Title: COMPOSITION COMPRISING A PESTICIDAL TERPENE MIXTURE AND A FUNGICIDE

Abstract: The present invention relates to a composition comprising at least one pesticidal terpene comprising, as pesticidally active chemical compounds, a-terpinene, p-cymene and limonene and at least one fungicide (I) in a synergistically effective amount, with the proviso that the pesticidal terpene mixture and fungicide (I) are not identical. 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 fungicide

The present invention relates to a composition comprising a pesticidal terpene mixture and at least one fungicide (I) in a synergistically effective amount, with the proviso that the biological control agent and the fungicide (I) are not identical. 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 target ones, 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 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.

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. a-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 20120/144919 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 from *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 and fungicides, 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 disease control.

Accordingly, it was found that these objects at least partly are 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 surprisingly discovered that the application of the composition according to the present invention in a simultaneous or sequential way to plants, plant parts, harvested fruits, vegetables and/or plant’s loci 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 fungicides on the other hand, alone (synergistic mixtures). By applying the pesticidal terpene mixture and the fungicide according to the invention the activity against insects, mites, nematodes and/or phytopathogens is preferably increased in a superadditive manner. Preferably, the application of the composition according to the invention induces an increase in the activity of phytopathogens in a superadditive manner.

As a consequence, the composition according to the present invention preferably allows a reduced total amount of active compounds to be used and thus the crops which have been treated by this composition preferably show a decreased amount of residues in the crop. Accordingly, the risk of resistance formation of harmful microorganisms is decreased.

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 fungicide (I) in
a synergistically effective amount, with the proviso that the pesticidal terpene mixture and fungicide (I) are not identical.

Furthermore, the present invention relates to a kit of parts comprising at least one of the pesticidal terpene mixture comprising the three terpenes as mentioned before and at least one fungicide (I). The present invention is further directed to the use of said composition as fungicide and/or insecticide. 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.

Moreover, 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 a-terpinene, p-cymene and limonene.

The pesticidal mixture according to the invention may be obtained from any source such as, for example, 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 also 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 a-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 a-terpinene, p-cymene and limonene. In the most preferred embodiment the pesticidal terpene mixture does not contain essential oils other than a-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 of the 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 from 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 limonene, 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 ambrosioides.

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

In some embodiments the limonene 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 36:14.9:1 1.4, 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 others as in the essential oil extract.


a-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 a-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 capitatus*, *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 hydrodistillation 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 AgroQuest under the trade name Requiem®. Preferably, this commercial product is used as pesticidal terpene mixture according to the invention. Besides the three terpenes a-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®.

5 Fungicide (I)

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.

The composition according to the present invention comprises at least one fungicide (I), with the proviso
that the pesticidal terpene mixture and the fungicide are not identical.

According to one embodiment of the present invention preferred fungicides (I) are selected from the
group consisting of

(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) mylobutanil (88671-89-0),
(F32) naftifime (65472-88-0), (F33) nuarimol (63284-71-9), (F34) oxpoconazole (174212-12-5), (F35)
paclotrazol (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) pyributicar (88678-67-5), (F43) pyrifenthox (88283-41-4), (F44)
quinoconazole (103970-75-8), (F45) simeconazole (149508-90-7), (F46) spiroxamine (118134-30-8),
(F47) tebuconazole (107534-96-3), (F48) terbinafime (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-(IH-1,2,4-triazol-1-yl)cycloheptanol (129586-32-9), (F61) methyl 1-(2,2-dimethyl-2,3-dihydro-IH-inden-1-yl)-IH-imidazole-5-carboxylate (110323-95-0), (F62) N'-[5-(difluoromethyl)-2-methyl-4-[3-(trimethylsilyl)propoxy]phenyl] -N-ethyl-N-methyllimidoformamide, (F63) N-ethyl-N-methyl-N'-[2-methyl-5-(trifluoromethyl)-4-[3-(trimethylsilyl)propoxy]phenyl]imidofomamide, (F64) 0-[1-(4-methoxyphenoxy)-3,3-dimethylbutan-2-yl] IH-imidazole-1-carboxthioate (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-tetrafluoroethoxy)phenyl]-3-(trifluoromethyl)-IH-pyrazole-4-carboxamide, (F89) 3-(difluoromethyl)-1-methyl-N-[2-(1,1,2,2-tetrafluoroethoxy)phenyl]-IH-pyrazole-4-carboxamide, (F90) 3-(difluoromethyl)-N-[4-fluoro-2-(1,1,2,3,3-hexafluoropropoxy)phenyl]-1-methyl-IH-pyrazole-4-carboxamide, (F91) N-[1-(2,4-dichlorophenyl)-1-methoxypropan-2-yl]-3-(difluoromethyl)-1-methyl-IH-pyrazole-4-carboxamide (1092400-97-5), (F92) 5,8-difluoro-N-[2-(2-fluoro-4-[(4-(trifluoromethyl)pyridin-2-yl)oxy]phenyl)ethyl]quinoxalin-4-amine (1210070-84-0), (F93) benzovindiflupyr, (F94) N-[1-(1S,4R)-9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-IH-pyrazole-4-carboxamide, (F95) N-[(1R,4S)-9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-IH-pyrazole-4-carboxamide, (F96) 3-(Difluoromethyl)-1-methyl-N-(1,1,3-trimethyl-2,3-dihydro-IH-inden-4-yl)-IH-pyrazol-4-carboxamid, (F97) 1,3,5-Trimethyl-N-(1,1,3-trimethyl-2,3-dihydro-IH-inden-4-yl)-IH-pyrazol-4-carboxamid, (F98) 1-Methyl-3-(trifluoromethyl)-N-(1,3,3-trimethyl-2,3-dihydro-IH-inden-4-yl)-IH-pyrazol-4-carboxamid, (F99) 1-Methyl-3-(trifluoromethyl)-N-[(1S)-1,3,3-trimethyl-2,3-dihydro-IH-inden-4-yl]-IH-pyrazol-4-carboxamid, (F100) 1-Methyl-3-(trifluoromethyl)-N-[(1R)-1,3,3-trimethyl-2,3-dihydro-IH-inden-4-yl]-IH-pyrazol-4-carboxamid, (F101) 3-(Difluoromethyl)-1-methyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-IH-inden-4-yl]-IH-pyrazol-4-carboxamid, (F102) 3-(Difluoromethyl)-1-methyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-IH-inden-4-yl]-IH-pyrazol-4-carboxamid, (F103) 1,3,5-Trimethyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-IH-inden-4-yl]-IH-pyrazol-4-carboxamid, (F104) 1,3,5-Trimethyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-IH-inden-4-yl]-IH-pyrazol-4-carboxamid;
(3) inhibitors of the respiratory chain at complex III, for example (F105) ametoctradin (865318-97-4),
(F106) amilsulbrum (348635-87-0), (F107) azoxystrobin (131860-33-8), (F108) cyazofamid (120116-88-3),
(F109) coumaphos (850881-30-0), (F110) coumoxystrobin (850881-70-8), (F112) dimoxystrobin (141600-52-4),
(F113) enstroburin (238410-11-2), (F113) famoxadone (131807-57-3),
(F14) fenamidone (161326-34-7), (F15) fenoxystrobin (918162-02-4), (F16) fluoxastrobins (361377-29-9),
(F117) kresoxim-methyl (143390-89-0), (F118) metamitrophen (133408-50-1), (F119) olysastrobins (189892-69-1),
(F120) picoxytrobin (117428-22-5), (F121) pyraclostrobin (175013-18-0),
(F122) pyrametrioxstrobin (915410-70-7), (F123) pyraoxystrobin (862588-11-2), (F124) pyribencarb
(799247-52-2), (F125) triclopyrcarb (902760-40-1), (F126) trifluroxstrobin (141517-21-7), (F127) (2E)-
(2-[(6-(3-chloro-2-methylphenoxy)-5-fluoropyrimidin-4-yl)oxy]phenyl)-2-(methoxyimino)-N-
meylethalamide, (F128) (2E)-2-(methoxyimino)-N-methyl-2-2-[[[(11-E)-1-[3-
(trifluoromethyl)phenyl][ethylidene]amino]oxy][methyl]phenyl]ethalamide, (F129) (2E)-2-
(methoxyimino)-N-methyl-2-2-[[E]-1-[3-
(trifluoromethyl)phenyl][ethoxy][methyl]phenyl]ethalamide (158169-73-4), (F130) (2E)-2-2-
2-(methoxyimino)-N-methylethalamide (326896-28-0), (F131) (2E)-2-2-2-2-[[[(2E,3E)-4-(2,6-
dichloropheno)but-3-en-2-ylidene][methyl]phenyl]-2-(methoxyimino)-N-
methylethalamide, (F132) 2-chloro-N-(1,1,3-trimethyl-2,3-di-hydro-4H-inden-4-yl)pyridine-3-
carboxamide (119899-14-8),
(F133) 5-methoxy-2-methyl-4-2-[[[(1IE)-1-[3-
(trifluoromethyl)phenyl][ethylidene]amino][oxy][methyl]phenyl]-2,4-dihydro-3H-1,2,4-triazol-3-one,
(F134) methyl (2E)-2-2-2-2-[[cyclopropyl][4-methoxyphenyl][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) 2-2-2-2-[[2,5-dimethylphenoxyl][methyl]phenyl]-2-
(methoxy-N-methylacetamide (173662-97-0), (F137) (2R)-2-2-2-2-[[2,5-dimethylphenoxyl][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) chlorfenazon (3574-96-7), (F141) diethofencarb (87130-20-9),
(F142) ethaboxam (162650-77-3), (F143) fluopicolide (239110-15-7), (F144) fuberidazoe (3878-19-1),
(F145) pencuron (66063-05-6), (F146) thiabendazole (148-79-8), (F147) thiophanate-methyl (32564-
05-8), (F148) thiophanate (23564-06-9), (F149) zoxamide (156052-68-5), (F150) 5-chloro-7-(4-
methyipiperidin-1-y)-6-(2,4,6-trifluorophenyl)[1,2,4]triazolo[1,5-a]pyrimidine
(241706-53-3), (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 napthenate (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) mane (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 (22409-04-1), (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) cypnodil (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) edifenfos (17109-49-8), (F215) etridiazole (2593-15-9), (F216) iodocarb (55406-53-6), (F217) iprofenos (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) furaxal (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) chlozoline (84332-86-5), (F247) fenciclilon (74738-17-3), (F248) fluodioxil (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) pyrifenone (chiazafenone) (688046-61-9), (F264) cufraneb (11096-18-7), (F265) cyflufenamid (180409-60-3), (F266) cymoxanil (57966-95-7), (F267) cyprosulamide (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), (F274) 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) irumamyacin (81604-73-1), (F286) methasulfocarb (66952-49-6), (F287) methyl isothiocyanate (556-61-6), (F288) metrafenone (220899-03-6), (F289) mildoxymycine (67527-71-3), (F290) natamycin (7681-93-8), (F291) nickel dimethylthiocarbamate (15521-65-0), (F292) nitrothal-isopropyl (10552-74-6), (F293) oothilinone (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-fosetyl, (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)-l-(morpholin-4-yl)prop-2-en-l-one (1231776-28-5), (F304) (2Z)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-l-(morpholin-4-yl)prop-2-en-l-one (1231776-29-6), (F305) pyrrolnitrine (1018-71-9), (F306) tebufluquin (376645-78-2), (F307) tecloflam (76280-91-6), (F308) tolufanide (304911-98-6), (F309) triaxozide (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-methoxy pyridin-2-yl]carbonyl]arnino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl 2-methylpropanoate (517875-34-2), (F313) 1-(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-[[5(S)-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(S)-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-[[5-(2,6-dimethyl-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]-l-(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]-l-(4-[[5S)-5-phenyl-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl)piperidin-1-yl)ethanone (1003318-80-9), (F315) 1-(4-[[4-[[5(S)-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 (1003316-54-8), (F322) 2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]-l-(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-difluoropyrimidone)-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-difluoropyrimidone)-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-dimethylenyl)-N-ethyl-N-methylimididoformamide, (F338) N-(4-chlorobenzyl)-3-[3-methoxy-4-(prop-2-yn-1-yl)oxy]phenylpropanamide, (F339) N-[[4-chlorophenyl](cyano)methyl]-3-[3-methoxy-4-(prop-2-yn-1-yl)oxy]phenylpropanamide, (F340) N-[[5-bromo-3-chloropyridin-2-yl)methyl]-2,4-dichloropyridine-3-carboxamide, (F341) N-[[5-bromo-3-chloropyridin-2-yl]ethyl]-2,4-dichloropyridine-3-carboxamide, (F342) N-[[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-methylimidodoformamide, (F346) N-methyl-2-[(5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl)acetyl)piperidin-4-yl]-N-(1,2,3,4-tetrahydroanaphthalen-1-yl)-1,3-thiazole-4-carboxamide (922514-49-6), (F347) N-methyl-2-[(5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl)acetyl)piperidin-4-yl]-N-[[IR]-1,2,3,4-tetrahydroanaphthalen-1-yl]-1,3-thiazole-4-carboxamide (922514-07-6), (F348) N-methyl-2-[(5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl)acetyl)piperidin-4-yl]-N-[[1S]-1,2,3,4-tetrahydroanaphthalen-1-yl]-1,3-thiazole-4-carboxamide
(922514-48-5), (F349) pentyl \{6-[(1-methyl-1H-tetrazol-5-yl)(phenyl)methylidene]amino\}oxy)methylpyridin-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)methylpyridin-2-yl)carbamate;

(16) Further compounds, like for example (F354) 1-methyl-3-(trifluoromethyl)-N-[2'-trifluoromethyl]-biphenyl-2-yl)-lH-pyrazole-4-carboxamide, (F355) N-(4'-chlorobiphenyl-2-yl)-3-(difluoromethyl)-l-methyl-1H-pyrazole-4-carboxamide, (F356) N-(2',4'-dichlorobiphenyl-2-yl)-3-(difluoromethyl)-l-methyl-1H-pyrazole-4-carboxamide, (F357) 3-(difluoromethyl)-l-methyl-N-[4'-(trifluoromethyl)biphenyl-2-yl]-lH-pyrazole-4-carboxamide, (F358) N-(2',5'-difluorobiphenyl-2-yl)-l-methyl-3-(trifluoromethyl)-lH-pyrazole-4-carboxamide, (F359) 3-(difluoromethyl)-N-[4'-(3,3-dimethylbut-1-yn-1-yl)biphenyl-2-yl]-l-methyl-1H-pyrazole-4-carboxamide, (F360) 5-fluoro-1,3-dimethyl-N-[4'-(prop-1-yn-1-yl)biphenyl-2-yl]-lH-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]-l-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)-l-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]ethyln 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)methylpyridin-2-yl)carbamate, (F378) 4-Amino-5-fluoropyrimidin-2-ol (mesomeric form: 6-Amino-5-fluoropyrimidin-2(lH)-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 (I) is a synthetic fungicide. As used herein, the term "synthetic" defines a compound that has not been obtained from a plant or other organism.
According to a preferred embodiment of the present invention fungicide (I) is selected from the group consisting of:

(1) inhibitors of the ergosterol biosynthesis, for example (F3) bitertanol, (F4) bsortaconazole (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) fluapyroxad (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) pentaquinox (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) l-Methyl-3-(trifluoromethyl)-N-[1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, (F99) l-Methyl-3-(trifluoromethyl)-N-[(ls)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F100) l-Methyl-3-(trifluoromethyl)-N-[(IR)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F101) 3-(Difluoromethyl)-1-methyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, (F102) 3-(Difluoromethyl)-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), (F11) dimoxystrobin (141600-52-4), (F112) enestroburin (238410-11-2), (F113) famoxadone (131807-57-3), (F114) fenamindone (161326-34-7), (F116) fluoxastrobion (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) bentiavalcarb (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) carpropanid

(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) cyloxanil (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-lH,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrrole-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), Difenconazole (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).

**Compositions according to the present invention**

According to the present invention the composition comprises the pesticidal terpene mixture and at least one fungicide (I) in a synergistically effective amount, with the proviso that the pesticidal terpene mixture and the fungicide are not identical.

The "synergistic effect" is defined as follows according to the invention (in the following the formula is designated as Coly formula)

The expected efficacy of a given combination of two compounds is calculated as follows (see Colby, S.R., „Calculating Synergistic and antagonistic Responses of Herbicide Combinations”, Weeds 15, pp. 20-22, 1967):

If

\[ X = \frac{y}{C_A} \] is the efficacy expressed in % mortality of the untreated control for test compound A at a concentration of \( m \) ppm respectively \( m \) g/ha,

\[ Y = \frac{y}{C_B} \] is the efficacy expressed in % mortality of the untreated control for test compound B at a concentration of \( n \) ppm respectively \( n \) g/ha,

\[ E = \frac{y}{C_A + C_B} \] is the efficacy expressed in % mortality of the untreated control using the mixture of A and B at \( m \) and \( n \) ppm respectively \( m \) and \( n \) g/ha,

then is

\[ E = \frac{X + Y - (X + Y) / 100}{100} \]

If the observed insecticidal efficacy of the combination is higher than the one calculated as "E", then the combination of the two compounds is more than additive, i.e., there is a synergistic effect.

That is, a "synergistically effective amount" according to the present invention represents a quantity of a combination of a pesticidal terpene mixture and a fungicide that is statistically significantly more effective against insects, mites, nematodes and/or phytopathogens than the pesticidal terpene mixture or the fungicide only.
In a preferred embodiment the composition according to the present invention comprises the following combinations:

In the following the designation B1 means the pesticidal terpene mixture according to the invention comprising a-terpinene, p-cymene and limonene as defined before.

In a more preferred embodiment the composition according to the present invention comprises the following combinations:

B1+F3, B1+F4, B1+F5, B1+F7, B1+F12, B1+F16, B1+F17, B1+F18, B1+F19, B1+F22, B1+F26, 
B1+F29, B1+F30, B1+F31, B1+F37, B1+F39, 1+F40, B1+F41, B1+F44, B1+F46, B1+F47, B1+F51, 
B1+F55, B1+F66, B1+F67, B1+F70, B1+F71, B1+F72, B1+F73, B1+F75, B1+F76, B1+F77, B1+F78, 
B1+F79, B1+F80, B1+F81, B1+F84, B1+F85, B1+F86, B1+F87, B1+F98, B1+F99, B1+F100, 
B1+F114, B1+F116, B1+F117, B1+F118, B1+F119, B1+F120, B1+F121, B1+F124, B1+F126, 
B1+F130, B1+F140, B1+F141, B1+F142, B1+F143, B1+F144, B1+F145, B1+F147, B1+F149, 
B1+F154, B1+F155, B1+F156, B1+F159, B1+F162, B1+F163, B1+F167, B1+F168, B1+F172, 
B1+F201, B1+F202, B1+F203, B1+F205, B1+F206, B1+F210, B1+F216, B1+F217, B1+F220, 
B1+F225, B1+F226, B1+F233, B1+F234, B1+F239, B1+F240, B1+F241, B1+F242, B1+F244, 
B1+F247, B1+F248, B1+F249, B1+F251, B1+F252, B1+F256, B1+F266, B1+F280, B1+F281, 

In particular, the composition according to the invention does not comprise citrus oil as fungicide (I).

Further, the invention does not include

- the sequential treatment, in particular of watermelon seedlings, comprising separate treatment with the pesticidal terpene mixture of the invention and the specific insecticides/fungicides 2x Pymetrozine (Fulfill®), 2x Endosulfan (Thionex®), 2x Spiromesifen (Oberon®), 2x Endosulfan (Thionex®), as disclosed in Example 5 of WO 2012/044919,
- the sequential treatment, in particular of S. tuberosum, using the pesticidal terpene mixture of the invention every 3 to 4 days and the standard grower sequence using Acetamipirid (Assail®), Flonicamid (Beleaf®), Pymetrozine (Fulfill®), Imidacloprid (Provado®), Acetamipirid (Assail®), Methamidophos (Monitor®), as disclosed in Example 6 of US 2012/0316738
the sequential treatment, in particular of "Jalapeno" pepper transplants, using the pesticidal terpene mixture of the invention and Spinetoram-J and Spinetoram-L (Radiant®) disclosed in Example 14 of WO 2010/144919.

WO 2010/144919 discloses combiantions of the pesticidal terpene mixture with 2-ethyl-1,3-hexanediol, N-octyl bicycloheptene dicarboxamide, N,N-diethyl-M-toluamide, 2,3:4,5-Bis (2-butylene) tetrahydro-2-furaldehyde, Di-n-propyl isocinchomeronate, 2-hydroxyethyl-n-octyl sulfide. These compounds are described in WO 20120/144919 as "other repellents". However, the present inventors consider them merely formulation aids. Anyway, combinations of the pesticidal terpene mixture with these compounds are excluded from the present invention.

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

The term "active compound" is used in the present description to designate the pesticidal terpene mixture, fungicide (I) and fungicide (II).

**Fungicide (II)**

In a preferred embodiment fungicide (II) is a synthetic fungicide.


In a particularly preferred embodiment of the invention, the fungicide (I) is selected from the group consisting of azoxystrobin (F107), chlorothalonil (F155), difenoconazole (F7), fenhexamid (F16), fenamidine (F114), fludioxonil (F248), fluopyram (F70), flutolanil (F71), fluxapyroxad (F72), fosetyl-Al (F281), isothianil (F187), mancozeb (F174), mefenoxam (F242), metalaxyl (F241), penflufen (F84), propamocarb-HCl (F220), prothioconazole (F41), pyraclostrobin (F121), spiroxamine (F46), tebuconazole (F47), trifloxystrobin (F126).

In a further preferred embodiment, the composition comprises the commercially available product Requiem® in combination with one of the fungicides (I) selected from the group consisting of azoxystrobin (F107), chlorothalonil (F155), difenoconazole (F7), fenhexamid (F16), fenamidine (F14), fludioxonil (F248), fluopyram (F70), flutolanil (F71), fluxapyroxad (F72), fosetyl-Al (F281), isothianil (F187), mancozeb (F174), mefenoxam (F242), metalaxyl (F241), penflufen (F84), propamocarb-HCl (F220), prothioconazole (F41), pyraclostrobin (F121), spiroxamine (F46), tebuconazole (F47), trifloxystrobin (F126).

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 sulphonosuccinate 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,
alkynaphthalenes, 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 sulfoxides (such as dimethyl sulfoxide).

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
alkynaphthalenes, 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 sulfoxide,
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 alkynaphthalenes, 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 sulfoxide, 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 at least one pesticidal terpene mixture and the at least one fungicide (I).

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 fungicide (I) in a synergistically effective amount, with the proviso that the pesticidal terpene mixture and fungicide (I) are not identical, in a spatially separated arrangement.

In a further embodiment of the present invention the above-mentioned kit of parts further comprises at least one additional fungicide (II), with the proviso that the pesticidal terpene mixture, fungicide (I) and fungicide (II) are not identical. Fungicide (II) can be present either in the pesticidal terpene mixture component of the kit of parts or in the fungicide (I) component of the kit of parts being spatially separated or in both of these components. Preferably, fungicide (II) is present in the fungicide (I) component.

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 fungicide (I) 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 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 fungicide as described herein), or an application without a pesticidal terpene mixture as described herein, or an application without a fungicide 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 at least one pesticidal terpene mixture and at least one fungicide (I) in a synergistically effective amount, with the proviso that the pesticidal terpene mixture and fungicide (I) are not identical.

In a preferred embodiment of the present method the at least one fungicide (I) is a synthetic fungicide. Preferably, fungicide (I) is selected from the group of fungicides mentioned above.

In another preferred embodiment of the present method the composition further comprises at least one additional fungicide (II), with the proviso that the pesticidal terpene mixture, fungicide (I) and fungicide (II) are not identical.

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

The method of the present invention includes the following application methods, namely both of the at least one biological control agent and the at least one fungicide (I) 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 at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II), 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 at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II) on or in a plant to be treated or its surrounding, habitat or storage space, e.g. after simultaneously or consecutively applying the at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II) to a plant its surrounding, habitat or storage space.
If the at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II) 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 at least one fungicide (I) and optionally the at least one fungicide (II) on the plant or plant parts, and **secondly** applying the pesticidal terpene mixture to the same plant or plant parts. 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, about 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 1 week, 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 at least one fungicide (I), and optionally at least one fungicide (II) 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 at least one pesticidal terpene mixture, the at least one fungicide (I), and optionally the at least one fungicide (II) as solo-formulation or combined-formulations by the ultralow 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 fungicide (I), optionally in the presence of at least one fungicide (II), 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 fungicide (I), and optionally the fungicide (II).

Also the amount of the at least one fungicide (I) which is used or employed in combination with the pesticidal terpene mixture, optionally in the presence of a fungicide (II), 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 fungicide (I) 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 (II).

The at least one pesticidal terpene mixture and at least one fungicide (I), and if present also the fungicide (II) 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 at least one pesticidal terpene mixture described herein and the fungicide (I) 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 fungicide (I), 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 fungicide (I), 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 at least one pesticidal terpene mixture and the at least one fungicide \( (I) \) 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 fungicide \( (I) \) are applied at different times and fungicide \( (I) \) is applied noticeable prior to the pesticidal terpene mixture, the skilled person can determine the concentration of fungicide \( (I) \) 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 a 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 fungicide \( (I) \).

In particular, in one embodiment the synergistic weight ratio of the pesticidal terpene mixture and the at least fungicide \( (I) \) 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 \( 1 : 500 \) to \( 300 : 1 \). It has to be noted that these ratio ranges refer to the pesticidal terpene mixture (to be combined with at least one fungicide \( (I) \) or a preparation of at least one fungicide \( (I) \)). For example, a ratio of \( 100:1 \) means 100 weight parts of a pesticidal terpene mixture and 1 weight part of fungicide \( (I) \) 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 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 composition, use and method of the invention have been proven to be particularly effective in treatment and protection of Chinese cabbage (*Brassica pekinensis*), French beans (*Phaseolus vulgaris*), tomatoes, apples, cucumbers and beans.

The plant diseases which can be treated and/or prevented by the inventive composition in a particularly effective way are diseases caused by *Myzus persicae* (green peach aphid), *Tetranychus urticae* (two spotted spider mite), *Phytophthora infestans*, *Venturia inaequalis* (apple scab), *Sphareotheca fuliginea*, *Alternaria solani* and *Botrytis cinerea*.

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 at least one pesticidal terpene mixture as defined above 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 at least one fungicide (I) and optionally at least one fungicide (II) 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 at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II).

It also encompasses a method in which the seed is treated at different times with the at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II).

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 at least one pesticidal terpene mixture and at least one fungicide (I), and optionally at least one fungicide (II). The invention further relates to seed which has been treated at different times with the at least one pesticidal terpene mixture and the at least one fungicide (I) and optionally the at least one fungicide (II). In the case of seed which has been treated at different times with the at least one pesticidal terpene mixture and the at least one fungicide (I), and optionally the at least one fungicide (II), 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 SchadlingsbekämpfungsmitTEL", 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 fungicide (I) 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:


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., Pachoblatta spp., Periplaneta spp., Supella longipalpa;


Brevicoryne brassicae, Cacopsylla spp., Calligypona marginata, Cameocephala fulgida, Ceratovacuna lanigera, Cercopedidae, Ceroplastes spp., Chaetosiphon fragaefolii, Chionaspis tegalensis, Chlorita onukii, Chondracris rosea, Chromaphis juglandicola, Chrysomphalus ficus, Cicadulina mbila, Coccomytilus halli, Coccus spp., Cryptomyzus ribis, Cryptoneoassa spp., Ctenarytaina spp., Dalbulus spp., Dialeurodes citri, Diaphorina citri, Diaspis spp., Drosicha spp., Dysaphis spp., Dysmicoccus spp., Empoasca spp.,


Viteus vitifolii, Zygina spp.;

from the order Hymenoptera, for example, Acromyrnex 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 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., Ptilius pubis, Trichodectes spp.;

from the order Pscoptera for example Lepinatus spp., Lipocelis spp.;

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


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 systematically 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 Albugo 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; Cladosporium species, for example Cladosporium cucumerinum; Cochliobolus species, for example Cochliobolus sativus (conidia form: Drechslera, Syn: Helminthosporium), Cochliobolus miyabeanus; Colletotrichum species, for example Colletotrichum lindemuthianum; 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 bidwellii; 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 repens; Ramularia species, for example Ramularia collo-cygni, Ramularia areola; Rhynchosporium species, for example Rhynchosporium secalis; Septoria species, for example Septoria apii, Septoria lycopersici; 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; Gaemannomyces species, for example Gaemannomyces graminis; Rhizoctonia species, such as, for example Rhizoctonia solani; Sarodadium diseases caused for example by Sarodontium 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 sderotiorum; Verticillium species, for example Verticillium 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 graminia; 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 Phaeomiella clamydiospora, 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 Plasmodiophora 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 gloeosporioides* dematium var. *truncatum*), brown spot (*Septoria glycines*), cercospora leaf spot and blight (*Cercospora kikuchii*), choaneophora leaf blight (*Choaneophora infundibulifera* trispora (Syn.)), dactuliophora leaf spot (*Dactuliophora glycines*), downy mildew (*Peronospora mansurica*), *d. pachycaula* 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*), pyrenochea leaf spot (*Pyrenochea glycines*), rhizoctonia aerial, foliage, and web blight (*Rhizococia solani*), rust (*Phakopsora pachyphila, Phakopsora meibomiae*), scab (*Sphaeloma glycines*), stemphytium leaf blight (*Stemphytium botryosum*), target spot (*Corynespora cassicola*).

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 vasinae*), 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, tritcale, 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), Sterculicaceae 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), Cannabaceae 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, phosphinotricin 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 phosphinotricin acetyltransferase (such as the bar or pat protein from Streptomyces species). Plants expressing an exogenous phosphinotricin 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, pyrimidinoyxy(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 Cry3Bbl 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 plant cells.

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

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 sucrase 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-59 122-7 (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 F1117 (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 GHB1 19 (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 GJ1 1 (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 orWO 04/074492); EventJOPL11 (wheat,disease tolerance, not deposited, described in US-A 2008-064032); EventLL27 (soybean, herbicide tolerance, deposited as NCIMB41658, described inWO 06/108674 orUS-A 2008-320616); EventLL55 (soybean, herbicide tolerance, deposited as NCIMB41660, described inWO 06/108675 orUS-A 2008-196127); EventLLcotton25 (cotton, herbicide tolerance, deposited as ATCC PTA-3343, described inWO 03/013224 orUS-A 2003-097687); EventLLRICE06 (rice, herbicide tolerance, deposited as ATCC-23352, described inUS 6,468,747 orWO 00/026345); EventLLRICE601 (rice, herbicide tolerance, deposited asATCC PTA-2600, described inUS-A 2008-2289060 orWO 00/026356); EventLY038 (corn,quality trait, deposited as ATCC PTA-5623, described inUS-A 2007-028322 orWO 05/061720); EventMIR162 (corn, insect control, deposited as PTA-8166, described inUS-A 2009-300784 orWO 07/142840); EventMIR604 (corn, insect control, not deposited, described inUS-A 2008-167456 orWO 05/103301); EventMON15985 (cotton, insect control, deposited as ATCC PTA-2516, described inUS-A 2004-250317 orWO 02/100163); EventMON810 (corn, insect control, not deposited, described inUS-A 2002-102582); EventMON863 (corn, insect control, deposited as ATCC PTA-2605, described inWO 04/011601 orUS-A 2006-095986); EventMON87427 (corn, pollination control, deposited asATCC PTA-7899, described inWO 11/062904); EventMON87460 (corn, stress tolerance, deposited asATCC PTA-8910, described inWO 09/111263 orUS-A 2011-0138504); EventMON87701 (soybean,insect control, deposited as ATCC PTA-8194, described inUS-A 2009-130071 orWO 09/064652); EventMON87705 (soybean, quality trait - herbicide tolerance, deposited as ATCC PTA-9241, described inUS-A 2010-0080887 orWO 10/037016); EventMON87708 (soybean, herbicide tolerance, deposited asATCC PTA9670, described inWO 11/034704); EventMON87754 (soybean, quality trait, deposited asATCC PTA-9385, described inWO 10/024976); EventMON87769 (soybean, quality trait, deposited as ATCC PTA-8911, described inUS-A 2011-0067141 orWO 09/102873); EventMON88017 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-5582, described inUS-A 2008-028482 orWO 05/059103); EventMON88913 (cotton, herbicide tolerance, deposited as ATCC PTA-4854, described inWO 04/072235 orUS-A 2006-059590); EventMON89034 (corn, insect control, deposited as ATCC PTA-7455, described inWO 07/140256 orUS-A 2008-260932); EventMON89788 (soybean, herbicide tolerance, deposited as ATCC PTA-6708, described inUS-A 2006-282915 orWO 06/130436); EventMS11 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-850 orPTA-2485, described inWO 01/031042); EventMS8 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-730, described inWO 01/041558 orUS-A 2003-188347); EventNK603 (corn, herbicide tolerance, deposited as ATCC PTA-2478, described inUS-A 2007-292854); EventPE-7 (rice, insect control, not deposited, described inWO 08/114282); EventRF3 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-730, described inWO 01/041558 orUS-A 2003-188347); EventRT73 (oilseed rape, herbicide tolerance, not deposited, described inWO 02/036831 orUS-A 2008-070260); EventT227-1 (sugar beet, herbicide tolerance, not deposited, described inWO 02/44407 orUS-A 2009-265817); EventT25 (corn, herbicide tolerance, not deposited, described inUS-A 2001-029014 orWO 01/051654); EventT304-40 (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).
Examples

Example A

Myzus persicae - spray test

Solvent: 78.0 parts by weight acetone
1.5 parts by weight dimethylformamide

Emulsifier: 0.5 parts by weight alkylarylpolyglycoether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

Chinese cabbage (Brassica pekinensis) leaf-disks infected with all instars of the green peach aphid (Myzus persicae) are sprayed with a preparation of the active ingredient of the desired concentration. After the specified period of time, mortality in % is determined. 100 % means that all aphids have been killed; 0 % means that none of the aphids have been killed. The mortality values determined thus are recalculated using the Colby-formula (see above).

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

Table A: Myzus persicae - test

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Concentration in g ai/ha</th>
<th>Efficacy in % after 6d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requiem (QRD 4.052)</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>Pyraclostrobin (F121)</td>
<td>500</td>
<td>70</td>
</tr>
<tr>
<td>Requiem + Pyraclostrobin (1:1)</td>
<td>500 + 500</td>
<td>obs.* cal.**</td>
</tr>
<tr>
<td>according to the invention</td>
<td></td>
<td>90 70</td>
</tr>
</tbody>
</table>

*obs. = observed insecticidal efficacy, **cal. = efficacy calculated with Colby-formula

Example B

Tetranychus urticae - spray test, OP-resistant

Solvent: 78.0 parts by weight acetone
To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

French beans (*Phaseolus vulgaris*) which are heavily infested with all stages of the two spotted spidermite (*Tetranychus urticae*), are sprayed with a preparation of the active ingredient of the desired concentration.

After the specified period of time, mortality in % is determined. 100% means that all spider mites have been killed and 0% means that none of the spider mites have been killed. The mortality values determined thus are recalculated using the Colby-formula (see sheet 1).

According to the present application in this test e.g. the following combinations show a synergistic effect in comparison to the single compounds:

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Concentration in g ai/ha</th>
<th>Efficacy in % after 6d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requiem (QRD 4.052)</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>Fosetyl-Al</td>
<td>500</td>
<td>70</td>
</tr>
<tr>
<td>Requiem + Fosetyl-Al (1 : 1) according to the invention</td>
<td>500 + 500</td>
<td>obs.* cal.**</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>70</td>
</tr>
</tbody>
</table>

*obs. = observed insecticidal efficacy, **cal. = efficacy calculated with Colby-formula

**Fungicidal Activity**

Example 1

*T Phytophthora test* (tomatoes) / preventive

The commercially available compound REQUIEM®, active compounds (1 part by weight) solved in acetone/dimethylacetamide (24.5/24.5 part by weight) and alkylaryl polyglycol ether (1 part by weight), or combinations thereof were diluted with water to the desired concentration.

The application rate of REQUIEM® refers to the amounts of the 3 terpenes a-terpinene, p-cymene and limonene, contained in the product REQUIEM®.
To test for preventive activity, young plants are sprayed with the preparation of active compound at the stated rate of application. After the spray coating has dried on, the plants are inoculated with an aqueous spore suspension of *Phytophthora infestans*. The plants are then placed in an incubation cabinet at approximately 20 °C and a relative atmospheric humidity of 100%.

The test is evaluated 3 days after the inoculation. 0% means an efficacy which corresponds to that of the untreated control, while an efficacy of 100% means that no disease is observed.

The table below clearly shows that the observed activity of the active compound combination according to the invention is greater than the calculated activity, i.e. a synergistic effect is present.

Table

<table>
<thead>
<tr>
<th>Active compounds</th>
<th>Application rate of active compound in ppm a.i.</th>
<th>Efficacy in % found*</th>
<th>calc.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>REQUIEM®</td>
<td>1000</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Azoxystrobin (F107)</td>
<td>0.5</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Mancozeb (F174)</td>
<td>20</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Propamocarb-HCl (F220)</td>
<td>200</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Metalaxyl (F241)</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Mefenoxam (F242)</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>REQUIEM® + F107</td>
<td>1:0.002</td>
<td>43</td>
<td>34</td>
</tr>
<tr>
<td>REQUIEM® + F174</td>
<td>1:0.05</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td>REQUIEM® + F220</td>
<td>1:0.4</td>
<td>58</td>
<td>0</td>
</tr>
<tr>
<td>REQUIEM® + F241</td>
<td>1:0.005</td>
<td>28</td>
<td>17</td>
</tr>
<tr>
<td>REQUIEM® + F242</td>
<td>1:0.005</td>
<td>32</td>
<td>16</td>
</tr>
</tbody>
</table>

* found = activity found
** calc. = activity calculated using Colby's formula

Example 2

*Venturia test* (apples) / preventive

The commercially available compound REQUIEM®, active compounds (1 part by weight) solved in acetone/dimethylacetamide (24.5/24.5 part by weight) and alkylaryl polyglycol ether (1 part by weight), or combinations thereof were diluted with water to the desired concentration.
The application rate of REQUIEM® refers to the amounts of the 3 terpenes a-terpinene, p-cymene and limonene, contained in the product REQUIEM®.

To test for preventive activity, young plants are sprayed with the preparation of active compound at the stated rate of application. After the spray coating has dried on, the plants are inoculated with an aqueous conidia suspension of the causal agent of apple scab (*Venturia inaequalis*) and then remain for 1 day in an incubation cabinet at approximately 20 °C and a relative atmospheric humidity of 100%.

The plants are then placed in a greenhouse at approximately 21 °C and a relative atmospheric humidity of approximately 90%.

The test is evaluated 10 days after the inoculation. 0%> means an efficacy which corresponds to that of the untreated control, while an efficacy of 100%> means that no disease is observed.

The table below clearly shows that the observed activity of the active compound combination according to the invention is greater than the calculated activity, i.e. a synergistic effect is present.
### Table

**Venturia test (apples) / preventive**

<table>
<thead>
<tr>
<th>Active compounds</th>
<th>Application rate of active compound in ppm a.i.</th>
<th>Efficacy in % found*</th>
<th>calc.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>REQUIEM®</td>
<td>1000 500 250</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F7  difenoconazole</td>
<td>1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>F70 fluopyram</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>F72 fluxapyroxad</td>
<td>0.5</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>F84 penflufen</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>F121 pyraclostrobin</td>
<td>1</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>F126 trifloxystrobin</td>
<td>0.25</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>REQUIEM® + F7 1:0.002</td>
<td>500 + 1</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>REQUIEM® + F70 1:0.004</td>
<td>1000 + 4</td>
<td>73</td>
<td>4</td>
</tr>
<tr>
<td>REQUIEM® + F72 1:0.001</td>
<td>500 + 0.5</td>
<td>79</td>
<td>43</td>
</tr>
<tr>
<td>REQUIEM® + F84 1:0.002</td>
<td>1000 + 2</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>REQUIEM® + F121 1:0.001</td>
<td>1000 + 1</td>
<td>100</td>
<td>65</td>
</tr>
<tr>
<td>REQUIEM® + F126 1:0.001</td>
<td>250 + 0.25</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>REQUIEM®</td>
<td>1000 400 200</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Flutolanil (F71)</td>
<td>100</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Chlorothalonil (F155)</td>
<td>10</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Mancozeb (F174)</td>
<td>20</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Fludioxonil (F248)</td>
<td>100</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>REQUIEM® + F71 1:0.1</td>
<td>1000 + 100</td>
<td>43</td>
<td>8</td>
</tr>
<tr>
<td>REQUIEM® + F155 1:0.05</td>
<td>200 + 10</td>
<td>53</td>
<td>43</td>
</tr>
<tr>
<td>REQUIEM® + F174 1:0.05</td>
<td>400 + 20</td>
<td>90</td>
<td>24</td>
</tr>
<tr>
<td>REQUIEM® + F248 1:0.1</td>
<td>1000+ 100</td>
<td>85</td>
<td>4</td>
</tr>
</tbody>
</table>
Example 3

*Sphaerotheca* test (cucumbers) / preventive

The commercially available compound REQUIEM®, active compounds (1 part by weight) solved in acetone/dimethylacetamide (24.5/24.5 part by weight) and alkylaryl polyglycol ether (1 part by weight), or combinations thereof were diluted with water to the desired concentration.

The application rate of REQUIEM® refers to the amounts of the 3 terpenes a-terpinene, p-cymene and limonene, contained in the product REQUIEM®.

To test for preventive activity, young plants are sprayed with the preparation of active compound at the stated rate of application. After the spray coating has dried on, the plants are inoculated with an aqueous spore suspension of *Sphaerotheca fuliginea*. The plants are then placed in a greenhouse at approximately 23 °C and a relative atmospheric humidity of approximately 70%.

The test is evaluated 7 days after the inoculation. 0% means an efficacy which corresponds to that of the untreated control, while an efficacy of 100% means that no disease is observed.

The table below clearly shows that the observed activity of the active compound combination according to the invention is greater than the calculated activity, i.e. a synergistic effect is present.

Table

*Sphaerotheca* test (cucumbers) / preventive

<table>
<thead>
<tr>
<th>Active compounds</th>
<th>Application rate of active compound in ppm a.i.</th>
<th>Efficacy in % found*</th>
<th>calc.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>REQUIEM®</td>
<td>1000 500 250</td>
<td>0 0 0</td>
<td></td>
</tr>
<tr>
<td>Prothioconazole (F41)</td>
<td>2</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Spiroxamine (F46)</td>
<td>50</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Tebuconazole (F47)</td>
<td>2</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Fluxapyroxad (F72)</td>
<td>1</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Fenamidone (Fl 14)</td>
<td>50</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Isotianil (F187)</td>
<td>25</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Fludioxonil (F248)</td>
<td>50</td>
<td>62</td>
<td></td>
</tr>
</tbody>
</table>
Example 4

*Alternaria* test (tomatoes) / preventive

The commercially available compound **REQUIEM®**, active compounds (1 part by weight) solved in acetone/dimethylacetamide (24.5/24.5 part by weight) and alkylaryl polyglycol ether (1 part by weight), or combinations thereof were diluted with water to the desired concentration.

The application rate of **REQUIEM®** refers to the amounts of the 3 terpenes a-terpinene, p-cymene and limonene, contained in the product **REQUIEM®**.

To test for preventive activity, young plants are sprayed with the preparation of active compound at the stated rate of application. After the spray coating has dried on, the plants are inoculated with an aqueous spore suspension of *Alternaria solani*. The plants are then placed in an incubation cabinet at approximately 20 °C and a relative atmospheric humidity of 100%.

The test is evaluated 3 days after the inoculation. 0% means an efficacy which corresponds to that of the untreated control while an efficacy of 100% means that no disease is observed.

The table below clearly shows that the observed activity of the active compound combination according to the invention is greater than the calculated activity, i.e. a synergistic effect is present.

Table

*Alternaria* test (tomatoes) / preventive

<table>
<thead>
<tr>
<th>Active compounds</th>
<th>Application rate of active compound in ppm a.i.</th>
<th>Efficacy in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>found*</td>
<td>calc.**</td>
</tr>
<tr>
<td><strong>REQUIEM®</strong></td>
<td>1000 500 250</td>
<td>13 0 29</td>
</tr>
<tr>
<td>Pyraclostrobin (F121)</td>
<td>0.5</td>
<td>30</td>
</tr>
</tbody>
</table>
Example 5

*Botrytis* test (beans) / preventive

The commercially available compound REQUIEM®, active compounds (1 part by weight) solved in acetone/dimethylacetamide (24.5/24.5 part by weight) and alkylaryl polyglycol ether (1 part by weight), or combinations thereof were diluted with water to the desired concentration.

The application rate of REQUIEM® refers to the amounts of the 3 terpenes a-terpinene, p-cymene and limonene, contained in the product REQUIEM®.

To test for preventive activity, young plants are sprayed with the preparation of active compound. After the spray coating has dried on, 2 small pieces of agar covered with growth of *Botrytis cinerea* are placed on each leaf. The inoculated plants are placed in a darkened chamber at 20 °C and a relative atmospheric humidity of 100%.

2 days after the inoculation, the size of the lesions on the leaves is evaluated. 0% means an efficacy which corresponds to that of the untreated control, while an efficacy of 100% means that no disease is observed.

The table below clearly shows that the observed activity of the active compound combination according to the invention is greater than the calculated activity, i.e. a synergistic effect is present.

Table

*Botrytis* test (beans) / preventive

<table>
<thead>
<tr>
<th>Active compounds</th>
<th>Application rate of active compound in ppm a.i.</th>
<th>Efficacy in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>found*</td>
<td>calc.**</td>
</tr>
<tr>
<td>REQUIEM®</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Fenhexamid (F16)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>REQUIEM® + F16</td>
<td>1:0.01</td>
<td></td>
</tr>
</tbody>
</table>

* found = activity found
** calc. = activity calculated using Colby's formula
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 fungicide (I) in a synergistically effective amount,
   with the proviso that the pesticidal terpene mixture and the fungicide are not identical.

2. The composition according to claim 1, wherein fungicide (I) is a synthetic fungicide.

3. The composition according to claim 1 or claim 2, further comprising c) at least one additional fungicide (II), with the proviso that the pesticidal terpene mixture, fungicide (I) and fungicide (II) are not identical.

4. The composition according to claim 3, wherein fungicide (II) is a synthetic fungicide.

5. The composition according to any one of claims 1 to 4, wherein the pesticidal terpene 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 pesticidal 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-
wherein each of the substantially pure a-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 a-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 obtainable 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 fungicide (I) 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, pyripenone (chlazafenone), cufraneb, cyflufenamid, cyxamol, cyprosulfamide, dazomet, debacarb, dichlorophen, diclomezone, difenzoquat, difemzoquat methylsulphate, diphenylamine, ecomate, fenpyrazamine, flumetover, fluoroimide, flusulfamide, flutianil, fosetyl-aluminium, fosetyl-calcium, fosetyl-sodium, hexachlorobenzene, irumamycin, methasulfocarb, methyl isothiocyanate, metrafixone, mildiomycin, natamycin, nickel dimethylthiocarbamate, nitrothal-isopropyl, otholinone, oxamocarb, oxyfenthiin, pentachlorophenol and salts (87-86-5), (F297) phenothrin, (F298) phosphorous acid and its salts, propamocarb-fosetylactate, 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, tolfluanide, triafoxide, trichlamide, zarilamid, (3S,6S,7R,SR)-8-benzyl-3-{[(3-[isobutyryl oxy) methoxy]-4-methoxy pyridin-2-yl] carbonyl} amino]-6-methyl-4,9-dio xo-1,5-dioxolan-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-((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-((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-methoxyphenoxo)-3,3-dimethylbutan-2-yl 

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piperidin-1-yl)ethanone, 2-(4-(5-phenyl-4,5-dihydro-1,2-oxazol-3-yl)-1,3-thiazol-2-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-dimethylpyrazidine, 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-[(3-3-(4-chlorobenzyl)-1,2,4-thiadiazol-5-yl)oxy]-2,5-dimethylphenyl)-N-ethyl-N-methylimidofomamide, N-(4-chlorobenzyl)-3-[3-methoxy-4-propyn-1-yl]oxy)phenyl)propanamide, N-[(4-chlorophenyl)(cyano)methyl]-3-[3-methoxy-4-(prop-2-yn-1-yl)oxy)phenyl)propanamide, N-[(5-bromo-3-chloropyridin-2-yl)methyl]-2,4-dichloropyridine-3-carboxamide, N-[(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-methylimidofomamide, N-methyl-2-[(4-(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-[(5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl)acetyl]piperidin-4-yl]-N-([IR]-1,2,3,4-tetrahydronaphthalen-1-yl)-1,3-thiazole-4-carboxamide, N-methyl-2-[(5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl)acetyl]piperidin-4-yl]-N-[(IS)-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)methlenem] 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-

11. The composition according to any one of claims 3 to 10, wherein fungicide (II) 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, pyriflufenone (chlazafenone), cufraneb, cyfluafenamid, 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, oethilinone, oxamocarb, oxyfenthia,
pentachlorophenol and salts (87-86-5), (F297) phenothrin, (F298) phosphorous acid and its salts,
propamocarb-fosetylactone, propanosine-sodium, proquinazid, pyrimorph, (2E)-3-(4-tert-butylphenyl)-3-(2-
chloropyridin-4-yl)-l-(morpholin-4-yl)prop-2-en-l-one, (2Z)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-
4-yl)-l-(morpholin-4-yl)prop-2-en-l-one, pyrrolnitrine, tebuflouquin, tecloftalam, tolufamidine, triazoxide,
trichlamide, zarilamid, (3S,6S,7R,8R)-8-benzyl-3-[(3-[(isobutyryloxy)metoxyl]-4-methoxypridin-2-
yl]carbonyl]amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl 2-methylpropanoate, (l-(4-{4-[(5R)-5-(2,6-
difluorophenyl)-4,5-dihydro-2-oxazol-3-yl]-l,3-thiazo1-2-yl)piperinidin-l-yl)-2-[5-methyl-3-(trifluoro-
ethyl)-IH-pyrazol-1-yl]ethanone,
(1-(4-[(5S)-5-(2,6-difluorophenyl)-4,5-dihydro-2-oxazol-3-yl]-1,3-thialoz-2-yl) piperidin-1-yl)-2-[5-
methyl-3-(trifluoromethyl)-IH-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)-IH-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)-IH-pyrazol-1-yl]ethanone, (4-{4-5-[2,6-difluorophenyl]-4,5-dihydro-1,2-
oxazol-3-yl]-1,3-thiazol-2-yl)piperidin-1-yl)ethanone, (2-[4-(4-(5-phenyl-4,5-dihydro-
1,2-oxazol-3-yl)-1,3-thiazo1-2-yl)piperinidin-1-yl]ethanone,
(2-[4-(4-5-[2,6-difluorophenyl]-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazo1-2-yl)piperidin-1-yl)ethanone,
(2-cho1o-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-dihydriodoquinolin-1-yl)quinonolone, 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-methylpyrizaine, (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)oxl}pyrimidin-4-amine,
5-fluoro-2-{(4-methylbenzyl)oxy}pyrimidin-4-amine, 5-methyl-6-ocyl[1,2,4]triazolo[1,5-a]pyrimidin-7-
amine, ethyl (2Z)-3-amino-2-cyano-3 phenylprop-2-en-oate, N-4-[(3-[(4-chlorobenzyl)-1,2,4-thiadiazol-
5-y]oxy)-2,5-dimethylphenyl]-N-ethyl-N-methylimidooformamide, N-(4-chlorobenzyl)-3-[3-methoxy-4-
(prop-2-yn-1-yl)oxy]phenyl]propanamide, N-{[(4-chlorophenyl)(cyano)methyl]-3-[3-methoxy-4-
(prop-2-yn-1-yl)oxy]phenyl]propanamide, N-{5-bromo-3-chloropyridin-2-yl) methyl]-2,4-dichloropyridine-3-

carboxamide, N-{[5-bromo-3-chloropyridin-2-yl]ethyl}, 2,4-dichloropyridine-3-carboxamide, N-{[5-
bromo-3-chloropyridin-2-yl]ethyl}-2-fluro-4-iodopyridine-3-carboxamide, N-{(E)-
\[(cyclopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl]-2-phenylacetamide,
N-{(Z)-[cyclcopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluoropyrinl]methyl]}-2-
phenylacetamide, N'-4-{[3-(tert-butyl-4-cyano-1,2-thiazol-5-yl)oxy]-2-chloro-5-methylphenyl]-N-ethyl-
N-methylimidooformamide, N-methyl-2-{1-[5-methyl-3-(trifluoromethyl)-IH-pyrazol-1-
yl] acetyl} piperidin-4-yl)-N-[(1,2,3,4-tetrahydronaphthalen-1-yl)-1,3-thiazole-4-carboxamide, N-methyl-2-[(5-methyl-3-(trifluoromethyl)-IH-pyrazol-1-yl)acetyl]piperidin-4-yl)-N-[(IR)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide, N-methyl-2-(l-[(5-methyl-3-(trifluoromethyl)-IH-pyrazol-1-yl)acetyl]piperidin-4-yl)-N-[(IS)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide, N-methyl-2-[(l-[(5-methyl-3-(trifluoromethyl)-lH-pyrazol-1-yl]acetyl) piperidin-4-yl)-N-[(lR)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide, N-methyl-2-[(l-[(5-methyl-3-(trifluoromethyl)-lH-pyrazol-1-yl)acetyl]piperidin-4-yl)-N-[(lS)-1,2,3,4-tetrahydronaphthalen-1-yl]-1,3-thiazole-4-carboxamide, pentyl 6-[(l-methyl-IH-tetrazol-5-yl)(phenyl)methylene] 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-[(l-methyl-IH-tetrazol-5-yl)(phenyl)methylene] amino[oxy]methyl]pyridin-2-yl] carbamate, 1-methyl-3-(trifluoromethyl)-N-[2'-(trifluoromethyl)benzyl-2-yl]-IH-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-lH-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)benzyl-2-yl]-IH-pyrazole-4-carboxamide, 1-methyl-1H-pyrazole-4-carboxamide, 2-chloro-N-[4'-(prop-1-yn-1-yl)benzyl-2-yl]pyridine-3-carboxamide, 3-(difluoromethyl)-N-[(3,3-dimethylbut-1-yn-1-yl)benzyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, N-[4'-(3,3-dimethylbut-1-yn-1-yl)benzyl-2-yl]-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide, 3-(difluoromethyl)-N-(4'-ethynylbenzyl-2-yl)-1-methyl-1H-pyrazole-4-carboxamide, N-(4'-ethynylbenzyl-2-yl)-5-fluoro-1,3-dimethyl-1H-pyrazole-4-carboxamide, 2-chloro-N-(4'-ethynylbenzyl-2-yl)pyridine-3-carboxamide, 2-chloro-N-[4'-(3,3-dimethylbut-1-yn-1-yl)benzyl-2-yl]pyridine-3-carboxamide, 4-(difluoromethyl)-2-methyl-N-[4'-(trifluoromethyl)benzyl-2-yl]-1,3-thiazole-5-carboxamide, 5-fluoro-N-[4'-(3-hydroxy-3-methylbut-1-yn-1-yl)benzyl-2-yl]-l,3-dimethyl-1H-pyrazole-4-carboxamide, 2-chloro-N-[4'-(3-hydroxy-3-methylbut-1-yn-1-yl)benzyl-2-yl]pyridine-3-carboxamide, 3-(difluoromethyl)-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)benzyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, 5-fluoro-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)benzyl-2-yl]-1-methyl-1H-pyrazole-4-carboxamide, 2-chloro-N-[4'-(3-methoxy-3-methylbut-1-yn-1-yl)benzyl-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)-l-methyl-IH-tetrazol-5-yl](phenyl)methylene] amino][oxy]methyl)pyridin-2-yl) carbamate, 4-Amino-5-fluoropyrimidin-2-ol (mesomeric form: 6-Amino-5-fluoropyrimidin-2(IH)-on), propyl 3,4,5-trihydroxybenzoate and oryzastrobine.

12. The composition according to any one of claims 1 to 11, wherein fungicide (I) is selected form the group consisting of bitertanol, bburuconazole, cyproconazole, difenoconazole, epoxiconazole, fenhexamid, fenpropidin, fenpropimorph, fludiothion, flutriafol, imazalil, ipconazole, mecopropol, mecoprop, mecoprop, metconazole,
myclobutanil, penconazole, prochloraz, propiconazole, prothioconazole, spiromexamine, tebuconazole, triadimenol, triforconazole, 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 1S,4R,9S), penflufen, penthiopyrad, sedaxane, thifluzamide, N-[l-(2,4-dichlorophenyl)-1-methoxypropan-2-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, 1-Methyl-3-(trifluoromethyl)-N-(1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazol-4-carboxamid, 1-Methyl-3-(trifluoromethyl)-N-[l(S)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, 1-Methyl-3-(trifluoromethyl)-N-[l(R)-1,3,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, 3-(Difluoromethyl)-1-methyl-N-[3(S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, 3-(Difluoromethyl)-1-methyl-N-[3(R)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazol-4-carboxamid, ametocdrad, amidlubrom, azoxytrobzin, cyazoamid, dimoxstrobin, enestroburin, famoxadone, fenamidone, fluoxastrobin, kresoxim-methyl, metominostrobin, orysastrobin, picoxystrobin, pyraclostrobin, pyribencarb, trifloxystrobin, carbendazim, clorfenaazole, diethofencarb, ethydroxam, fluopicolide, fuberidazone, pencycunor, thiophanate-methyl, zoamide, 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, iadinil, cyprodinil, pyrimethanil, benthiavalicarbb, dimethomorph, iprovalicarb, mandipropamid, valifenalate, iodocarb, iprobenfos, propamocarb hydrochloride, tolclofos-methyl, carpropanid, benalaxyl, benalaxyl-M (kiralaxy), furalaxy, hymexazol, metalaxyl, metalaxy M (mefenoxame), oxadixyl, fenpiclonil, fludioxonil, iprodione, quinoxyfen, vinclozolin, fluazinam, cymoxanil, flutianil, fosetyl-aluminium, methasulfofcarb, methyl isothiocyanate, metrafenone, phosphorous acid and its salts, proquinzad, triazoxide and 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrrole-1,3,5,7(2H,6H)-tetrone.

13. The composition according to any one of claims 1 to 12, wherein fungicide (I) is selected form the group consisting of azoxystrobin, chlorothalonil, difenoconozole, fenhexamid, fenamidone, fludioxonil, fluopyram, flutolanil, fluxapyroxad, fosetyl-Al, isotianil, mancozeb, mefenoxame, metalaxyl, penflufen, propamocarb-HCl, prothioconazole, pyraclostrobin, spiromexamine, tebuconazole, trifloxystrobin.
14. The composition according to any one of claims 1 to 13 additionally comprising at least one auxiliary selected from the group consisting of extenders, solvents, spontaneity promoters, carriers, emulsifiers, dispersants, frost protectants, thickeners and adjuvants.

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

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

17. The use according to claim 16 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.

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

19. 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 pesticidal terpene mixture comprising, as pesticidally active chemical compounds, a-terpinene, p-cymene and limonene, and at least one fungicide (I) in a synergistically effective amount, with the proviso that the pesticidal terpene mixture and fungicide (I) are not identical.

20. The method according to claim 19 further comprising at least one additional fungicide (II), with the proviso that the pesticidal terpene mixture, fungicide (I) and fungicide (II) are not identical.
A CLASSIFICATION OF SUBJECT MATTER
INV. A01N27/00 A01N43/54 A23B7/154 A01N37/34 A01N43/653
A01N37/24 A01N43/50 A01N43/36 A01N43/40 A01N43/56
A01N57/12 A01N43/80 A01N47/14 A01N37/46 A01N47/12

According to International Patent Classification (IPC) and to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A01N A23B

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

Electronic database consulted during the international search (name of database base and, where practicable, search terms used)
EPO-Internal, BIOSIS, CHEMABS Data, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<td>abstract tables 2-4</td>
<td>1-12, 14-20</td>
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Date of the actual completion of the international search
10 September 2013

Date of mailing of the international search report
17/09/2013

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