for example by *Sclerotium rolfsii*; *Septoria* species, caused for example by *Septoria nodorum*; *Typhula* species, caused for example by *Typhula incarnata*; *Verticillium* species, caused for example by *Verticillium dahliae*;

cancers, galls and witches' broom caused, for example, by *Nectria* species, for example *Nectria galligena*;

wilt diseases caused, for example, by *Monilinia* species, for example *Monilinia laxa*;

leaf blister or leaf curl diseases caused, for example, by *Exobasidium* species, for example *Exobasidium vexans*;

Taphrina species, for example *Taphrina deformans*;

decline diseases of wooden plants caused, for example, by Esca disease, caused for example by *Phaemoniella clamydospora*, *Phaeoacremonium aleophilum* and *Fomitiporia mediterranea*; Eutypa dyeback, caused for example by *Eutypa lata* ; Ganoderma diseases caused for example by *Ganoderma boninense*; Rigidoporus diseases caused for example by *Rigidoporus lignosus*;

diseases of flowers and seeds caused, for example, by *Botrytis* species, for example *Botrytis cinerea*;

diseases of plant tubers caused, for example, by *Rhizoctonia* species, for example *Rhizoctonia solani*; *Helminthosporium* species, for example *Helminthosporium solani*;

Club root caused, for example, by *Plasmodiophora* species, for example *Plamodiophora brassicae*;

diseases caused by bacterial pathogens, for example *Xanthomonas* species, for example *Xanthomonas campestris pv. oryzae*; *Pseudomonas* species, for example *Pseudomonas syringae pv. lachrymans*; *Erwinia* species, for example *Erwinia amylovora*.

The following diseases of soya beans 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*).

The inventive compositions can be used for curative or protective/preventive control of phytopathogenic fungi. The invention therefore also relates to curative and protective methods for controlling phytopathogenic fungi by the use of the inventive composition, which is applied to the seed, the plant or plant parts, the fruit or the soil in which the plants grow.

The fact that the composition is 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 composition, when it is well tolerated by plants, has favourable homeotherm toxicity and is well tolerated by the environment, is suitable for protecting plants and plant organs, for enhancing harvest yields, for improving the quality of the harvested material. It can preferably be used as crop protection composition. It is 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.

Depending on the plant species or plant cultivars, their location and growth conditions (soils, climate, vegetation period, diet), using or employing the composition according to the present invention the treatment according to the invention may also result in super-additive ("synergistic") effects. Thus, for example, by using or employing inventive composition in the treatment according to the invention, reduced application rates and/or a widening of the activity spectrum and/or an increase in the activity better plant growth, increased tolerance to high or low temperatures, increased tolerance to drought or to water or soil salt content, increased flowering performance, easier harvesting, accelerated maturation, higher harvest yields, bigger fruits, larger plant height, greener leaf color, earlier flowering, higher quality and/or a higher nutritional value of the harvested products, higher sugar concentration within the fruits, better storage stability and/or processability of the harvested products are possible, which exceed the effects which were actually to be expected.

At certain application rates of the inventive composition in the treatment according to the invention may also have a strengthening effect in plants. The defense system of the plant against attack by unwanted phytopathogenic fungi and/ or microorganisms and/or viruses is mobilized. Plant-strengthening (resistance-inducing) substances are to be understood as meaning, in the present context, those substances or combinations of substances which are capable of stimulating the defense system of plants in such a way that, when subsequently inoculated with unwanted phytopathogenic fungi and/or microorganisms and/or viruses, the treated plants display a substantial degree of resistance to these

phytopathogenic fungi and/or microorganisms and/or viruses, Thus, by using or employing composition according to the present invention in the treatment according to the invention, plants can be protected against attack by the abovementioned pathogens within a certain period of time after the treatment. The period of time within which protection is effected generally extends from 1 to 10 days, preferably 1 to 7 days, after the treatment of the plants with the active compounds.

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, i. e. that already exhibit an increased plant health with respect to stress tolerance. Abiotic stress conditions may include, for example, drought, cold temperature exposure, heat exposure, osmotic stress, flooding, increased soil salinity, increased mineral exposure, ozon exposure, high light exposure, limited availability of nitrogen nutrients, limited availability of phosphorus nutrients, shade avoidance. Preferably, the treatment of these plants and cultivars with the composition of the present invention additionally increases the overall plant health (cf. above).

Plants and plant cultivars which may also be treated according to the invention, are those plants characterized by enhanced yield characteristics, i. e. that already exhibit an increased plant health with respect to this feature. 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, protein content, oil content and composition, nutritional value, reduction in anti-nutritional compounds, improved processability and better storage stability. Preferably, the treatment of these plants and cultivars with the composition of the present invention additionally increases the overall plant health (cf. above).

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 stress factors. Such plants are typically made by crossing an inbred male-sterile parent line (the female parent) with another inbred male-fertile parent line (the male parent). Hybrid seed is typically harvested from the male sterile plants and sold to growers. Male sterile plants can sometimes (e.g. in corn) be produced by detasseling, i.e. the mechanical removal of the male

reproductive organs (or males flowers) but, more typically, male sterility is the result of genetic determinants in the plant genome. In that case, and especially when seed is the desired product to be harvested from the hybrid plants it is typically useful to ensure that male fertility in the hybrid plants is fully restored. This can be accomplished by ensuring that the male parents have appropriate fertility restorer genes which are capable of restoring the male fertility in hybrid plants that contain the genetic determinants responsible for male-sterility. Genetic determinants for male sterility may be located in the cytoplasm. Examples of cytoplasmic male sterility (CMS) were for instance described in Brassica species. However, genetic determinants for male sterility can also be located in the nuclear genome. Male sterile plants can also be obtained by plant biotechnology methods such as genetic engineering. A particularly useful means of obtaining male-sterile plants is described in WO 89/10396 in which, for example, a ribonuclease such as barnase is selectively expressed in the tapetum cells in the stamens. Fertility can then be restored by expression in the tapetum cells of a ribonuclease inhibitor such as barstar.

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.

Herbicide-tolerant plants are for example glyphosate-tolerant plants, i.e. plants made tolerant to the herbicide glyphosate or salts thereof. Plants can be made tolerant to glyphosate through different means. For example, glyphosate-tolerant plants can be obtained by transforming the plant with a gene encoding the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS). Examples of such EPSPS genes are the AroA gene (mutant CT7) of the bacterium *Salmonella typhimurium*, the CP4 gene of the bacterium *Agrobacterium sp*, the genes encoding a Petunia EPSPS, a Tomato EPSPS, or an Eleusine EPSPS. It can also be a mutated EPSPS. Glyphosate-tolerant plants can also be obtained by expressing a gene that encodes a glyphosate oxido-reductase enzyme. Glyphosate-tolerant plants can also be obtained by expressing a gene that encodes a glyphosate acetyl transferase enzyme. Glyphosate-tolerant plants can also be obtained by selecting plants containing naturally-occurring mutations of the above-mentioned genes.

Other herbicide resistant plants are for example plants that are made tolerant to herbicides inhibiting the enzyme glutamine synthase, such as bialaphos, phosphinothricin or glufosinate. Such plants can be obtained by expressing an enzyme detoxifying the herbicide or a mutant glutamine synthase enzyme that is resistant to inhibition. One such efficient detoxifying enzyme is an enzyme encoding a phosphinothricin acetyltransferase (such as the bar or pat protein from Streptomyces species). Plants expressing an exogenous phosphinothricin acetyltransferase are also described.

Further herbicide-tolerant plants are also plants that are made tolerant to the herbicides inhibiting the enzyme hydroxyphenylpyruvatedioxygenase (HPPD). Hydroxyphenylpyruvatedioxygenases are

enzymes that catalyze the reaction in which para-hydroxyphenylpyruvate (HPP) is transformed into homogentisate.

Plants tolerant to HPPD-inhibitors can be transformed with a gene encoding a naturally-occurring resistant HPPD enzyme, or a gene encoding a mutated HPPD enzyme. Tolerance to HPPD-inhibitors can also be obtained by transforming plants with genes encoding certain enzymes enabling the formation of homogentisate despite the inhibition of the native HPPD enzyme by the HPPD-inhibitor. Tolerance of plants to HPPD inhibitors can also be improved by transforming plants with a gene encoding an enzyme prephenate dehydrogenase in addition to a gene encoding an HPPD-tolerant enzyme.

Still further herbicide resistant plants are plants that are made tolerant to acetolactate synthase (ALS) inhibitors. Known ALS-inhibitors include, for example, sulfonylurea, imidazolinone, triazolopyrimidines, pyrimidinyoxy(thio)benzoates, and/or sulfonylaminocarbonyltriazolinone herbicides. Different mutations in the ALS enzyme (also known as acetohydroxyacid synthase, AHAS) are known to confer tolerance to different herbicides and groups of herbicides. The production of sulfonylurea-tolerant plants and imidazolinone-tolerant plants is described in WO 1996/033270. Other imidazolinone-tolerant plants are also described. Further sulfonylurea- and imidazolinone-tolerant plants are also described in for example WO 2007/024782.

Other plants tolerant to imidazolinone and/or sulfonylurea can be obtained by induced mutagenesis, selection in cell cultures in the presence of the herbicide or mutation breeding as described for example for soybeans, for rice, for sugar beet, for lettuce, or for sunflower.

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.

An “insect-resistant transgenic plant”, as used herein, includes any plant containing at least one transgene comprising a coding sequence encoding:

1) An insecticidal crystal protein from *Bacillus thuringiensis* or an insecticidal portion thereof, such as the insecticidal crystal proteins listed online at: http://www.lifesci.sussex.ac.uk/Home/Neil_Crickmore/Bt/, or insecticidal portions thereof, e.g., proteins of the Cry protein classes Cry1Ab, Cry1Ac, Cry1F, Cry2Ab, Cry3Aa, or Cry3Bb or insecticidal portions thereof; or

2) a crystal protein from *Bacillus thuringiensis* or a portion thereof which is insecticidal in the presence of a second other crystal protein from *Bacillus thuringiensis* or a portion thereof, such as the binary toxin made up of the Cry34 and Cry35 crystal proteins; or

3) a hybrid insecticidal protein comprising parts of different insecticidal crystal proteins from *Bacillus thuringiensis*, such as a hybrid of the proteins of 1) above or a hybrid of the proteins of 2) above, e.g., the Cry1A.105 protein produced by corn event MON98034 (WO 2007/027777); or

4) a protein of any one of 1) to 3) above wherein some, particularly 1 to 10, amino acids have been replaced by another amino acid to obtain a higher insecticidal activity to a target insect species, and/or to expand the range of target insect species affected, and/or because of changes introduced into the encoding DNA during cloning or transformation, such as the Cry3Bb1 protein in corn events MON863 or MON88017, or the Cry3A protein in corn event MIR604;

5) an insecticidal secreted protein from *Bacillus thuringiensis* or *Bacillus cereus*, or an insecticidal portion thereof, such as the vegetative insecticidal (VIP) proteins listed at: http://www.lifesci.sussex.ac.uk/home/Neil_Crickmore/Bt/vip.html, e.g. proteins from the VIP3Aa protein class; or

6) secreted protein from *Bacillus thuringiensis* or *Bacillus cereus* which is insecticidal in the presence of a second secreted protein from *Bacillus thuringiensis* or *B. cereus*, such as the binary toxin made up of the VIP1A and VIP2A proteins; or

7) hybrid insecticidal protein comprising parts from different secreted proteins from *Bacillus thuringiensis* or *Bacillus cereus*, such as a hybrid of the proteins in 1) above or a hybrid of the proteins in 2) above; or

8) protein of any one of 1) to 3) above wherein some, particularly 1 to 10, amino acids have been replaced by another amino acid to obtain a higher insecticidal activity to a target insect species, and/or to expand the range of target insect species affected, and/or because of changes introduced into the encoding DNA during cloning or transformation (while still encoding an insecticidal protein), such as the VIP3Aa protein in cotton event COT102.

Of course, an insect-resistant transgenic plant, as used herein, also includes any plant comprising a combination of genes encoding the proteins of any one of the above classes 1 to 8. In one embodiment, an insect-resistant plant contains more than one transgene encoding a protein of any one of the above classes 1 to 8, to expand the range of target insect species affected when using different proteins directed at different target insect species, or to delay insect resistance development to the plants by using different proteins insecticidal to the same target insect species but having a different mode of action, such as binding to different receptor binding sites in the insect.

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. Particularly useful stress tolerance plants include:

a. plants which contain a transgene capable of reducing the expression and/or the activity of poly(ADP-ribose)polymerase (PARP) gene in the plant cells or plants

b. plants which contain a stress tolerance enhancing transgene capable of reducing the expression and/or the activity of the poly(ADP-ribose)glycohydrolase (PARG) encoding genes of the plants or plants cells.

c. plants which contain a stress tolerance enhancing transgene coding for a plant-functional enzyme of the nicotinamide adenine dinucleotide salvage synthesis pathway including nicotinamidase, nicotinate phosphoribosyltransferase, nicotinic acid mononucleotide adenyl transferase, nicotinamide adenine dinucleotide synthetase or nicotine amide phosphorybosyltransferase.

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 such as :

1) transgenic plants which synthesize a modified starch, which in its physical-chemical characteristics, in particular the amylose content or the amylose/amylopectin ratio, the degree of branching, the average chain length, the side chain distribution, the viscosity behaviour, the gelling strength, the starch grain size and/or the starch grain morphology, is changed in comparison with the synthesised starch in wild type plant cells or plants, so that this is better suited for special applications.

2) transgenic plants which synthesize non starch carbohydrate polymers or which synthesize non starch carbohydrate polymers with altered properties in comparison to wild type plants without genetic modification. Examples are plants producing polyfructose, especially of the inulin and levan-type, plants producing alpha 1,4 glucans, plants producing alpha-1,6 branched alpha-1,4-glucans, plants producing alternan,

3) transgenic plants which produce hyaluronan.

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 and include:

a) Plants, such as cotton plants, containing an altered form of cellulose synthase genes,

b) Plants, such as cotton plants, containing an altered form of rsw2 or rsw3 homologous nucleic acids,

c) Plants, such as cotton plants, with increased expression of sucrose phosphate synthase,

d) Plants, such as cotton plants, with increased expression of sucrose synthase,

e) Plants, such as cotton plants, wherein the timing of the plasmodesmatal gating at the basis of the fiber cell is altered, e.g. through downregulation of fiberselective β 1,3-glucanase,

f) Plants, such as cotton plants, having fibers with altered reactivity, e.g. through the expression of N-acteylglucosaminetransferase gene including nodC and chitinsynthase genes.

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 characteristics and include:

a) Plants, such as oilseed rape plants, producing oil having a high oleic acid content,

b) Plants such as oilseed rape plants, producing oil having a low linolenic acid content,

c) Plant such as oilseed rape plants, producing oil having a low level of saturated fatty acids.

Particularly useful transgenic plants which may be treated according to the invention are plants which comprise one or more genes which encode one or more toxins, such as the following which are sold under the trade names YIELD GARD® (for example maize, cotton, soya beans), KnockOut® (for example maize), BiteGard® (for example maize), Bt-Xtra® (for example maize), StarLink® (for example maize), Bollgard® (cotton), Nucotn® (cotton), Nucotn 33B® (cotton), NatureGard® (for example maize), Protecta® and NewLeaf® (potato). Examples of herbicide-tolerant plants which may be mentioned are maize varieties, cotton varieties and soya bean varieties which are sold under the trade names Roundup Ready® (tolerance to glyphosate, for example maize, cotton, soya bean), Liberty Link® (tolerance to phosphinotricin, for example oilseed rape), IMI® (tolerance to imidazolinones) and STS® (tolerance to sulphonylureas, for example maize). Herbicide-resistant plants (plants bred in a conventional manner for herbicide tolerance) which may be mentioned include the varieties sold under the name Clearfield® (for example maize).

Particularly useful transgenic plants which may be treated according to the invention are plants containing transformation events, or a combination of transformation events, and that are listed for example in the databases for various national or regional regulatory agencies including Event 1143-14A (cotton, insect control, not deposited, described in WO 06/128569); Event 1143-51B (cotton, insect control, not deposited, described in WO 06/128570); Event 1445 (cotton, herbicide tolerance, not deposited, described in US-A 2002-120964 or WO 02/034946); Event 17053 (rice, herbicide tolerance, deposited as PTA-9843, described in WO 10/117737); Event 17314 (rice, herbicide tolerance, deposited as PTA-9844, described in WO 10/117735); Event 281-24-236 (cotton, insect control - herbicide tolerance, deposited as PTA-6233, described in WO 05/103266 or US-A 2005-216969); Event 3006-210-23 (cotton, insect control - herbicide tolerance, deposited as PTA-6233, described in US-A 2007-143876 or WO 05/103266); Event 3272 (corn, quality trait, deposited as PTA-9972, described in WO 06/098952 or US-A 2006-230473); Event 40416 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-11508, described in WO 11/075593); Event 43A47 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-11509, described in WO 11/075595); Event 5307 (corn, insect control, deposited as ATCC PTA-9561, described in WO 10/077816); Event ASR-368 (bent grass, herbicide tolerance, deposited as ATCC PTA-4816, described in US-A 2006-162007 or WO 04/053062); Event B16 (corn, herbicide tolerance, not deposited, described in US-A 2003-126634); Event BPS-CV127-9 (soybean, herbicide tolerance, deposited as NCIMB No. 41603, described in WO 10/080829); Event CE43-67B (cotton, insect control, deposited as DSM ACC2724, described in US-A 2009-217423 or WO 06/128573); Event CE44-69D (cotton, insect control, not deposited, described in

US-A 2010-0024077); Event CE44-69D (cotton, insect control, not deposited, described in WO 06/128571); Event CE46-02A (cotton, insect control, not deposited, described in WO 06/128572); Event COT102 (cotton, insect control, not deposited, described in US-A 2006-130175 or WO 04/039986); Event COT202 (cotton, insect control, not deposited, described in US-A 2007-067868 or WO 05/054479); Event COT203 (cotton, insect control, not deposited, described in WO 05/054480); Event DAS40278 (corn, herbicide tolerance, deposited as ATCC PTA-10244, described in WO 11/022469); Event DAS-59122-7 (corn, insect control - herbicide tolerance, deposited as ATCC PTA 11384 , described in US-A 2006-070139); Event DAS-59132 (corn, insect control - herbicide tolerance, not deposited, described in WO 09/100188); Event DAS68416 (soybean, herbicide tolerance, deposited as ATCC PTA-10442, described in WO 11/066384 or WO 11/066360); Event DP-098140-6 (corn, herbicide tolerance, deposited as ATCC PTA-8296, described in US-A 2009-137395 or WO 08/112019); Event DP-305423-1 (soybean, quality trait, not deposited, described in US-A 2008-312082 or WO 08/054747); Event DP-32138-1 (corn, hybridization system, deposited as ATCC PTA-9158, described in US-A 2009-0210970 or WO 09/103049); Event DP-356043-5 (soybean, herbicide tolerance, deposited as ATCC PTA-8287, described in US-A 2010-0184079 or WO 08/002872); Event EE-1 (brinjal, insect control, not deposited, described in WO 07/091277); Event FI117 (corn, herbicide tolerance, deposited as ATCC 209031, described in US-A 2006-059581 or WO 98/044140); Event GA21 (corn, herbicide tolerance, deposited as ATCC 209033, described in US-A 2005-086719 or WO 98/044140); Event GG25 (corn, herbicide tolerance, deposited as ATCC 209032, described in US-A 2005-188434 or WO 98/044140); Event GHB119 (cotton, insect control - herbicide tolerance, deposited as ATCC PTA-8398, described in WO 08/151780); Event GHB614 (cotton, herbicide tolerance, deposited as ATCC PTA-6878, described in US-A 2010-050282 or WO 07/017186); Event GJ11 (corn, herbicide tolerance, deposited as ATCC 209030, described in US-A 2005-188434 or WO 98/044140); Event GM RZ13 (sugar beet, virus resistance , deposited as NCIMB-41601, described in WO 10/076212); Event H7-1 (sugar beet, herbicide tolerance, deposited as NCIMB 41158 or NCIMB 41159, described in US-A 2004-172669 or WO 04/074492); Event JOPLIN1 (wheat, disease tolerance, not deposited, described in US-A 2008-064032); Event LL27 (soybean, herbicide tolerance, deposited as NCIMB41658, described in WO 06/108674 or US-A 2008-320616); Event LL55 (soybean, herbicide tolerance, deposited as NCIMB 41660, described in WO 06/108675 or US-A 2008-196127); Event LLcotton25 (cotton, herbicide tolerance, deposited as ATCC PTA-3343, described in WO 03/013224 or US-A 2003-097687); Event LLRICE06 (rice, herbicide tolerance, deposited as ATCC-23352, described in US 6,468,747 or WO 00/026345); Event LLRICE601 (rice, herbicide tolerance, deposited as ATCC PTA-2600, described in US-A 2008-2289060 or WO 00/026356); Event LY038 (corn, quality trait, deposited as ATCC PTA-5623, described in US-A 2007-028322 or WO 05/061720); Event MIR162 (corn, insect control, deposited as PTA-8166, described in US-A 2009-300784 or WO 07/142840); Event MIR604 (corn, insect control, not deposited, described in US-A 2008-167456 or WO 05/103301); Event MON15985 (cotton, insect control, deposited as ATCC PTA-2516, described in US-A 2004-250317 or WO 02/100163); Event MON810 (corn, insect control, not deposited, described in US-A

2002-102582); Event MON863 (corn, insect control, deposited as ATCC PTA-2605, described in WO 04/011601 or US-A 2006-095986); Event MON87427 (corn, pollination control, deposited as ATCC PTA-7899, described in WO 11/062904); Event MON87460 (corn, stress tolerance, deposited as ATCC PTA-8910, described in WO 09/111263 or US-A 2011-0138504); Event MON87701 (soybean, insect control, deposited as ATCC PTA-8194, described in US-A 2009-130071 or WO 09/064652); Event MON87705 (soybean, quality trait - herbicide tolerance, deposited as ATCC PTA-9241, described in US-A 2010-0080887 or WO 10/037016); Event MON87708 (soybean, herbicide tolerance, deposited as ATCC PTA9670, described in WO 11/034704); Event MON87754 (soybean, quality trait, deposited as ATCC PTA-9385, described in WO 10/024976); Event MON87769 (soybean, quality trait, deposited as ATCC PTA-8911, described in US-A 2011-0067141 or WO 09/102873); Event MON88017 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-5582, described in US-A 2008-028482 or WO 05/059103); Event MON88913 (cotton, herbicide tolerance, deposited as ATCC PTA-4854, described in WO 04/072235 or US-A 2006-059590); Event MON89034 (corn, insect control, deposited as ATCC PTA-7455, described in WO 07/140256 or US-A 2008-260932); Event MON89788 (soybean, herbicide tolerance, deposited as ATCC PTA-6708, described in US-A 2006-282915 or WO 06/130436); Event MS11 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-850 or PTA-2485, described in WO 01/031042); Event MS8 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-730, described in WO 01/041558 or US-A 2003-188347); Event NK603 (corn, herbicide tolerance, deposited as ATCC PTA-2478, described in US-A 2007-292854); Event PE-7 (rice, insect control, not deposited, described in WO 08/114282); Event RF3 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-730, described in WO 01/041558 or US-A 2003-188347); Event RT73 (oilseed rape, herbicide tolerance, not deposited, described in WO 02/036831 or US-A 2008-070260); Event T227-1 (sugar beet, herbicide tolerance, not deposited, described in WO 02/44407 or US-A 2009-265817); Event T25 (corn, herbicide tolerance, not deposited, described in US-A 2001-029014 or WO 01/051654); Event T304-40 (cotton, insect control - herbicide tolerance, deposited as ATCC PTA-8171, described in US-A 2010-077501 or WO 08/122406); Event T342-142 (cotton, insect control, not deposited, described in WO 06/128568); Event TC1507 (corn, insect control - herbicide tolerance, not deposited, described in US-A 2005-039226 or WO 04/099447); Event VIP1034 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-3925., described in WO 03/052073), Event 32316 (corn, insect control-herbicide tolerance, deposited as PTA-11507, described in WO 11/084632), Event 4114 (corn, insect control-herbicide tolerance, deposited as PTA-11506, described in WO 11/084621).

Particularly useful transgenic plants which may be treated according to the invention are plants containing transformation events, or combination of transformation events, that are listed for example in the databases from various national or regional regulatory agencies (see for example http://gmoinfo.jrc.it/gmp_browse.aspx and http://www.agbios.com/dbase.php).

Claims

1. A composition comprising
a) a pesticidal terpene mixture comprising, as pesticidally active chemical compounds α-terpinene, p-cymene and limonene, and
b) at least one biological control agentand/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens
in a synergistically effective amount.

2. The composition according to claim 1, further comprising c) at least one fungicideand/or d) at least one insecticide, with the proviso that the pesticidal terpene mixture, insecticide and fungicide are not identical.

3. The composition according to claim 2, wherein the fungicide is a synthetic fungicide.

4. The composition according to claim 2 or 3, wherein the insecticide is a synthetic insecticide.

5. The composition according to any one of claims 1 to 4, wherein the pesticidal terpene mixture consists of α-terpinene, p-cymene and limonene and accidental impurities.

6. The composition according to any one of claims 1 to 5, wherein the pesticidal terpene mixture comprises a simulated blend of an essential oil extract of *Chenopodium ambrosioides* near *ambrosioides*, wherein the simulated blend consists essentially of substantially pure α-terpinene, p-cymene and limonene, wherein each of the substantially pure α-terpinene, p-cymene and limonene is not obtained from a *Chenopodium* extract.

7. The composition according to any of claims 1 to 6, comprising as pesticdal terpene mixture an insecticidally effective amount of
(i) a simulated blend of an essential oil extract of *Chenopodium ambrosioides* near

ambrosioides, wherein the simulated blend consists essentially of a volume filler and substantially pure α-terpinene, p-cymene, and limonene, wherein each of the substantially pure α-terpinene, p-cymene and limonene is not obtained from a *Chenopodium* extract and (ii) a carrier.

8. A composition of any of claims 1 to 7 wherein the relative ratio by weight of the α-terpinene to p-cymene to limonene is about 30 to about 70 α-terpinene, about 10 to about 30 p-cymene and about 1 to about 20 limonene.

9. A composition according to any of claims 1 to 8 using a pesticidally active terpene mixture which is obtainble by synthetically producing the α-terpinene and p-cymene, obtaining the limonene from a plant other than *Chenopodium,* and mixing.

10. The composition according to any one of claims 1 to 9, wherein the fungicide is selected from the group consisting of

inhibitors of the ergosterol biosynthesis, inhibitors of the respiratory chain at complex I or II, inhibitors of the respiratory chain at complex III, inhibitors of the mitosis and cell division, compounds capable to have a multisite action, compounds capable to induce a host defence, inhibitors of the amino acid and/or protein biosynthesis, inhibitors of the ATP production, inhibitors of the cell wall synthesis, inhibitors of the lipid and membrane synthesis, inhibitors of the melanine biosynthesis, inhibitors of the nucleic acid synthesis, inhibitors of the signal transduction, compounds capable to act as an uncoupler, further compounds such as benthiazole, bethoxazin, capsimycin, carvone, chinomethionat, pyriofenone (chlazafenone), cufraneb, cyflufenamid, cymoxanil, cyprosulfamide, dazomet, debacarb, dichlorophen, diclomezine, difenzoquat, difenzoquat methylsulphate, diphenylamine, ecomate, fenpyrazamine, flumetover, fluoroimide, flusulfamide, flutianil, fosetyl-aluminium, fosetyl-calcium, fosetyl-sodium, hexachlorobenzene, irumamycin, methasulfocarb, methyl isothiocyanate, metrafenone, mildiomycin, natamycin, nickel dimethyldithiocarbamate, nitrothal-isopropyl, octhilinone, oxamocarb, oxyfenthiin, pentachlorophenol and salts (87-86-5), (F297) phenothrin, (F298) phosphorous acid and its salts, propamocarb-fosetylate, propanosine-sodium, proquinazid, pyrimorph, (2E)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-1-(morpholin-4-yl)prop-2-en-1-one, (2Z)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-1-(morpholin-4-yl)prop-2-en-1-one, pyrrolnitrine, tebufloquin, tecloftalam, tolnifanide, triazoxide, trichlamide, zarilamid, (3S,6S,7R,8R)-8-benzyl-3-[({3-[(isobutyryloxy)methoxy]-4-methoxypyridin-2-yl}carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl 2-methylpropanoate, 1-(4-{4-[(5R)-5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-

(trifluoromethyl)-1H-pyrazol-1-yl]ethanone, 1-(4-{4-[(5S)-5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone, 1-(4-{4-[5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone, 1-(4-methoxyphenoxy)-3,3-dimethylbutan-2-yl 1H-imidazole-1-carboxylate, 2,3,5,6-tetrachloro-4-(methylsulfonyl)pyridine, 2,3-dibutyl-6-chlorothieno[2,3-d]pyrimidin-4(3H)-one, 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone, 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-1-(4-{4-[(5R)-5-phenyl-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)ethanone, 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-1-(4-{4-[(5S)-5-phenyl-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)ethanone, 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-1-{4-[4-(5-phenyl-4,5-dihydro-1,2-oxazol-3-yl)-1,3-thiazol-2-yl]piperidin-1-yl}ethanone, 2-butoxy-6-iodo-3-propyl-4H-chromen-4-one, 2-chloro-5-[2-chloro-1-(2,6-difluoro-4-methoxyphenyl)-4-methyl-1H-imidazol-5-yl]pyridine, 2-phenylphenol and salts, 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinolone, 3,4,5-trichloropyridine-2,6-dicarbonitrile, 3-[5-(4-chlorophenyl)-2,3-dimethyl-1,2-oxazolidin-3-yl]pyridine, 3-chloro-5-(4-chlorophenyl)-4-(2,6-difluorophenyl)-6-methylpyridazine, 4-(4-chlorophenyl)-5-(2,6-difluorophenyl)-3,6-dimethylpyridazine, 5-amino-1,3,4-thiadiazole-2-thiol, 5-chloro-N'-phenyl-N'-(prop-2-yn-1-yl)thiophene-2-sulfonohydrazide, 5-fluoro-2-[(4-fluorobenzyl)oxy]pyrimidin-4-amine, 5-fluoro-2-[(4-methylbenzyl)oxy]pyrimidin-4-amine, 5-methyl-6-octyl[1,2,4]triazolo[1,5-a]pyrimidin-7-amine, ethyl (2Z)-3-amino-2-cyano-3-phenylprop-2-enoate, N'-(4-{[3-(4-chlorobenzyl)-1,2,4-thiadiazol-5-yl]oxy}-2,5-dimethylphenyl)-N-ethyl-N-methylimidoformamide, N-(4-chlorobenzyl)-3-[3-methoxy-4-(prop-2-yn-1-yloxy)phenyl]propanamide, N-[(4-chlorophenyl)(cyano)methyl]-3-[3-methoxy-4-(prop-2-yn-1-yloxy)phenyl]propanamide, N-[(5-bromo-3-chloropyridin-2-yl)methyl]-2,4-dichloropyridine-3-carboxamide, N-[1-(5-bromo-3-chloropyridin-2-yl)ethyl]-2,4-dichloropyridine-3-carboxamide, N-[1-(5-bromo-3-chloropyridin-2-yl)ethyl]-2-fluoro-4-iodopyridine-3-carboxamide, N-{(E)-[(cyclopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl}-2-phenylacetamide, N-{(Z)-[(cyclopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl}-2-phenylacetamide, N'-{4-[(3-tert-butyl-4-cyano-1,2-thiazol-5-yl)oxy]-2-chloro-5-methylphenyl}-N-ethyl-N-methylimidoformamide, N-methyl-2-(1-{[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-N-(1,2,3,4-tetrahydronaphthalen-1-yl)-1,3-thiazole-4-carboxamide, N-methyl-2-(1-{[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-N-[(1R)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide, N-methyl-2-(1-{[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-N-[(1S)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide, pentyl {6-[({[(1-methyl-1H-tetrazol-5-yl)(phenyl)methylidene]amino}oxy)methyl]pyridin-2-yl}carbamate, phenazine-1-carboxylic acid, quinolin-8-ol (134-31-6), quinolin-8-ol sulfate (2:1), tert-butyl {6-[({[(1-methyl-1H-tetrazol-5-yl)(phenyl)methylene]amino}oxy)methyl]pyridin-2-yl}carbamate, 1-methyl-3-

(trifluoromethyl)-N-[2'-(trifluoromethyl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, N-(4'-chlorobiphenyl-2-yl)-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, N-(2',4'-dichlorobiphenyl-2-yl)-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, 3-(difluoromethyl)-1-methyl-N-[4'-(trifluoromethyl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, N-(2',5'-difluorobiphenyl-2-yl)-1-methyl-3-(trifluoromethyl)-1H-pyrazole-4-carboxamide, 3-(difluoromethyl)-1-methyl-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, 5-fluoro-1,3-dimethyl-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, 2-chloro-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, 3-(difluoromethyl)-N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide, 3-(difluoromethyl)-N-(4'-ethynylbiphenyl-2-yl)-1-methyl-1H-pyrazole-4-carboxamide, N-(4'-ethynylbiphenyl-2-yl)-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide, 2-chloro-N-(4'-ethynylbiphenyl-2-yl)pyridine-3-carboxamide, 2-chloro-N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, 4-(difluoromethyl)-2-methyl-N-[4'-(trifluoromethyl)biphenyl-2-yl]-1,3-thiazole-5-carboxamide, 5-fluoro-N-[4'-(3-hydroxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]-1,3-dimethyl-1H-pyrazole-4-carboxamide, 2-chloro-N-[4'-(3-hydroxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, 3-(difluoromethyl)-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, 5-fluoro-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]-1,3-dimethyl-1H-pyrazole-4-carboxamide, 2-chloro-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)biphenyl-2-yl]pyridine-3-carboxamide, (5-bromo-2-methoxy-4-methylpyridin-3-yl)(2,3,4-trimethoxy-6-methylphenyl)methanone, N-[2-(4-{[3-(4-chlorophenyl)prop-2-yn-1-yl]oxy}-3-methoxyphenyl)ethyl]-N2-(methylsulfonyl)valinamide, 4-oxo-4-[(2-phenylethyl)amino]butanoic acid, but-3-yn-1-yl {6-[({[(Z)-(1-methyl-1H-tetrazol-5-yl)(phenyl)methylene]amino}oxy)methyl]pyridin-2-yl}carbamate, 4-Amino-5-fluorpyrimidin-2-ol (mesomeric form: 6-Amino-5-fluorpyrimidin-2(1H)-on), propyl 3,4,5-trihydroxybenzoate and oryzastrobin.

11. The composition according to any one of claims 1 to 10, wherein the fungicide is selected form the group consisting of bitertanol, bromuconazole, cyproconazole, difenoconazole, epoxiconazole, fenhexamid, fenpropidin, fenpropimorph, fluquinconazole, flutriafol, imazalil, ipconazole, metconazole, myclobutanil, penconazole, prochloraz, propiconazole, prothioconazole, quinconazole, spiroxamine, tebuconazole, triadimenol, triticonazole, bixafen, boscalid, carboxin, fluopyram, flutolanil, fluxapyroxad, furametpyr, isopyrazam (mixture of syn-epimeric racemate 1RS,4SR,9RS and anti-epimeric racemate 1RS,4SR,9SR), isopyrazam (anti-epimeric racemate 1RS,4SR,9SR), isopyrazam (anti-epimeric enantiomer 1R,4S,9S), isopyrazam (anti-epimeric

enantiomer 1S,4R,9R), isopyrazam (syn epimeric racemate 1RS,4SR,9RS), isopyrazam (syn-epimeric enantiomer 1R,4S,9R), isopyrazam (syn-epimeric enantiomer 1S,4R,9S), penflufen, penthiopyrad, sedaxane, thifluzamide, N-[1-(2,4-dichlorophenyl)-1-methoxypropan-2-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, 1-Methyl-3-(trifluormethyl)-N-(1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, 1-Methyl-3-(trifluormethyl)-N-[(1S)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, 1-Methyl-3-(trifluormethyl)-N-[(1R)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, 3-(Difluormethyl)-1-methyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, 3-(Difluormethyl)-1-methyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, ametoctradin, amisulbrom, azoxystrobin, cyazofamid, dimoxystrobin, enestroburin, famoxadone, fenamidone, fluoxastrobin, kresoxim-methyl, metominostrobin, orysastrobin, picoxystrobin, pyraclostrobin, pyribencarb, trifloxystrobin, carbendazim, chlorfenazole, diethofencarb, ethaboxam, fluopicolide, fuberidazole, pencycuron, thiophanate-methyl, zoxamide, captan, chlorothalonil, copper hydroxide, copper oxychloride, dithianon, dodine, folpet, guazatine, iminoctadine triacetate, mancozeb, propineb, sulphur and sulphur preparations including calcium polysulphide, acibenzolar-S-methyl, isotianil, tiadinil, cyprodinil, pyrimethanil, benthiavalicarb, dimethomorph, iprovalicarb, mandipropamid, valifenalate, iodocarb, iprobenfos, propamocarb hydrochloride, tolclofos-methyl, carpropamid, benalaxyl, benalaxyl-M (kiralaxyl), furalaxyl, hymexazol, metalaxyl, metalaxyl-M (mefenoxam), oxadixyl, fenpiclonil, fludioxonil, iprodione, quinoxyfen, vinclozolin, fluazinam, cymoxanil, flutianil, fosetyl-aluminium, methasulfocarb, methyl isothiocyanate, metrafenone, phosphorous acid and its salts, proquinazid, triazoxide and 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone.

12. The composition according to any of claims 1 to 11, wherein the insecticide is selected from the group consisting of Abamectin, Acephate, Acetamiprid, Acrinathrin, Afidopyropen, Alpha-Cypermethrin, Azadirachtin, *Bacillus firmus*, Beta-Cyfluthrin, Bifenthrin, Buprofezin, Clothianidin, Chlorantraniliprole, Chlorfenapyr, Chlorpyrifos, Carbofuran, Cyantraniliprole, Cyenopyrafen, Cyflumentofen, Cyfluthrin, Cypermethrin, Deltamethrin, Diafenthiuron, Dinotefuran, Emamectin-benzoate, Ethiprole, Fenpyroximate, Fipronil, Flometoquin, Flonicamid, Flubendiamide, Fluensulfone, Fluopyram, Flupyradifurone, γ-Cyhalothrin, Imidacloprid, Indoxacarb, Lambda-Cyhalothrin, Lufenuron, Metaflumizone, Methiocarb, Methoxyfenozide, Milbemectin, Profenofos, Pyflubumide, Pymetrozin, Pyrifluquinazone, Spinetoram, Spinosad, Spirodiclofen, Spiromesifen, Spirotetramate, Sulfoxaflor, Tebufenpyrad, Tefluthrin, Thiacloprid, Thiamethoxam, Thiodicarb, Triflumuron, 1-(3-chloropyridin-2-yl)-N-[4-cyano-2-methyl-6-(methylcarbamoyl)phenyl]-3-{[5-(trifluoromethyl)-1H-tetrazol-1-yl]methyl}-1H-pyrazole-5-

carboxamide, 1-(3-chloropyridin-2-yl)-N-[4-cyano-2-methyl-6-(methylcarbamoyl)phenyl]-3-{[5-(trifluoromethyl)-2H-tetrazol-2-yl]methyl}-1H-pyrazole-5-carboxamide and 1-{2-fluoro-4-methyl-5-[(2,2,2-trifluorethyl)sulfinyl]phenyl}-3-(trifluoromethyl)-1H-1,2,4-triazol-5-amine.

13. The composition according to any one of claims 1 to 12 additionally comprising at least one auxiliary selected from the group consisting of extenders, solvents, spontaneity promoters, carriers, emulsifiers, dispersants, frost protectants, thickeners and adjuvants.

14. A seed treated with the composition according to any one of claims 1 to 13.

15. A use of the composition according to any one of claims 1 to 14 as fungicide and/or insecticide.

16. The use according to claim 15 for reducing overall damage of plants and plant parts as well as losses in harvested fruits or vegetables caused by insects, mites, nematodes and/or phytopathogens.

17. The use according to claim 15 or 16 for treating conventional or transgenic plants or seed thereof.

18. A method for reducing overall damage of plants and plant parts as well as losses in harvested fruits or vegetables caused by insects, mites, nematodes and/or phytopathogens comprising the step of simultaneously or sequentially applying
a) a pesticidal terpene mixture comprising, as pesticidally active chemical compounds, α-terpinene, p-cymene and limonene, and
b) at least one biological control agent and/or a mutant of it having all identifying characteristics of the respective strain, and/or a metabolite produced by the respective strain that exhibits activity against insects, mites, nematodes and/or phytopathogens
in a synergistically effective amount.

19. The method according to claim 18 further comprising c) at least one fungicide and/or d) at least one insecticide, with the proviso that the pesticidal terpene mixture, the insecticide and the fungicide are not identical.

5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2013/067260

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01N27/00 A01N63/00 A01N63/04 A01N63/02 A01N25/00
A01P3/00 A01P5/00 A01P7/02 A01P7/04
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.
A	WO 01/67868 A2 (URGEL DELISLE & ASSOCIES INC [CA]; CHIASSON HELENE [CA]) 20 September 2001 (2001-09-20) cited in the application the whole document -----	1-19
A	"REQUIEM 25 EC", , 1 January 2010 (2010-01-01), pages 1-11, XP055082985, Retrieved from the Internet: URL:http://www.requieminsecticide.com/pdf/Requiem-Label-US0083-B-005.pdf [retrieved on 2013-10-08] the whole document ----- -/--	1-19

[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

"E" earlier application or patent but published on or after the international filing date

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

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 October 2013	22/10/2013

Name and mailing address of the ISA/	Authorized officer
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1

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/144919 A1 (AGRAQUEST INC [US]; JIMENEZ DESMOND [US]; JANSSEN GISELLE [US]; LONG D) 16 December 2010 (2010-12-16) cited in the application page 1, lines 19-29 page 4, line 18 - page 6, line 13 page 6, line 31 - page 7, line 3 pages 80-86; examples 14-15; tables 39-44	1-19
X	DENISE C. MANKER: "Biopesticides: The Next Line of Defense for Resistance Management", OUTLOOKS ON PEST MANAGEMENT, vol. 23, no. 3, 1 June 2012 (2012-06-01), pages 136-139, XP055082996, ISSN: 1743-1026, DOI: 10.1564/23jun12 page 138, left-hand column, line 3 - right-hand column, line 8 figures 4-5	1-19
X	DATABASE WPI Week 200966 Thomson Scientific, London, GB; AN 2009-N57062 XP002714489, & CN 101 518 251 A (FUJIAN ACAD AGRIC SCI RES INST PLANT PROTECTION) 2 September 2009 (2009-09-02)	1-19
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Y	"Development of 20% Chlorpyrifos Micro-emulsion with Chenopodium Ambrosioides Essential Oil as Auxiliary", China Papers - Part B, 1 May 2010 (2010-05-01), XP55046511, Retrieved from the Internet: URL:http://mt.china-papers.com/1/?p=166720 [retrieved on 2012-12-04] the whole document	1-19
Y	"Enhancing Effect of Chenopodium Ambrosioides Essential Oil on the Selected Insecticides Penetration Through Cuticula of Plutella Xylostella Larvae", China Papers - Part B, 26 April 2012 (2012-04-26), XP55046481, Retrieved from the Internet: URL:http://mt.china-papers.com/1/?p=169406 [retrieved on 2012-12-04] the whole document	1-19

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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.
X	CHANDRA SHEKHAR PRASAD ET AL: "In vitro and in vivo antifungal activity of essential oils of Cymbopogon martini and Chenopodium ambrosioides and their synergism against dermatophytes", MYCOSES, vol. 53, no. 2, 1 March 2010 (2010-03-01), pages 123-129, XP55077920, ISSN: 0933-7407, DOI: 10.1111/j.1439-0507.2008.01676.x abstract -----	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2013/067260

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CN 101518251 A	02-09-2009	NONE	