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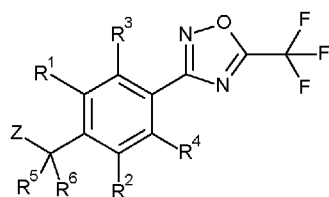
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(54) Title: MICROBIOCIDAL OXADIAZOLE DERIVATIVES

(57) Abstract: Compounds of the formula (I) wherein the substituents are as defined in claim 1, useful as pesticides, especially as fungicides.



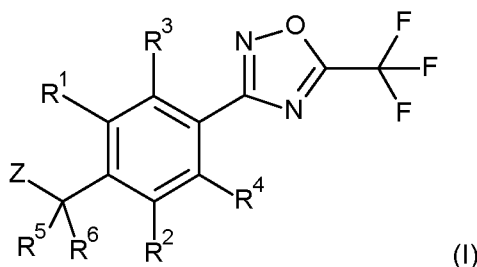
(I)



Microbiocidal Oxadiazole Derivatives

The present invention relates to microbiocidal oxadiazole derivatives, e.g., as active ingredients, which have microbiocidal activity, in particular, fungicidal activity. The invention also relates to agrochemical compositions which comprise at least one of the oxadiazole derivatives, to processes of preparation of these compounds and to uses of the oxadiazole derivatives or compositions in agriculture or horticulture for controlling or preventing infestation of plants, harvested food crops, seeds or non-living materials by phytopathogenic microorganisms, preferably fungi.

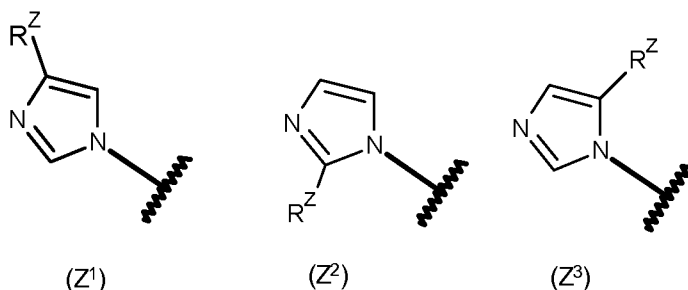
According to the present invention, there is provided a compound of formula (I):



wherein R^1, R^2, R^3, R^4 are independently selected from hydrogen or fluoro and wherein 0, 1 or 2 of R^1, R^2, R^3 and R^4 are fluoro;

R^5 and R^6 are independently selected from hydrogen or methyl;

Z is selected from Z^1, Z^2 , or Z^3 :



and R^Z is R^7 , wherein

(i) R^7 represents $-C(O)N(R^{7a})(R^{7b})$, wherein:

R^{7a} is C_{1-5} alkyl, C_{1-4} haloalkyl, cyano C_{1-4} alkyl, hydroxy C_{1-4} alkyl, C_{1-2} alkoxy C_{1-4} alkyl, C_{1-2} haloalkoxy C_{1-4} alkyl, C_{3-5} alkenyl, C_{3-5} alkynyl, amino C_{1-4} alkyl, amino, N,N-di C_{1-2} alkylamino, N-formyl-N- C_{1-2} alkylamino, N- C_{1-2} alkylcarbonyl-N- C_{1-2} alkylamino, pyrrolidin-1-amino, piperidin-1-amino, morpholin-4-amino, N- C_{1-2} alkylamino C_{1-4} alkyl, N,N-di C_{1-2} alkylamino C_{1-4} alkyl, hydroxyl, C_{1-4} alkoxy, C_{3-4} alkenyloxy, C_{3-4} haloalkyloxy, C_{3-4} alkynyloxy, cyclopropyl C_{1-2} alkoxy; or

R^{7a} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, phenylC₁₋₂alkyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N or S(O)₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl, wherein the
5 heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 2, 3 or 4 heteroatoms individually selected from N, O and S,

and wherein the cycloalkyl, phenyl, heterocyclyl, or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, amino, formyl, acyl,
10 cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O), and

R^{7b} is hydrogen, C₁₋₄alkyl, C₁₋₄haloalkyl, or cyclopropyl, or

15 R^{7a} and R^{7b} together with the nitrogen atom to which they are bonded, form a 4- to 6-membered monocycle optionally containing an additional heteroatom or group selected from O, S, S(O)₂, C(O) and NR⁸, or

20 R^{7a} and R^{7b} together with the nitrogen atom to which they are bonded, form a 5- to 8-membered spirobicyclic ring system optionally containing an additional heteroatom or group selected from O, C(O), and NR⁸;

R⁸ is hydrogen, methyl, methoxy, formyl or acyl;

25 or

(ii) R⁷ represents -C(O)OR^{7c}, wherein:

30 R^{7c} is C₂₋₅alkyl, C₁₋₄haloalkyl, cyanoC₁₋₄alkyl, hydroxyC₁₋₄alkyl, C₁₋₂alkoxyC₂₋₄alkyl, C₁₋₂alkoxyC₁₋₂alkoxyC₁₋₄alkyl, C₁₋₂haloalkoxyC₁₋₄alkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, C₃₋₄haloalkenyl, N-C₁₋₃alkylaminoC₁₋₄alkyl, N,N-di-C₁₋₃alkylaminoC₁₋₄alkyl; or

35 R^{7c} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, phenylC₁₋₂alkyl, heterocyclyl or heterocyclylC₁₋₂alkyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N or S(O)₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl or heteroarylC₁₋₂alkyl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1, 2, 3 or 4 heteroatoms individually selected from N, O and S,

and wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O);

5

or

(iii) R^7 represents $-C(O)C(O)N(R^{7d})(R^{7e})$, wherein

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R^{7d} is C_{1-5} alkyl, C_{1-4} haloalkyl, cyano C_{1-4} alkyl, hydroxy C_{1-4} alkyl, C_{1-3} alkoxy C_{2-4} alkyl, C_{1-2} haloalkoxy C_{1-4} alkyl, C_{3-5} alkenyl, C_{3-5} alkynyl, hydroxyl, amino C_{1-4} alkyl, N- C_{1-4} alkylamino C_{1-4} alkyl, N,N-di C_{1-2} alkylamino, pyrrolidin-1-amino, piperidin-1-amino, morpholin-4-amino, C_{1-5} alkoxy, C_{3-4} haloalkyloxy, C_{3-4} alkenyloxy, C_{3-4} alkynyloxy, cyclopropyl C_{1-2} alkoxy, (C_{1-4} alkyl)-O-N=C(H) C_{1-4} alkyl-, or

15

R^{7d} is C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-2} alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N, SO_2 , with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S,

20

wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O); and

25

R^{7e} is hydrogen, C_{1-4} alkyl, C_{1-4} fluoroalkyl, cyclopropyl, cyclopropylmethyl;

or

30

(iv) R^7 represents $-C(O)C(O)OR^{7f}$, wherein:

R^{7f} is hydrogen, C_{1-5} alkyl, C_{1-4} haloalkyl, C_{3-5} alkenyl, C_{3-5} alkynyl, or

35

R^{7f} is C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-2} alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1 or 2 ring members independently selected from the group consisting of O, S, N, SO_2 , with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, or heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S; or

40

(v) R^7 represents $-C(O)C(O)R^{7g}$, wherein:

R^{7g} is hydrogen, C₁₋₅alkyl, or cyclopropyl;

or

5

(vi) R⁷ represents (C₁₋₄alkyl)-O-N=C(H)-, (C₁₋₄haloalkyl)-O-N=C(H)-, (C₃₋₅alkenyl)-O-N=C(H)-, (C₃₋₅alkynyl)-O-N=C(H)-, or benzyl-O-N=C(H)-;

or a salt or an N-oxide thereof.

10

Surprisingly, it has been found that the novel compounds of Formula (I) have, for practical purposes, a very advantageous level of biological activity for protecting plants against diseases that are caused by fungi.

15

According to a second aspect of the invention, there is provided an agrochemical composition comprising a fungicidally effective amount of a compound of Formula (I). Such an agricultural composition may further comprise at least one additional active ingredient and/or an agrochemically-acceptable diluent or carrier.

20

According to a third aspect of the invention, there is provided a method of controlling or preventing infestation of useful plants by phytopathogenic microorganisms, wherein a fungicidally effective amount of a compound of Formula (I), or a composition comprising this compound as active ingredient, is applied to the plants, to parts thereof or the locus thereof.

25

According to a fourth aspect of the invention, there is provided the use of a compound of Formula (I) as a fungicide. According to this particular aspect of the invention, the use may exclude methods for the treatment of the human or animal body by surgery or therapy.

30

As used herein, the term "halogen" or "halo" refers to fluorine (fluoro), chlorine (chloro), bromine (bromo) or iodine (iodo), preferably fluorine, chlorine or bromine.

As used herein, cyano means a -CN group.

As used herein, the term "hydroxyl" or "hydroxy" means an -OH group.

As used herein, amino means an -NH₂ group.

As used herein, acyl means a -C(O)CH₃ group.

35

As used herein, formyl means a -C(O)H group.

40

As used herein, the term "C₁₋₅alkyl" refers to a straight or branched hydrocarbon chain radical consisting solely of carbon and hydrogen atoms, containing no unsaturation, having from one to five carbon atoms, and which is attached to the rest of the molecule by a single bond. C₁₋₄alkyl, C₁₋₃alkyl and C₁₋₂alkyl are to be construed accordingly. Examples of C₁₋₅alkyl include, but are not limited to, methyl, ethyl, *n*-propyl, 1-methylethyl (isopropyl), *n*-butyl, and 1-dimethylethyl (*t*-butyl). A "C₁₋

C₂alkylene" group refers to the corresponding definition of C₁₋₂alkyl, except that such radical is attached to the rest of the molecule by two single bonds. Examples of C₁₋₂alkylene, are -CH₂- and -CH₂CH₂-.

As used herein, the term "C₁₋₄alkoxy" refers to a radical of the formula -OR_a where R_a is a C₁₋₄alkyl radical as generally defined above. The terms C₁₋₃alkoxy and C₁₋₂alkoxy are to be construed accordingly. Examples of C₁₋₄alkoxy include, but are not limited to, methoxy, ethoxy, propoxy, isopropoxy, and *t*-butoxy.

As used herein, the term "C₁₋₄haloalkyl" refers to a C₁₋₄alkyl radical as generally defined above substituted by one or more of the same or different halogen atoms. Examples of C₁₋₄haloalkyl include, but are not limited to fluoromethyl, fluoroethyl, difluoromethyl, trifluoromethyl, 2,2,2-trifluoroethyl, and 3,3,3-trifluoropropyl.

As used herein, the term "C₃₋₅alkenyl" refers to a straight or branched hydrocarbon chain radical group consisting solely of carbon and hydrogen atoms, containing at least one double bond that can be of either the (*E*)- or (*Z*)-configuration, having from three to five carbon atoms, which is attached to the rest of the molecule by a single bond. Examples of C₃₋₅alkenyl include, but are not limited to, prop-1-enyl, allyl (prop-2-enyl), and but-1-enyl.

As used herein, the term "C₃₋₄haloalkenyl" refers to a C₃₋₄alkenyl radical as generally defined above substituted by one or more of the same or different halogen atoms.

As used herein, the term "C₃₋₄alkenoxy" refers to a radical of the formula -OR_a where R_a is a C₃₋₄alkenyl radical as generally defined above.

As used herein, the term "C₃₋₅alkynyl" refers to a straight or branched hydrocarbon chain radical group consisting solely of carbon and hydrogen atoms, containing at least one triple bond, having from three to five carbon atoms, and which is attached to the rest of the molecule by a single bond. Examples of C₃₋₅alkynyl include, but are not limited to, prop-1-ynyl, propargyl (prop-2-ynyl).

As used herein, the term "C₃₋₄alkynoxy" refers to a radical of the formula -OR_a where R_a is a C₃₋₄alkynyl radical as generally defined above.

As used herein, the term "C₃₋₄alkynyloxyC₁₋₄alkyl" refers to a C₁₋₄alkyl radical as generally defined above substituted by a C₃₋₄alkynyloxy group as defined above.

As used herein, the term "C₁₋₂alkoxyC₁₋₄alkyl" refers to radical of the formula R_b-O-R_a- where R_b is a C₁₋₂alkyl radical as generally defined above, and R_a is a C₁₋₄alkylene radical as generally defined above.

As used herein, the term "hydroxyC₁₋₄alkyl" refers to a C₁₋₄alkyl radical as generally defined above substituted by one or more hydroxy groups. The term "hydroxyC₁₋₂alkyl" should be construed accordingly.

As used herein, the term "cyanoC₁₋₄alkyl" refers to refers to a C₁₋₄alkyl radical as generally defined above substituted by one or more cyano groups.

As used herein, the term "C₁₋₄alkylcarbonyl" refers to a radical of the formula -C(O)R_a where R_a is a C₁₋₄alkyl radical as generally defined above.

As used herein, the term "C₁₋₂alkoxyC₁₋₂alkoxyC₁₋₄alkyl" refers to a radical of the formula R_aOR_bOR_c-, where R_b and R_c are C₁₋₂alkylene radicals as generally defined above, and R_a is a C₁₋₄alkyl radical as generally defined above.

As used herein, the term "N-C₁₋₄alkylamino" refers to a radical of the formula R_aNH- where R_a is a C₁₋₄alkyl radical as generally defined above.

As used herein, the term "N,N-diC₁₋₄alkylamino" refers to a radical of the formula R_a(R_a)N- where R_a is a C₁₋₄alkyl radical as generally defined above.

5 As used herein, the term "C₃₋₄haloalkoxy" refers to a C₃₋₄alkoxy group as defined above substituted by one or more of the same or different halogen atoms.

As used herein, the term "C₃₋₆cycloalkyl" refers to a stable, monocyclic ring radical which is saturated or partially unsaturated and contains 3 to 6 carbon atoms. C₃₋₅cycloalkyl and C₃cycloalkyl are to be construed accordingly. Examples of C₃₋₆cycloalkyl include, but are not limited to cyclopropyl, cyclobutyl, cyclopentyl, cyclopenten-1-yl, cyclopenten-3-yl, and cyclohexen-3-yl.

10 As used herein, the term "C₃₋₆cycloalkylC₁₋₂alkyl" refers to a C₃₋₆cycloalkyl ring as defined above attached to the rest of the molecule by a C₁₋₂alkylene radical as defined above. Examples of C₃₋₆cycloalkylC₁₋₃alkyl include, but are not limited to cyclopropyl-methyl and cyclobutyl-ethyl.

As used herein, the term "phenylC₁₋₂alkyl" refers to a phenyl ring attached to the rest of the molecule by a C₁₋₂alkylene radical as defined above. Examples of phenylC₁₋₂alkyl include, but are not limited to, benzyl.

15 As used herein, the term "heteroaryl" generally refers to a 5- or 6-membered monocyclic aromatic ring radical which comprises 1, 2, 3 or 4 heteroatoms individually selected from nitrogen, oxygen and sulfur. The heteroaryl radical may be bonded to the rest of the molecule via a carbon atom or heteroatom. Examples of heteroaryl include but are not limited to, furyl, pyrrolyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, oxazolyl, isoxazolyl, triazolyl, tetrazolyl, pyrazinyl, pyridazinyl, pyrimidyl, pyridyl, and indolyl.

As used herein, the term "heterocyclyl" or "heterocyclic" generally refers to a stable, saturated or partially saturated, 4- to 6-membered, non-aromatic monocyclic ring, which comprises 1, 2 or 3 heteroatoms individually selected from nitrogen, oxygen and sulfur. The heterocyclyl radical may be bonded to the rest of the molecule via a carbon atom or heteroatom. Examples of heterocyclyl include, but are not limited to, azetidiny, oxetanyl, pyrrolidyl, tetrahydrofuryl, tetrahydrothienyl, tetrahydrothiopyranyl, piperidiny, piperazinyl, tetrahydropyranyl, dioxolanyl, and morpholinyl.

20 The presence of one or more possible asymmetric carbon atoms in a compound of Formula (I) means that the compounds may occur in chiral isomeric forms, i.e., enantiomeric or diastereomeric forms. Also, atropisomers may occur as a result of restricted rotation about a single bond. Formula (I) is intended to include all those possible isomeric forms and mixtures thereof. The present invention includes all those possible isomeric forms and mixtures thereof for a compound of Formula (I). Likewise, Formula (I) is intended to include all possible tautomers (including lactam-lactim tautomerism and keto-enol tautomerism) where present. The present invention includes all possible tautomeric forms for a compound of Formula (I).

30 In each case, the compounds of Formula (I) according to the invention are in free form, in oxidized form as an N-oxide, in covalently hydrated form, or in salt form, e.g., an agronomically usable or agrochemically acceptable salt form.

40

N-oxides are oxidized forms of tertiary amines or oxidized forms of nitrogen containing heteroaromatic compounds. They are described for instance in the book "Heterocyclic N-oxides" by A. Albin and S. Pietra, CRC Press, Boca Raton 1991.

5 The following list provides definitions, including preferred definitions, for substituents R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , Z (including Z^1 , Z^2 , Z^3), R^z (R^7 , including as defined by R^{7a} , R^{7b} , R^{7c} , R^{7d} , R^{7e} , R^{7f} , R^{7g}) and R^8 with reference to the compounds of Formula (I) according to the invention. For any one of these substituents, any of the definitions given below may be combined with any definition of any other substituent given below or elsewhere in this document.

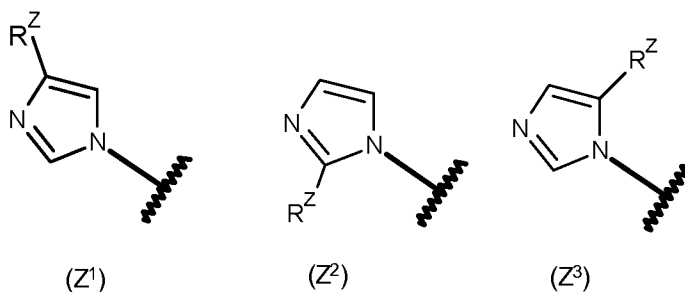
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R^1 , R^2 , R^3 , R^4 are independently selected from hydrogen or fluoro, wherein 0, 1 or 2 of R^1 , R^2 , R^3 and R^4 are fluoro.

15 In certain embodiments of the invention, R^1 , R^2 , R^3 and R^4 are hydrogen; R^2 , R^3 and R^4 are hydrogen and R^1 is fluoro; R^1 , R^2 and R^4 are hydrogen and R^3 is fluoro; R^1 and R^2 are fluoro and R^3 and R^4 are hydrogen; R^1 and R^3 are fluoro and R^2 and R^4 are hydrogen, or R^1 and R^2 are hydrogen and R^3 and R^4 are fluoro. Preferably, R^1 to R^4 are hydrogen, or R^1 is fluoro and R^2 to R^4 are hydrogen.

20 R^5 and R^6 independently represent hydrogen or methyl. Preferably, R^5 and R^6 are both hydrogen, or R^5 is hydrogen and R^6 is methyl. More preferably, R^5 and R^6 are both hydrogen.

Z is selected from Z^1 , Z^2 , or Z^3 :



25 In some embodiments of the invention, Z is Z^1 .

In some embodiments of the invention, Z is Z^2 .

In some embodiments of the invention, Z is Z^3 .

30

Preferably, Z is Z^1 or Z^3 .

R^z is R^7 .

R⁷ may be a group individually selected from (i), (ii), (iii), (iv), (v) or (vi) as defined according to the invention.

In some embodiments of the invention, R⁷ is represented by group (i).

5 In some embodiments of the invention, R⁷ is represented by group (ii).

In some embodiments of the invention, R⁷ is represented by group (iii).

In some embodiments of the invention, R⁷ is represented by group (iv).

In some embodiments of the invention, R⁷ is represented by group (v).

In some embodiments of the invention, R⁷ is represented by group (vi).

10

(i) R⁷ may represent -C(O)N(R^{7a})(R^{7b}), wherein:

15 R^{7a} is C₁₋₅alkyl, C₁₋₄haloalkyl, cyanoC₁₋₄alkyl, hydroxyC₁₋₄alkyl, C₁₋₂alkoxyC₁₋₄alkyl, C₁₋₂haloalkoxyC₁₋₄alkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, aminoC₁₋₄alkyl, amino, N,N-diC₁₋₂alkylamino, N-formyl-N-C₁₋₂alkylamino, N-C₁₋₂alkylcarbonyl-N-C₁₋₂alkylamino, pyrrolidin-1-amino, piperdin-1-amino, morpholin-4-amino, N-C₁₋₂alkylaminoC₁₋₄alkyl, N,N-diC₁₋₂alkylaminoC₁₋₄alkyl, hydroxyl, C₁₋₄alkoxy, C₃₋₄alkenyloxy, C₃₋₄haloalkyloxy, C₃₋₄alkynyloxy, cyclopropylC₁₋₂alkoxy; or

20 R^{7a} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, phenylC₁₋₂alkyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N or S(O)₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 2, 3 or 4 heteroatoms individually selected from N, O and S,

25 and wherein the cycloalkyl, phenyl, heterocyclyl, or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, amino, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O), and

R^{7b} is hydrogen, C₁₋₄alkyl, C₁₋₄haloalkyl or cyclopropyl, or

30 R^{7a} and R^{7b} together with the nitrogen atom to which they are bonded, form a 4- to 6-membered monocycle optionally containing an additional heteroatom or group selected from O, S, S(O)₂, C(O) and NR⁸, or

R^{7a} and R^{7b} together with the nitrogen atom to which they are bonded, form a 5- to 8-membered spirobicyclic ring system optionally containing an additional heteroatom or group selected from O, C(O), and NR⁸, wherein R⁸ is hydrogen, methyl, methoxy, formyl or acyl.

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40 Preferably, R^{7a} is C₁₋₄alkyl, C₁₋₂fluoroalkyl, cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₁₋₂alkyl, C₁₋₂fluoroalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, aminoC₁₋₂alkyl, amino, N,N-diC₁₋₂alkylamino, N-formyl-N-C₁₋₂alkylamino, N-C₁₋₂alkylcarbonyl-N-C₁₋₂alkylamino, pyrrolidin-1-amino, piperdin-1-amino, morpholin-4-amino, N-C₁₋₂alkylaminoC₁₋₂alkyl, N,N-diC₁₋₂alkylaminoC₁₋₂alkyl, hydroxyl, C₁₋₂alkoxy, C₃₋₄alkenyloxy, C₃₋₄haloalkyloxy, C₃₋₄alkynyloxy, cyclopropylC₁₋₂alkoxy. More preferably, R^{7a} is C₁₋₄alkyl,

C₁₋₂fluoroalkyl, cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₁₋₂alkyl, C₁₋₂fluoroalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, aminoC₁₋₂alkyl, amino, hydroxyl, C₁₋₂alkoxy, C₃₋₄alkenyloxy, C₃₋₄haloalkyloxy, C₃₋₄alkynyloxy.

5 Preferably, R^{7a} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, phenylC₁₋₂alkyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1 or 2 ring members independently selected from the group consisting of O, S or N, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 2 or 3 heteroatoms individually
10 selected from N, O and S, and wherein the cycloalkyl, phenyl, heterocyclyl, or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, amino, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 group which is oxo (=O).

15

Preferably, R^{7b} is hydrogen, methyl, ethyl, difluoromethyl, trifluoromethyl or cyclopropyl. More preferably, R^{7b} is hydrogen or methyl.

(ii) R⁷ may represent -C(O)OR^{7c}, wherein:

20

R^{7c} is C₂₋₅alkyl, C₁₋₄haloalkyl, cyanoC₁₋₄alkyl, hydroxyC₁₋₄alkyl, C₁₋₂alkoxyC₂₋₄alkyl, C₁₋₂alkoxyC₁₋₂alkoxyC₁₋₄alkyl, C₁₋₂haloalkoxyC₁₋₄alkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, C₃₋₄haloalkenyl, N-C₁₋₃alkylaminoC₁₋₄alkyl, N,N-di-C₁₋₃alkylaminoC₁₋₄alkyl; or

R^{7c} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, phenylC₁₋₂alkyl, heterocyclyl or heterocyclylC₁₋₂alkyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N or S(O)₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl or heteroarylC₁₋₂alkyl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1, 2, 3 or 4 heteroatoms individually selected from N, O and S,
25

and wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O).
30

Preferably, R^{7c} is C₂₋₅alkyl, C₁₋₄fluoroalkyl, cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₂alkyl, C₁₋₂alkoxyC₁₋₂alkoxyC₁₋₂alkyl, C₁₋₂haloalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, C₃₋₄haloalkenyl, N-C₁₋₂alkylaminoC₁₋₃alkyl, N,N-di-C₁₋₂alkylaminoC₁₋₂alkyl.
35

Preferably, R^{7c} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, phenylC₁₋₂alkyl, heterocyclyl or heterocyclylC₁₋₂alkyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which
40

comprises 1 or 2 ring members independently selected from the group consisting of O, S or N, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl or heteroarylC₁₋₂alkyl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1, 2 or 3 heteroatoms individually selected from N, O and S, and wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 groups which is oxo (=O).

(iii) R⁷ may represent -C(O)C(O)N(R^{7d})(R^{7e}), wherein

R^{7d} is C₁₋₅alkyl, C₁₋₄haloalkyl, cyanoC₁₋₄alkyl, hydroxyC₁₋₄alkyl, C₁₋₃alkoxyC₂₋₄alkyl, C₁₋₂haloalkoxyC₁₋₄alkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, hydroxyl, aminoC₁₋₄alkyl, N-C₁₋₄alkylaminoC₁₋₄alkyl, N,N-diC₁₋₂alkylamino, pyrrolidin-1-amino, piperidin-1-amino, morpholin-4-amino, C₁₋₅alkoxy, C₃₋₄haloalkoxy, C₃₋₄alkenyloxy, C₃₋₄alkynyloxy, cyclopropylC₁₋₂alkoxy, (C₁₋₄alkyl)-O-N=C(H)C₁₋₄alkyl-, or

R^{7d} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N, SO₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S,

wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O); and

R^{7e} is hydrogen, C₁₋₄alkyl, C₁₋₄fluoroalkyl, cyclopropyl, cyclopropylmethyl.

Preferably, R^{7d} is C₁₋₅alkyl, C₁₋₂fluoroalkyl, cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₂alkyl, C₁₋₂haloalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, hydroxyl, aminoC₁₋₂alkyl, N-C₁₋₂alkylaminoC₁₋₂alkyl, N,N-diC₁₋₂alkylamino, pyrrolidin-1-amino, piperidin-1-amino, morpholin-4-amino, C₁₋₄alkoxy, C₃₋₄haloalkoxy, C₃₋₄alkenyloxy, C₃₋₄alkynyloxy, cyclopropylC₁₋₂alkoxy, (C₁₋₄alkyl)-O-N=C(H)C₁₋₄alkyl-. More preferably, R^{7d} is C₁₋₄alkyl, C₁₋₂fluoroalkyl, cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₂alkyl, C₁₋₂haloalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, hydroxyl, aminoC₁₋₂alkyl, N-C₁₋₂alkylaminoC₁₋₂alkyl, C₁₋₄alkoxy, C₃₋₄haloalkoxy, C₃₋₄alkenyloxy, C₃₋₄alkynyloxy.

Preferably, R^{7d} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1 or 2 ring members independently selected from the group consisting of O, S or N, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S,

wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 group which is oxo (=O).

5

Preferably, R^{7e} is hydrogen, methyl, ethyl, difluoromethyl, trifluoromethyl or cyclopropyl. More preferably, R^{7e} is hydrogen or methyl.

(iv) R⁷ may represent -C(O)C(O)OR^{7f}, wherein:

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R^{7f} is hydrogen, C₁₋₅alkyl, C₁₋₄haloalkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, or

R^{7f} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1 or 2 ring members independently selected from the group consisting of O, S, N, SO₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, or heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S.

15

Preferably, R^{7f} is hydrogen, methyl, ethyl, difluoromethyl, trifluoromethyl, C₃₋₄alkenyl or C₃₋₄alkynyl.

20

Preferably, R^{7f} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 5- to 6-membered non-aromatic ring which comprises 1 or 2 ring members independently selected from the group consisting of O, S or N with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, or heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S.

25

(v) R⁷ may represent -C(O)C(O)R^{7g}, wherein R^{7g} is hydrogen, C₁₋₅alkyl, or cyclopropyl.

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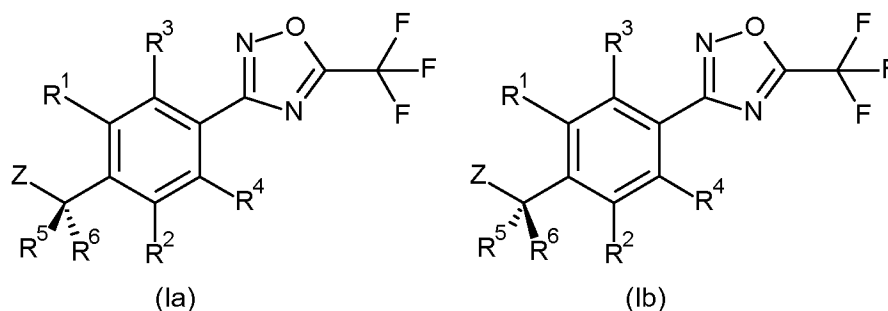
Preferably, R^{7g} is hydrogen, methyl, ethyl, n-propyl, or cyclopropyl.

(vi) R⁷ may represent (C₁₋₄alkyl)-O-N=C(H)-, (C₁₋₄haloalkyl)-O-N=C(H)-, (C₃₋₅alkenyl)-O-N=C(H)-, (C₃₋₅alkynyl)-O-N=C(H)-, or benzyl-O-N=C(H)-, preferably (C₁₋₂alkyl)-O-N=C(H)-, (C₁₋₂fluoroalkyl)-O-N=C(H)-, (C₃₋₄alkenyl)-O-N=C(H)-, (C₃₋₄alkynyl)-O-N=C(H)-, or benzyl-O-N=C(H)-, and more preferably (C₁₋₂alkyl)-O-N=C(H)- or (C₁₋₂fluoroalkyl)-O-N=C(H)-.

35

Preferably, the compound according to Formula (I) is selected from a compound 1.1 to 1.10 described in Table T1 (below), or a compound 2.1 to 2.80 described in Table T2 (below).

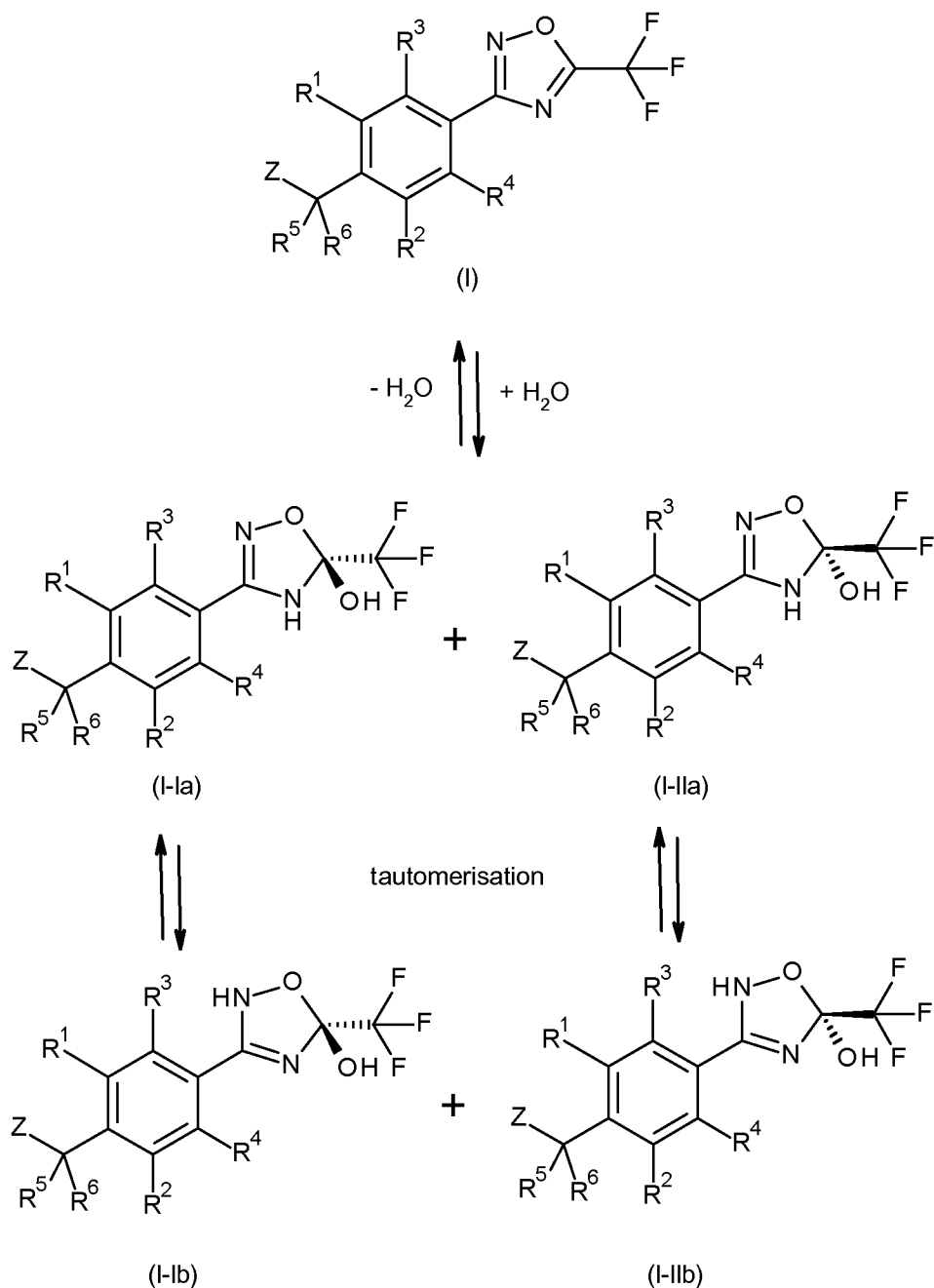
The compounds of the present invention may be enantiomers of the compound of Formula (I) as represented by a Formula (Ia) or a Formula (Ib), wherein R⁵ and R⁶ are different substituents.



5

It is understood that when in aqueous media, the compounds of formula (I) according to the invention may be present in a reversible equilibrium with the corresponding covalently hydrated forms (ie, the compounds of formula (I-Ia) and formula (I-IIa) as shown below, which may exist in tautomeric form as the compounds of formula (I-Ib) and formula (I-IIb)) at the CF₃-oxadiazole motif). This dynamic equilibrium may be important for the biological activity of the compounds of Formula (I). The designations R¹, R², R³, R⁴, R⁵, R⁶, Z (including Z¹, Z², Z³), R^z (R⁷, including as defined by R^{7a}, R^{7b}, R^{7c}, R^{7d}, R^{7e}, R^{7f}, R^{7g}) and R⁸ with reference to the compounds of formula (I) of the present invention, apply generally to the compounds of Formula (I-Ia), Formula (I-IIa), Formula (I-Ib), and Formula (I-IIb), as do the specific disclosures of combinations of R¹, R², R³, R⁴, R⁵, R⁶, Z (including Z¹, Z², Z³), R^z (R⁷, including as defined by R^{7a}, R^{7b}, R^{7c}, R^{7d}, R^{7e}, R^{7f}, R^{7g}) and R⁸ as represented in the compounds of Tables 1.1A to 1.8A, Tables 1.1B to 1.8B, Tables 2.1A to 2.3A, Tables 2.1B to 2.3B, or in the compounds 1.1 to 1.10 described in Table T1 (below) or a compound 2.1 to 2.80 described in Table T2 (below).

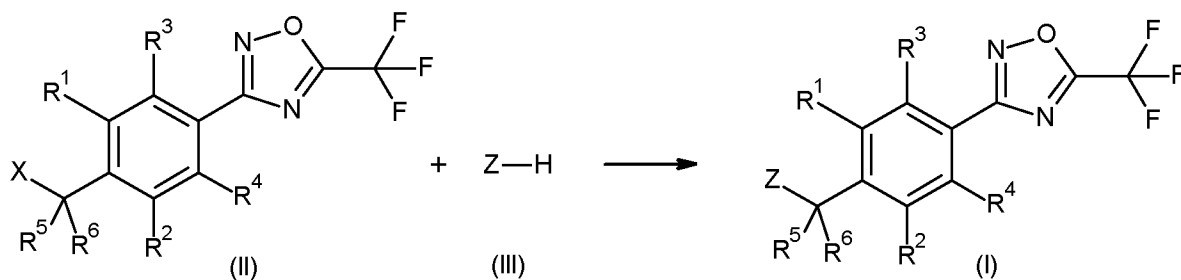
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Compounds of the present invention can be made as shown in the following schemes 1 to 12, in which, unless otherwise stated, the definition of each variable is as defined above for a compound of formula (I).

Compounds of formula (I) can be prepared from compounds of formula (II), wherein X is a halogen, preferably Cl, Br or I, via treatment with compounds of formula (III), in the presence of a base (e.g. K₂CO₃, Cs₂CO₃, or NaH) in a suitable solvent (e.g. dimethylformamide or tetrahydrofuran) at a temperature between 25°C and 110°C. In some cases, a better reaction performance may be gained from the use of a catalyst (eg, NaI or 4-dimethylaminopyridine) and with microwave irradiation. For

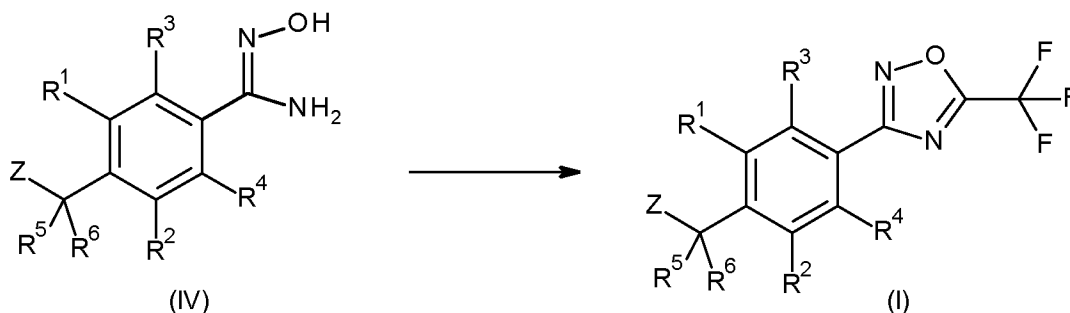
related examples, see: WO 2013/132253 and Garcia, M. *et al Org. Biomol. Chem.* (2004), 11, 1633. This reaction is shown in Scheme 1.



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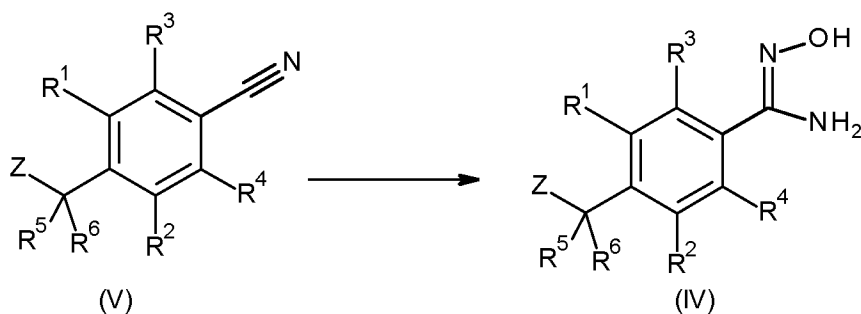
Scheme 1

Additionally, compounds of formula (I) can be prepared from compounds of formula (IV) by treatment with trifluoroacetic fluoride, trifluoroacetic chloride, trifluoroacetic anhydride optionally in the presence of a base (eg, pyridine or 4-dimethylaminopyridine) in a suitable solvent, such as tetrahydrofuran or ethanol, at a temperature between 25°C and 75°C. For related examples, see WO 2003/028729 and WO 2010/045251. This reaction is shown in Scheme 2.



Scheme 2

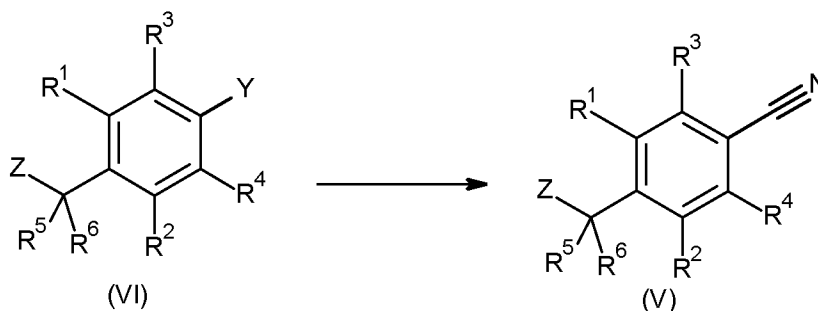
15 Compounds of formula (IV) can be prepared from compounds of formula (V) by treatment with a hydroxylamine hydrochloride salt in the presence of a base, such as triethylamine, in a suitable solvent, such as methanol, at a temperature between 0°C and 100°C. For related examples, see Kitamura, S. *et al Chem. Pharm. Bull.* (2001), 49, 268 and WO 2013/066838. This reaction is shown in Scheme 3.



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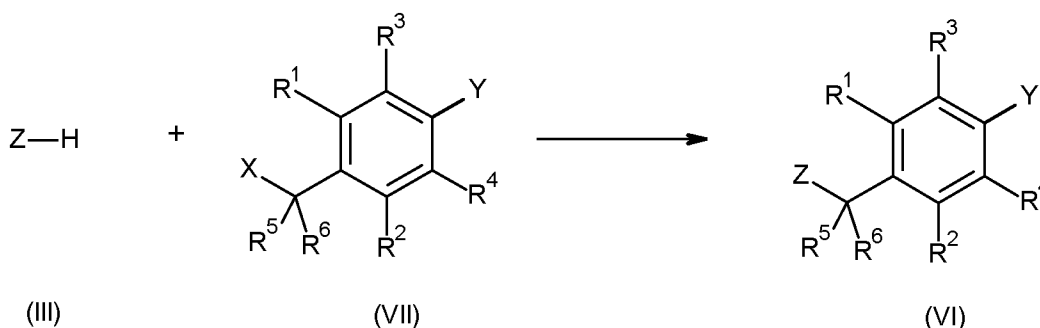
Scheme 3

Compounds of formula (V) can be prepared from compounds of formula (VI), wherein Y is Br or I, via metal-promoted reaction with a suitable cyanide reagent, such as Pd(0)/Zn(CN)₂ or CuCN, in a suitable solvent (eg, dimethylformamide or N-methylpyrrolidone) at elevated temperature between 100°C and 120°C. For related examples, see US 2007/0155739 and WO 2009/022746. This reaction is shown in Scheme 4.



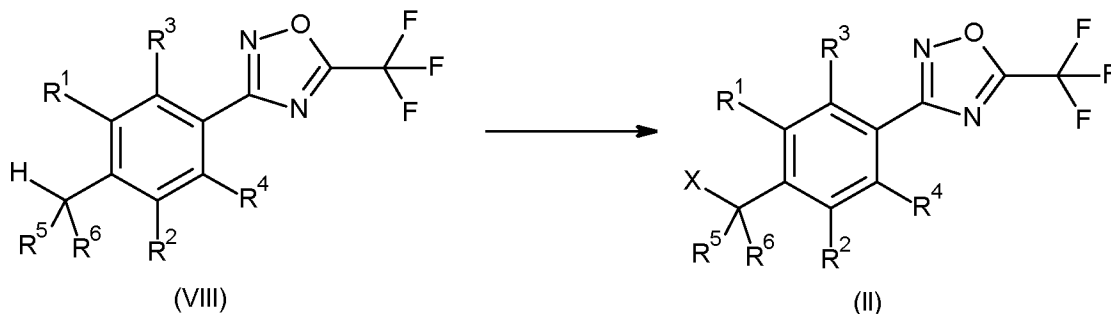
Scheme 4

Compounds of formula (VI) wherein Y is Br, I or CN, can be prepared from compounds of formula (VII), wherein X is a halogen, preferably Cl, Br or I, via treatment with compounds of formula (III), in the presence of a base (e.g. K₂CO₃, Cs₂CO₃, or NaH) in a suitable solvent (e.g. dimethylformamide or tetrahydrofuran) at a temperature between 25°C and 110°C. In some cases, a better reaction performance may be gained from the use of a catalyst (eg, NaI or 4-dimethylaminopyridine) and with microwave irradiation. For related examples, see: WO 2013/132253 and Garcia, M. *et al Org. Biomol. Chem.* (2004), 11, 1633. This reaction is shown in Scheme 5.



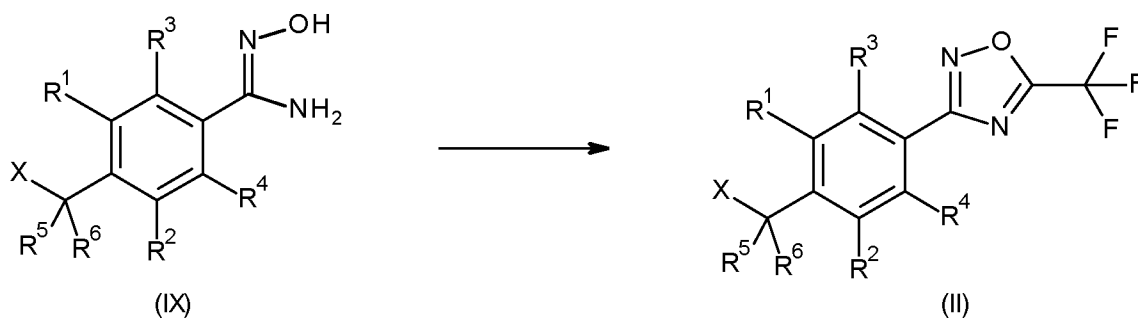
Scheme 5

Compounds of formula (II), wherein X is Cl or Br, can be prepared from compounds of formula (VIII) by treatment with a halogen source (eg, N-bromosuccinimide (NBS) or N-chlorosuccinimide (NCS)) and a radical initiator (eg, (PhCO₂)₂ or azobisisobutyronitrile (AIBN)) in a suitable solvent, such as tetrachloromethane, at temperatures between 55° and 100°C in the presence of ultraviolet light. For related examples, see Liu, S. *et al Synthesis* (2001), 14, 2078 and Kompella, A. *et al Org. Proc. Res. Dev.* (2012), 16, 1794. This reaction is shown in Scheme 6.



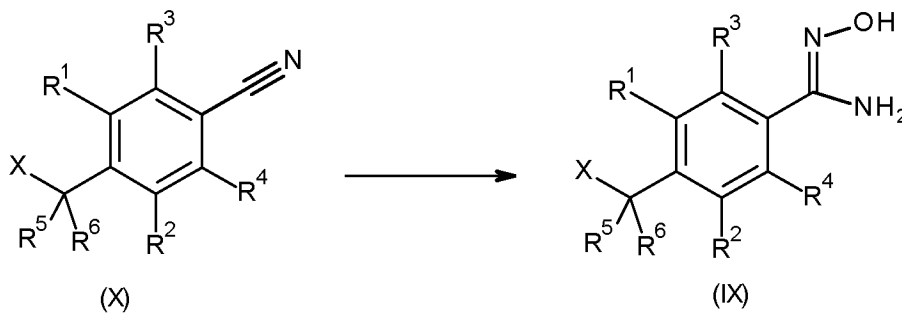
Scheme 6

Alternatively, compounds of formula (II) can be prepared from compounds of formula (IX) by treatment with trifluoroacetic chloride, trifluoroacetic fluoride, or trifluoroacetic anhydride optionally in the presence of a base (eg, pyridine or 4-dimethylaminopyridine) in a suitable solvent, such as tetrahydrofuran or ethanol, at a temperature between 25°C and 75°C. For related examples, see WO 2003/028729 and WO 2010/045251. This reaction is shown in Scheme 7.



Scheme 7

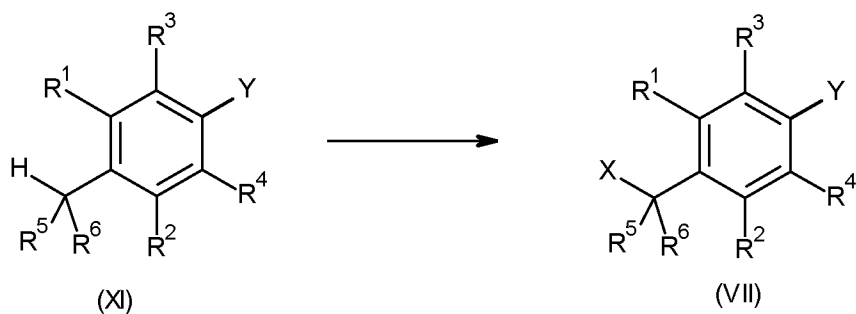
Compounds of formula (IX) can be prepared from compounds of formula (X) by treatment with a hydroxylamine hydrochloride salt in the presence of a base, such as triethylamine, in a suitable solvent, such as methanol, at a temperature between 0°C and 100°C. For related examples, see Kitamura, S. *et al Chem. Pharm. Bull.* (2001), 49, 268 and WO 2013/066838. This reaction is shown in Scheme 8.



Scheme 8

Compounds of formula (VII), wherein Y is Br, I or CN and X is Cl, Br or I, are either commercially available or can be prepared from compounds of formula (XI), by treatment with a halogen source, (eg, N-bromosuccinimide (NBS) or N-chlorosuccinimide (NCS)) and a radical initiator, such as (PhCO₂)₂ or

azobisisobutyronitrile (AIBN), in the presence of ultraviolet light, in a suitable solvent, such as tetrachloromethane, at temperatures between 55°C and 100°C. For related examples, see Liu, S. *et al Synthesis* (2001), 14, 2078 and Kompella, A. *et al Org. Proc. Res. Dev.* (2012), 16, 1794. This reaction is shown in Scheme 9.

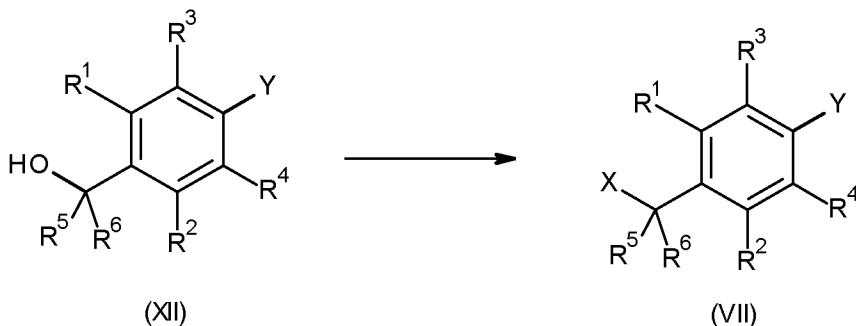


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Scheme 9

Alternatively, compounds of formula (VII), wherein X is Cl, Br, I or OSO₂Me and Y is Br, I or CN, are either commercially available or can be prepared from compounds of formula (XII), by treatment with a halogen source (eg, CCl₃Br, CCl₄ or I₂) in the presence of triphenylphosphine, or with methanesulfonyl chloride (ClSO₂Me), in a suitable solvent, (eg, dichloromethane) at a temperature between 0°C and 100°C. For related examples, see Liu, H. *et al Bioorg. Med. Chem.* (2008), 16, 10013, WO 2014/020350 and Kompella, A. *et al Bioorg. Med. Chem. Lett.* (2001), 1, 3161. Compounds of formula (XII) are commercially available. This reaction is shown in Scheme 10.

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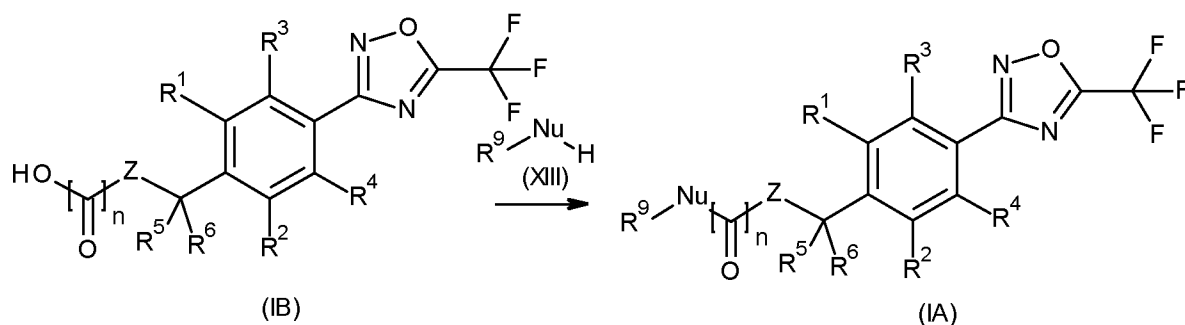
Scheme 10

The compounds of formula (IA), wherein Z represents Z¹, Z², or Z³ and R⁹-Nu-H represents HOR^{7c}, HOR^{7f}, HN(R^{7a})R^{7b}, or HN(R^{7d})R^{7e}, can be obtained by an amide coupling transformation with compounds of formula (IB) and nucleophiles of formula (XIII), by activating the carboxylic acid function of the compounds of formula (IB), a process that usually takes place by converting the -OH of the carboxylic acid into a good leaving group, such as a chloride group, for example by using (COCl)₂ or SOCl₂, prior to treatment with the nucleophiles of formula (XIII), preferably in a suitable solvent (eg, dimethylformamide, dichloromethane or tetrahydrofuran), preferably at a temperature of between 25°C and 100°C, and optionally in the presence of a base such as triethylamine or *N,N*-diisopropylethylamine, or under conditions described in the literature for an ester or amide coupling. For examples, see WO 2003/028729. Compounds of formula (XIII) are commercially available or prepared using known

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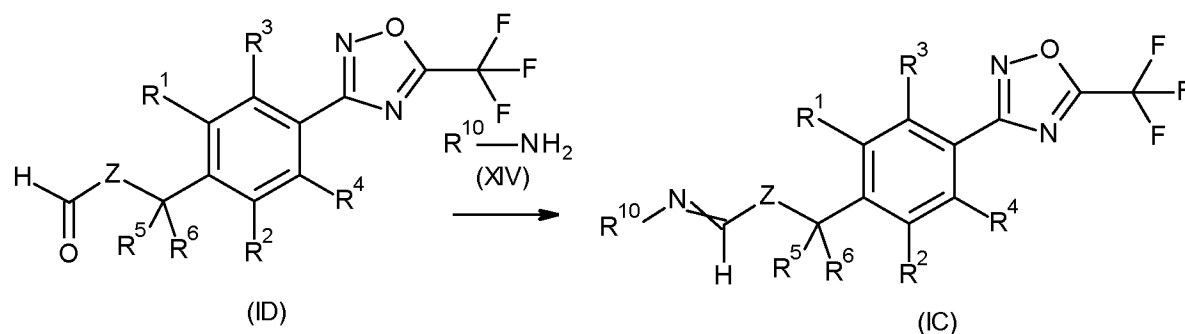
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methods. For related examples, see: Nelson, T. D *et al Tetrahedron Lett.* (2004), 45, 8917; Senthil, K. *et al Pest. Res. Journal* (2009), 21, 133; and Crich, D., Zou, Y. *J. Org. Chem.* (2005), 70, 3309. This reaction is shown in Scheme 11.



Scheme 11

10 Compounds of formula (IC), wherein Z represents Z¹, Z², or Z³, can be prepared from formyl compounds of formula (ID) via condensation with amines of formula (XIV) in the presence of a base, such as triethylamine, in a suitable solvent (eg, dichloromethane or tetrahydrofuran) at temperatures between 0°C and 50°C. This is shown in Scheme 12.



Scheme 12

As already indicated, surprisingly, it has now been found that the compounds of Formula (I) of the present invention have, for practical purposes, a very advantageous level of biological activity for protecting plants against diseases that are caused by fungi.

20 The compounds of Formula (I) can be used in the agricultural sector and related fields of use, e.g., as active ingredients for controlling plant pests or on non-living materials for the control of spoilage microorganisms or organisms potentially harmful to man. The novel compounds are distinguished by excellent activity at low rates of application, by being well tolerated by plants and by being environmentally safe. They have very useful curative, preventive and systemic properties and can be used for protecting numerous cultivated plants. The compounds of Formula (I) can be used to inhibit or
 25 destroy the pests that occur on plants or parts of plants (fruit, blossoms, leaves, stems, tubers, roots) of different crops of useful plants, while at the same time protecting also those parts of the plants that grow later, e.g., from phytopathogenic microorganisms.

The present invention further relates to a method for controlling or preventing infestation of plants or plant propagation material and/or harvested food crops susceptible to microbial attack by treating plants or plant propagation material and/or harvested food crops wherein an effective amount a compound of Formula (I) is applied to the plants, to parts thereof or the locus thereof.

It is also possible to use compounds of Formula (I) as a fungicide. The term "fungicide" as used herein means a compound that controls, modifies, or prevents the growth of fungi. The term "fungicidally effective amount" where used means the quantity of such a compound or combination of such compounds that is capable of producing an effect on the growth of fungi. Controlling or modifying effects include all deviation from natural development, such as killing, retardation and the like, and prevention includes barrier or other defensive formation in or on a plant to prevent fungal infection.

It may also be possible to use compounds of Formula (I) as dressing agents for the treatment of plant propagation material, e.g., seed, such as fruits, tubers or grains, or plant cuttings, for the protection against fungal infections as well as against phytopathogenic fungi occurring in the soil. The propagation material can be treated with a composition comprising a compound of Formula (I) before planting: seed, for example, can be dressed before being sown. The active compounds of Formula (I) can also be applied to grains (coating), either by impregnating the seeds in a liquid formulation or by coating them with a solid formulation. The composition can also be applied to the planting site when the propagation material is being planted, for example, to the seed furrow during sowing. The invention relates also to such methods of treating plant propagation material and to the plant propagation material so treated.

Furthermore, the compounds of Formula (I) can be used for controlling fungi in related areas, for example in the protection of technical materials, including wood and wood related technical products, in food storage, in hygiene management.

In addition, the invention could be used to protect non-living materials from fungal attack, e.g. lumber, wall boards and paint.

The compounds of Formula (I) are for example, effective against fungi and fungal vectors of disease as well as phytopathogenic bacteria and viruses. These fungi and fungal vectors of disease as well as phytopathogenic bacteria and viruses are for example:

Absidia corymbifera, *Alternaria* spp, *Aphanomyces* spp, *Ascochyta* spp, *Aspergillus* spp. including *A. flavus*, *A. fumigatus*, *A. nidulans*, *A. niger*, *A. terreus*, *Aureobasidium* spp. including *A. pullulans*, *Blastomyces dermatitidis*, *Blumeria graminis*, *Bremia lactucae*, *Botryosphaeria* spp. including *B. dothidea*, *B. obtusa*, *Botrytis* spp. including *B. cinerea*, *Candida* spp. including *C. albicans*, *C. glabrata*, *C. krusei*, *C. lusitaniae*, *C. parapsilosis*, *C. tropicalis*, *Cephaloascus fragrans*, *Ceratocystis* spp, *Cercospora* spp. including *C. arachidicola*, *Cercosporidium personatum*, *Cladosporium* spp,

Claviceps purpurea, Coccidioides immitis, Cochliobolus spp, Colletotrichum spp. including *C. musae*,
 Cryptococcus neoformans, Diaporthe spp, Didymella spp, Drechslera spp, Elsinoe
 spp, Epidermophyton spp, Erwinia amylovora, Erysiphe spp. including *E. cichoracearum*, Eutypa lata,
 Fusarium spp. including *F. culmorum*, *F. graminearum*, *F. langsethiae*, *F. moniliforme*, *F. oxysporum*,
 5 *F. proliferatum*, *F. subglutinans*, *F. solani*, Gaeumannomyces graminis, Gibberella fujikuroi, Gloeodes
 pomigena, Gloeosporium musarum, Glomerella cingulate, Guignardia bidwellii, Gymnosporangium
 juniperi-virginianae, Helminthosporium spp, Hemileia spp, Histoplasma spp. including *H. capsulatum*,
 Laetisaria fuciformis, Leptographium lindbergi, Leveillula taurica, Lophodermium seditiosum,
 Microdochium nivale, Microsporium spp, Monilinia spp, Mucor spp, Mycosphaerella spp. including *M.*
 10 *graminicola*, *M. pomi*, Oncobasidium theobromaeon, Ophiostoma piceae, Paracoccidioides spp,
 Penicillium spp. including *P. digitatum*, *P. italicum*, Petriellidium spp, Peronosclerospora spp. Including
P. maydis, *P. philippinensis* and *P. sorghi*, Peronospora spp, Phaeosphaeria nodorum, Phakopsora
 pachyrhizi, Phellinus igniarius, Phialophora spp, Phoma spp, Phomopsis viticola, Phytophthora spp.
 including *P. infestans*, Plasmopara spp. including *P. halstedii*, *P. viticola*, Pleospora spp., Podosphaera
 15 spp. including *P. leucotricha*, Polymyxa graminis, Polymyxa betae, Pseudocercospora
 herpotrichoides, Pseudomonas spp, Pseudoperonospora spp. including *P. cubensis*, *P. humuli*,
 Pseudopeziza tracheiphila, Puccinia Spp. including *P. hordei*, *P. recondita*, *P. striiformis*, *P. triticina*,
 Pyrenopeziza spp, Pyrenophora spp, Pyricularia spp. including *P. oryzae*, Pythium spp. including *P.*
 20 *ultimum*, Ramularia spp, Rhizoctonia spp, Rhizomucor pusillus, Rhizopus arrhizus, Rhynchosporium
 spp, Scedosporium spp. including *S. apiospermum* and *S. prolificans*, Schizothyrium pomi, Sclerotinia
 spp, Sclerotium spp, Septoria spp, including *S. nodorum*, *S. tritici*, Sphaerotheca macularis,
 Sphaerotheca fusca (*Sphaerotheca fuliginea*), Sporothrix spp, Stagonospora nodorum, Stemphylium
 spp., Stereum hirsutum, Thanatephorus cucumeris, Thielaviopsis basicola, Tilletia spp, Trichoderma
 spp. including *T. harzianum*, *T. pseudokoningii*, *T. viride*, Trichophyton spp, Typhula spp, Uncinula
 25 necator, Urocystis spp, Ustilago spp, Venturia spp. including *V. inaequalis*, Verticillium spp, and
 Xanthomonas spp.

The compounds of Formula (I) may be used for example on turf, ornamentals, such as flowers,
 shrubs, broad-leaved trees or evergreens, for example conifers, as well as for tree injection, pest
 30 management and the like.

Within the scope of present invention, target crops and/or useful plants to be protected typically
 comprise perennial and annual crops, such as berry plants for example blackberries, blueberries,
 cranberries, raspberries and strawberries; cereals for example barley, maize (corn), millet, oats, rice,
 rye, sorghum triticales and wheat; fibre plants for example cotton, flax, hemp, jute and sisal; field crops
 35 for example sugar and fodder beet, coffee, hops, mustard, oilseed rape (canola), poppy, sugar cane,
 sunflower, tea and tobacco; fruit trees for example apple, apricot, avocado, banana, cherry, citrus,
 nectarine, peach, pear and plum; grasses for example Bermuda grass, bluegrass, bentgrass, centipede
 grass, fescue, ryegrass, St. Augustine grass and Zoysia grass; herbs such as basil, borage, chives,
 coriander, lavender, lovage, mint, oregano, parsley, rosemary, sage and thyme; legumes for example
 40 beans, lentils, peas and soya beans; nuts for example almond, cashew, ground nut, hazelnut, peanut,

pecan, pistachio and walnut; palms for example oil palm; ornamentals for example flowers, shrubs and trees; other trees, for example cacao, coconut, olive and rubber; vegetables for example asparagus, aubergine, broccoli, cabbage, carrot, cucumber, garlic, lettuce, marrow, melon, okra, onion, pepper, potato, pumpkin, rhubarb, spinach and tomato; and vines for example grapes.

5 The term "useful plants" is to be understood as also including useful plants that have been rendered tolerant to herbicides like bromoxynil or classes of herbicides (such as, for example, HPPD inhibitors, ALS inhibitors, for example primisulfuron, prosulfuron and trifloxysulfuron, EPSPS (5-enol-pyrovyl-shikimate-3-phosphate-synthase) inhibitors, GS (glutamine synthetase) inhibitors or PPO (protoporphyrinogen-oxidase) inhibitors) as a result of conventional methods of breeding or genetic
10 engineering. An example of a crop that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding (mutagenesis) is Clearfield® summer rape (Canola). Examples of crops that have been rendered tolerant to herbicides or classes of herbicides by genetic engineering methods include glyphosate- and glufosinate-resistant maize varieties commercially available under the trade names RoundupReady®, Herculex I® and LibertyLink®.

15 The term "useful plants" is to be understood as also including useful plants which have been so transformed by the use of recombinant DNA techniques that they are capable of synthesising one or more selectively acting toxins, such as are known, for example, from toxin-producing bacteria, especially those of the genus *Bacillus*.

 Examples of such plants are: YieldGard® (maize variety that expresses a CryIA(b) toxin);
20 YieldGard Rootworm® (maize variety that expresses a CryIIIB(b1) toxin); YieldGard Plus® (maize variety that expresses a CryIA(b) and a CryIIIB(b1) toxin); Starlink® (maize variety that expresses a Cry9(c) toxin); Herculex I® (maize variety that expresses a CryIF(a2) toxin and the enzyme phosphinothricine N-acetyltransferase (PAT) to achieve tolerance to the herbicide glufosinate ammonium); NuCOTN 33B® (cotton variety that expresses a CryIA(c) toxin); Bollgard I® (cotton variety
25 that expresses a CryIA(c) toxin); Bollgard II® (cotton variety that expresses a CryIA(c) and a CryIIA(b) toxin); VIPCOT® (cotton variety that expresses a VIP toxin); NewLeaf® (potato variety that expresses a CryIIIA toxin); NatureGard® Agrisure® GT Advantage (GA21 glyphosate-tolerant trait), Agrisure® CB Advantage (Bt11 corn borer (CB) trait), Agrisure® RW (corn rootworm trait) and Protecta®.

30 The term "crops" is to be understood as including also crop plants which have been so transformed by the use of recombinant DNA techniques that they are capable of synthesising one or more selectively acting toxins, such as are known, for example, from toxin-producing bacteria, especially those of the genus *Bacillus*.

 Toxins that can be expressed by such transgenic plants include, for example, insecticidal proteins from *Bacillus cereus* or *Bacillus popilliae*; or insecticidal proteins from *Bacillus thuringiensis*,
35 such as δ -endotoxins, e.g. Cry1Ab, Cry1Ac, Cry1F, Cry1Fa2, Cry2Ab, Cry3A, Cry3Bb1 or Cry9C, or vegetative insecticidal proteins (Vip), e.g. Vip1, Vip2, Vip3 or Vip3A; or insecticidal proteins of bacteria colonising nematodes, for example *Photorhabdus* spp. or *Xenorhabdus* spp., such as *Photorhabdus luminescens*, *Xenorhabdus nematophilus*; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins and other insect-specific neurotoxins; toxins produced by fungi, such as

Streptomyces toxins, plant lectins, such as pea lectins, barley lectins or snowdrop lectins; agglutinins; proteinase inhibitors, such as trypsin inhibitors, serine protease inhibitors, patatin, cystatin, papain inhibitors; ribosome-inactivating proteins (RIP), such as ricin, maize-RIP, abrin, luffin, saporin or bryodin; steroid metabolism enzymes, such as 3-hydroxysteroidoxidase, ecdysteroid-UDP-glycosyl-
5 transferase, cholesterol oxidases, ecdysone inhibitors, HMG-COA-reductase, ion channel blockers, such as blockers of sodium or calcium channels, juvenile hormone esterase, diuretic hormone receptors, stilbene synthase, bibenzyl synthase, chitinases and glucanases.

Further, in the context of the present invention there are to be understood by δ -endotoxins, for example Cry1Ab, Cry1Ac, Cry1F, Cry1Fa2, Cry2Ab, Cry3A, Cry3Bb1 or Cry9C, or vegetative
10 insecticidal proteins (Vip), for example Vip1, Vip2, Vip3 or Vip3A, expressly also hybrid toxins, truncated toxins and modified toxins. Hybrid toxins are produced recombinantly by a new combination of different domains of those proteins (see, for example, WO 02/15701). Truncated toxins, for example a truncated Cry1Ab, are known. In the case of modified toxins, one or more amino acids of the naturally occurring toxin are replaced. In such amino acid replacements, preferably non-naturally present protease
15 recognition sequences are inserted into the toxin, such as, for example, in the case of Cry3A055, a cathepsin-G-recognition sequence is inserted into a Cry3A toxin (see WO 03/018810).

Examples of such toxins or transgenic plants capable of synthesising such toxins are disclosed, for example, in EP-A-0 374 753, WO93/07278, WO95/34656, EP-A-0 427 529, EP-A-451 878 and WO
20 03/052073.

The processes for the preparation of such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. CryI-type deoxyribonucleic acids and their preparation are known, for example, from WO 95/34656, EP-A-0 367
474, EP-A-0 401 979 and WO 90/13651.

The toxin contained in the transgenic plants imparts to the plants tolerance to harmful insects.
25 Such insects can occur in any taxonomic group of insects, but are especially commonly found in the beetles (Coleoptera), two-winged insects (Diptera) and butterflies (Lepidoptera).

Transgenic plants containing one or more genes that code for an insecticidal resistance and express one or more toxins are known and some of them are commercially available. Examples of such
30 plants are: YieldGard® (maize variety that expresses a Cry1Ab toxin); YieldGard Rootworm® (maize variety that expresses a Cry3Bb1 toxin); YieldGard Plus® (maize variety that expresses a Cry1Ab and a Cry3Bb1 toxin); Starlink® (maize variety that expresses a Cry9C toxin); Herculex I® (maize variety that expresses a Cry1Fa2 toxin and the enzyme phosphinothricine N-acetyltransferase (PAT) to achieve tolerance to the herbicide glufosinate ammonium); NuCOTN 33B® (cotton variety that
35 expresses a Cry1Ac toxin); Bollgard I® (cotton variety that expresses a Cry1Ac toxin); Bollgard II® (cotton variety that expresses a Cry1Ac and a Cry2Ab toxin); VipCot® (cotton variety that expresses a Vip3A and a Cry1Ab toxin); NewLeaf® (potato variety that expresses a Cry3A toxin); NatureGard®, Agrisure® GT Advantage (GA21 glyphosate-tolerant trait), Agrisure® CB Advantage (Bt11 corn borer (CB) trait) and Protecta®.

Further examples of such transgenic crops are:

- 5 1. **Bt11 Maize** from Syngenta Seeds SAS, Chemin de l'Hobit 27, F-31 790 St. Sauveur, France, registration number C/FR/96/05/10. Genetically modified *Zea mays* which has been rendered resistant to attack by the European corn borer (*Ostrinia nubilalis* and *Sesamia nonagrioides*) by transgenic expression of a truncated Cry1Ab toxin. Bt11 maize also transgenically expresses the enzyme PAT to achieve tolerance to the herbicide glufosinate ammonium.
- 10 2. **Bt176 Maize** from Syngenta Seeds SAS, Chemin de l'Hobit 27, F-31 790 St. Sauveur, France, registration number C/FR/96/05/10. Genetically modified *Zea mays* which has been rendered resistant to attack by the European corn borer (*Ostrinia nubilalis* and *Sesamia nonagrioides*) by transgenic expression of a Cry1Ab toxin. Bt176 maize also transgenically expresses the enzyme PAT to achieve tolerance to the herbicide glufosinate ammonium.
- 15 3. **MIR604 Maize** from Syngenta Seeds SAS, Chemin de l'Hobit 27, F-31 790 St. Sauveur, France, registration number C/FR/96/05/10. Maize which has been rendered insect-resistant by transgenic expression of a modified Cry3A toxin. This toxin is Cry3A055 modified by insertion of a cathepsin-G-protease recognition sequence. The preparation of such transgenic maize plants is described in WO
20 03/018810.
- 25 4. **MON 863 Maize** from Monsanto Europe S.A. 270-272 Avenue de Tervuren, B-1150 Brussels, Belgium, registration number C/DE/02/9. MON 863 expresses a Cry3Bb1 toxin and has resistance to certain Coleoptera insects.
5. **IPC 531 Cotton** from Monsanto Europe S.A. 270-272 Avenue de Tervuren, B-1150 Brussels, Belgium, registration number C/ES/96/02.
- 30 6. **1507 Maize** from Pioneer Overseas Corporation, Avenue Tedesco, 7 B-1160 Brussels, Belgium, registration number C/NL/00/10. Genetically modified maize for the expression of the protein Cry1F for achieving resistance to certain Lepidoptera insects and of the PAT protein for achieving tolerance to the herbicide glufosinate ammonium.
- 35 7. **NK603 × MON 810 Maize** from Monsanto Europe S.A. 270-272 Avenue de Tervuren, B-1150 Brussels, Belgium, registration number C/GB/02/M3/03. Consists of conventionally bred hybrid maize varieties by crossing the genetically modified varieties NK603 and MON 810. NK603 × MON 810 Maize transgenically expresses the protein CP4 EPSPS, obtained from *Agrobacterium sp.* strain CP4, which imparts tolerance to the herbicide Roundup® (contains glyphosate), and also a Cry1Ab toxin obtained from *Bacillus thuringiensis subsp. kurstaki* which brings about tolerance to certain Lepidoptera, include
40 the European corn borer.

The compounds of Formula (I) (including any one of compounds 1.1 to 1.10 described in Table T1 (below) or compounds 2.1 to 2.80 described in Table T2 (below)) according to the present invention may be used in controlling or preventing phytopathogenic diseases, especially phytopathogenic fungi (such as *Phakopsora pachyrhizi*) on soy bean plants.

5 In particular, transgenic soybean plants expressing toxins, for example insecticidal proteins such as delta-endotoxins, e.g. Cry1Ac (Cry1Ac Bt protein). Accordingly, this may include transgenic soybean plants comprising event MON87701 (see U.S. Patent No. 8,049,071 and related applications and patents, as well as WO 2014/170327 A1 (eg, see paragraph [008] reference to Intacta RR2 PRO™ soybean)), event MON87751 (US. Patent Application Publication No. 2014/0373191) or event DAS-
10 81419 (U.S. Patent No. 8632978 and related applications and patents).

Other transgenic soybean plants may comprise event SYHT0H2 - HPPD tolerance (U.S. Patent Application Publication No. 2014/0201860 and related applications and patents), event MON89788 - glyphosate tolerance (U.S. Pat. No. 7,632,985 and related applications and patents), event MON87708 - dicamba tolerance (U.S. Patent Application Publication No. US 2011/0067134 and related applications
15 and patents), event DP-356043-5 - glyphosate and ALS tolerance (U.S. Patent Application Publication No. US 2010/0184079 and related applications and patents), event A2704-12 - glufosinate tolerance (U.S. Patent Application Publication No. US 2008/0320616 and related applications and patents), event DP-305423-1 - ALS tolerance (U.S. Patent Application Publication No. US 2008/0312082 and related applications and patents), event A5547-127 - glufosinate tolerance (U.S. Patent Application Publication
20 No. US 2008/0196127 and related applications and patents), event DAS-40278-9 - tolerance to 2,4-dichlorophenoxyacetic acid and aryloxyphenoxypropionate (see WO 2011/022469, WO 2011/022470, WO 2011/022471, and related applications and patents), event 127 - ALS tolerance (WO 2010/080829 and related applications and patents), event GTS 40-3-2 - glyphosate tolerance, event DAS-68416-4-2,4-dichlorophenoxyacetic acid and glufosinate tolerance, event FG72 - glyphosate and isoxaflutole
25 tolerance, event BPS-CV127-9 - ALS tolerance and GU262 - glufosinate tolerance or event SYHT04R - HPPD tolerance.

Under certain circumstances, compounds of Formula (I) according to the present invention when used in controlling or preventing phytopathogenic diseases, especially phytopathogenic fungi (such as *Phakopsora pachyrhizi*) on soy bean plants (in particular any of the transgenic soybean plants as
30 described above), may display a synergistic interaction between the active ingredients.

Additionally, to date, no cross-resistance has been observed between the compounds of Formula (I) (including any one of compounds 1.1 to 1.10 described in Table T1 (below) or compounds 2.1 to 2.80 described in Table T2 (below)) and the current fungicidal solutions used to control *Phakopsora pachyrhizi*.
35

Indeed, fungicidal-resistant strains of *Phakopsora pachyrhizi* have been reported in the scientific literature, with strains resistant to one or more fungicides from at least each of the following fungicidal mode of action classes being observed: sterol demethylation-inhibitors (DMI), quinone-outside-inhibitors (QoI) and succinate dehydrogenase inhibitors (SDHI). See for example: "Sensitivity of
40 *Phakopsora pachyrhizi* towards quinone-outside-inhibitors and demethylation-inhibitors, and

corresponding resistance mechanisms.” Schmitz HK *et al*, *Pest Manag Sci* (2014) 70: 378-388; “First detection of a SDH variant with reduced SDHI sensitivity in *Phakopsora pachyrhizi*” Simões K *et al*, *J Plant Dis Prot* (2018) 125: 21-2; “Competitive fitness of *Phakopsora pachyrhizi* isolates with mutations in the CYP51 and CYTB genes.” Klosowski AC *et al*, *Phytopathology* (2016) 106: 1278-1284; “Detection of the F129L mutation in the cytochrome b gene in *Phakopsora pachyrhizi*.” Klosowski AC *et al*, *Pest Manag Sci* (2016) 72: 1211-1215.

Thus, in a preferred embodiment, the compounds of Formula (I) (including any one of compounds 1.1 to 1.10 described in Table T1 (below) or compounds 2.1 to 2.80 described in Table T2 (below)), or fungicidal compositions according to the present invention comprising a compound of Formula (I), are used to control *Phakopsora pachyrhizi* which are resistant to one or more fungicides from any of the following fungicidal MoA classes: sterol demethylation-inhibitors (DMI), quinone-oxidoreductase-inhibitors (QoI) and succinate dehydrogenase inhibitors (SDHI).

The compounds of Formula (I) (including any one of compounds 1.1 to 1.10 described in Table T1 (below) or compounds 2.1 to 2.80 described in Table T2 (below)) or fungicidal compositions according to the present invention comprising a compound of Formula (I) may be used in controlling or preventing phytopathogenic diseases, especially phytopathogenic fungi (such as *Phakopsora pachyrhizi*) on soy bean plants. In particular, there are known in the scientific literature certain Elite soybean plant varieties where R-gene stacks, conferring a degree of immunity or resistance to specific *Phakopsora pachyrhizi*, have been introgressed in the plant genome, see for example: “*Fighting Asian Soybean Rust*”, Langenbach C, *et al*, *Front Plant Science* 7(797) 2016).

An elite plant is any plant from an elite line, such that an elite plant is a representative plant from an elite variety. Non-limiting examples of elite soybean varieties that are commercially available to farmers or soybean breeders include: AG00802, A0868, AG0902, A1923, AG2403, A2824, A3704, A4324, A5404, AG5903, AG6202 AG0934; AG1435; AG2031; AG2035; AG2433; AG2733; AG2933; AG3334; AG3832; AG4135; AG4632; AG4934; AG5831; AG6534; and AG7231 (Asgrow Seeds, Des Moines, Iowa, USA); BPR0144RR, BPR 4077NRR and BPR 4390NRR (Bio Plant Research, Camp Point, Ill., USA); DKB17-51 and DKB37-51 (DeKalb Genetics, DeKalb, Ill., USA); DP 4546 RR, and DP 7870 RR (Delta & Pine Land Company, Lubbock, Tex., USA); JG 03R501, JG 32R606C ADD and JG 55R503C (JGL Inc., Greencastle, Ind., USA); NKS 13-K2 (NK Division of Syngenta Seeds, Golden Valley, Minnesota, USA); 90M01, 91M30, 92M33, 93M11, 94M30, 95M30, 97B52, P008T22R2; P16T17R2; P22T69R; P25T51R; P34T07R2; P35T58R; P39T67R; P47T36R; P46T21R; and P56T03R2 (Pioneer Hi-Bred International, Johnston, Iowa, USA); SG4771NRR and SG5161NRR/STS (Soygenetics, LLC, Lafayette, Ind., USA); S00-K5, S11-L2, S28-Y2, S43-B1, S53-A1, S76-L9, S78-G6, S0009-M2; S007-Y4; S04-D3; S14-A6; S20-T6; S21-M7; S26-P3; S28-N6; S30-V6; S35-C3; S36-Y6; S39-C4; S47-K5; S48-D9; S52-Y2; S58-Z4; S67-R6; S73-S8; and S78-G6 (Syngenta Seeds, Henderson, Ky., USA); Richer (Northstar Seed Ltd. Alberta, CA); 14RD62 (Stine Seed Co. Ia., USA); or Armor 4744 (Armor Seed, LLC, Ar., USA).

Thus, in a further preferred embodiment, the compounds of Formula (I) (including any one of compounds 1.1 to 1.10 described in Table T1 (below) or compounds 2.1 to 2.80 described in Table T2

(below)), or fungicidal compositions according to the present invention comprising a compound of Formula (I), are used to control *Phakopsora pachyrhizi*, (including fungicidally-resistant strains thereof, as outlined above) on Elite soybean plant varieties where R-gene stacks, conferring a degree of immunity or resistance to specific *Phakopsora pachyrhizi*, have been introgressed in the plant genome. Numerous benefits may be expected to ensue from said use, e.g. improved biological activity, an advantageous or broader spectrum of activity (inc. sensitive and resistant strains of *Phakopsora pachyrhizi*), an increased safety profile, improved crop tolerance, synergistic interactions or potentiating properties, improved onset of action or a longer lasting residual activity, a reduction in the number of applications and/or a reduction in the application rate of the compounds and compositions required for effective control of the phytopathogen (*Phakopsora pachyrhizi*), thereby enabling beneficial resistance-management practices, reduced environmental impact and reduced operator exposure.

The term "locus" as used herein means fields in or on which plants are growing, or where seeds of cultivated plants are sown, or where seed will be placed into the soil. It includes soil, seeds, and seedlings, as well as established vegetation.

The term "plants" refers to all physical parts of a plant, including seeds, seedlings, saplings, roots, tubers, stems, stalks, foliage, and fruits.

The term "plant propagation material" is understood to denote generative parts of the plant, such as seeds, which can be used for the multiplication of the latter, and vegetative material, such as cuttings or tubers, for example potatoes. There can be mentioned for example seeds (in the strict sense), roots, fruits, tubers, bulbs, rhizomes and parts of plants. Germinated plants and young plants which are to be transplanted after germination or after emergence from the soil, may also be mentioned. These young plants can be protected before transplantation by a total or partial treatment by immersion. Preferably "plant propagation material" is understood to denote seeds.

The compounds of Formula (I) may be used in unmodified form or, preferably, together with the adjuvants conventionally employed in the art of formulation. To this end they may be conveniently Formulated in known manner to emulsifiable concentrates, coatable pastes, directly sprayable or dilutable solutions or suspensions, dilute emulsions, wettable powders, soluble powders, dusts, granulates, and also encapsulations e.g. in polymeric substances. As with the type of the compositions, the methods of application, such as spraying, atomising, dusting, scattering, coating or pouring, are chosen in accordance with the intended objectives and the prevailing circumstances. The compositions may also contain further adjuvants such as stabilizers, antifoams, viscosity regulators, binders or tackifiers as well as fertilizers, micronutrient donors or other formulations for obtaining special effects.

Suitable carriers and adjuvants, e.g. for agricultural use, can be solid or liquid and are substances useful in formulation technology, e.g. natural or regenerated mineral substances, solvents, dispersants, wetting agents, tackifiers, thickeners, binders or fertilizers. Such carriers are for example described in WO 97/33890.

Suspension concentrates are aqueous formulations in which finely divided solid particles of the active compound are suspended. Such formulations include anti-settling agents and dispersing agents and may further include a wetting agent to enhance activity as well an anti-foam and a crystal growth

inhibitor. In use, these concentrates are diluted in water and normally applied as a spray to the area to be treated. The amount of active ingredient may range from 0.5% to 95% of the concentrate.

Wettable powders are in the form of finely divided particles which disperse readily in water or other liquid carriers. The particles contain the active ingredient retained in a solid matrix. Typical solid matrices include fuller's earth, kaolin clays, silicas and other readily wet organic or inorganic solids. Wettable powders normally contain from 5% to 95% of the active ingredient plus a small amount of wetting, dispersing or emulsifying agent.

Emulsifiable concentrates are homogeneous liquid compositions dispersible in water or other liquid and may consist entirely of the active compound with a liquid or solid emulsifying agent, or may also contain a liquid carrier, such as xylene, heavy aromatic naphthas, isophorone and other non-volatile organic solvents. In use, these concentrates are dispersed in water or other liquid and normally applied as a spray to the area to be treated. The amount of active ingredient may range from 0.5% to 95% of the concentrate.

Granular formulations include both extrudates and relatively coarse particles and are usually applied without dilution to the area in which treatment is required. Typical carriers for granular Formulations include sand, fuller's earth, attapulgite clay, bentonite clays, montmorillonite clay, vermiculite, perlite, calcium carbonate, brick, pumice, pyrophyllite, kaolin, dolomite, plaster, wood flour, ground corn cobs, ground peanut hulls, sugars, sodium chloride, sodium sulphate, sodium silicate, sodium borate, magnesia, mica, iron oxide, zinc oxide, titanium oxide, antimony oxide, cryolite, gypsum, diatomaceous earth, calcium sulphate and other organic or inorganic materials which absorb or which can be coated with the active compound. Granular Formulations normally contain 5% to 25% of active ingredients which may include surface-active agents such as heavy aromatic naphthas, kerosene and other petroleum fractions, or vegetable oils; and/or stickers such as dextrans, glue or synthetic resins.

Dusts are free-flowing admixtures of the active ingredient with finely divided solids such as talc, clays, flours and other organic and inorganic solids which act as dispersants and carriers.

Microcapsules are typically droplets or granules of the active ingredient enclosed in an inert porous shell which allows escape of the enclosed material to the surroundings at controlled rates. Encapsulated droplets are typically 1 to 50 microns in diameter. The enclosed liquid typically constitutes 50 to 95% of the weight of the capsule and may include solvent in addition to the active compound. Encapsulated granules are generally porous granules with porous membranes sealing the granule pore openings, retaining the active species in liquid form inside the granule pores. Granules typically range from 1 millimetre to 1 centimetre and preferably 1 to 2 millimetres in diameter. Granules are formed by extrusion, agglomeration or prilling, or are naturally occurring. Examples of such materials are vermiculite, sintered clay, kaolin, attapulgite clay, sawdust and granular carbon. Shell or membrane materials include natural and synthetic rubbers, cellulosic materials, styrene-butadiene copolymers, polyacrylonitriles, polyacrylates, polyesters, polyamides, polyureas, polyurethanes and starch xanthates.

Other useful formulations for agrochemical applications include simple solutions of the active ingredient in a solvent in which it is completely soluble at the desired concentration, such as acetone, alkylated naphthalenes, xylene and other organic solvents. Pressurised sprayers, wherein the active

ingredient is dispersed in finely-divided form as a result of vaporisation of a low boiling dispersant solvent carrier, may also be used.

Suitable agricultural adjuvants and carriers that are useful in formulating the compositions of the invention in the formulation types described above are well known to those skilled in the art.

5 Liquid carriers that can be employed include, for example, water, toluene, xylene, petroleum naphtha, crop oil, acetone, methyl ethyl ketone, cyclohexanone, acetic anhydride, acetonitrile, acetophenone, amyl acetate, 2-butanone, chlorobenzene, cyclohexane, cyclohexanol, alkyl acetates, diacetonolcohol, 1,2-dichloropropane, diethanolamine, p-diethylbenzene, diethylene glycol, diethylene glycol abietate, diethylene glycol butyl ether, diethylene glycol ethyl ether, diethylene glycol methyl ether, N,N-dimethyl formamide, dimethyl sulfoxide, 1,4-dioxane, dipropylene glycol, dipropylene glycol methyl ether, dipropylene glycol dibenzoate, diproxitol, alkyl pyrrolidinone, ethyl acetate, 2-ethyl hexanol, ethylene carbonate, 1,1,1-trichloroethane, 2-heptanone, alpha pinene, d-limonene, ethylene glycol, ethylene glycol butyl ether, ethylene glycol methyl ether, gamma-butyrolactone, glycerol, glycerol diacetate, glycerol monoacetate, glycerol triacetate, hexadecane, hexylene glycol, isoamyl acetate, 15 isobornyl acetate, isooctane, isophorone, isopropyl benzene, isopropyl myristate, lactic acid, laurylamine, mesityl oxide, methoxy-propanol, methyl isoamyl ketone, methyl isobutyl ketone, methyl laurate, methyl octanoate, methyl oleate, methylene chloride, m-xylene, n-hexane, n-octylamine, octadecanoic acid, octyl amine acetate, oleic acid, oleylamine, o-xylene, phenol, polyethylene glycol (PEG400), propionic acid, propylene glycol, propylene glycol monomethyl ether, p-xylene, toluene, 20 triethyl phosphate, triethylene glycol, xylene sulfonic acid, paraffin, mineral oil, trichloroethylene, perchloroethylene, ethyl acetate, amyl acetate, butyl acetate, methanol, ethanol, isopropanol, and higher molecular weight alcohols such as amyl alcohol, tetrahydrofurfuryl alcohol, hexanol, octanol, etc., ethylene glycol, propylene glycol, glycerine and N-methyl-2-pyrrolidinone. Water is generally the carrier of choice for the dilution of concentrates.

25 Suitable solid carriers include, for example, talc, titanium dioxide, pyrophyllite clay, silica, attapulgite clay, kieselguhr, chalk, diatomaceous earth, lime, calcium carbonate, bentonite clay, fuller's earth, cotton seed hulls, wheat flour, soybean flour, pumice, wood flour, walnut shell flour and lignin.

 A broad range of surface-active agents are advantageously employed in both said liquid and solid compositions, especially those designed to be diluted with carrier before application. These 30 agents, when used, normally comprise from 0.1% to 15% by weight of the formulation. They can be anionic, cationic, non-ionic or polymeric in character and can be employed as emulsifying agents, wetting agents, suspending agents or for other purposes. Typical surface active agents include salts of alkyl sulfates, such as diethanolammonium lauryl sulphate; alkylarylsulfonate salts, such as calcium dodecylbenzenesulfonate; alkylphenol-alkylene oxide addition products, such as nonylphenol-C.sub. 18 ethoxylate; alcohol-alkylene oxide addition products, such as tridecyl alcohol-C.sub. 16 ethoxylate; 35 soaps, such as sodium stearate; alkylnaphthalenesulfonate salts, such as sodium dibutylnaphthalenesulfonate; dialkyl esters of sulfosuccinate salts, such as sodium di(2-ethylhexyl) sulfosuccinate; sorbitol esters, such as sorbitol oleate; quaternary amines, such as lauryl trimethylammonium chloride; polyethylene glycol esters of fatty acids, such as polyethylene glycol

stearate; block copolymers of ethylene oxide and propylene oxide; and salts of mono and dialkyl phosphate esters.

Other adjuvants commonly utilized in agricultural compositions include crystallisation inhibitors, viscosity modifiers, suspending agents, spray droplet modifiers, pigments, antioxidants, foaming agents, anti-foaming agents, light-blocking agents, compatibilizing agents, antifoam agents, 5 sequestering agents, neutralising agents and buffers, corrosion inhibitors, dyes, odorants, spreading agents, penetration aids, micronutrients, emollients, lubricants and sticking agents.

In addition, further, other biocidally active ingredients or compositions may be combined with the compositions of the invention and used in the methods of the invention and applied simultaneously 10 or sequentially with the compositions of the invention. When applied simultaneously, these further active ingredients may be formulated together with the compositions of the invention or mixed in, for example, the spray tank. These further biocidally active ingredients may be fungicides, herbicides, insecticides, bactericides, acaricides, nematocides and/or plant growth regulators.

Pesticidal agents are referred to herein using their common name are known, for example, from 15 "The Pesticide Manual", 15th Ed., British Crop Protection Council 2009.

In addition, the compositions of the invention may also be applied with one or more systemically acquired resistance inducers ("SAR" inducer). SAR inducers are known and described in, for example, United States Patent No. US 6,919,298 and include, for example, salicylates and the commercial SAR inducer acibenzolar-S-methyl. 20

The compounds of Formula (I) are normally used in the form of agrochemical compositions and can be applied to the crop area or plant to be treated, simultaneously or in succession with further compounds. These further compounds can be e.g. fertilizers or micronutrient donors or other preparations, which influence the growth of plants. They can also be selective herbicides or non- 25 selective herbicides as well as insecticides, fungicides, bactericides, nematocides, molluscicides or mixtures of several of these preparations, if desired together with further carriers, surfactants or application promoting adjuvants customarily employed in the art of formulation.

The compounds of Formula (I) may be used in the form of (fungicidal) compositions for controlling or protecting against phytopathogenic microorganisms, comprising as active ingredient at 30 least one compound of Formula (I) or of at least one preferred individual compound as defined herein, in free form or in agrochemically usable salt form, and at least one of the above-mentioned adjuvants.

The invention therefore provides a composition, preferably a fungicidal composition, comprising at least one compound Formula (I) an agriculturally acceptable carrier and optionally an adjuvant. An agricultural acceptable carrier is for example a carrier that is suitable for agricultural use. Agricultural 35 carriers are well known in the art. Preferably said composition may comprise at least one or more pesticidally-active compounds, for example an additional fungicidal active ingredient in addition to the compound of Formula (I).

The compound of Formula (I) may be the sole active ingredient of a composition or it may be 40 admixed with one or more additional active ingredients such as a pesticide, fungicide, synergist,

herbicide or plant growth regulator where appropriate. An additional active ingredient may, in some cases, result in unexpected synergistic activities.

Examples of suitable additional active ingredients include the following: acycloamino acid fungicides, aliphatic nitrogen fungicides, amide fungicides, anilide fungicides, antibiotic fungicides, aromatic fungicides, arsenical fungicides, aryl phenyl ketone fungicides, benzamide fungicides, benzanilide fungicides, benzimidazole fungicides, benzothiazole fungicides, botanical fungicides, bridged diphenyl fungicides, carbamate fungicides, carbanilate fungicides, conazole fungicides, copper fungicides, dicarboximide fungicides, dinitrophenol fungicides, dithiocarbamate fungicides, dithiolane fungicides, furamide fungicides, furanilide fungicides, hydrazide fungicides, imidazole fungicides, mercury fungicides, morpholine fungicides, organophosphorous fungicides, organotin fungicides, oxathiin fungicides, oxazole fungicides, phenylsulfamide fungicides, polysulfide fungicides, pyrazole fungicides, pyridine fungicides, pyrimidine fungicides, pyrrole fungicides, quaternary ammonium fungicides, quinoline fungicides, quinone fungicides, quinoxaline fungicides, strobilurin fungicides, sulfonanilide fungicides, thiadiazole fungicides, thiazole fungicides, thiazolidine fungicides, thiocarbamate fungicides, thiophene fungicides, triazine fungicides, triazole fungicides, triazolopyrimidine fungicides, urea fungicides, valinamide fungicides, and zinc fungicides.

Examples of suitable additional active ingredients also include the following: 3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxylic acid (9-dichloromethylene-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl)-amide, 3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxylic acid methoxy-[1-methyl-2-(2,4,6-trichlorophenyl)-ethyl]-amide, 1-methyl-3-difluoromethyl-1H-pyrazole-4-carboxylic acid (2-dichloromethylene-3-ethyl-1-methyl-indan-4-yl)-amide (1072957-71-1), 1-methyl-3-difluoromethyl-1H-pyrazole-4-carboxylic acid (4'-methylsulfanyl-biphenyl-2-yl)-amide, 1-methyl-3-difluoromethyl-4H-pyrazole-4-carboxylic acid [2-(2,4-dichloro-phenyl)-2-methoxy-1-methyl-ethyl]-amide, (5-Chloro-2,4-dimethyl-pyridin-3-yl)-(2,3,4-trimethoxy-6-methyl-phenyl)-methanone, (5-Bromo-4-chloro-2-methoxy-pyridin-3-yl)-(2,3,4-trimethoxy-6-methyl-phenyl)-methanone, 2-{2-[(E)-3-(2,6-Dichloro-phenyl)-1-methyl-prop-2-en-(E)-ylideneaminoxy-methyl]-phenyl}-2-[(Z)-methoxyimino]-N-methyl-acetamide, 3-[5-(4-Chloro-phenyl)-2,3-dimethyl-isoxazolidin-3-yl]-pyridine, (E)-N-methyl-2-[2-(2,5-dimethylphenoxy-methyl) phenyl]-2-methoxy-iminoacetamide, 4-bromo-2-cyano-N,N-dimethyl-6-trifluoromethylbenzimidazole-1-sulphonamide, □-[N-(3-chloro-2,6-xylolyl)-2-methoxyacetamido]-γ-butyrolactone, 4-chloro-2-cyano-N,N-dimethyl-5-p-tolylimidazole-1-sulfonamide, N-allyl-4,5,-dimethyl-2-trimethylsilylthiophene-3-carboxamide, N-(1-cyano-1,2-dimethylpropyl)-2-(2,4-dichlorophenoxy)propionamide, N-(2-methoxy-5-pyridyl)-cyclopropane carboxamide, (.+.-)-cis-1-(4-chlorophenyl)-2-(1H-1,2,4-triazol-1-yl)-cycloheptanol, 2-(1-*tert*-butyl)-1-(2-chlorophenyl)-3-(1,2,4-triazol-1-yl)-propan-2-ol, 2',6'-dibromo-2-methyl-4-trifluoromethoxy-4'-trifluoromethyl-1,3-thiazole-5-carboxanilide, 1-imidazolyl-1-(4'-chlorophenoxy)-3,3-dimethylbutan-2-one, methyl (E)-2-[2-[6-(2-cyanophenoxy)pyrimidin-4-yloxy]phenyl]3-methoxyacrylate, methyl (E)-2-[2-[6-(2-thioamidophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-fluorophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2,6-difluorophenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(pyrimidin-2-yloxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(5-methylpyrimidin-2-yloxy)-

phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(phenyl-sulphonyloxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(4-nitrophenoxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-phenoxyphenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3,5-dimethyl-benzoyl)pyrrol-1-yl]-3-methoxyacrylate, methyl (E)-2-[2-(3-methoxyphenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(2-phenylethen-1-yl)-phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3,5-dichlorophenoxy)pyridin-3-yl]-3-methoxyacrylate, methyl (E)-2-(2-(3-(1,1,2,2-tetrafluoroethoxy)phenoxy)phenyl)-3-methoxyacrylate, methyl (E)-2-(2-[3-(alpha-hydroxybenzyl)phenoxy]phenyl)-3-methoxyacrylate, methyl (E)-2-(2-(4-phenoxy)pyridin-2-yloxy)phenyl)-3-methoxyacrylate, methyl (E)-2-[2-(3-n-propyloxy-phenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3-isopropyloxyphenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(2-fluorophenoxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3-ethoxyphenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(4-*tert*-butyl-pyridin-2-yloxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[3-(3-cyanophenoxy)phenoxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[(3-methyl-pyridin-2-yloxymethyl)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-methyl-phenoxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(5-bromo-pyridin-2-yloxymethyl)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(3-(3-iodopyridin-2-yloxy)phenoxy)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-chloropyridin-3-yloxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E),(E)-2-[2-(5,6-dimethylpyrazin-2-ylmethylloximinomethyl)phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(6-methylpyridin-2-yloxy)pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E),(E)-2-[2-(3-methoxyphenyl)methylloximinomethyl]-phenyl]-3-methoxyacrylate, methyl (E)-2-[2-(6-(2-azidophenoxy)-pyrimidin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E),(E)-2-[2-[6-phenylpyrimidin-4-yl)-methylloximinomethyl]phenyl]-3-methoxyacrylate, methyl (E),(E)-2-[2-[(4-chlorophenyl)-methylloximinomethyl]-phenyl]-3-methoxyacrylate, methyl (E)-2-[2-[6-(2-n-propylphenoxy)-1,3,5-triazin-4-yloxy]phenyl]-3-methoxyacrylate, methyl (E),(E)-2-[2-[(3-nitrophenyl)methylloximinomethyl]phenyl]-3-methoxyacrylate, 3-chloro-7-(2-aza-2,7,7-trimethyl-oct-3-en-5-ine), 2,6-dichloro-N-(4-trifluoromethylbenzyl)-benzamide, 3-iodo-2-propinyl alcohol, 4-chlorophenyl-3-iodopropargyl formal, 3-bromo-2,3-diiodo-2-propenyl ethylcarbamate, 2,3,3-triiodoallyl alcohol, 3-bromo-2,3-diiodo-2-propenyl alcohol, 3-iodo-2-propinyl n-butylcarbamate, 3-iodo-2-propinyl n-hexylcarbamate, 3-iodo-2-propinyl cyclohexyl-carbamate, 3-iodo-2-propinyl phenylcarbamate; phenol derivatives, such as tribromophenol, tetrachlorophenol, 3-methyl-4-chlorophenol, 3,5-dimethyl-4-chlorophenol, phenoxyethanol, dichlorophene, o-phenylphenol, m-phenylphenol, p-phenylphenol, 2-benzyl-4-chlorophenol, 5-hydroxy-2(5H)-furanone; 4,5-dichlorodithiazolinone, 4,5-benzodithiazolinone, 4,5-trimethylenedithiazolinone, 4,5-dichloro-(3H)-1,2-dithiol-3-one, 3,5-dimethyl-tetrahydro-1,3,5-thiadiazine-2-thione, N-(2-p-chlorobenzoyl)ethyl)-hexaminium chloride, acibenzolar, acypetacs, alanycarb, albendazole, aldimorph, allicin, allyl alcohol, ametocradin, amisulbrom, amobam, ampropylfos, anilazine, asomate, aureofungin, azaconazole, azafendin, azithiram, azoxystrobin, barium polysulfide, benalaxyl, benalaxyl-M, benodanil, benomyl, benquinox, bentaluron, benthiaivalcarb, benthiazole, benzalkonium chloride, benzamacril, benzamorf, benzohydroxamic acid, benzovindiflupyr, berberine, bethoxazin, biloxazol, binapacryl, biphenyl, bitertanol, bithionol, bixafen, blasticidin-S, boscalid, bromothalonil, bromuconazole, bupirimate, buthiobate, butylamine calcium polysulfide, captafol, captan, carbamorph, carbendazim, carbendazim chlorhydrate, carboxin, carpropamid,

carvone, CGA41396, CGA41397, chinomethionate, chitosan, chlobenthiazone, chloraniformethan, chloranil, chlorfenazole, chloroneb, chloropicrin, chlorothalonil, chlorozolate, chlozolate, climbazole, clotrimazole, clozylacon, copper containing compounds such as copper acetate, copper carbonate, copper hydroxide, copper naphthenate, copper oleate, copper oxychloride, copper oxyquinolate, copper
5 silicate, copper sulphate, copper tallate, copper zinc chromate and Bordeaux mixture, cresol, cufraneb, cuprobam, cuprous oxide, cyazofamid, cyclafuramid, cycloheximide, cyflufenamid, cymoxanil, cypendazole, cyproconazole, cyprodinil, dazomet, debacarb, decafentin, dehydroacetic acid, di-2-pyridyl disulphide 1,1'-dioxide, dichlofluanid, diclomezine, dichlone, dicloran, dichlorophen, dichlozoline, diclobutrazol, diclocymet, diethofencarb, difenoconazole, difenzoquat, diflumetorim, O, O-di-iso-propyl-
10 S-benzyl thiophosphate, dimefluzole, dimetachlone, dimetconazole, dimethomorph, dimethirimol, diniconazole, diniconazole-M, dinobuton, dinocap, dinocton, dinopenton, dinosulfon, dinoterbon, diphenylamine, dipyrithione, disulfiram, ditalimfos, dithianon, dithioether, dodecyl dimethyl ammonium chloride, dodemorph, dodicin, dodine, doguadine, drazoxolon, edifenphos, enestroburin, epoxiconazole, etaconazole, etem, ethaboxam, ethirimol, ethoxyquin, ethilicin, ethyl (Z)-N-benzyl-N
15 ([methyl (methyl-thioethylideneamino- oxycarbonyl) amino] thio)- β -alaninate, etridiazole, famoxadone, fenamidone, fenaminosulf, fenapanil, fenarimol, fenbuconazole, fenfuram, fenhexamid, fenitropan, fenoxanil, fempiclonil, fempicoxamid, fenpropidin, fenpropimorph, fenpyrazamine, fentin acetate, fentin hydroxide, ferbam, ferimzone, fluazinam, fludioxonil, flumetover, flumorph, flupicolide, fluopyram, fluoroimide, fluotrimazole, fluoxastrobin, fluquinconazole, flusilazole, flusulfamide, flutanil, flutolanil,
20 flutriafol, fluxapyroxad, folpet, formaldehyde, fosetyl, fuberidazole, furalaxyl, furametpyr, furcarbanil, furconazole, furfural, furmecyclox, furophanate, glyodin, griseofulvin, guazatine, halacrinat, hexa chlorobenzene, hexachlorobutadiene, hexachlorophene, hexaconazole, hexylthiofos, hydrargaphen, hydroxyisoxazole, hymexazole, imazalil, imazalil sulphate, imibenconazole, iminoctadine triacetate, inezin, iodocarb, ipconazole, ipfentrifluconazole, iprobenfos, iprodione, iprovalicarb,
25 isopropanyl butyl carbamate, isoprothiolane, isopyrazam, isotianil, isovalledione, izopamfos, kasugamycin, kresoxim-methyl, LY186054, LY211795, LY248908, mancozeb, mandipropamid, maneb, mebenil, mecarbinzid, mefenoxam, mefentrifluconazole, mepanipyrin, mepronil, mercuric chloride, mercurous chloride, meptyldinocap, metalaxyl, metalaxyl-M, metam, metazoxolon, metconazole, methasulfocarb, methfuroxam, methyl bromide, methyl iodide, methyl isothiocyanate, metiram,
30 metiram-zinc, metominostrobin, metrafenone, metsulfovax, milneb, moroxydine, myclobutanil, myclozolin, nabam, natamycin, neoasozin, nickel dimethyldithiocarbamate, nitrostyrene, nitrothal-iso-propyl, nuarimol, octhilinone, ofurace, organomercury compounds, orysastrobin, osthol, oxadixyl, oxasulfuron, oxathiapirolin, oxine-copper, oxolinic acid, oxpoconazole, oxycarboxin, parinol, pefurazoate, penconazole, pencycuron, penflufen, pentachlorophenol, penthiopyrad, phenamacril,
35 phenazin oxide, phosdiphen, phosetyl-Al, phosphorus acids, phthalide, picoxystrobin, piperalin, polycarbamate, polyoxin D, polyoxrim, polyram, probenazole, prochloraz, procymidone, propamidine, propamocarb, propiconazole, propineb, propionic acid, proquinazid, prothiocarb, prothioconazole, pydiflumetofen, pyracarbolid, pyraclostrobin, pyrametrostrobin, pyraoxystrobin, pyrazophos, pyribencarb, pyridinitril, pyrifenox, pyrimethanil, pyriofenone, pyroquilon, pyroxychlor, pyroxyfur,
40 pyrrolnitrin, quaternary ammonium compounds, quinacetol, quinazamid, quinconazole,

quinomethionate, quinoxifen, quintozone, rabenzazole, santonin, sedaxane, silthiofam, simeconazole, sipconazole, sodium pentachlorophenate, spiroxamine, streptomycin, sulphur, sultropen, tebuconazole, tebflouin, tecloftalam, tecnazene, tecoram, tetraconazole, thiabendazole, thiadifluor, thicyofen, thifluzamide, 2- (thiocyanomethylthio) benzothiazole, thiophanate-methyl, thioquinox, thiram, tiadinil, timibenconazole, tioxyimid, tolclofos-methyl, tolylfluanid, triadimefon, triadimenol, triamiphos, triarimol, triazbutil, triazoxide, tricyclazole, tridemorph, trifloxystrobin, triflumazole, triforine, triflumizole, triticonazole, uniconazole, urbacide, validamycin, valifenalate, vapam, vinclozolin, zarilamid, zineb, ziram, and zoxamide.

10 The compounds of the invention may also be used in combination with anthelmintic agents. Such anthelmintic agents include, compounds selected from the macrocyclic lactone class of compounds such as ivermectin, avermectin, abamectin, emamectin, eprinomectin, doramectin, selamectin, moxidectin, nemadectin and milbemycin derivatives as described in EP- 357460, EP- 444964 and EP-594291. Additional anthelmintic agents include semisynthetic and biosynthetic 15 avermectin/milbemycin derivatives such as those described in US-5015630, WO-9415944 and WO-9522552. Additional anthelmintic agents include the benzimidazoles such as albendazole, cambendazole, fenbendazole, flubendazole, mebendazole, oxfendazole, oxibendazole, parbendazole, and other members of the class. Additional anthelmintic agents include imidazothiazoles and tetrahydropyrimidines such as tetramisole, levamisole, pyrantel pamoate, oxantel or morantel. 20 Additional anthelmintic agents include flukicides, such as triclabendazole and clorsulon and the cestocides, such as praziquantel and epsiprantel.

The compounds of the invention may be used in combination with derivatives and analogues of the paraherquamide/marcfortine class of anthelmintic agents, as well as the antiparasitic oxazolines such as those disclosed in US-5478855, US- 4639771 and DE-19520936.

25 The compounds of the invention may be used in combination with derivatives and analogues of the general class of dioxomorpholine antiparasitic agents as described in WO 96/15121 and also with anthelmintic active cyclic depsipeptides such as those described in WO 96/11945, WO 93/19053, WO 93/25543, EP 0 626 375, EP 0 382 173, WO 94/19334, EP 0 382 173, and EP 0 503 538.

30 The compounds of the invention may be used in combination with other ectoparasiticides; for example, fipronil; pyrethroids; organophosphates; insect growth regulators such as lufenuron; ecdysone agonists such as tebufenozide and the like; neonicotinoids such as imidacloprid and the like.

The compounds of the invention may be used in combination with terpene alkaloids, for example those described in International Patent Application Publication Numbers WO 95/19363 or WO 04/72086, particularly the compounds disclosed therein.

35 Other examples of such biologically active compounds that the compounds of the invention may be used in combination with include but are not restricted to the following:

40 Organophosphates: acephate, azamethiphos, azinphos-ethyl, azinphos- methyl, bromophos, bromophos-ethyl, cadusafos, chlorethoxyphos, chlorpyrifos, chlorfenvinphos, chlormephos, demeton, demeton-S-methyl, demeton-S-methyl sulphone, dialifos, diazinon, dichlorvos, dicrotophos, dimethoate, disulfoton, ethion, ethoprophos, etrimfos, famphur, fenamiphos, fenitrothion, fensulfothion,

fenthion, flupyrazofos, fonofos, formothion, fosthiazate, heptenophos, isazophos, isothioate, isoxathion, malathion, methacriphos, methamidophos, methidathion, methyl- parathion, mevinphos, monocrotophos, naled, omethoate, oxydemeton-methyl, paraoxon, parathion, parathion-methyl, phenthoate, phosalone, phosfolan, phosphocarb, phosmet, phosphamidon, phorate, phoxim, 5
 5 pirimiphos, pirimiphos- methyl, profenofos, propaphos, proetamphos, prothiofos, pyraclofos, pyridapenthion, quinalphos, sulprophos, temephos, terbufos, tebupirimfos, tetrachlorvinphos, thimeton, triazophos, trichlorfon, vamidothion.

Carbamates: alanycarb, aldicarb, 2-sec-butylphenyl methylcarbamate, benfuracarb, carbaryl, carbofuran, carbosulfan, cloethocarb, ethiofencarb, fenoxycarb, fenthio carb, furathio carb, HCN-801, 10
 isoprocarb, indoxacarb, methiocarb, methomyl, 5-methyl-m-cumenylbutyryl(methyl)carbamate, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, triazamate, UC-51717.

Pyrethroids: acrinathin, allethrin, alphametrin, 5-benzyl-3-furylmethyl (E)-(1 R)-cis-2,2-dimethyl-3-(2-oxothiolan-3-ylidenemethyl)cyclopropanecarboxylate, bifenthrin, beta-cyfluthrin, cyfluthrin, a-cypermethrin, beta-cypermethrin, bioallethrin, bioallethrin((S)-cyclopentylisomer), 15
 bioresmethrin, bifenthrin, NCI-85193, cycloprothrin, cyhalothrin, cythithrin, cyphenothrin, deltamethrin, empenthrin, esfenvalerate, ethofenprox, fenfluthrin, fenpropathrin, fenvalerate, flucythrinate, flumethrin, fluvalinate (D isomer), imiprothrin, cyhalothrin, lambda-cyhalothrin, permethrin, phenothrin, prallethrin, pyrethrins (natural products), resmethrin, tetramethrin, transfluthrin, theta-cypermethrin, silafluofen, t-fluvalinate, tefluthrin, tralomethrin, Zeta-cypermethrin.

Arthropod growth regulators: a) chitin synthesis inhibitors: benzoylureas: chlorfluazuron, diflubenzuron, fluazuron, flucycloxuron, flufenoxuron, hexaflumuron, lufenuron, novaluron, teflubenzuron, triflumuron, buprofezin, diofenolan, hexythiazox, etoxazole, chlorfentazine; b) ecdysone 20
 antagonists: halofenozide, methoxyfenozide, tebufenozide; c) juvenoids: pyriproxyfen, methoprene (including S-methoprene), fenoxycarb; d) lipid biosynthesis inhibitors: spiroadicofen.

Other antiparasitics: acequinocyl, amitraz, AKD-1022, ANS-118, azadirachtin, Bacillus thuringiensis, bensultap, bifenazate, binapacryl, bromopropylate, BTG-504, BTG-505, camphechlor, cartap, chlorobenzilate, chlordimeform, chlorfenapyr, chromafenozide, clothianidine, cyromazine, diacloden, diafenthiuron, DBI-3204, dinactin, dihydroxymethyl-dihydroxypyrrolidine, dinobuton, dinocap, endosulfan, ethiprole, ethofenprox, fenazaquin, flumite, MTI- 800, fenpyroximate, fluacrypyrim, 30
 flubenzimine, flubrocycythrinate, flufenzine, flufenprox, fluproxyfen, halofenprox, hydramethylnon, IKI-220, kanemite, NC-196, neem guard, nidinorterfuran, nitenpyram, SD-35651, WL-108477, pirydaryl, propargite, protrifenbute, pymethrozine, pyridaben, pyrimidifen, NC-1111, R-195, RH-0345, RH-2485, RYI-210, S-1283, S-1833, SI-8601, silafluofen, silomadine, spinosad, tebufenpyrad, tetradifon, tetranactin, thiacloprid, thiocyclam, thiamethoxam, tolfenpyrad, triazamate, triethoxyspinosyn, trinactin, 35
 verbutin, vertalec, YI-5301.

Biological agents: Bacillus thuringiensis ssp aizawai, kurstaki, Bacillus thuringiensis delta endotoxin, baculovirus, entomopathogenic bacteria, virus and fungi.

Bactericides: chlortetracycline, oxytetracycline, streptomycin.

Other biological agents: enrofloxacin, febantel, penethamate, moloxicam, cefalexin, kanamycin, pimobendan, clenbuterol, omeprazole, tiamulin, benazepril, pyriprole, cefquinome, florfenicol, buserelin, cefovecin, tulathromycin, ceftiour, carprofen, metaflumizone, praziquarantel, triclabendazole.

- 5 The following mixtures of the compounds of formula (I) with active ingredients are preferred. The abbreviation "TX" means one compound selected from the group consisting of the compounds as represented in Tables 1.1A to 1.8A, Tables 1.1B to 1.8B, Tables 2.1A to 2.3A, Tables 2.1B to 2.3B (below), or a compound 1.1 to 1.10 described in Table T1 (below) or a compound 2.1 to 2.80 described in Table T2 (below).
- 10 an adjuvant selected from the group of substances consisting of petroleum oils (alternative name) (628) + TX,
- an acaricide selected from the group of substances consisting of 1,1-bis(4-chlorophenyl)-2-ethoxyethanol (IUPAC name) (910) + TX, 2,4-dichlorophenyl benzenesulfonate (IUPAC/Chemical Abstracts name) (1059) + TX, 2-fluoro-*N*-methyl-*N*-1-naphthylacetamide (IUPAC name) (1295) + TX,
- 15 4-chlorophenyl phenyl sulfone (IUPAC name) (981) + TX, abamectin (1) + TX, acequinocyl (3) + TX, acetoprole [CCN] + TX, acrinathrin (9) + TX, aldicarb (16) + TX, aldoxycarb (863) + TX, alpha-cypermethrin (202) + TX, amidithion (870) + TX, amidoflumet [CCN] + TX, amidothioate (872) + TX, amiton (875) + TX, amiton hydrogen oxalate (875) + TX, amitraz (24) + TX, aramite (881) + TX, arsenous oxide (882) + TX, AVI 382 (compound code) + TX, AZ 60541 (compound code) + TX,
- 20 azinphos-ethyl (44) + TX, azinphos-methyl (45) + TX, azobenzene (IUPAC name) (888) + TX, azocyclotin (46) + TX, azothoate (889) + TX, benomyl (62) + TX, benoxafos (alternative name) [CCN] + TX, benzoximate (71) + TX, benzyl benzoate (IUPAC name) [CCN] + TX, bifenazate (74) + TX, bifenthrin (76) + TX, binapacryl (907) + TX, brofenvalerate (alternative name) + TX, bromocyclen (918) + TX, bromophos (920) + TX, bromophos-ethyl (921) + TX, bromopropylate (94) + TX, buprofezin (99)
- 25 + TX, butocarboxim (103) + TX, butoxycarboxim (104) + TX, butylpyridaben (alternative name) + TX, calcium polysulfide (IUPAC name) (111) + TX, camphechlor (941) + TX, carbanolate (943) + TX, carbaryl (115) + TX, carbofuran (118) + TX, carbophenothion (947) + TX, CGA 50'439 (development code) (125) + TX, chinomethionat (126) + TX, chlorbenside (959) + TX, chlordimeform (964) + TX, chlordimeform hydrochloride (964) + TX, chlorfenapyr (130) + TX, chlorfenethol (968) + TX, chlorfenson (970) + TX, chlorfensulfide (971) + TX, chlorfenvinphos (131) + TX, chlorobenzilate (975) + TX, chloromebuform (977) + TX, chloromethiuron (978) + TX, chloropropylate (983) + TX, chlorpyrifos (145)
- 30 + TX, chlorpyrifos-methyl (146) + TX, chlorthiophos (994) + TX, cinerin I (696) + TX, cinerin II (696) + TX, cinerins (696) + TX, clofentezine (158) + TX, closantel (alternative name) [CCN] + TX, coumaphos (174) + TX, crotamiton (alternative name) [CCN] + TX, crotoxyphos (1010) + TX, cufraneb (1013) + TX,
- 35 cyanthoate (1020) + TX, cyflumetofen (CAS Reg. No.: 400882-07-7) + TX, cyhalothrin (196) + TX, cyhexatin (199) + TX, cypermethrin (201) + TX, DCPM (1032) + TX, DDT (219) + TX, demephion (1037) + TX, demephion-O (1037) + TX, demephion-S (1037) + TX, demeton (1038) + TX, demeton-methyl (224) + TX, demeton-O (1038) + TX, demeton-O-methyl (224) + TX, demeton-S (1038) + TX, demeton-S-methyl (224) + TX, demeton-S-methylsulfon (1039) + TX, diafenthion (226) + TX, dialifos (1042) +
- 40 TX, diazinon (227) + TX, dichlofluanid (230) + TX, dichlorvos (236) + TX, dicliphos (alternative name)

+ TX, dicofol (242) + TX, dicrotophos (243) + TX, dienochlor (1071) + TX, dimefox (1081) + TX, dimethoate (262) + TX, dinactin (alternative name) (653) + TX, dinex (1089) + TX, dinex-diclexine (1089) + TX, dinobuton (269) + TX, dinocap (270) + TX, dinocap-4 [CCN] + TX, dinocap-6 [CCN] + TX, dinoocton (1090) + TX, dinopenton (1092) + TX, dinosulfon (1097) + TX, dinoterbon (1098) + TX, 5 dioxathion (1102) + TX, diphenyl sulfone (IUPAC name) (1103) + TX, disulfiram (alternative name) [CCN] + TX, disulfoton (278) + TX, DNOC (282) + TX, dofenapyn (1113) + TX, doramectin (alternative name) [CCN] + TX, endosulfan (294) + TX, endothion (1121) + TX, EPN (297) + TX, eprinomectin (alternative name) [CCN] + TX, ethion (309) + TX, ethoate-methyl (1134) + TX, etoxazole (320) + TX, etrimfos (1142) + TX, fenazaflor (1147) + TX, fenazaquin (328) + TX, fenbutatin oxide (330) + TX, 10 fenothiocarb (337) + TX, fenpropathrin (342) + TX, fenpyrad (alternative name) + TX, fenpyroximate (345) + TX, fenson (1157) + TX, fentrifanil (1161) + TX, fenvalerate (349) + TX, fipronil (354) + TX, fluacrypyrim (360) + TX, fluazuron (1166) + TX, flubenzimine (1167) + TX, flucycloxuron (366) + TX, flucythrinate (367) + TX, fluenetil (1169) + TX, flufenoxuron (370) + TX, flumethrin (372) + TX, fluorbenside (1174) + TX, fluvalinate (1184) + TX, FMC 1137 (development code) (1185) + TX, 15 formetanate (405) + TX, formetanate hydrochloride (405) + TX, formothion (1192) + TX, formparanate (1193) + TX, gamma-HCH (430) + TX, glyodin (1205) + TX, halfenprox (424) + TX, heptenophos (432) + TX, hexadecyl cyclopropanecarboxylate (IUPAC/Chemical Abstracts name) (1216) + TX, hexythiazox (441) + TX, iodomethane (IUPAC name) (542) + TX, isocarbophos (alternative name) (473) + TX, isopropyl O-(methoxyaminothiophosphoryl)salicylate (IUPAC name) (473) + TX, ivermectin (alternative name) [CCN] + TX, 20 jasmolin I (696) + TX, jasmolin II (696) + TX, jodfenphos (1248) + TX, lindane (430) + TX, lufenuron (490) + TX, malathion (492) + TX, malonoben (1254) + TX, mecarbam (502) + TX, mephosfolan (1261) + TX, mesulfen (alternative name) [CCN] + TX, methacrifos (1266) + TX, methamidophos (527) + TX, methidathion (529) + TX, methiocarb (530) + TX, methomyl (531) + TX, methyl bromide (537) + TX, metolcarb (550) + TX, mevinphos (556) + TX, mexacarbate (1290) + TX, 25 milbemectin (557) + TX, milbemycin oxime (alternative name) [CCN] + TX, mipafox (1293) + TX, monocrotophos (561) + TX, morphothion (1300) + TX, moxidectin (alternative name) [CCN] + TX, naled (567) + TX, NC-184 (compound code) + TX, NC-512 (compound code) + TX, nifluridide (1309) + TX, nikkomycins (alternative name) [CCN] + TX, nitrilacarb (1313) + TX, nitrilacarb 1:1 zinc chloride complex (1313) + TX, NNI-0101 (compound code) + TX, NNI-0250 (compound code) + TX, omethoate (594) + TX, 30 oxamyl (602) + TX, oxydeprofos (1324) + TX, oxydisulfoton (1325) + TX, pp'-DDT (219) + TX, parathion (615) + TX, permethrin (626) + TX, petroleum oils (alternative name) (628) + TX, phenkapton (1330) + TX, phenthoate (631) + TX, phorate (636) + TX, phosalone (637) + TX, phosfolan (1338) + TX, phosmet (638) + TX, phosphamidon (639) + TX, phoxim (642) + TX, pirimiphos-methyl (652) + TX, polychloroterpenes (traditional name) (1347) + TX, polynactins (alternative name) (653) + TX, proclonol (1350) + TX, profenofos (662) + TX, promacyl (1354) + TX, propargite (671) + TX, propetamphos (673) + TX, propoxur (678) + TX, prothidathion (1360) + TX, prothoate (1362) + TX, pyrethrin I (696) + TX, 35 pyrethrin II (696) + TX, pyrethrins (696) + TX, pyridaben (699) + TX, pyridaphenthion (701) + TX, pyrimidifen (706) + TX, pyrimitate (1370) + TX, quinalphos (711) + TX, quintiofos (1381) + TX, R-1492 (development code) (1382) + TX, RA-17 (development code) (1383) + TX, rotenone (722) + TX, 40 schradan (1389) + TX, sebufos (alternative name) + TX, selamectin (alternative name) [CCN] + TX, SI-

0009 (compound code) + TX, sophamide (1402) + TX, spirodiclofen (738) + TX, spiromesifen (739) + TX, SSI-121 (development code) (1404) + TX, sulfiram (alternative name) [CCN] + TX, sulfluramid (750) + TX, sulfotep (753) + TX, sulfur (754) + TX, SZI-121 (development code) (757) + TX, tau-fluvalinate (398) + TX, tebufenpyrad (763) + TX, TEPP (1417) + TX, terbam (alternative name) + TX, 5 tetrachlorvinphos (777) + TX, tetradifon (786) + TX, tetranactin (alternative name) (653) + TX, tetrasul (1425) + TX, thiafenox (alternative name) + TX, thiocarboxime (1431) + TX, thiofanox (800) + TX, thiometon (801) + TX, thioquinox (1436) + TX, thuringiensin (alternative name) [CCN] + TX, triamiphos (1441) + TX, triarathene (1443) + TX, triazophos (820) + TX, triazuron (alternative name) + TX, trichlorfon (824) + TX, trifenofos (1455) + TX, trinactin (alternative name) (653) + TX, vamidothion (847) 10 + TX, vaniliprole [CCN] and YI-5302 (compound code) + TX,

an algicide selected from the group of substances consisting of bethoxazin [CCN] + TX, copper dioctanoate (IUPAC name) (170) + TX, copper sulfate (172) + TX, cybutryne [CCN] + TX, dichlone (1052) + TX, dichlorophen (232) + TX, endothal (295) + TX, fentin (347) + TX, hydrated lime [CCN] + TX, nabam (566) + TX, quinoclamine (714) + TX, quinonamid (1379) + TX, simazine (730) + TX, 15 triphenyltin acetate (IUPAC name) (347) and triphenyltin hydroxide (IUPAC name) (347) + TX,

an anthelmintic selected from the group of substances consisting of abamectin (1) + TX, crufomate (1011) + TX, doramectin (alternative name) [CCN] + TX, emamectin (291) + TX, emamectin benzoate (291) + TX, eprinomectin (alternative name) [CCN] + TX, ivermectin (alternative name) [CCN] + TX, milbemycin oxime (alternative name) [CCN] + TX, moxidectin (alternative name) [CCN] + TX, 20 piperazine [CCN] + TX, selamectin (alternative name) [CCN] + TX, spinosad (737) and thiophanate (1435) + TX,

an avicide selected from the group of substances consisting of chloralose (127) + TX, endrin (1122) + TX, fenthion (346) + TX, pyridin-4-amine (IUPAC name) (23) and strychnine (745) + TX,

a bactericide selected from the group of substances consisting of 1-hydroxy-1*H*-pyridine-2- 25 thione (IUPAC name) (1222) + TX, 4-(quinoxalin-2-ylamino)benzenesulfonamide (IUPAC name) (748) + TX, 8-hydroxyquinoline sulfate (446) + TX, bronopol (97) + TX, copper dioctanoate (IUPAC name) (170) + TX, copper hydroxide (IUPAC name) (169) + TX, cresol [CCN] + TX, dichlorophen (232) + TX, dipyrithione (1105) + TX, dodicin (1112) + TX, fenaminosulf (1144) + TX, formaldehyde (404) + TX, hydrargaphen (alternative name) [CCN] + TX, kasugamycin (483) + TX, kasugamycin hydrochloride 30 hydrate (483) + TX, nickel bis(dimethyldithiocarbamate) (IUPAC name) (1308) + TX, nitrapyrin (580) + TX, oclothilone (590) + TX, oxolinic acid (606) + TX, oxytetracycline (611) + TX, potassium hydroxyquinoline sulfate (446) + TX, probenazole (658) + TX, streptomycin (744) + TX, streptomycin sesquisulfate (744) + TX, tecloftalam (766) + TX, and thiomersal (alternative name) [CCN] + TX,

a biological agent selected from the group of substances consisting of *Adoxophyes orana* GV 35 (alternative name) (12) + TX, *Agrobacterium radiobacter* (alternative name) (13) + TX, *Amblyseius* spp. (alternative name) (19) + TX, *Anagrapha falcifera* NPV (alternative name) (28) + TX, *Anagrus atomus* (alternative name) (29) + TX, *Aphelinus abdominalis* (alternative name) (33) + TX, *Aphidius colemani* (alternative name) (34) + TX, *Aphidoletes aphidimyza* (alternative name) (35) + TX, *Autographa californica* NPV (alternative name) (38) + TX, *Bacillus firmus* (alternative name) (48) + TX, *Bacillus sphaericus* Neide (scientific name) (49) + TX, *Bacillus thuringiensis* Berliner (scientific name) (51) + TX, 40

Bacillus thuringiensis subsp. *aizawai* (scientific name) (51) + TX, *Bacillus thuringiensis* subsp. *israelensis* (scientific name) (51) + TX, *Bacillus thuringiensis* subsp. *japonensis* (scientific name) (51) + TX, *Bacillus thuringiensis* subsp. *kurstaki* (scientific name) (51) + TX, *Bacillus thuringiensis* subsp. *tenebrionis* (scientific name) (51) + TX, *Beauveria bassiana* (alternative name) (53) + TX, *Beauveria brongniartii* (alternative name) (54) + TX, *Chrysoperla carnea* (alternative name) (151) + TX, *Cryptolaemus montrouzieri* (alternative name) (178) + TX, *Cydia pomonella* GV (alternative name) (191) + TX, *Dacnusa sibirica* (alternative name) (212) + TX, *Diglyphus isaea* (alternative name) (254) + TX, *Encarsia formosa* (scientific name) (293) + TX, *Eretmocerus eremicus* (alternative name) (300) + TX, *Helicoverpa zea* NPV (alternative name) (431) + TX, *Heterorhabditis bacteriophora* and *H. megidis* (alternative name) (433) + TX, *Hippodamia convergens* (alternative name) (442) + TX, *Leptomastix dactylopii* (alternative name) (488) + TX, *Macrolophus caliginosus* (alternative name) (491) + TX, *Mamestra brassicae* NPV (alternative name) (494) + TX, *Metaphycus helvolus* (alternative name) (522) + TX, *Metarhizium anisopliae* var. *acridum* (scientific name) (523) + TX, *Metarhizium anisopliae* var. *anisopliae* (scientific name) (523) + TX, *Neodiprion sertifer* NPV and *N. lecontei* NPV (alternative name) (575) + TX, *Orius* spp. (alternative name) (596) + TX, *Paecilomyces fumosoroseus* (alternative name) (613) + TX, *Phytoseiulus persimilis* (alternative name) (644) + TX, *Spodoptera exigua* multicapsid nuclear polyhedrosis virus (scientific name) (741) + TX, *Steinernema bibionis* (alternative name) (742) + TX, *Steinernema carpocapsae* (alternative name) (742) + TX, *Steinernema feltiae* (alternative name) (742) + TX, *Steinernema glaseri* (alternative name) (742) + TX, *Steinernema riobrave* (alternative name) (742) + TX, *Steinernema riobravense* (alternative name) (742) + TX, *Steinernema scapterisci* (alternative name) (742) + TX, *Steinernema* spp. (alternative name) (742) + TX, *Trichogramma* spp. (alternative name) (826) + TX, *Typhlodromus occidentalis* (alternative name) (844) and *Verticillium lecanii* (alternative name) (848) + TX, *bacillus subtilis* var. *amyloliquefaciens* Strain FZB24 (available from Novozymes Biologicals Inc., 5400 Corporate Circle, Salem, VA 24153, U.S.A. and known under the trade name Taegro®) + TX,

a soil sterilant selected from the group of substances consisting of iodomethane (IUPAC name) (542) and methyl bromide (537) + TX,

a chemosterilant selected from the group of substances consisting of apholate [CCN] + TX, bisazir (alternative name) [CCN] + TX, busulfan (alternative name) [CCN] + TX, diflubenzuron (250) + TX, dimatif (alternative name) [CCN] + TX, hemel [CCN] + TX, hempa [CCN] + TX, metepa [CCN] + TX, methiotepa [CCN] + TX, methyl apholate [CCN] + TX, morzid [CCN] + TX, penfluron (alternative name) [CCN] + TX, tepa [CCN] + TX, thiohempa (alternative name) [CCN] + TX, thiotepa (alternative name) [CCN] + TX, tretamine (alternative name) [CCN] and uredepa (alternative name) [CCN] + TX,

an insect pheromone selected from the group of substances consisting of (*E*)-dec-5-en-1-yl acetate with (*E*)-dec-5-en-1-ol (IUPAC name) (222) + TX, (*E*)-tridec-4-en-1-yl acetate (IUPAC name) (829) + TX, (*E*)-6-methylhept-2-en-4-ol (IUPAC name) (541) + TX, (*E,Z*)-tetradeca-4,10-dien-1-yl acetate (IUPAC name) (779) + TX, (*Z*)-dodec-7-en-1-yl acetate (IUPAC name) (285) + TX, (*Z*)-hexadec-11-enal (IUPAC name) (436) + TX, (*Z*)-hexadec-11-en-1-yl acetate (IUPAC name) (437) + TX, (*Z*)-hexadec-13-en-11-yn-1-yl acetate (IUPAC name) (438) + TX, (*Z*)-icos-13-en-10-one (IUPAC name) (448) + TX, (*Z*)-tetradec-7-en-1-al (IUPAC name) (782) + TX, (*Z*)-tetradec-9-en-1-ol (IUPAC name)

(783) + TX, (Z)-tetradec-9-en-1-yl acetate (IUPAC name) (784) + TX, (7E,9Z)-dodeca-7,9-dien-1-yl acetate (IUPAC name) (283) + TX, (9Z,11E)-tetradeca-9,11-dien-1-yl acetate (IUPAC name) (780) + TX, (9Z,12E)-tetradeca-9,12-dien-1-yl acetate (IUPAC name) (781) + TX, 14-methyloctadec-1-ene (IUPAC name) (545) + TX, 4-methylnonan-5-ol with 4-methylnonan-5-one (IUPAC name) (544) + TX,
5 alpha-multistriatin (alternative name) [CCN] + TX, brevicomin (alternative name) [CCN] + TX, codlure (alternative name) [CCN] + TX, codlemone (alternative name) (167) + TX, cuelure (alternative name) (179) + TX, disparlure (277) + TX, dodec-8-en-1-yl acetate (IUPAC name) (286) + TX, dodec-9-en-1-yl acetate (IUPAC name) (287) + TX, dodeca-8 + TX, 10-dien-1-yl acetate (IUPAC name) (284) + TX, dominicalure (alternative name) [CCN] + TX, ethyl 4-methyloctanoate (IUPAC name) (317) + TX,
10 eugenol (alternative name) [CCN] + TX, frontalinal (alternative name) [CCN] + TX, gossyplure (alternative name) (420) + TX, grandlure (421) + TX, grandlure I (alternative name) (421) + TX, grandlure II (alternative name) (421) + TX, grandlure III (alternative name) (421) + TX, grandlure IV (alternative name) (421) + TX, hexalure [CCN] + TX, ipsdienol (alternative name) [CCN] + TX, ipsenol (alternative name) [CCN] + TX, japonilure (alternative name) (481) + TX, lineatin (alternative name) [CCN] + TX,
15 litlure (alternative name) [CCN] + TX, looplure (alternative name) [CCN] + TX, medlure [CCN] + TX, megatomoic acid (alternative name) [CCN] + TX, methyl eugenol (alternative name) (540) + TX, muscalure (563) + TX, octadeca-2,13-dien-1-yl acetate (IUPAC name) (588) + TX, octadeca-3,13-dien-1-yl acetate (IUPAC name) (589) + TX, orfralure (alternative name) [CCN] + TX, oryctalure (alternative name) (317) + TX, ostramone (alternative name) [CCN] + TX, siglure [CCN] + TX, sordidin (alternative name) (736) + TX, sulcatol (alternative name) [CCN] + TX, tetradec-11-en-1-yl acetate (IUPAC name) (785) + TX, trimedlure (839) + TX, trimedlure A (alternative name) (839) + TX, trimedlure B₁ (alternative name) (839) + TX, trimedlure B₂ (alternative name) (839) + TX, trimedlure C (alternative name) (839) and trunc-call (alternative name) [CCN] + TX,

an insect repellent selected from the group of substances consisting of 2-(octylthio)ethanol
25 (IUPAC name) (591) + TX, butopyronoxyl (933) + TX, butoxy(polypropylene glycol) (936) + TX, dibutyl adipate (IUPAC name) (1046) + TX, dibutyl phthalate (1047) + TX, dibutyl succinate (IUPAC name) (1048) + TX, diethyltoluamide [CCN] + TX, dimethyl carbate [CCN] + TX, dimethyl phthalate [CCN] + TX, ethyl hexanediol (1137) + TX, hexamide [CCN] + TX, methoquin-butyl (1276) + TX, methylneodecanamide [CCN] + TX, oxamate [CCN] and picaridin [CCN] + TX,

30 an insecticide selected from the group of substances consisting of 1-dichloro-1-nitroethane (IUPAC/Chemical Abstracts name) (1058) + TX, 1,1-dichloro-2,2-bis(4-ethylphenyl)ethane (IUPAC name) (1056), + TX, 1,2-dichloropropane (IUPAC/Chemical Abstracts name) (1062) + TX, 1,2-dichloropropane with 1,3-dichloropropene (IUPAC name) (1063) + TX, 1-bromo-2-chloroethane (IUPAC/Chemical Abstracts name) (916) + TX, 2,2,2-trichloro-1-(3,4-dichlorophenyl)ethyl acetate
35 (IUPAC name) (1451) + TX, 2,2-dichlorovinyl 2-ethylsulfinyloxyethyl methyl phosphate (IUPAC name) (1066) + TX, 2-(1,3-dithiolan-2-yl)phenyl dimethylcarbamate (IUPAC/ Chemical Abstracts name) (1109) + TX, 2-(2-butoxyethoxy)ethyl thiocyanate (IUPAC/Chemical Abstracts name) (935) + TX, 2-(4,5-dimethyl-1,3-dioxolan-2-yl)phenyl methylcarbamate (IUPAC/ Chemical Abstracts name) (1084) + TX, 2-(4-chloro-3,5-xylyloxy)ethanol (IUPAC name) (986) + TX, 2-chlorovinyl diethyl phosphate (IUPAC name) (984) + TX, 2-imidazolidone (IUPAC name) (1225) + TX, 2-isovalerylindan-1,3-dione (IUPAC

name) (1246) + TX, 2-methyl(prop-2-ynyl)aminophenyl methylcarbamate (IUPAC name) (1284) + TX, 2-thiocyanatoethyl laurate (IUPAC name) (1433) + TX, 3-bromo-1-chloroprop-1-ene (IUPAC name) (917) + TX, 3-methyl-1-phenylpyrazol-5-yl dimethylcarbamate (IUPAC name) (1283) + TX, 4-methyl(prop-2-ynyl)amino-3,5-xilyl methylcarbamate (IUPAC name) (1285) + TX, 5,5-dimethyl-3-oxocyclohex-1-enyl dimethylcarbamate (IUPAC name) (1085) + TX, abamectin (1) + TX, acephate (2) + TX, acetamiprid (4) + TX, acethion (alternative name) [CCN] + TX, acetoprole [CCN] + TX, acrinathrin (9) + TX, acrylonitrile (IUPAC name) (861) + TX, alanycarb (15) + TX, aldicarb (16) + TX, aldoxycarb (863) + TX, aldrin (864) + TX, allethrin (17) + TX, allosamidin (alternative name) [CCN] + TX, allyxycarb (866) + TX, alpha-cypermethrin (202) + TX, alpha-ecdysone (alternative name) [CCN] + TX, aluminium phosphide (640) + TX, amidithion (870) + TX, amidothioate (872) + TX, aminocarb (873) + TX, amiton (875) + TX, amiton hydrogen oxalate (875) + TX, amitraz (24) + TX, anabasine (877) + TX, athidathion (883) + TX, AVI 382 (compound code) + TX, AZ 60541 (compound code) + TX, azadirachtin (alternative name) (41) + TX, azamethiphos (42) + TX, azinphos-ethyl (44) + TX, azinphos-methyl (45) + TX, azothoate (889) + TX, *Bacillus thuringiensis* delta endotoxins (alternative name) (52) + TX, barium hexafluorosilicate (alternative name) [CCN] + TX, barium polysulfide (IUPAC/Chemical Abstracts name) (892) + TX, barthrin [CCN] + TX, Bayer 22/190 (development code) (893) + TX, Bayer 22408 (development code) (894) + TX, bendiocarb (58) + TX, benfuracarb (60) + TX, bensultap (66) + TX, beta-cyfluthrin (194) + TX, beta-cypermethrin (203) + TX, bifenthrin (76) + TX, bioallethrin (78) + TX, bioallethrin S-cyclopentenyl isomer (alternative name) (79) + TX, bioethanomethrin [CCN] + TX, biopermethrin (908) + TX, bioresmethrin (80) + TX, bis(2-chloroethyl) ether (IUPAC name) (909) + TX, bistrifluron (83) + TX, borax (86) + TX, brofenvalerate (alternative name) + TX, bromfenvinfos (914) + TX, bromocyclen (918) + TX, bromo-DDT (alternative name) [CCN] + TX, bromophos (920) + TX, bromophos-ethyl (921) + TX, bufencarb (924) + TX, buprofezin (99) + TX, butacarb (926) + TX, butathiofos (927) + TX, butocarboxim (103) + TX, butonate (932) + TX, butoxycarboxim (104) + TX, butylpyridaben (alternative name) + TX, cadusafos (109) + TX, calcium arsenate [CCN] + TX, calcium cyanide (444) + TX, calcium polysulfide (IUPAC name) (111) + TX, camphechlor (941) + TX, carbanolate (943) + TX, carbaryl (115) + TX, carbofuran (118) + TX, carbon disulfide (IUPAC/Chemical Abstracts name) (945) + TX, carbon tetrachloride (IUPAC name) (946) + TX, carbophenothion (947) + TX, carbosulfan (119) + TX, cartap (123) + TX, cartap hydrochloride (123) + TX, cevadine (alternative name) (725) + TX, chlorbicyclen (960) + TX, chlordane (128) + TX, chlordecone (963) + TX, chlordimeform (964) + TX, chlordimeform hydrochloride (964) + TX, chlorethoxyfos (129) + TX, chlorfenapyr (130) + TX, chlorfenvinphos (131) + TX, chlorfluazuron (132) + TX, chlormephos (136) + TX, chloroform [CCN] + TX, chloropicrin (141) + TX, chlorphoxim (989) + TX, chlorprazophos (990) + TX, chlorpyrifos (145) + TX, chlorpyrifos-methyl (146) + TX, chlorthiophos (994) + TX, chromafenozide (150) + TX, cinerin I (696) + TX, cinerin II (696) + TX, cinerins (696) + TX, cis-resmethrin (alternative name) + TX, cismethrin (80) + TX, clocythrin (alternative name) + TX, cloethocarb (999) + TX, closantel (alternative name) [CCN] + TX, clothianidin (165) + TX, copper acetoarsenite [CCN] + TX, copper arsenate [CCN] + TX, copper oleate [CCN] + TX, coumaphos (174) + TX, coumithoate (1006) + TX, crotamiton (alternative name) [CCN] + TX, crotoxyphos (1010) + TX, crufomate (1011) + TX, cryolite (alternative name) (177) + TX, CS 708 (development code) (1012) + TX, cyanofenphos (1019) + TX,

cyanophos (184) + TX, cyanthoate (1020) + TX, cyclethrin [CCN] + TX, cycloprothrin (188) + TX, cyfluthrin (193) + TX, cyhalothrin (196) + TX, cypermethrin (201) + TX, cyphenothrin (206) + TX, cyromazine (209) + TX, cythioate (alternative name) [CCN] + TX, *d*-limonene (alternative name) [CCN] + TX, *d*-tetramethrin (alternative name) (788) + TX, DAEP (1031) + TX, dazomet (216) + TX, DDT (219) + TX, decarbofuran (1034) + TX, deltamethrin (223) + TX, demephion (1037) + TX, demephion-O (1037) + TX, demephion-S (1037) + TX, demeton (1038) + TX, demeton-methyl (224) + TX, demeton-O (1038) + TX, demeton-O-methyl (224) + TX, demeton-S (1038) + TX, demeton-S-methyl (224) + TX, demeton-S-methylsulphon (1039) + TX, diafenthuron (226) + TX, dialifos (1042) + TX, diamidafos (1044) + TX, diazinon (227) + TX, dicapthon (1050) + TX, dichlofenthion (1051) + TX, dichlorvos (236) + TX, dicliphos (alternative name) + TX, dicresyl (alternative name) [CCN] + TX, dicrotophos (243) + TX, dicyclanil (244) + TX, dieldrin (1070) + TX, diethyl 5-methylpyrazol-3-yl phosphate (IUPAC name) (1076) + TX, diflubenzuron (250) + TX, dilor (alternative name) [CCN] + TX, dimefluthrin [CCN] + TX, dimefox (1081) + TX, dimetan (1085) + TX, dimethoate (262) + TX, dimethrin (1083) + TX, dimethylvinphos (265) + TX, dimetilan (1086) + TX, dinex (1089) + TX, dinex-diclexine (1089) + TX, dinoprop (1093) + TX, dinosam (1094) + TX, dinoseb (1095) + TX, dinotefuran (271) + TX, diofenolan (1099) + TX, dioxabenzofos (1100) + TX, dioxacarb (1101) + TX, dioxathion (1102) + TX, disulfoton (278) + TX, dithicrofos (1108) + TX, DNOC (282) + TX, doramectin (alternative name) [CCN] + TX, DSP (1115) + TX, ecdysterone (alternative name) [CCN] + TX, EI 1642 (development code) (1118) + TX, emamectin (291) + TX, emamectin benzoate (291) + TX, EMPC (1120) + TX, empenthrin (292) + TX, endosulfan (294) + TX, endothion (1121) + TX, endrin (1122) + TX, EPBP (1123) + TX, EPN (297) + TX, epofenonane (1124) + TX, eprinomectin (alternative name) [CCN] + TX, esfenvalerate (302) + TX, etaphos (alternative name) [CCN] + TX, ethiofencarb (308) + TX, ethion (309) + TX, ethiprole (310) + TX, ethoate-methyl (1134) + TX, ethoprophos (312) + TX, ethyl formate (IUPAC name) [CCN] + TX, ethyl-DDD (alternative name) (1056) + TX, ethylene dibromide (316) + TX, ethylene dichloride (chemical name) (1136) + TX, ethylene oxide [CCN] + TX, etofenprox (319) + TX, etrimfos (1142) + TX, EXD (1143) + TX, famphur (323) + TX, fenamiphos (326) + TX, fenazaflor (1147) + TX, fenchlorphos (1148) + TX, fenethacarb (1149) + TX, fenfluthrin (1150) + TX, fenitrothion (335) + TX, fenobucarb (336) + TX, fenoxacrim (1153) + TX, fenoxycarb (340) + TX, fenpirithrin (1155) + TX, fenpropathrin (342) + TX, fenpyrad (alternative name) + TX, fensulfothion (1158) + TX, fenthion (346) + TX, fenthion-ethyl [CCN] + TX, fenvalerate (349) + TX, fipronil (354) + TX, flonicamid (358) + TX, flubendiamide (CAS. Reg. No.: 272451-65-7) + TX, flucofuron (1168) + TX, flucyclohexuron (366) + TX, flucythrinate (367) + TX, fluenetil (1169) + TX, flufenerim [CCN] + TX, flufenoxuron (370) + TX, flufenprox (1171) + TX, flumethrin (372) + TX, fluvalinate (1184) + TX, FMC 1137 (development code) (1185) + TX, fonofos (1191) + TX, formetanate (405) + TX, formetanate hydrochloride (405) + TX, formothion (1192) + TX, formparanate (1193) + TX, fosmethilan (1194) + TX, fospirate (1195) + TX, fosthiazate (408) + TX, fosthietan (1196) + TX, furathiocarb (412) + TX, furethrin (1200) + TX, gamma-cyhalothrin (197) + TX, gamma-HCH (430) + TX, guazatine (422) + TX, guazatine acetates (422) + TX, GY-81 (development code) (423) + TX, halfenprox (424) + TX, halofenozide (425) + TX, HCH (430) + TX, HEOD (1070) + TX, heptachlor (1211) + TX, heptenophos (432) + TX, heterophos [CCN] + TX, hexaflumuron (439) + TX, HHDN (864) + TX, hydramethylnon (443) + TX, hydrogen cyanide (444) + TX, hydroprene (445) + TX, hyquincarb (1223)

+ TX, imidacloprid (458) + TX, imiprothrin (460) + TX, indoxacarb (465) + TX, iodomethane (IUPAC name) (542) + TX, IPSP (1229) + TX, isazofos (1231) + TX, isobenzan (1232) + TX, isocarbophos (alternative name) (473) + TX, isodrin (1235) + TX, isofenphos (1236) + TX, isolane (1237) + TX, isoprocarb (472) + TX, isopropyl O-(methoxyaminothiophosphoryl)salicylate (IUPAC name) (473) + TX, 5 isoprothiolane (474) + TX, isothioate (1244) + TX, isoxathion (480) + TX, ivermectin (alternative name) [CCN] + TX, jasmolin I (696) + TX, jasmolin II (696) + TX, jodfenphos (1248) + TX, juvenile hormone I (alternative name) [CCN] + TX, juvenile hormone II (alternative name) [CCN] + TX, juvenile hormone III (alternative name) [CCN] + TX, kelevan (1249) + TX, kinoprene (484) + TX, lambda-cyhalothrin (198) + TX, lead arsenate [CCN] + TX, lepimectin (CCN) + TX, leptophos (1250) + TX, lindane (430) + TX, 10 lirimfos (1251) + TX, lufenuron (490) + TX, lythidathion (1253) + TX, *m*-cumenyl methylcarbamate (IUPAC name) (1014) + TX, magnesium phosphide (IUPAC name) (640) + TX, malathion (492) + TX, malonoben (1254) + TX, mazidox (1255) + TX, mecarbam (502) + TX, mecarphon (1258) + TX, menazon (1260) + TX, mephosfolan (1261) + TX, mercurous chloride (513) + TX, mesulfenfos (1263) + TX, metaflumizone (CCN) + TX, metam (519) + TX, metam-potassium (alternative name) (519) + TX, 15 metam-sodium (519) + TX, methacrifos (1266) + TX, methamidophos (527) + TX, methanesulfonyl fluoride (IUPAC/Chemical Abstracts name) (1268) + TX, methidathion (529) + TX, methiocarb (530) + TX, methocrotophos (1273) + TX, methomyl (531) + TX, methoprene (532) + TX, methoquin-butyl (1276) + TX, methothrin (alternative name) (533) + TX, methoxychlor (534) + TX, methoxyfenozide (535) + TX, methyl bromide (537) + TX, methyl isothiocyanate (543) + TX, methylchloroform (alternative name) [CCN] + TX, 20 methylene chloride [CCN] + TX, metofluthrin [CCN] + TX, metolcarb (550) + TX, metoxadiazone (1288) + TX, mevinphos (556) + TX, mexacarbate (1290) + TX, milbemectin (557) + TX, milbemycin oxime (alternative name) [CCN] + TX, mipafox (1293) + TX, mirex (1294) + TX, monocrotophos (561) + TX, morphothion (1300) + TX, moxidectin (alternative name) [CCN] + TX, naftalofos (alternative name) [CCN] + TX, 25 naled (567) + TX, naphthalene (IUPAC/Chemical Abstracts name) (1303) + TX, NC-170 (development code) (1306) + TX, NC-184 (compound code) + TX, nicotine (578) + TX, nicotine sulfate (578) + TX, nifluridide (1309) + TX, nitenpyram (579) + TX, nithiazine (1311) + TX, nitrilacarb (1313) + TX, nitrilacarb 1:1 zinc chloride complex (1313) + TX, NNI-0101 (compound code) + TX, NNI-0250 (compound code) + TX, nor nicotine (traditional name) (1319) + TX, novaluron (585) + TX, noviflumuron (586) + TX, O-5-dichloro-4-iodophenyl O-ethyl ethylphosphonothioate (IUPAC name) 30 (1057) + TX, O,O-diethyl O-4-methyl-2-oxo-2*H*-chromen-7-yl phosphorothioate (IUPAC name) (1074) + TX, O,O-diethyl O-6-methyl-2-propylpyrimidin-4-yl phosphorothioate (IUPAC name) (1075) + TX, O,O,O',O'-tetrapropyl dithiopyrophosphate (IUPAC name) (1424) + TX, oleic acid (IUPAC name) (593) + TX, omethoate (594) + TX, oxamyl (602) + TX, oxydemeton-methyl (609) + TX, oxydeprofos (1324) + TX, oxydisulfoton (1325) + TX, pp'-DDT (219) + TX, para-dichlorobenzene [CCN] + TX, 35 parathion (615) + TX, parathion-methyl (616) + TX, penfluron (alternative name) [CCN] + TX, pentachlorophenol (623) + TX, pentachlorophenyl laurate (IUPAC name) (623) + TX, permethrin (626) + TX, petroleum oils (alternative name) (628) + TX, PH 60-38 (development code) (1328) + TX, phenkapton (1330) + TX, phenothrin (630) + TX, phenthoate (631) + TX, phorate (636) + TX, phosalone (637) + TX, phosfolan (1338) + TX, phosmet (638) + TX, phosnichlor (1339) + TX, phosphamidon (639) 40 + TX, phosphine (IUPAC name) (640) + TX, phoxim (642) + TX, phoxim-methyl (1340) + TX,

pirimetaphos (1344) + TX, pirimicarb (651) + TX, pirimiphos-ethyl (1345) + TX, pirimiphos-methyl (652) + TX, polychlorodicyclopentadiene isomers (IUPAC name) (1346) + TX, polychloroterpenes (traditional name) (1347) + TX, potassium arsenite [CCN] + TX, potassium thiocyanate [CCN] + TX, prallethrin (655) + TX, precocene I (alternative name) [CCN] + TX, precocene II (alternative name) [CCN] + TX, precocene III (alternative name) [CCN] + TX, primidophos (1349) + TX, profenofos (662) + TX, profluthrin [CCN] + TX, promacyl (1354) + TX, promecarb (1355) + TX, propaphos (1356) + TX, propetamphos (673) + TX, propoxur (678) + TX, prothidathion (1360) + TX, prothiofos (686) + TX, prothoate (1362) + TX, protrifenbute [CCN] + TX, pymetrozine (688) + TX, pyraclofos (689) + TX, pyrazophos (693) + TX, pyresmethrin (1367) + TX, pyrethrin I (696) + TX, pyrethrin II (696) + TX, pyrethrins (696) + TX, pyridaben (699) + TX, pyridalyl (700) + TX, pyridaphenthion (701) + TX, pyrimidifen (706) + TX, pyrimitate (1370) + TX, pyriproxyfen (708) + TX, quassia (alternative name) [CCN] + TX, quinalphos (711) + TX, quinalphos-methyl (1376) + TX, quinotion (1380) + TX, quintiofos (1381) + TX, R-1492 (development code) (1382) + TX, rafoxanide (alternative name) [CCN] + TX, resmethrin (719) + TX, rotenone (722) + TX, RU 15525 (development code) (723) + TX, RU 25475 (development code) (1386) + TX, ryania (alternative name) (1387) + TX, ryanodine (traditional name) (1387) + TX, sabadilla (alternative name) (725) + TX, schradan (1389) + TX, sebufos (alternative name) + TX, selamectin (alternative name) [CCN] + TX, SI-0009 (compound code) + TX, SI-0205 (compound code) + TX, SI-0404 (compound code) + TX, SI-0405 (compound code) + TX, silafluofen (728) + TX, SN 72129 (development code) (1397) + TX, sodium arsenite [CCN] + TX, sodium cyanide (444) + TX, sodium fluoride (IUPAC/Chemical Abstracts name) (1399) + TX, sodium hexafluorosilicate (1400) + TX, sodium pentachlorophenoxide (623) + TX, sodium selenate (IUPAC name) (1401) + TX, sodium thiocyanate [CCN] + TX, sophamide (1402) + TX, spinosad (737) + TX, spiromesifen (739) + TX, spirotetmat (CCN) + TX, sulcofuron (746) + TX, sulcofuron-sodium (746) + TX, sulfluramid (750) + TX, sulfotep (753) + TX, sulfuryl fluoride (756) + TX, sulprofos (1408) + TX, tar oils (alternative name) (758) + TX, tau-fluvalinate (398) + TX, tazimcarb (1412) + TX, TDE (1414) + TX, tebufenozide (762) + TX, tebufenpyrad (763) + TX, tebupirimfos (764) + TX, teflubenzuron (768) + TX, tefluthrin (769) + TX, temephos (770) + TX, TEPP (1417) + TX, terallethrin (1418) + TX, terbam (alternative name) + TX, terbufos (773) + TX, tetrachloroethane [CCN] + TX, tetrachlorvinphos (777) + TX, tetramethrin (787) + TX, theta-cypermethrin (204) + TX, thiacloprid (791) + TX, thiafenox (alternative name) + TX, thiamethoxam (792) + TX, thicrofos (1428) + TX, thiocarboxime (1431) + TX, thiocyclam (798) + TX, thiocyclam hydrogen oxalate (798) + TX, thiodicarb (799) + TX, thiofanox (800) + TX, thiometon (801) + TX, thionazin (1434) + TX, thiosultap (803) + TX, thiosultap-sodium (803) + TX, thuringiensin (alternative name) [CCN] + TX, tolfenpyrad (809) + TX, tralomethrin (812) + TX, transluthrin (813) + TX, transpermethrin (1440) + TX, triamiphos (1441) + TX, triazamate (818) + TX, triazophos (820) + TX, triazuron (alternative name) + TX, trichlorfon (824) + TX, trichlormetaphos-3 (alternative name) [CCN] + TX, trichloronat (1452) + TX, trifenofos (1455) + TX, triflumuron (835) + TX, trimethacarb (840) + TX, triprene (1459) + TX, vamidothion (847) + TX, vaniliprole [CCN] + TX, veratridine (alternative name) (725) + TX, veratrine (alternative name) (725) + TX, XMC (853) + TX, xylylcarb (854) + TX, YI-5302 (compound code) + TX, zeta-cypermethrin (205) + TX, zetamethrin (alternative name) + TX, zinc phosphide (640) + TX, zolaprofos (1469) and ZXI 8901 (development code) (858) + TX, cyantraniliprole

[736994-63-19 + TX, chlorantraniliprole [500008-45-7] + TX, cyenopyrafen [560121-52-0] + TX, cyflumetofen [400882-07-7] + TX, pyrifluquinazon [337458-27-2] + TX, spinetoram [187166-40-1 + 187166-15-0] + TX, spirotetramat [203313-25-1] + TX, sulfoxaflor [946578-00-3] + TX, flufiprole [704886-18-0] + TX, meperfluthrin [915288-13-0] + TX, tetramethylfluthrin [84937-88-2] + TX, triflumezopyrim (disclosed in WO 2012/092115) + TX,

a molluscicide selected from the group of substances consisting of bis(tributyltin) oxide (IUPAC name) (913) + TX, bromoacetamide [CCN] + TX, calcium arsenate [CCN] + TX, cloethocarb (999) + TX, copper acetoarsenite [CCN] + TX, copper sulfate (172) + TX, fentin (347) + TX, ferric phosphate (IUPAC name) (352) + TX, metaldehyde (518) + TX, methiocarb (530) + TX, niclosamide (576) + TX, niclosamide-olamine (576) + TX, pentachlorophenol (623) + TX, sodium pentachlorophenoxide (623) + TX, tazimcarb (1412) + TX, thiodicarb (799) + TX, tributyltin oxide (913) + TX, trifenmorph (1454) + TX, trimethacarb (840) + TX, triphenyltin acetate (IUPAC name) (347) and triphenyltin hydroxide (IUPAC name) (347) + TX, pyriprole [394730-71-3] + TX,

a nematicide selected from the group of substances consisting of AKD-3088 (compound code) + TX, 1,2-dibromo-3-chloropropane (IUPAC/Chemical Abstracts name) (1045) + TX, 1,2-dichloropropane (IUPAC/ Chemical Abstracts name) (1062) + TX, 1,2-dichloropropane with 1,3-dichloropropene (IUPAC name) (1063) + TX, 1,3-dichloropropene (233) + TX, 3,4-dichlorotetrahydrothiophene 1,1-dioxide (IUPAC/Chemical Abstracts name) (1065) + TX, 3-(4-chlorophenyl)-5-methylrhodanine (IUPAC name) (980) + TX, 5-methyl-6-thioxo-1,3,5-thiadiazinan-3-ylacetic acid (IUPAC name) (1286) + TX, 6-isopentenylaminopurine (alternative name) (210) + TX, abamectin (1) + TX, acetoprole [CCN] + TX, alanycarb (15) + TX, aldicarb (16) + TX, aldoxycarb (863) + TX, AZ 60541 (compound code) + TX, benclotiaz [CCN] + TX, benomyl (62) + TX, butylpyridaben (alternative name) + TX, cadusafos (109) + TX, carbofuran (118) + TX, carbon disulfide (945) + TX, carbosulfan (119) + TX, chloropicrin (141) + TX, chlorpyrifos (145) + TX, cloethocarb (999) + TX, cytokinins (alternative name) (210) + TX, dazomet (216) + TX, DBCP (1045) + TX, DCIP (218) + TX, diamidafos (1044) + TX, dichlofenthion (1051) + TX, dicliphos (alternative name) + TX, dimethoate (262) + TX, doramectin (alternative name) [CCN] + TX, emamectin (291) + TX, emamectin benzoate (291) + TX, eprinomectin (alternative name) [CCN] + TX, ethoprophos (312) + TX, ethylene dibromide (316) + TX, fenamiphos (326) + TX, fenpyrad (alternative name) + TX, fensulfthion (1158) + TX, fosthiazate (408) + TX, fosthietan (1196) + TX, furfural (alternative name) [CCN] + TX, GY-81 (development code) (423) + TX, heterophos [CCN] + TX, iodomethane (IUPAC name) (542) + TX, isamidofos (1230) + TX, isazofos (1231) + TX, ivermectin (alternative name) [CCN] + TX, kinetin (alternative name) (210) + TX, mecarphon (1258) + TX, metam (519) + TX, metam-potassium (alternative name) (519) + TX, metam-sodium (519) + TX, methyl bromide (537) + TX, methyl isothiocyanate (543) + TX, milbemycin oxime (alternative name) [CCN] + TX, moxidectin (alternative name) [CCN] + TX, *Myrothecium verrucaria* composition (alternative name) (565) + TX, NC-184 (compound code) + TX, oxamyl (602) + TX, phorate (636) + TX, phosphamidon (639) + TX, phosphocarb [CCN] + TX, sebufos (alternative name) + TX, selamectin (alternative name) [CCN] + TX, spinosad (737) + TX, terbam (alternative name) + TX, terbufos (773) + TX, tetrachlorothiophene (IUPAC/ Chemical Abstracts name) (1422) + TX, thiafenox (alternative name) + TX, thionazin (1434) +

TX, triazophos (820) + TX, triazuron (alternative name) + TX, xylenols [CCN] + TX, YI-5302 (compound code) and zeatin (alternative name) (210) + TX, fluensulfone [318290-98-1] + TX,

a nitrification inhibitor selected from the group of substances consisting of potassium ethylxanthate [CCN] and nitrapyrin (580) + TX,

5 a plant activator selected from the group of substances consisting of acibenzolar (6) + TX, acibenzolar-S-methyl (6) + TX, probenazole (658) and *Reynoutria sachalinensis* extract (alternative name) (720) + TX,

a rodenticide selected from the group of substances consisting of 2-isovalerylindan-1,3-dione (IUPAC name) (1246) + TX, 4-(quinoxalin-2-ylamino)benzenesulfonamide (IUPAC name) (748) + TX,
10 alpha-chlorohydrin [CCN] + TX, aluminium phosphide (640) + TX, antu (880) + TX, arsenous oxide (882) + TX, barium carbonate (891) + TX, bisthiosemi (912) + TX, brodifacoum (89) + TX, bromadiolone (91) + TX, bromethalin (92) + TX, calcium cyanide (444) + TX, chloralose (127) + TX, chlorophacinone (140) + TX, cholecalciferol (alternative name) (850) + TX, coumachlor (1004) + TX, coumafuryl (1005) + TX, coumatetralyl (175) + TX, crimidine (1009) + TX, difenacoum (246) + TX, difethialone (249) + TX,
15 diphacinone (273) + TX, ergocalciferol (301) + TX, flocoumafen (357) + TX, fluoroacetamide (379) + TX, flupropradine (1183) + TX, flupropradine hydrochloride (1183) + TX, gamma-HCH (430) + TX, HCH (430) + TX, hydrogen cyanide (444) + TX, iodomethane (IUPAC name) (542) + TX, lindane (430) + TX, magnesium phosphide (IUPAC name) (640) + TX, methyl bromide (537) + TX, norbormide (1318) + TX, phosacetim (1336) + TX, phosphine (IUPAC name) (640) + TX, phosphorus [CCN] + TX, pindone
20 (1341) + TX, potassium arsenite [CCN] + TX, pyrinuron (1371) + TX, scilliroside (1390) + TX, sodium arsenite [CCN] + TX, sodium cyanide (444) + TX, sodium fluoroacetate (735) + TX, strychnine (745) + TX, thallium sulfate [CCN] + TX, warfarin (851) and zinc phosphide (640) + TX,

a synergist selected from the group of substances consisting of 2-(2-butoxyethoxy)ethyl piperonylate (IUPAC name) (934) + TX, 5-(1,3-benzodioxol-5-yl)-3-hexylcyclohex-2-enone (IUPAC
25 name) (903) + TX, farnesol with nerolidol (alternative name) (324) + TX, MB-599 (development code) (498) + TX, MGK 264 (development code) (296) + TX, piperonyl butoxide (649) + TX, piprotal (1343) + TX, propyl isomer (1358) + TX, S421 (development code) (724) + TX, sesamex (1393) + TX, sesasmolin (1394) and sulfoxide (1406) + TX,

an animal repellent selected from the group of substances consisting of anthraquinone (32) +
30 TX, chloralose (127) + TX, copper naphthenate [CCN] + TX, copper oxychloride (171) + TX, diazinon (227) + TX, dicyclopentadiene (chemical name) (1069) + TX, guazatine (422) + TX, guazatine acetates (422) + TX, methiocarb (530) + TX, pyridin-4-amine (IUPAC name) (23) + TX, thiram (804) + TX, trimethacarb (840) + TX, zinc naphthenate [CCN] and ziram (856) + TX,

a virucide selected from the group of substances consisting of imanin (alternative name) [CCN]
35 and ribavirin (alternative name) [CCN] + TX,

a wound protectant selected from the group of substances consisting of mercuric oxide (512) + TX, octhilinone (590) and thiophanate-methyl (802) + TX,

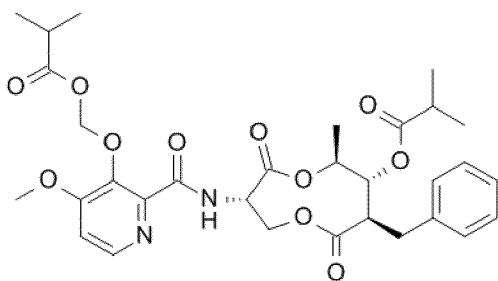
and biologically active compounds selected from the group consisting of ametocetradin [865318-
97-4] + TX, amisulbrom [348635-87-0] + TX, azaconazole [60207-31-0] + TX, benzovindiflupyr
40 [1072957-71-1] + TX, bitertanol [70585-36-3] + TX, bixafen [581809-46-3] + TX, bromuconazole

[116255-48-2] + TX, coumoxystrobin [850881-70-8] + TX, cyproconazole [94361-06-5] + TX, difenoconazole [119446-68-3] + TX, diniconazole [83657-24-3] + TX, enoxastrobin [238410-11-2] + TX, epoxiconazole [106325-08-0] + TX, fenbuconazole [114369-43-6] + TX, fenpyrazamine [473798-59-3] + TX, fluquinconazole [136426-54-5] + TX, flusilazole [85509-19-9] + TX, flutriafol [76674-21-0] + TX, fluxapyroxad [907204-31-3] + TX, fluopyram [658066-35-4] + TX, fenaminstrobin [366815-39-6] + TX, isofetamid [875915-78-9] + TX, hexaconazole [79983-71-4] + TX, imazalil [35554-44-0] + TX, imibenconazole [86598-92-7] + TX, ipconazole [125225-28-7] + TX, ipfentrifluconazole [1417782-08-1] + TX, isotianil [224049-04-1] + TX, mandestrobin [173662-97-0] (can be prepared according to the procedures described in WO 2010/093059) + TX, mefentrifluconazole [1417782-03-6] + TX, metconazole [125116-23-6] + TX, myclobutanil [88671-89-0] + TX, paclobutrazol [76738-62-0] + TX, pefurazoate [101903-30-4] + TX, penflufen [494793-67-8] + TX, penconazole [66246-88-6] + TX, prothioconazole [178928-70-6] + TX, pyrifenox [88283-41-4] + TX, prochloraz [67747-09-5] + TX, propiconazole [60207-90-1] + TX, simeconazole [149508-90-7] + TX, tebuconazole [107534-96-3] + TX, tetraconazole [112281-77-3] + TX, triadimefon [43121-43-3] + TX, triadimenol [55219-65-3] + TX, triflumizole [99387-89-0] + TX, triticonazole [131983-72-7] + TX, ancymidol [12771-68-5] + TX, fenarimol [60168-88-9] + TX, nuarimol [63284-71-9] + TX, bupirimate [41483-43-6] + TX, dimethirimol [5221-53-4] + TX, ethirimol [23947-60-6] + TX, dodemorph [1593-77-7] + TX, fenpropidin [67306-00-7] + TX, fenpropimorph [67564-91-4] + TX, spiroxamine [118134-30-8] + TX, tridemorph [81412-43-3] + TX, cyprodinil [121552-61-2] + TX, mepanipyrim [110235-47-7] + TX, pyrimethanil [53112-28-0] + TX, fempiclonil [74738-17-3] + TX, fludioxonil [131341-86-1] + TX, fluindapyr [1383809-87-7] + TX, benalaxyl [71626-11-4] + TX, furalaxyl [57646-30-7] + TX, metalaxyl [57837-19-1] + TX, R-metalaxyl [70630-17-0] + TX, ofurace [58810-48-3] + TX, oxadixyl [77732-09-3] + TX, benomyl [17804-35-2] + TX, carbendazim [10605-21-7] + TX, debacarb [62732-91-6] + TX, fuberidazole [3878-19-1] + TX, thiabendazole [148-79-8] + TX, chlozolate [84332-86-5] + TX, dichlozoline [24201-58-9] + TX, iprodione [36734-19-7] + TX, myclozoline [54864-61-8] + TX, procymidone [32809-16-8] + TX, vinclozoline [50471-44-8] + TX, boscalid [188425-85-6] + TX, carboxin [5234-68-4] + TX, fenfuram [24691-80-3] + TX, flutolanil [66332-96-5] + TX, flutianil [958647-10-4] + TX, mepronil [55814-41-0] + TX, oxycarboxin [5259-88-1] + TX, penthiopyrad [183675-82-3] + TX, thifluzamide [130000-40-7] + TX, guazatine [108173-90-6] + TX, dodine [2439-10-3] [112-65-2] (free base) + TX, iminoctadine [13516-27-3] + TX, azoxystrobin [131860-33-8] + TX, dimoxystrobin [149961-52-4] + TX, enestroburin {Proc. BCPC, Int. Congr., Glasgow, 2003, 1, 93} + TX, fluoxastrobin [361377-29-9] + TX, kresoxim-methyl [143390-89-0] + TX, metominostrobin [133408-50-1] + TX, trifloxystrobin [141517-21-7] + TX, orysastrobin [248593-16-0] + TX, picoxystrobin [117428-22-5] + TX, pyraclostrobin [175013-18-0] + TX, pyraoxystrobin [862588-11-2] + TX, ferbam [14484-64-1] + TX, mancozeb [8018-01-7] + TX, maneb [12427-38-2] + TX, metiram [9006-42-2] + TX, propineb [12071-83-9] + TX, thiram [137-26-8] + TX, zineb [12122-67-7] + TX, ziram [137-30-4] + TX, captafol [2425-06-1] + TX, captan [133-06-2] + TX, dichlofluanid [1085-98-9] + TX, fluoroimide [41205-21-4] + TX, folpet [133-07-3] + TX, tolylfluanid [731-27-1] + TX, bordeaux mixture [8011-63-0] + TX, copperhydroxid [20427-59-2] + TX, copperoxychlorid [1332-40-7] + TX, coppersulfat [7758-98-7] + TX, copperoxid [1317-39-1] + TX, mancopper [53988-93-5] + TX, oxine-copper [10380-28-6] + TX, dinocap [131-72-6] + TX, nitrothal-isopropyl [10552-74-6] + TX, edifenphos [17109-49-8] + TX, iprobenphos

[26087-47-8] + TX, isoprothiolane [50512-35-1] + TX, phosdiphen [36519-00-3] + TX, pyrazophos
 [13457-18-6] + TX, tolclofos-methyl [57018-04-9] + TX, acibenzolar-S-methyl [135158-54-2] + TX,
 anilazine [101-05-3] + TX, benthiaivalicarb [413615-35-7] + TX, blasticidin-S [2079-00-7] + TX,
 chinomethionat [2439-01-2] + TX, chloroneb [2675-77-6] + TX, chlorothalonil [1897-45-6] + TX,
 5 cyflufenamid [180409-60-3] + TX, cymoxanil [57966-95-7] + TX, dichlone [117-80-6] + TX, diclocymet
 [139920-32-4] + TX, diclomezine [62865-36-5] + TX, dicloran [99-30-9] + TX, diethofencarb [87130-20-
 9] + TX, dimethomorph [110488-70-5] + TX, SYP-LI90 (Flumorph) [211867-47-9] + TX, dithianon [3347-
 22-6] + TX, ethaboxam [162650-77-3] + TX, etridiazole [2593-15-9] + TX, famoxadone [131807-57-3]
 + TX, fenamidone [161326-34-7] + TX, fenoxanil [115852-48-7] + TX, fentin [668-34-8] + TX, ferimzone
 10 [89269-64-7] + TX, fluazinam [79622-59-6] + TX, fluopicolide [239110-15-7] + TX, flusulfamide [106917-
 52-6] + TX, fenhexamid [126833-17-8] + TX, fosetyl-aluminium [39148-24-8] + TX, hymexazol [10004-
 44-1] + TX, iprovalicarb [140923-17-7] + TX, IKF-916 (Cyazofamid) [120116-88-3] + TX, kasugamycin
 [6980-18-3] + TX, methasulfocarb [66952-49-6] + TX, metrafenone [220899-03-6] + TX, pencycuron
 [66063-05-6] + TX, phthalide [27355-22-2] + TX, picarbutrazox [500207-04-5] + TX, polyoxins [11113-
 15 80-7] + TX, probenazole [27605-76-1] + TX, propamocarb [25606-41-1] + TX, proquinazid [189278-12-
 4] + TX, pydiflumetofen [1228284-64-7] + TX, pyrametostrobin [915410-70-7] + TX, pyroquilon [57369-
 32-1] + TX, pyriofenone [688046-61-9] + TX, pyribencarb [799247-52-2] + TX, pyrisoxazole [847749-
 37-5] + TX, quinoxifen [124495-18-7] + TX, quintozene [82-68-8] + TX, sulfur [7704-34-9] + TX, Timorex
 Gold™ (plant extract containing tea tree oil from the Stockton Group) + TX, tebufloquin [376645-78-2]
 20 + TX, tiadinil [223580-51-6] + TX, triazoxide [72459-58-6] + TX, tolprocarb [911499-62-2] + TX,
 triclopyricarb [902760-40-1] + TX, tricyclazole [41814-78-2] + TX, triforine [26644-46-2] + TX,
 validamycin [37248-47-8] + TX, valifenalate [283159-90-0] + TX, zoxamide (RH7281) [156052-68-5] +
 TX, mandipropamid [374726-62-2] + TX, isopyrazam [881685-58-1] + TX, phenamacril + TX, sedaxane
 [874967-67-6] + TX, trinexapac-ethyl [95266-40-3] + TX, 3-difluoromethyl-1-methyl-1H-pyrazole-4-
 25 carboxylic acid (9-dichloromethylene-1,2,3,4-tetrahydro-1,4-methano-naphthalen-5-yl)-amide (disclosed
 in WO 2007/048556) + TX, 3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxylic acid (3',4',5'-trifluoro-
 biphenyl-2-yl)-amide (disclosed in WO 2006/087343) + TX, [(3*S*,4*R*,4*aR*,6*S*,6*aS*,12*R*,12*aS*,12*bS*)-3-
 [(cyclopropylcarbonyl)oxy]- 1,3,4,4*a*,5,6,6*a*,12,12*a*,12*b*-decahydro-6,12-dihydroxy-4,6*a*,12*b*-trimethyl-
 11-oxo-9-(3-pyridinyl)-2*H*,11*H*naphtho[2,1-*b*]pyrano[3,4-*e*]pyran-4-yl]methyl-cyclopropanecarboxylate
 30 [915972-17-7] + TX and 1,3,5-trimethyl-N-(2-methyl-1-oxopropyl)-N-[3-(2-methylpropyl)-4-[2,2,2-
 trifluoro-1-methoxy-1-(trifluoromethyl)ethyl]phenyl]-1H-pyrazole-4-carboxamide [926914-55-8] + TX,
 or a biologically active compound selected from the group consisting of N-[(5-chloro-2-
 isopropyl-phenyl)methyl]-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-pyrazole-4-carboxamide
 (can be prepared according to the procedures described in WO 2010/130767) + TX, 2,6-Dimethyl-
 35 1*H*,5*H*-[1,4]dithiino[2,3-*c*:5,6-*c'*]dipyrrole-1,3,5,7(2*H*,6*H*)-tetrone (can be prepared according to the
 procedures described in WO 2011/138281) + TX, 6-ethyl-5,7-dioxo-pyrrolo[4,5][1,4]dithiino[1,2-
c]isothiazole-3-carbonitrile + TX, 4-(2-bromo-4-fluoro-phenyl)-N-(2-chloro-6-fluoro-phenyl)-2,5-
 dimethyl-pyrazol-3-amine (can be prepared according to the procedures described in WO
 2012/031061) + TX, 3-(difluoromethyl)-N-(7-fluoro-1,1,3-trimethyl-indan-4-yl)-1-methyl-pyrazole-4-
 40 carboxamide (can be prepared according to the procedures described in WO 2012/084812) + TX, CAS

850881-30-0 + TX, 3-(3,4-dichloro-1,2-thiazol-5-ylmethoxy)-1,2-benzothiazole 1,1-dioxide (can be prepared according to the procedures described in WO 2007/129454) + TX, 2-[2-[(2,5-dimethylphenoxy)methyl]phenyl]-2-methoxy-N-methyl-acetamide + TX, 3-(4,4-difluoro-3,4-dihydro-3,3-dimethylisoquinolin-1-yl)quinolone (can be prepared according to the procedures described in WO
5 2005/070917) + TX, 2-[2-fluoro-6-[(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol (can be prepared according to the procedures described in WO 2011/081174) + TX, 2-[2-[(7,8-difluoro-2-methyl-3-quinolyl)oxy]-6-fluoro-phenyl]propan-2-ol (can be prepared according to the procedures described in WO 2011/081174) + TX, oxathiapiprolin + TX [1003318-67-9], tert-butyl N-[6-[[[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate + TX, N-[2-(3,4-
10 difluorophenyl)phenyl]-3-(trifluoromethyl)pyrazine-2-carboxamide (can be prepared according to the procedures described in WO 2007/ 072999) + TX, 3-(difluoromethyl)-1-methyl-N-[(3R)-1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide (can be prepared according to the procedures described in WO 2014/013842) + TX, 2,2,2-trifluoroethyl N-[2-methyl-1-[[[4-methylbenzoyl]amino]methyl]propyl]carbamate + TX, (2RS)-2-[4-(4-chlorophenoxy)- α,α,α -trifluoro-*o*-tolyl]-1-(1H-1,2,4-triazol-1-yl)propan-2-ol + TX, (2RS)-2-[4-(4-chlorophenoxy)- α,α,α -trifluoro-*o*-tolyl]-3-methyl-1-(1H-1,2,4-triazol-1-yl)butan-2-ol + TX, 2-(difluoromethyl)-N-[(3R)-3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-[3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX, N'-(2,5-dimethyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine + TX, N'-[4-(4,5-dichlorothiazol-2-yl)oxy-2,5-dimethyl-phenyl]-N-ethyl-N-methyl-formamidine (can be prepared
20 according to the procedures described in WO 2007/031513) + TX, [2-[3-[2-[1-[2-[3,5-bis(difluoromethyl)pyrazol-1-yl]acetyl]-4-piperidyl]thiazol-4-yl]-4,5-dihydroisoxazol-5-yl]-3-chloro-phenyl] methanesulfonate (can be prepared according to the procedures described in WO 2012/025557) + TX, but-3-ynyl N-[6-[[[Z]-[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate (can be prepared according to the procedures described in WO 2010/000841) +
25 TX, 2-[[3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl]-4H-1,2,4-triazole-3-thione (can be prepared according to the procedures described in WO 2010/146031) + TX, methyl N-[[5-[4-(2,4-dimethylphenyl)triazol-2-yl]-2-methyl-phenyl]methyl]carbamate + TX, 3-chloro-6-methyl-5-phenyl-4-(2,4,6-trifluorophenyl)pyridazine (can be prepared according to the procedures described in WO 2005/121104) + TX, 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1,2,4-triazol-1-yl)propan-2-ol (can be prepared according to the procedures described in WO 2013/024082) + TX, 3-chloro-4-(2,6-difluorophenyl)-6-methyl-5-phenyl-pyridazine (can be prepared according to the procedures described in WO 2012/020774) + TX, 4-(2,6-difluorophenyl)-6-methyl-5-phenyl-pyridazine-3-carbonitrile (can be prepared according to the procedures described in WO 2012/020774) + TX, (R)-3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide (can be prepared according to the
35 procedures described in WO 2011/162397) + TX, 3-(difluoromethyl)-N-(7-fluoro-1,1,3-trimethyl-indan-4-yl)-1-methyl-pyrazole-4-carboxamide (can be prepared according to the procedures described in WO 2012/084812) + TX, 1-[2-[[1-(4-chlorophenyl)pyrazol-3-yl]oxymethyl]-3-methyl-phenyl]-4-methyl-tetrazol-5-one (can be prepared according to the procedures described in WO 2013/162072) + TX, 1-methyl-4-[3-methyl-2-[[2-methyl-4-(3,4,5-trimethylpyrazol-1-yl)phenoxy]methyl]phenyl]tetrazol-5-one
40 (can be prepared according to the procedures described in WO 2014/051165) + TX, (Z,E)-5-[1-(4-

chlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-pent-3-enamide + TX, (4-phenoxyphenyl)methyl 2-amino-6-methyl-pyridine-3-carboxylate + TX, N-(5-chloro-2-isopropylbenzyl)-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methylpyrazole-4-carboxamide [1255734-28-1] (can be prepared according to the procedures described in WO 2010/130767) + TX, 3-(difluoromethyl)-N-[(R)-2,3-dihydro-1,1,3-trimethyl-1H-inden-4-yl]-1-methylpyrazole-4-carboxamide [1352994-67-2] + TX, N'-(2,5-dimethyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine + TX, N'-[4-(4,5-dichloro-thiazol-2-yloxy)-2,5-dimethyl-phenyl]-N-ethyl-N-methyl-formamidine + TX, N'-(2,5-dimethyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine + TX, N'-[4-(4,5-dichloro-thiazol-2-yloxy)-2,5-dimethyl-phenyl]-N-ethyl-N-methyl-formamidine + TX,



(fenpicoxamid [517875-34-2]) + TX (as described in WO

2003/035617), 2-(difluoromethyl)-N-(1,1,3-trimethylindan-4-yl)pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-(3-ethyl-1,1-dimethyl-indan-4-yl)pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-(1,1-dimethyl-3-propyl-indan-4-yl)pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-(3-isobutyl-1,1-dimethyl-indan-4-yl)pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-[(3R)-1,1,3-trimethylindan-4-yl]pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-[(3R)-3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX, and 2-(difluoromethyl)-N-[(3R)-1,1-dimethyl-3-propyl-indan-4-yl]pyridine-3-carboxamide + TX, wherein each of these carboxamide compounds can be prepared according to the procedures described in WO 2014/095675 and/or WO 2016/139189.

The references in brackets behind the active ingredients, e.g. [3878-19-1] refer to the Chemical Abstracts Registry number. The above described mixing partners are known. Where the active ingredients are included in "The Pesticide Manual" [The Pesticide Manual - A World Compendium; Thirteenth Edition; Editor: C. D. S. Tomlin; The British Crop Protection Council], they are described therein under the entry number given in round brackets hereinabove for the particular compound; for example, the compound "abamectin" is described under entry number (1). Where "[CCN]" is added hereinabove to the particular compound, the compound in question is included in the "Compendium of Pesticide Common Names", which is accessible on the internet [A. Wood; Compendium of Pesticide Common Names, Copyright © 1995-2004]; for example, the compound "acetoprole" is described under the internet address <http://www.alanwood.net/pesticides/acetoprole.html>.

Most of the active ingredients described above are referred to hereinabove by a so-called "common name", the relevant "ISO common name" or another "common name" being used in individual cases. If the designation is not a "common name", the nature of the designation used instead is given in round brackets for the particular compound; in that case, the IUPAC name, the IUPAC/Chemical Abstracts name, a "chemical name", a "traditional name", a "compound name" or a "development code"

is used or, if neither one of those designations nor a "common name" is used, an "alternative name" is employed. "CAS Reg. No" means the Chemical Abstracts Registry Number.

The active ingredient mixture of the compounds of formula (I) selected from one compound as represented in Tables 1.1A to 1.8A, Tables 1.1B to 1.8B, Tables 2.1A to 2.3A, Tables 2.1B to 2.3B (below), or in the compounds 1.1 to 1.10 described in Table T1 (below) or the compounds 2.1 to 2.80 described in Table T2 (below), preferably in a mixing ratio of from 100:1 to 1:6000, especially from 50:1 to 1:50, more especially in a ratio of from 20:1 to 1:20, even more especially from 10:1 to 1:10, very especially from 5:1 and 1:5, special preference being given to a ratio of from 2:1 to 1:2, and a ratio of from 4:1 to 2:1 being likewise preferred, above all in a ratio of 1:1, or 5:1, or 5:2, or 5:3, or 5:4, or 4:1, or 4:2, or 4:3, or 3:1, or 3:2, or 2:1, or 1:5, or 2:5, or 3:5, or 4:5, or 1:4, or 2:4, or 3:4, or 1:3, or 2:3, or 1:2, or 1:600, or 1:300, or 1:150, or 1:35, or 2:35, or 4:35, or 1:75, or 2:75, or 4:75, or 1:6000, or 1:3000, or 1:1500, or 1:350, or 2:350, or 4:350, or 1:750, or 2:750, or 4:750. Those mixing ratios are by weight.

The mixtures as described above can be used in a method for controlling pests, which comprises applying a composition comprising a mixture as described above to the pests or their environment, with the exception of a method for treatment of the human or animal body by surgery or therapy and diagnostic methods practised on the human or animal body.

The mixtures comprising a compound as represented in Tables 1.1A to 1.8A, Tables 1.1B to 1.8B, Tables 2.1A to 2.3A, Tables 2.1B to 2.3B (below), or a compound 1.1 to 1.10 described in Table T1 (below) or a compound 2.1 to 2.80 described in Table T2 (below), and one or more active ingredients as described above can be applied, for example, in a single "ready-mix" form, in a combined spray mixture composed from separate formulations of the single active ingredient components, such as a "tank-mix", and in a combined use of the single active ingredients when applied in a sequential manner, i.e. one after the other with a reasonably short period, such as a few hours or days. The order of applying the compounds as represented in Tables 1.1A to 1.8A, Tables 1.1B to 1.8B, Tables 2.1A to 2.3A, Tables 2.1B to 2.3B (below), or a compound 1.1 to 1.10 described in Table T1 (below) or a compound 2.1 to 2.80 described in Table T2 (below), and the active ingredient(s) as described above, is not essential for working the present invention.

The compositions according to the invention can also comprise further solid or liquid auxiliaries, such as stabilizers, for example unepoxidized or epoxidized vegetable oils (for example epoxidized coconut oil, rapeseed oil or soya oil), antifoams, for example silicone oil, preservatives, viscosity regulators, binders and/or tackifiers, fertilizers or other active ingredients for achieving specific effects, for example bactericides, fungicides, nematocides, plant activators, molluscicides or herbicides.

The compositions according to the invention are prepared in a manner known per se, in the absence of auxiliaries for example by grinding, screening and/or compressing a solid active ingredient and in the presence of at least one auxiliary for example by intimately mixing and/or grinding the active ingredient with the auxiliary (auxiliaries). These processes for the preparation of the compositions and the use of the compounds (I) for the preparation of these compositions are also a subject of the invention.

Another aspect of the invention is related to the use of a compound of Formula (I) or of a preferred individual compound as defined herein, of a composition comprising at least one compound of Formula (I) or at least one preferred individual compound as above-defined, or of a fungicidal or insecticidal mixture comprising at least one compound of Formula (I) or at least one preferred individual compound as above-defined, in admixture with other fungicides or insecticides as described above, for
5 controlling or preventing infestation of plants, e.g. useful plants such as crop plants, propagation material thereof, e.g. seeds, harvested crops, e.g. harvested food crops, or non-living materials by insects or by phytopathogenic microorganisms, preferably fungal organisms.

A further aspect of the invention is related to a method of controlling or preventing an infestation
10 of plants, e.g., useful plants such as crop plants, propagation material thereof, e.g. seeds, harvested crops, e.g., harvested food crops, or of non-living materials by insects or by phytopathogenic or spoilage microorganisms or organisms potentially harmful to man, especially fungal organisms, which comprises the application of a compound of Formula (I) or of a preferred individual compound as above-defined as active ingredient to the plants, to parts of the plants or to the locus thereof, to the propagation material
15 thereof, or to any part of the non-living materials.

Controlling or preventing means reducing infestation by phytopathogenic or spoilage microorganisms or organisms potentially harmful to man, especially fungal organisms, to such a level that an improvement is demonstrated.

A preferred method of controlling or preventing an infestation of crop plants by phytopathogenic
20 microorganisms, especially fungal organisms, or insects which comprises the application of a compound of Formula (I), or an agrochemical composition which contains at least one of said compounds, is foliar application. The frequency of application and the rate of application will depend on the risk of infestation by the corresponding pathogen or insect. However, the compounds of Formula (I) can also penetrate the plant through the roots *via* the soil (systemic action) by drenching the locus of
25 the plant with a liquid Formulation, or by applying the compounds in solid form to the soil, e.g. in granular form (soil application). In crops of water rice such granulates can be applied to the flooded rice field. The compounds of Formula (I) may also be applied to seeds (coating) by impregnating the seeds or tubers either with a liquid formulation of the fungicide or coating them with a solid formulation.

A formulation, e.g. a composition containing the compound of Formula (I), and, if desired, a
30 solid or liquid adjuvant or monomers for encapsulating the compound of Formula (I), may be prepared in a known manner, typically by intimately mixing and/or grinding the compound with extenders, for example solvents, solid carriers and, optionally, surface active compounds (surfactants).

Advantageous rates of application are normally from 5g to 2kg of active ingredient (a.i.) per
35 hectare (ha), preferably from 10g to 1kg a.i./ha, most preferably from 20g to 600g a.i./ha. When used as seed drenching agent, convenient dosages are from 10mg to 1g of active substance per kg of seeds.

When the combinations of the present invention are used for treating seed, rates of 0.001 to 50
g of a compound of Formula (I) per kg of seed, preferably from 0.01 to 10g per kg of seed are generally sufficient.

Suitably, a composition comprising a compound of Formula (I) according to the present invention is applied either preventative, meaning prior to disease development or curative, meaning after disease development.

5 The compositions of the invention may be employed in any conventional form, for example in the form of a twin pack, a powder for dry seed treatment (DS), an emulsion for seed treatment (ES), a flowable concentrate for seed treatment (FS), a solution for seed treatment (LS), a water dispersible powder for seed treatment (WS), a capsule suspension for seed treatment (CF), a gel for seed treatment (GF), an emulsion concentrate (EC), a suspension concentrate (SC), a suspo-emulsion (SE), a capsule suspension (CS), a water dispersible granule (WG), an emulsifiable granule (EG), an emulsion, water
10 in oil (EO), an emulsion, oil in water (EW), a micro-emulsion (ME), an oil dispersion (OD), an oil miscible flowable (OF), an oil miscible liquid (OL), a soluble concentrate (SL), an ultra-low volume suspension (SU), an ultra-low volume liquid (UL), a technical concentrate (TK), a dispersible concentrate (DC), a wettable powder (WP) or any technically feasible formulation in combination with agriculturally acceptable adjuvants.

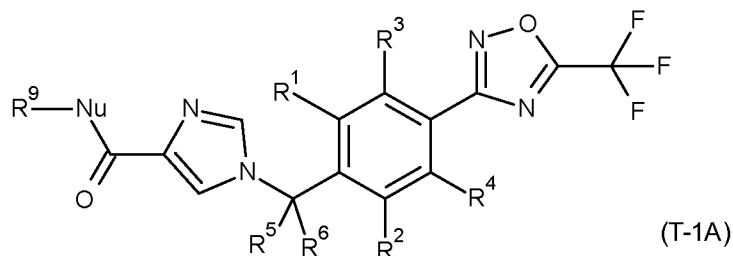
15 Such compositions may be produced in conventional manner, e.g. by mixing the active ingredients with appropriate formulation inerts (diluent, solvents, fillers and optionally other formulating ingredients such as surfactants, biocides, anti-freeze, stickers, thickeners and compounds that provide adjuvancy effects). Also conventional slow release formulations may be employed where long lasting efficacy is intended. Particularly Formulations to be applied in spraying forms, such as water dispersible
20 concentrates (e.g. EC, SC, DC, OD, SE, EW, EO and the like), wettable powders and granules, may contain surfactants such as wetting and dispersing agents and other compounds that provide adjuvancy effects, e.g. the condensation product of formaldehyde with naphthalene sulphonate, an alkylarylsulphonate, a lignin sulphonate, a fatty alkyl sulphate, and ethoxylated alkylphenol and an ethoxylated fatty alcohol.

25 A seed dressing formulation is applied in a manner known per se to the seeds employing the combination of the invention and a diluent in suitable seed dressing formulation form, e.g. as an aqueous suspension or in a dry powder form having good adherence to the seeds. Such seed dressing formulations are known in the art. Seed dressing formulations may contain the single active ingredients or the combination of active ingredients in encapsulated form, e.g. as slow release capsules or
30 microcapsules.

In general, the formulations include from 0.01 to 90% by weight of active agent, from 0 to 20% agriculturally acceptable surfactant and 10 to 99.99% solid or liquid formulation inerts and adjuvant(s), the active agent consisting of at least the compound of Formula (I) optionally together with other active agents, particularly microbiocides or conservatives or the like. Concentrated forms of compositions
35 generally contain in between about 2 and 80%, preferably between about 5 and 70% by weight of active agent. Application forms of formulation may for example contain from 0.01 to 20% by weight, preferably from 0.01 to 5% by weight of active agent. Whereas commercial products will preferably be formulated as concentrates, the end user will normally employ diluted formulations.

Whereas it is preferred to formulate commercial products as concentrates, the end user will
40 normally use dilute formulations.

Table 1.1A: This table discloses 75 specific compounds of the formula (T-1A):



wherein R^1 , R^2 , R^3 , R^4 , R^5 , and R^6 are hydrogen, and R^9 -Nu is as defined below in Table 1A.

5

Each of Tables 1.2A to 1.8A (which follow Table 1.1A) make available 75 individual compounds of the formula (T-1A) in which R^1 , R^2 , R^3 , R^4 , R^5 , and R^6 are as specifically defined in Tables 1.2A to 1.8A, which refer to Table 1A wherein R^9 -Nu is specifically defined.

10 **Table 1A**

Compound no.	R^9 -Nu	Compound no.	R^9 -Nu
1A.001	cyclopentoxy	1A.039	piperidin-1-amino
1A.002	prop-2-ynyloxy	1A.040	2-furylmethanamino
1A.003	cyclopropylmethoxy	1A.041	<i>N</i> -methoxymethanamino
1A.004	3-fluoropropoxy	1A.042	<i>O</i> -methylhydroxylamino
1A.005	cyclobutoxy	1A.043	ethanamino
1A.006	pentoxy	1A.044	<i>N</i> -methylethanamino
1A.007	2,2,2-trifluoroethoxy	1A.045	2,2,2-trifluoroethanamino
1A.008	2-ethoxyethoxy	1A.046	cyclopropanamino
1A.009	benzyloxy	1A.047	prop-2-yn-1-amino
1A.010	phenoxy	1A.048	cyclopropylmethanamino
1A.011	butoxy	1A.049	morpholin-4-amino
1A.012	prop-2-enyloxy	1A.050	<i>N</i> -methylacetohydrazide
1A.013	2,2-dimethylpropoxy	1A.051	(2,2-dichlorocyclopropyl)methanamino
1A.014	cyclohexoxy	1A.052	<i>N</i> -methylpropan-2-amino
1A.015	2-fluoroethoxy	1A.053	cyclobutanamino
1A.016	tetrahydrofuran-3-yloxy	1A.054	methanamino
1A.017	2,2-difluoroethoxy	1A.055	<i>N</i> -methylmethanamino
1A.018	2-ethoxy-1-ethoxy	1A.056	2-aminoacetonitrile
1A.019	but-2-ynyloxy	1A.057	prop-2-en-1-amino
1A.020	isobutoxy	1A.058	propanamino

1A.021	oxetan-3-yloxy	1A.059	2-propanylamino
1A.022	2-methoxyethoxy	1A.060	1,1-dimethylhydrazine
1A.023	O-ethylhydroxylamino	1A.061	N-ethylethanamino
1A.024	1-propoxy	1A.062	butan-2-amino
1A.025	2-propoxy	1A.063	2-methylpropan-1-amino
1A.026	ethoxy	1A.064	2-methylpropan-2-amino
1A.027	cyclopropoxy	1A.065	2-methoxyethanamino
1A.028	cyclohexanamino	1A.066	N-morpholine
1A.029	N-methylformylhydrazide	1A.067	aniline
1A.030	2,2-dimethylpropan-1-amino	1A.068	phenylmethanamino
1A.031	O-(prop-2-enyl)hydroxylamino	1A.069	cyclopentanamino
1A.032	N-(cyclopropylmethyl)propan-1-amino	1A.070	1-cyclopropylethanamino
1A.033	O-(cyclopropylmethyl)hydroxylamino	1A.071	ethyl 2-[amino(methyl)amino]acetate
1A.034	N-5-azoniaspiro[2.4]heptane	1A.072	N-isoxazolidine
1A.035	N-cyclopropyl-N-(2,2-difluoroethyl)amino	1A.073	N-ethylcyclopropanamino
1A.036	O-(cyclopropylmethyl)hydroxylamino	1A.074	O-(prop-2-ynyl)hydroxylamino
1A.037	N-methylcyclopropanamino	1A.075	O-(2,2,2-trifluoroethyl)hydroxylamino
1A.038	O-(2,2-difluoroethyl)hydroxylamino		

Table 1.2A: This table discloses 75 specific compounds of formula (T-1A) wherein R², R³, R⁴, R⁵, and R⁶ are hydrogen, R¹ is fluorine, and R⁹-Nu is as defined above in Table 1A.

5 Table 1.3A: This table discloses 75 specific compounds of formula (T-1A) wherein R¹, R², R⁴, R⁵, and R⁶ are hydrogen, R³ is fluorine, and R⁹-Nu is as defined above in Table 1A.

Table 1.4A: This table discloses 75 specific compounds of formula (T-1A) wherein R², R⁴, R⁵, and R⁶ are hydrogen, R¹ and R³ are fluorine, and R⁹-Nu is as defined above in Table 1A.

10

Table 1.5A: This table discloses 75 specific compounds of formula (T-1A) wherein R³, R⁴, R⁵, and R⁶ are hydrogen, R¹ and R² are fluorine, and R⁹-Nu is as defined above in Table 1A.

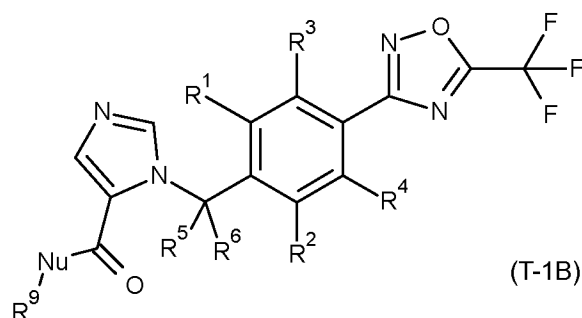
Table 1.6A: This table discloses 75 specific compounds of formula (T-2A) wherein R¹, R², R³, R⁴, and R⁵ are hydrogen, R⁶ is methyl, and R⁹-Nu is as defined above in Table 1A.

15

Table 1.7A: This table discloses 75 specific compounds of formula (T-1A) wherein R¹, R², R⁵ and R⁶ are hydrogen, R³ and R⁴ are fluorine, and R⁹-Nu is as defined above in Table 1A.

5 Table 1.8A: This table discloses 75 specific compounds of formula (T-1A) wherein R², R³, R⁵ and R⁶ are hydrogen, R¹ and R⁴ are fluorine, and R⁹-Nu is as defined above in Table 1A.

Table 1.1B: This table discloses 75 specific compounds of the formula (T-1B):



10 wherein R¹, R², R³, R⁴, R⁵, and R⁶ are hydrogen, and R⁹-Nu is as defined below in Table 1B.

Each of Tables 1.2B to 1.8B (which follow Table 1.1B) make available 75 individual compounds of the formula (T-1B) in which R¹, R², R³, R⁴, R⁵, and R⁶ are as specifically defined in Tables 1.2B to 1.8B, which refer to Table 1B wherein R⁹-Nu is specifically defined.

15 **Table 1B**

Compound no.	R ⁹ -Nu	Compound no.	R ⁹ -Nu
1B.001	cyclopentoxy	1B.039	piperidin-1-amino
1B.002	prop-2-ynyloxy	1B.040	2-furylmethanamino
1B.003	cyclopropylmethoxy	1B.041	<i>N</i> -methoxymethanamino
1B.004	3-fluoropropoxy	1B.042	<i>O</i> -methylhydroxylamino
1B.005	cyclobutoxy	1B.043	ethanamino
1B.006	pentoxy	1B.044	<i>N</i> -methylethanamino
1B.007	2,2,2-trifluoroethoxy	1B.045	2,2,2-trifluoroethanamino
1B.008	2-ethoxyethoxy	1B.046	cyclopropanamino
1B.009	benzyloxy	1B.047	prop-2-yn-1-amino
1B.010	phenoxy	1B.048	cyclopropylmethanamino
1B.011	butoxy	1B.049	morpholin-4-amino
1B.012	prop-2-enyloxy	1B.050	<i>N</i> -methylacetohydrazide
1B.013	2,2-dimethylpropoxy	1B.051	(2,2-dichlorocyclopropyl)methanamino
1B.014	cyclohexoxy	1B.052	<i>N</i> -methylpropan-2-amino

1B.015	2-fluoroethoxy	1B.053	cyclobutanamino
1B.016	tetrahydrofuran-3-yloxy	1B.054	methanamino
1B.017	2,2-difluoroethoxy	1B.055	<i>N</i> -methylmethanamino
1B.018	2-ethoxy-1-ethoxy	1B.056	2-aminoacetonitrile
1B.019	but-2-ynyloxy	1B.057	prop-2-en-1-amino
1B.020	isobutoxy	1B.058	propan-1-amino
1B.021	oxetan-3-yloxy	1B.059	propan-2-amino
1B.022	2-methoxyethoxy	1B.060	1,1-dimethylhydrazine
1B.023	<i>O</i> -ethylhydroxylamino	1B.061	<i>N</i> -ethylethanamino
1B.024	1-propoxy	1B.062	butan-2-amino
1B.025	2-propoxy	1B.063	2-methylpropan-1-amino
1B.026	ethoxy	1B.064	2-methylpropan-2-amino
1B.027	cyclopropoxy	1B.065	2-methoxyethanamino
1B.028	cyclohexanamino	1B.066	<i>N</i> -morpholine
1B.029	<i>N</i> -methylformylhydrazide	1B.067	aniline
1B.030	2,2-dimethylpropan-1-amino	1B.068	phenylmethanamino
1B.031	<i>O</i> -(prop-2-enyl)hydroxylamino	1B.069	cyclopentanamino
1B.032	<i>N</i> -(cyclopropylmethyl)propan-1-amino	1B.070	cyclopropyl-1-ethanamino
1B.033	<i>O</i> -(cyclopropylmethyl)hydroxylamino	1B.071	ethyl 2-[amino(methyl)amino]acetate
1B.034	<i>N</i> -5-azoniaspiro[2.4]heptane	1B.072	<i>N</i> -isoxazolidine
1B.035	<i>N</i> -cyclopropyl- <i>N</i> -(2,2-difluoroethyl)amino	1B.073	<i>N</i> -ethylcyclopropanamino
1B.036	<i>O</i> -(cyclopropylmethyl)hydroxylamino	1B.074	<i>O</i> -(prop-2-ynyl)hydroxylamino
1B.037	<i>N</i> -methylcyclopropanamino	1B.075	<i>O</i> -(2,2,2-trifluoroethyl)hydroxylamino
1B.038	<i>O</i> -(2,2-difluoroethyl)hydroxylamino		

Table 1.2B: This table discloses 75 specific compounds of formula (T-1B) wherein R², R³, R⁴, R⁵, and R⁶ are hydrogen, R¹ is fluorine, and R⁹-Nu is as defined above in Table 1B.

- 5 **Table 1.3B:** This table discloses 75 specific compounds of formula (T-1B) wherein, R¹, R², R⁴, R⁵, and R⁶ are hydrogen, R³ is fluorine, and R⁹-Nu is as defined above in Table 1B.

Table 1.4B: This table discloses 75 specific compounds of formula (T-1B) wherein R², R⁴, R⁵, and R⁶ are hydrogen, R¹ and R³ are fluorine, and R⁹-Nu is as defined above in Table 1B.

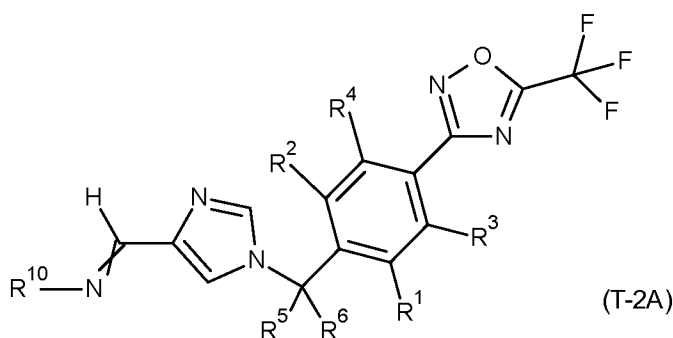
Table 1.5B: This table discloses 75 specific compounds of formula (T-1B) wherein R^3 , R^4 , R^5 , and R^6 are hydrogen, R^1 and R^2 are fluorine, and R^9 -Nu is as defined above in Table 1B.

5 Table 1.6B: This table discloses 75 specific compounds of formula (T-1B) wherein R^1 , R^2 , R^3 , R^4 , and R^5 are hydrogen, R^6 is methyl, and R^9 -Nu is as defined above in Table 1B.

Table 1.7B: This table discloses 75 specific compounds of formula (T-1B) wherein R^1 , R^2 , R^5 and R^6 are hydrogen, R^3 and R^4 are fluorine, and R^9 -Nu is as defined above in Table 1B.

10 Table 1.8B: This table discloses 75 specific compounds of formula (T-1B) wherein R^2 , R^3 , R^5 and R^6 are hydrogen, R^1 and R^4 are fluorine, and R^9 -Nu is as defined above in Table 1B.

Table 2.1A: This table discloses 6 specific compounds of the formula (T-2A):



15 wherein R^1 , R^2 , R^3 , R^4 , R^5 , and R^6 are hydrogen, and R^{10} is as defined below in Table 2A.

Each of Tables 2.2A to 2.3A (which follow Table 2.1A) make available 6 individual compounds of the formula (T-2A) in which R^1 , R^2 , R^3 , R^4 , R^5 , and R^6 are as specifically defined in Tables 2.2A to 2.3A, which refer to Table 2A wherein R^{10} is specifically defined.

20

Table 2A

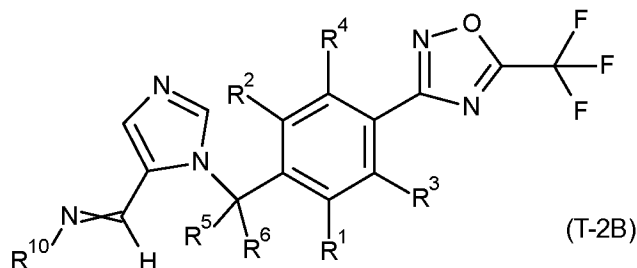
Compound no.	R^{10}	Compound no.	R^{10}
2A.001	methoxy	2A.004	prop-2-enyloxy
2A.002	ethoxy	2A.005	prop-2-ynyloxy
2A.003	propoxy	2A.006	2,2-difluoroethoxy

Table 2.2A: This table discloses 6 specific compounds of formula (T-2A) wherein R^2 , R^3 , R^4 , R^5 , and R^6 are hydrogen, R^1 is fluorine, and R^{10} is as defined above in Table 2A.

25

Table 2.3A: This table discloses 6 specific compounds of formula (T-2A) wherein, R^1 , R^2 , R^4 , R^5 , and R^6 are hydrogen, R^3 is fluorine, and R^{10} is as defined above in Table 2A.

Table 2.1B: This table discloses 6 specific compounds of the formula (T-2B):



wherein R¹, R², R³, R⁴, R⁵, and R⁶ are hydrogen, and R¹⁰-Nu is as defined below in Table 2B.

5

Each of Tables 2.2B to 2.3B (which follow Table 2.1B) make available 6 individual compounds of the formula (T-2B) in which R¹, R², R³, R⁴, R⁵, and R⁶ are as specifically defined in Tables 2.2B to 2.3B, which refer to Table 2B wherein R¹⁰ is specifically defined.

10 Table 2B

Compound no.	R ¹⁰	Compound no.	R ¹⁰
2B.001	methoxy	2B.004	prop-2-enyloxy
2B.002	ethoxy	2B.005	prop-2-ynyloxy
2B.003	propoxy	2B.006	2,2-difluoroethoxy

Table 2.2B: This table discloses 6 specific compounds of formula (T-2B) wherein R², R³, R⁴, R⁵, and R⁶ are hydrogen, R¹ is fluorine, and R¹⁰ is as defined above in Table 2B.

15 Table 2.3B: This table discloses 6 specific compounds of formula (T-2B) wherein, R¹, R², R⁴, R⁵, and R⁶ are hydrogen, R³ is fluorine, and R¹⁰ is as defined above in Table 2B.

EXAMPLES

20 The Examples which follow serve to illustrate the invention.

The compounds of the invention can be distinguished from known compounds by virtue of greater efficacy at low application rates, which can be verified by the person skilled in the art using the experimental procedures outlined in the Examples, using lower application rates if necessary, for example 50 ppm, 12.5 ppm, 6 ppm, 3 ppm, 1.5 ppm, 0.8 ppm or 0.2 ppm.

25 Compounds of Formula (I) may possess any number of benefits including, *inter alia*, advantageous levels of biological activity for protecting plants against diseases that are caused by fungi or superior properties for use as agrochemical active ingredients (for example, greater biological activity, an advantageous spectrum of activity, an increased safety profile (including improved crop tolerance), improved physico-chemical properties, or increased biodegradability).

Throughout this description, temperatures are given in degrees Celsius (°C) and “mp.” means melting point. LC/MS means Liquid Chromatography Mass Spectrometry and the description of the apparatus and the method (Methods A, B, C and D) is as follows:

5 The description of the LC/MS apparatus and the method A is:

SQ Detector 2 from Waters

Ionisation method: Electrospray

Polarity: positive and negative ions

10 Capillary (kV) 3.0, Cone (V) 30.00, Extractor (V) 2.00, Source Temperature (°C) 150, Desolvation Temperature (°C) 350, Cone Gas Flow (L/Hr) 0, Desolvation Gas Flow (L/Hr) 650

Mass range: 100 to 900 Da

DAD Wavelength range (nm): 210 to 500

15 Method Waters ACQUITY UPLC with the following HPLC gradient conditions:

(Solvent A: Water/Methanol 20:1 + 0.05% formic acid and Solvent B: Acetonitrile+ 0.05% formic acid)

	Time (minutes)	A (%)	B (%)	Flow rate (ml/min)
20	0	100	0	0.85
	1.2	0	100	0.85
	1.5	0	100	0.85

Type of column: Waters ACQUITY UPLC HSS T3; Column length: 30 mm; Internal diameter of column:

25 2.1 mm; Particle Size: 1.8 micron; Temperature: 60°C.

The description of the LC/MS apparatus and the method B is:

SQ Detector 2 from Waters

30 Ionisation method: Electrospray

Polarity: positive ions

Capillary (kV) 3.5, Cone (V) 30.00, Extractor (V) 3.00, Source Temperature (°C) 150, Desolvation Temperature (°C) 400, Cone Gas Flow (L/Hr) 60, Desolvation Gas Flow (L/Hr) 700

Mass range: 140 to 800 Da

35 DAD Wavelength range (nm): 210 to 400

Method Waters ACQUITY UPLC with the following HPLC gradient conditions

(Solvent A: Water/Methanol 9:1 + 0.1% formic acid and Solvent B: Acetonitrile + 0.1% formic acid)

	Time (minutes)	A (%)	B (%)	Flow rate (ml/min)
40	0	100	0	0.75

2.5	0	100	0.75
2.8	0	100	0.75
3.0	100	0	0.75

5 Type of column: Waters ACQUITY UPLC HSS T3; Column length: 30 mm; Internal diameter of column: 2.1 mm; Particle Size: 1.8 micron; Temperature: 60°C.

The description of the LC/MS apparatus and the method C is:

SQ Detector 2 from Waters
 10 Ionisation method: Electrospray
 ACQUITY H Class UPLC, Mass Spectrometer from Waters
 Polarity: positive and Negative Polarity Switch
 Scan Type MS1 Scan
 Capillary (kV) 3.00, Cone (V) 40.00, Desolvation Temperature (°C) 500, Cone Gas Flow (L/Hr) 50,
 15 Desolvation Gas Flow (L/Hr) 1000
 Mass range: 0 to 2000 Da
 DAD Wavelength range (nm): 200 to 350

Method Waters ACQUITY UPLC with the following HPLC gradient conditions
 20 (Solvent A: Water +,0.1% formic acid and Solvent B: Acetonitrile)

Time (minutes)	A (%)	B (%)	Flow rate (ml/min)
0	70	30	0.5
0.05	70	30	0.5
0.8	5	95	0.5
25 1.8	5	95	0.5
2.45	70	30	0.5
2.50	70	30	0.5

30 Type of column: Waters ACQUITY UPLC BEH C18; Column length: 50 mm; Internal diameter of column: 2.1 mm; Particle Size: 1.7 micron; Temperature: 35°C.

The description of the LC/MS apparatus and the method D is:

Instrumentation:-
 Mass Spectrometer : Agilent 6410 Triple Quadruple Mass Spectrometer
 35 HPLC : Agilent 1200 Series HPLC with Quaternary Gradient
 Optimized Mass Parameter:-
 Ionisation method : Electrospray (ESI)
 Polarity : Positive and Negative Polarity Switch
 Scan Type : MS2 Scan
 40 Capillary (kV) : 4.00

	Fragmentor (V)	: 100.00
	Gas Temperature (°C)	: 350
	Gas Flow (L/min)	: 11
	Nebulizer Gas (psi)	: 45
5	Mass range	: 110 to 1000 Da

Optimized Chromatographic Parameter:-Gradient conditions with Solvent A: Water with 0.1% formic acid: Acetonitrile: : 95 : 5 v/v and Solvent B: Acetonitrile with 0.1% formic acid

10	Time (minutes)	A (%)	B (%)	Flow rate (ml/min)
	0	90	10	1.8
	0.9	0	100	1.8
	1.8	0	100	1.8
	2.2	90	10	1.8
15	2.5	90	10	1.8

PDA Wavelength range: 210 to 400 nm; Column : KINETEX EVO C18; Column length: 50 mm; Internal diameter of column : 4.6 mm; Particle Size: 2.6 micron; Temperature: 40°C.

20 Where necessary, enantiomerically pure final compounds may be obtained from racemic materials as appropriate via standard physical separation techniques, such as reverse phase chiral chromatography, or through stereoselective synthetic techniques, eg, by using chiral starting materials.

Formulation Examples

25

<u>Wettable powders</u>	a)	b)	c)
Active ingredient [compound of Formula (I)]	25 %	50 %	75 %
sodium lignosulfonate	5 %	5 %	-
sodium lauryl sulfate	3 %	-	5 %
sodium diisobutylphthalenesulfonate	-	6 %	10 %
phenol polyethylene glycol ether (7-8 mol of ethylene oxide)	-	2 %	-
highly dispersed silicic acid	5 %	10 %	10 %
Kaolin	62 %	27 %	-

The active ingredient is thoroughly mixed with the adjuvants and the mixture is thoroughly ground in a suitable mill, affording wettable powders that can be diluted with water to give suspensions of the desired concentration.

30

<u>Powders for dry seed treatment</u>	a)	b)	c)
---------------------------------------	----	----	----

Active ingredient [compound of Formula (I)]	25 %	50 %	75 %
light mineral oil	5 %	5 %	5 %
highly dispersed silicic acid	5 %	5 %	-
Kaolin	65 %	40 %	-
Talcum	-	-	20 %

The active ingredient is thoroughly mixed with the adjuvants and the mixture is thoroughly ground in a suitable mill, affording powders that can be used directly for seed treatment.

Emulsifiable concentrate

active ingredient [compound of Formula (I)]	10 %
octylphenol polyethylene glycol ether (4-5 mol of ethylene oxide)	3 %
calcium dodecylbenzenesulfonate	3 %
castor oil polyglycol ether (35 mol of ethylene oxide)	4 %
Cyclohexanone	30 %
xylene mixture	50 %

5

Emulsions of any required dilution, which can be used in plant protection, can be obtained from this concentrate by dilution with water.

<u>Dusts</u>	a)	b)	c)
Active ingredient [compound of Formula (I)]	5 %	6 %	4 %
Talcum	95 %	-	-
Kaolin	-	94 %	-
mineral filler	-	-	96 %

10

Ready-for-use dusts are obtained by mixing the active ingredient with the carrier and grinding the mixture in a suitable mill. Such powders can also be used for dry dressings for seed.

Extruder granules

Active ingredient [compound of Formula (I)]	15 %
sodium lignosulfonate	2 %
Carboxymethylcellulose	1 %
Kaolin	82 %

15

The active ingredient is mixed and ground with the adjuvants, and the mixture is moistened with water. The mixture is extruded and then dried in a stream of air.

Coated granules

Active ingredient [compound of Formula (I)]	8 %
polyethylene glycol (mol. wt. 200)	3 %
Kaolin	89 %

The finely ground active ingredient is uniformly applied, in a mixer, to the kaolin moistened with polyethylene glycol. Non-dusty coated granules are obtained in this manner.

5 Suspension concentrate

Active ingredient [compound of Formula (I)]	40 %
propylene glycol	10 %
nonylphenol polyethylene glycol ether (15 mol of ethylene oxide)	6 %
Sodium lignosulfonate	10 %
Carboxymethylcellulose	1 %
Silicone oil (in the form of a 75 % emulsion in water)	1 %
Water	32 %

The finely ground active ingredient is intimately mixed with the adjuvants, giving a suspension concentrate from which suspensions of any desired dilution can be obtained by dilution with water. Using such dilutions, living plants as well as plant propagation material can be treated and protected against infestation by microorganisms, by spraying, pouring or immersion.

Flowable concentrate for seed treatment

Active ingredient [compound of Formula (I)]	40 %
propylene glycol	5 %
copolymer butanol PO/EO	2 %
tristyrenephenole with 10-20 moles EO	2 %
1,2-benzisothiazolin-3-one (in the form of a 20% solution in water)	0.5 %
monoazo-pigment calcium salt	5 %
Silicone oil (in the form of a 75 % emulsion in water)	0.2 %
Water	45.3 %

The finely ground active ingredient is intimately mixed with the adjuvants, giving a suspension concentrate from which suspensions of any desired dilution can be obtained by dilution with water. Using such dilutions, living plants as well as plant propagation material can be treated and protected against infestation by microorganisms, by spraying, pouring or immersion.

Slow-Release Capsule Suspension

28 parts of a combination of the compound of Formula I are mixed with 2 parts of an aromatic solvent and 7 parts of toluene diisocyanate/polymethylene-polyphenylisocyanate-mixture (8:1). This mixture is emulsified in a mixture of 1.2 parts of polyvinylalcohol, 0.05 parts of a defoamer and 51.6

parts of water until the desired particle size is achieved. To this emulsion a mixture of 2.8 parts 1,6-diaminohexane in 5.3 parts of water is added. The mixture is agitated until the polymerization reaction is completed.

- 5 The obtained capsule suspension is stabilized by adding 0.25 parts of a thickener and 3 parts of a dispersing agent. The capsule suspension Formulation contains 28% of the active ingredients. The medium capsule diameter is 8-15 microns.

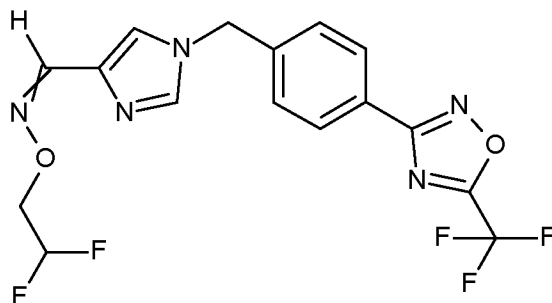
10 The resulting formulation is applied to seeds as an aqueous suspension in an apparatus suitable for that purpose.

List of Abbreviations:

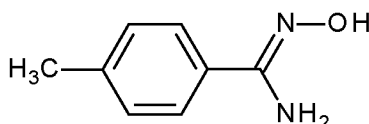
	AIBN	= azobisisobutyronitrile
15	BOP-Cl	= phosphoric acid bis(2-oxooxazolidide) chloride
	DMF	= dimethylformamide
	DIBAL-H	= diisobutyl aluminum hydride
	DIPEA	= N,N-di-isopropylethylamine
	EtOAc	= ethyl acetate
20	HCl	= hydrochloric acid
	mp	= melting point
	°C	= degrees Celsius
	MeOH	= methyl alcohol
	NaOH	= sodium hydroxide
25	NBS	= N-bromosuccinimide
	min	= minutes
	RT	= room temperature
	h	= hour(s)
	TFAA	= trifluoroacetic acid anhydride
30	THF	= tetrahydrofuran
	t _R	= retention time (in minutes)
	LC/MS	= Liquid Chromatography Mass Spectrometry (description of the apparatus and the methods used for LC/MS analysis are given above)

35 Preparation examples

Example 1: This example illustrates the preparation of N-(2,2-difluoroethoxy)-1-[1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]]phenyl]methyl]imidazol-4-yl]methanimine (compound 1.4 in Table T1)

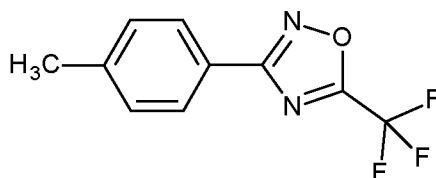


Step 1: Preparation of N'-hydroxy-4-methyl-benzamidine



5 To a stirred suspension of 4-methylbenzonitrile (35 g, 0.29 mol) in ethanol (220 mL) and water (440 mL) at room temperature was added hydroxylamine hydrochloride (41.1 g, 0.58 mol), potassium carbonate (65.4 g, 0.47 mol) and 8-hydroxyquinoline (0.22 g, 1.5 mmol). The reaction mixture was heated at 80°C for 4 hours. The mixture was cooled to room temperature and diluted with 2N HCl until pH 8 and volatiles were then removed under reduced pressure. The reaction contents were filtered,
10 washed with water, and dried under reduced pressure to afford the title compound. LC/MS (Method A) retention time = 0.23 minutes, 151.0 (M+H).

Step 2: Preparation of 3-(p-tolyl)-5-(trifluoromethyl)-1,2,4-oxadiazole

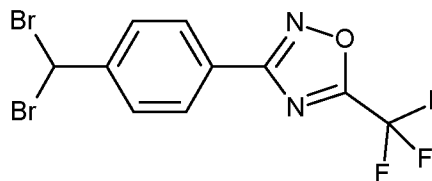
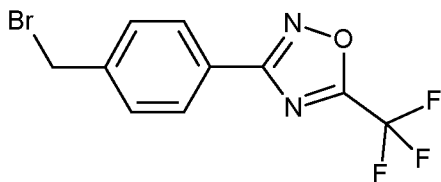


15 To a stirred solution of N'-hydroxy-4-methyl-benzamidine (38.7 g, 0.25 mol) in 2-methyltetrahydrofuran (750 mL) was added TFAA (49.9 mL, 349.9 mmol) at 0°C. The reaction mixture was stirred at 15°C for two hours and then diluted with water. The organic layer was separated, washed successively with a saturate sodium bicarbonate solution, a saturated aqueous ammonium chloride solution, water, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude
20 product was purified by flash chromatography over silica gel (heptane:EtOAc eluent gradient 99:1 to 90:10) to afford the title compound as a clear oil, which solidified upon storage. LC/MS (Method A) retention time = 1.15 minutes, mass not detected.

¹H NMR (400 MHz, CDCl₃) δ ppm: 8.00 (d, 2H), 7.32 (d, 2H), 2.45 (s, 3H).

25 ¹⁹F NMR (400 MHz, CDCl₃) δ ppm: -65.41 (s).

Step 3a: Preparation of 3-[4-(bromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole



A stirred mixture of 3-(p-tolyl)-5-(trifluoromethyl)-1,2,4-oxadiazole (56.0 g, 0.24 mol) and NBS (45.4 g, 0.25 mol) in tetrachloromethane (480 mL) under argon was heated to 70°C. AIBN (4.03 g, 24 mmol) was added and the reaction mixture was stirred at 65°C for 18 hours, cooled to room temperature, and then diluted with dichloromethane and water. The fractions were separated and the combined organic layer was washed with a saturated aqueous sodium bicarbonate solution, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified by flash chromatography over silica gel (cyclohexane:EtOAc eluent gradient 100:0 to 95:5) to afford the title compound as a white solid mp: 58-63°C.

¹H NMR (400 MHz, CDCl₃) δ ppm: 8.11 (d, 2H), 7.55 (d, 2H), 4.53 (s, 2H).

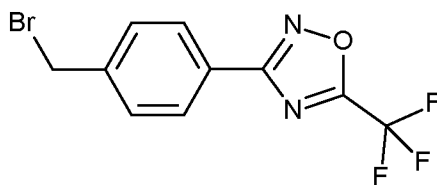
¹⁹F NMR (400 MHz, CDCl₃) δ ppm: -65.32 (s).

3-[4-(dibromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole was isolated as by-product as a white solid mp: 61-66°C.

¹H NMR (400 MHz, CDCl₃) δ ppm: 8.15 (d, 2H), 7.73 (d, 2H), 6.68 (s, 1H).

¹⁹F NMR (400 MHz, CDCl₃) δ ppm: -65.34 (s).

Step 3b: Preparation of 3-[4-(bromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole from 3-[4-(dibromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole

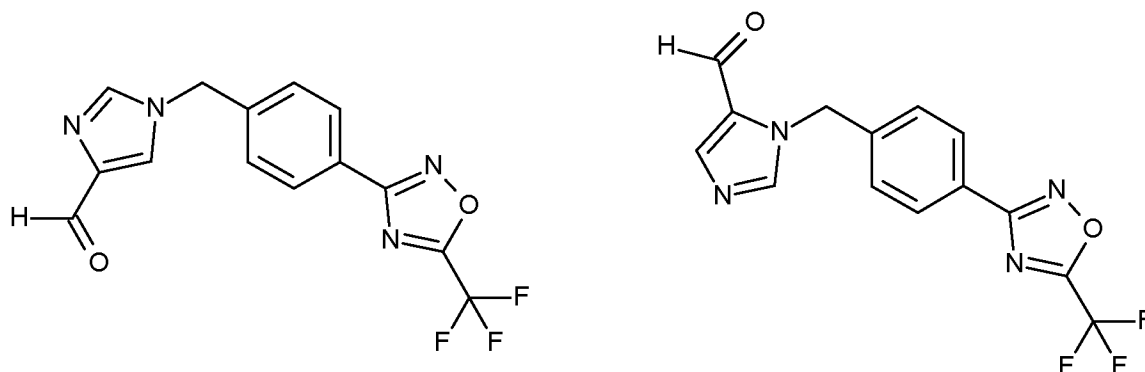


To a stirred 1:9 ratio mixture of 3-[4-(bromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole and 3-[4-(dibromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole (10.2 g) in acetonitrile (95 mL), water (1.9 mL) and DIPEA (6.20 ml, 35.7 mmol) was added diethylphosphite (4.7 mL, 35.7 mmol) at 5°C. The mixture was stirred at 5-10°C for two hours, water and 1M HCl were added and volatiles were removed under reduced pressure. The white slurry was extracted with dichloromethane and the total combined organic layer was dried over sodium sulfate, and filtered. The solvent was removed under reduced pressure and the resultant crude residue was purified by flash chromatography over silica gel (cyclohexane:EtOAc eluent gradient 99:1 to 9:1) to afford the title compound as a white solid. mp: 58-63°C.

¹H NMR (400 MHz, CDCl₃) δ ppm: 8.11 (d, 2H), 7.55 (d, 2H), 4.53 (s, 2H).

^{19}F NMR (400 MHz, CDCl_3) δ ppm: -65.32 (s).

Step 4: Preparation of 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carbaldehyde



5

To a solution of 3-[4-(bromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole (0.3 g, 1.0 mmol) in N,N-dimethylformamide (4 mL) was added K_2CO_3 (0.3 g, 2 mmol) followed by 1H-imidazole-4-carbaldehyde (0.1 g, 1 mmol) and stirred at room temperature for 3 hours. Then, the reaction vessel was diluted with water (10 mL), extracted with ethyl acetate and the total combined organic layer was washed with brine solution, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The resultant crude residue was purified by column chromatography (dichloromethane:methanol eluent gradient 95:5) and isolated 0.075 g of 3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carbaldehyde. LC/MS (Method C) retention time = 1.41 minutes, (M+H) not detected.

15

^1H NMR (400 MHz, CDCl_3) δ ppm: 9.90 (s, 1H), 8.24 (m, 2H), 7.70 (m, 2H), 7.29 (m, 2H), 5.60 (m, 2H).

1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carbaldehyde was isolated as a by-product (0.068 g) LC/MS (Method C) retention time = 1.37 minutes, (M+H) not detected.

20

^1H NMR (400 MHz, CDCl_3) δ ppm: 9.90 (s, 1H), 8.25 (m, 2H), 7.75 (m, 2H), 7.29 (m, 2H), 5.60 (m, 2H).

Step 5: Preparation of N-(2,2-difluoroethoxy)-1-[1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine

25

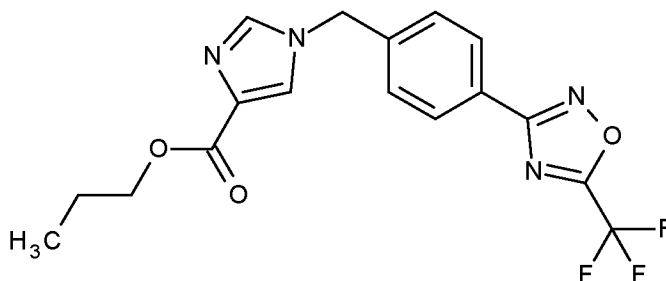
To a solution of 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carbaldehyde (0.1 g, 0.3 mmol) in ethanol (6 mL) was added O-(2,2-difluoroethyl)hydroxylamine hydrochloride (0.1 g, 0.9 mmol) and sodium acetate. The reaction mixture was stirred overnight. The volatiles were removed under reduced pressure, 20 mL water was added followed with extraction in ethyl acetate. The combined organic layers were washed with brine solution, dried over sodium

30

sulphate, and concentrated under reduced pressure. The resultant crude residue was purified by column chromatography (dichloromethane/methanol eluent gradient 95/5) to afford 0.11 g the title compound as an off-white solid. mp: 70 - 72°C.

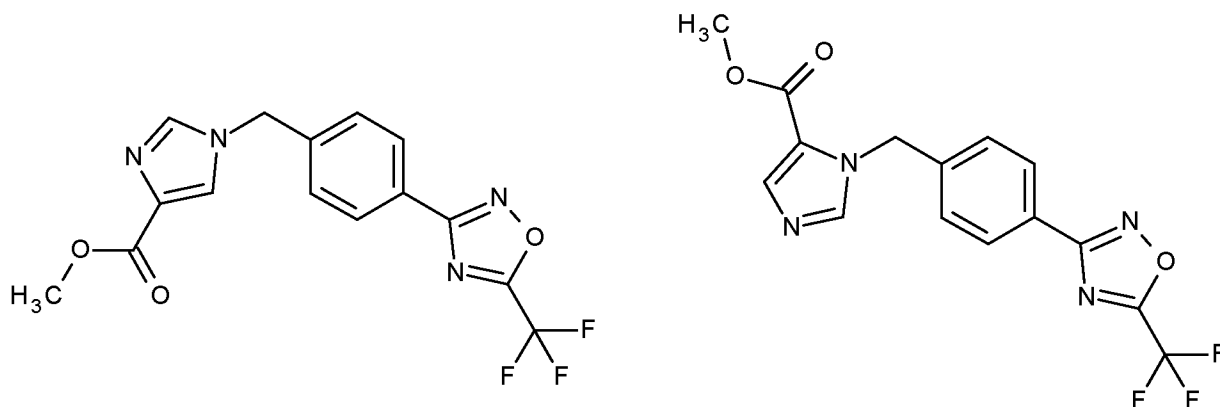
- 5 $^1\text{H NMR}$ (400 MHz, CDCl_3) δ ppm: 8.14 (m, 2H), 7.70 (m, 1H), 7.6 (m, 1H), 7.35 (m, 2H), 7.22 (m, 1H), 6.04 (m, 1H), 5.24 (m, 2H), 4.29 (m, 2H).

Example 2: This example illustrates the preparation of propyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate (compound 1.9 in Table T1)



10

Step 1: Preparation of 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate



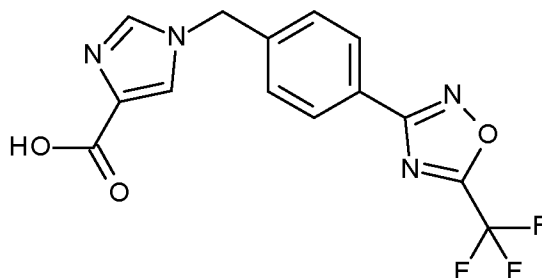
- 15 To a solution of 3-[4-(bromomethyl)phenyl]-5-(trifluoromethyl)-1,2,4-oxadiazole (7.5 g, 24.0 mmol) in *N,N*-dimethylformamide (75 mL) was added K_2CO_3 (6.8 g, 49 mmol) followed by 1H-imidazole-4-carboxylate (2.5 g, 29 mmol) and stirred at room temperature for 4 hours. Then, the reaction vessel was diluted with cold water, extracted with ethyl acetate, and the total combined organic layer was washed with brine solution, dried over sodium sulfate, filtered, and concentrated under reduced pressure.
- 20 The resultant crude residue was purified by column chromatography (dichloromethane:methanol eluent gradient 95:5) and isolated 2.5 g of 3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate.

- 25 $^1\text{H NMR}$ (400 MHz, CDCl_3) δ ppm: 8.07 (m, 2H), 7.55 (m, 2H), 7.27 (s, 1H), 5.18 (s, 2H), 3.81 (s, 3H).

1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate was isolated as a by-product (2.1 g)

5 $^1\text{H NMR}$ (400 MHz, CDCl_3) δ ppm: 8.10 (d, 2H), 7.81 (s, 1H), 7.72 (m, 1H), 7.28 (m, 2H), 5.61 (s, 2H), 3.81 (s, 3H).

Step 2: Preparation of 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylic acid



10 To a suspension of methyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate (0.8 g, 2.27 mmol) in methanol (32 mL) cooled to 0°C via ice bath was added barium hydroxide octahydrate (1.43g, 6.8 mmol) in water (26 mL). The reaction mixture was stirred at room temperature for 12 hours. The reaction was diluted with water, volatiles were removed under reduced pressure, and extracted with ethyl acetate. The aqueous layer was acidified to pH = 2 with aqueous 1M HCl and extracted with EtOAc and the total combined organic layer was washed with brine, dried over Na_2SO_4 , filtered and concentrated under reduced pressure to give 0.35 g of the title compound as a white powder. LC/MS (Method A) retention time = 0.37 minutes, (M+H) not detected.

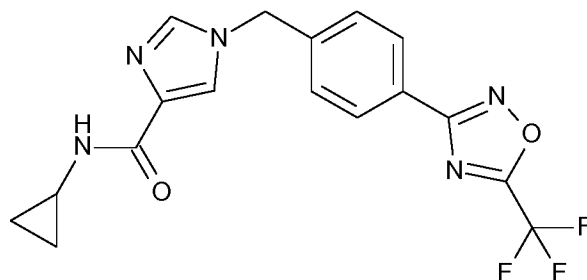
20 $^1\text{H NMR}$ (400 MHz, $\text{DMSO}-d_6$) δ ppm: 8.04 (m, 3H), 7.94 (m, 1H), 7.48 (m, 2H), 5.37 (s, 2H).

Step 3: Preparation of propyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate

25 To 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylic acid (100 mg, 0.29 mmol) dissolved in propan-1-ol (6 mL) was added thionyl chloride (0.011 mL, 0.15 mmol) at room temperature. The reaction mixture was stirred at 70°C for 12 hours. Then, the reaction vessel was diluted with ice water (10 mL), extracted with ethyl acetate, brine solution, dried over sodium sulfate, filtered, and concentrated under reduced pressure and afforded 0.075 g of the title compound as a light brown solid. mp.: $248 - 250^\circ\text{C}$.

30 $^1\text{H NMR}$ (400 MHz, CDCl_3) δ ppm: 8.15 (d, 2H), 7.92 (s, 1H), 7.63 (s, 1H), 7.38 (d, 2H), 5.31 (m, 2H), 4.28 (t, 2H), 2.16 (m, 2H), 1.00 (t, 3H).

Example 3: This example illustrates the preparation of N-cyclopropyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide (compound 1.10 in Table T1)



5 To a 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylic acid (0.1 g, 0.30 mmol) and triethylamine (0.12 mL, 0.89 mmol) in 1,2-dichloroethane (5 mL) cooled via an ice bath was introduced cyclopropylamine (0.025 mL, 0.35 mmol) and BOP-Cl (0.09 g, 0.35 mmol), were stirred at room temperature for 2 days.. EtOAc (10 mL) and H₂O (5 mL) were added, the layers were separated, and the aqueous layer was extracted with EtOAc. The combined organic layers were washed with water, dried with Na₂SO₄, filtered, and concentrated under reduced pressure. The crude residue was purified by flash chromatography over silica gel (cyclohexane:ethyl acetate eluent gradient 99:1 to 1:1) to afford the title compound. LC/MS (Method A) retention time = 0.93 minutes, 378 (M+H).

15 **Table T1: Melting point (mp) data and/or retention times (t_R) for compounds 1.1 to 1.10 according to Formula (I):**

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H] ⁺	LCMS Method	mp (°C)
1.1	N-methoxy-1-[1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine		1.39	352	D	
1.2	N-methoxy-1-[3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine					91 - 93

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H] ⁺	LCMS Method	mp (°C)
1.3	N-ethoxy-1-[1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine		1.35	366	D	
1.4	N-(2,2-difluoroethoxy)-1-[1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine					70 - 72
1.5	N-ethoxy-1-[3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine					95 - 97
1.6	N-(2,2-difluoroethoxy)-1-[3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanimine					65 - 67

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H] ⁺	LCMS Method	mp (°C)
1.9	propyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate					248 - 250
1.10	N-cyclopropyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		0.93	378	A	

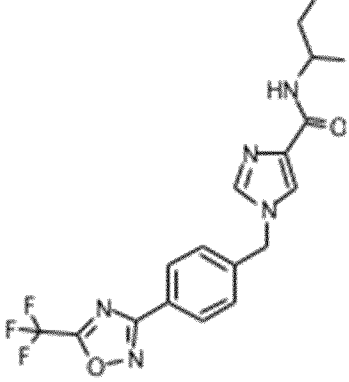
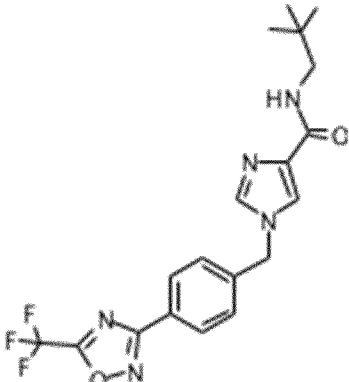
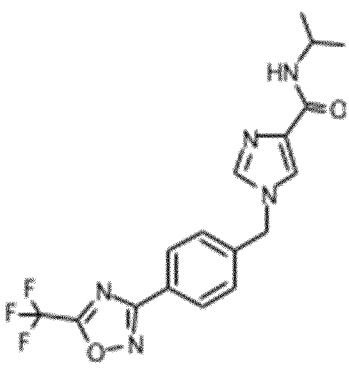
Table T2: Melting point (mp) data and/or retention times (t_R) for compounds 2.1 to 2.80 according to Formula (I):

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.1	N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.22	352.06	B	157.5 - 160.8
2.2	N-methyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.05	352.06	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.3	N-cyclopropyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide					165 - 170
2.4	ethyl 3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate					90 - 93
2.5	N-ethoxy-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide					157 - 159
2.6	N-ethoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide					156 - 160
2.7	N-(1-cyclopropylethyl)-N-methyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.327	420	D	

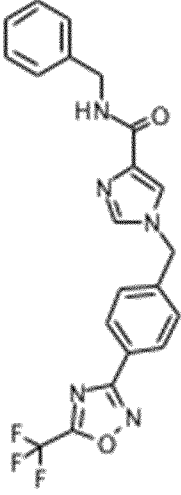
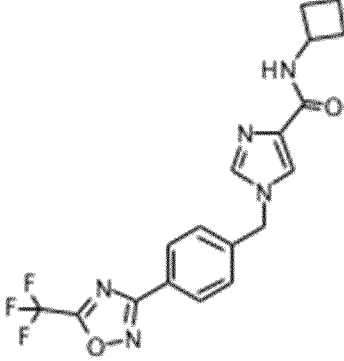
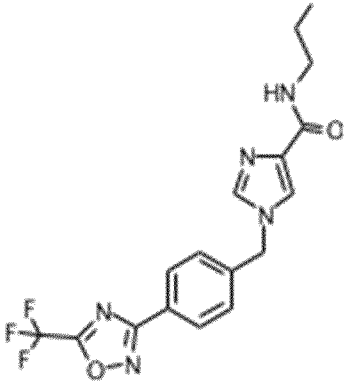
Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.8	ethyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate					150 - 154
2.9	methyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxylate					112 - 114
2.10	ethyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxylate					74 - 76
2.11	N-cyclopropyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide					128 - 131
2.12	N-ethoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide					129 - 132

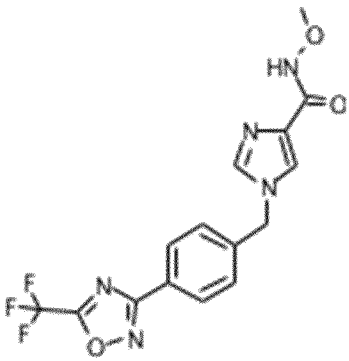
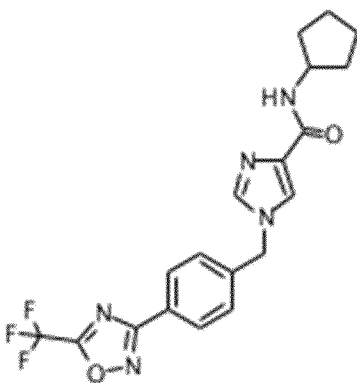
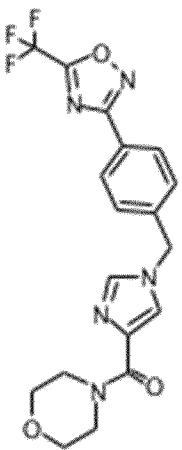
Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.13	N-(1-cyclopropylethyl)-N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.52	420	D	
2.14	(3-cyclopropylisoxazol-5-yl)methyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate					160 - 162
2.15	2,2,2-trifluoroethyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxylate					111 - 113
2.16	N-(2,2-difluoroethoxy)-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide					150 - 152

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.17	N-sec-butyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.51	394.10	B	
2.18	N-(2,2-dimethylpropyl)-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.63	408.12	B	
2.19	N-isopropyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.42	380.08	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.20	N-methoxy-N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.17	382.05	B	
2.21	N,N-dimethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.18	366.05	B	
2.22	N-cyclohexyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.64	420.13	B	
2.23	N-ethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.31	366.06	B	

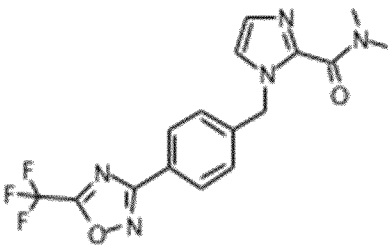
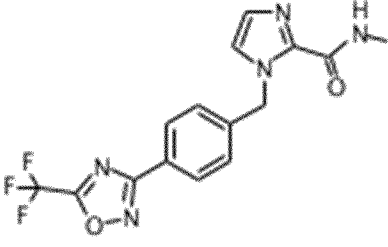
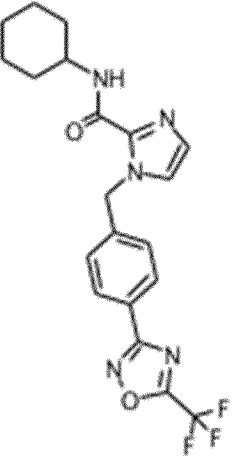
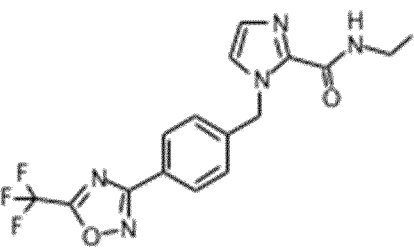
Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.24	N-allyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.38	378.07	B	
2.25	N-isobutyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.52	394.10	B	
2.26	N,N-diethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.41	394.13	B	
2.27	N-phenyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.63	414.09	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.28	N-benzyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.57	428.08	B	
2.29	N-cyclobutyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.47	392.09	B	
2.30	N-propyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.42	380.09	B	

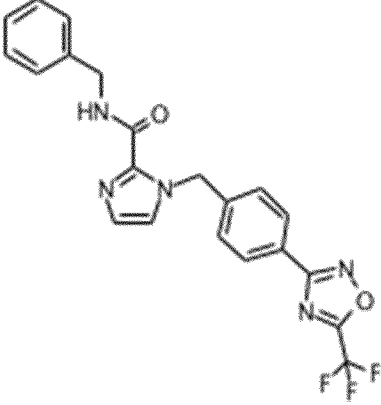
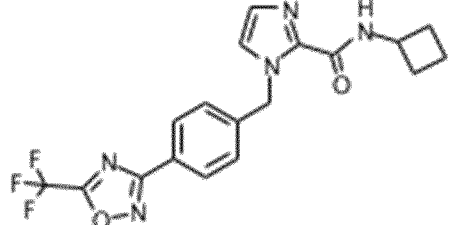
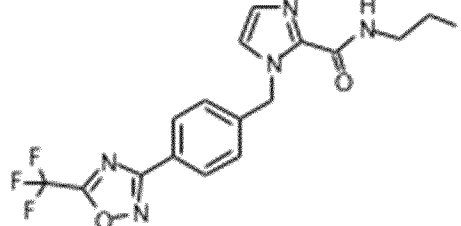
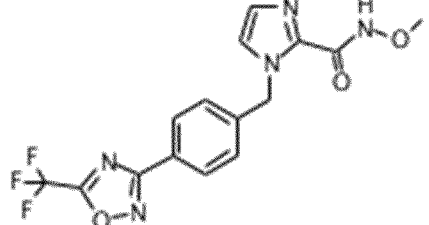
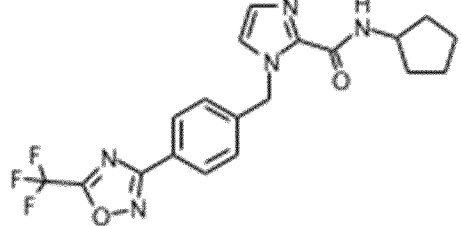
Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.31	N-methoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.21	368.06	B	
2.32	N-cyclopentyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.54	406.11	B	
2.33	morpholino-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-yl]methanone		1.25	408.26	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.34	N-(2-furylmethyl)-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.47	418.07	B	
2.35	N-tert-butyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.56	394.10	B	
2.36	N-prop-2-ynyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.34	376.07	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.37	N-ethyl-N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.29	380.09	B	
2.38	N-sec-butyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.76	394.41	B	
2.39	N-(2,2-dimethylpropyl)-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.88	408.42	B	
2.40	N-isopropyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.66	380.06	B	
2.41	N-methoxy-N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.37	382.05	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.42	N,N-dimethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.33	366.07	B	
2.43	N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.43	352.08	B	
2.44	N-cyclohexyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.91	420.43	B	
2.45	N-ethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.54	366.06	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.46	N-allyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.61	378.07	B	
2.47	N-isobutyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.77	394.11	B	
2.48	N,N-diethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.55	394.10	B	
2.49	N-phenyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.87	414.09	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.50	N-benzyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.78	428.10	B	
2.51	N-cyclobutyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.72	392.10	B	
2.52	N-propyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.66	380.10	B	
2.53	N-methoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.39	368.04	B	
2.54	N-cyclopentyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.80	406.27	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.55	morpholino-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-2-yl]methanone		1.36	408.06	B	
2.56	N-(2-furylmethyl)-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.68	418.06	B	
2.57	N-tert-butyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.82	394.09	B	
2.58	N-prop-2-ynyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.54	376.03	B	
2.59	N-ethyl-N-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-2-carboxamide		1.43	380.07	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.60	N-sec-butyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.33	394.29	B	
2.61	N-(2,2-dimethylpropyl)-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.46	408.51	B	
2.62	N-isopropyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.23	380.07	B	
2.63	N-methoxy-N-methyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.21	382.06	B	
2.64	N,N-dimethyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.01	366.05	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.65	N-cyclohexyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.47	420.12	B	
2.66	N-ethyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.14	366.06	B	
2.67	N-allyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.22	378.06	B	
2.68	N-isobutyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.35	394.09	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.69	N,N-diethyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.22	394.09	B	
2.70	N-phenyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.50	414.07	B	
2.71	N-benzyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.42	428.48	B	
2.72	N-cyclobutyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.31	392.09	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.73	N-propyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.25	380.07	B	
2.74	N-methoxy-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.09	368.04	B	
2.75	N-cyclopentyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.37	406.09	B	
2.76	morpholino-[3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazol-4-yl]methanone		1.05	408.24	B	
2.77	N-(2-furylmethyl)-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.31	418.44	B	

Entry	Compound name	Structure	t _R (min)	Mass charge [M+H]	LCMS Method	mp (°C)
2.78	N-tert-butyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.35	394.26	B	
2.79	N-prop-2-ynyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.19	376.04	B	
2.80	N-ethyl-N-methyl-3-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]imidazole-4-carboxamide		1.13	380.07	B	

BIOLOGICAL EXAMPLES

General examples of leaf disk tests in well plates:

5

Leaf disks or leaf segments of various plant species are cut from plants grown in a greenhouse. The cut leaf disks or segments are placed in multiwell plates (24-well format) onto water agar. The leaf disks are sprayed with a test solution before (preventative) or after (curative) inoculation. Compounds to be tested are prepared as DMSO solutions (max. 10 mg/ml) which are diluted to the appropriate concentration with 0.025% Tween20 just before spraying. The inoculated leaf disks or segments are incubated under defined conditions (temperature, relative humidity, light, etc.) according to the respective test system. A single evaluation of disease level is carried out 3 to 14 days after inoculation, depending on the pathosystem. Percent disease control relative to the untreated check leaf disks or segments is then calculated.

15

General examples of liquid culture tests in well plates:

Mycelia fragments or conidia suspensions of a fungus prepared either freshly from liquid cultures of the fungus or from cryogenic storage, are directly mixed into nutrient broth. DMSO solutions of the test compound (max. 10 mg/ml) are diluted with 0.025% Tween20 by a factor of 50 and 10 µl of this solution is pipetted into a microtiter plate (96-well format). The nutrient broth containing the fungal spores/mycelia fragments is then added to give an end concentration of the tested compound. The test plates are incubated in the dark at 24°C and 96% relative humidity. The inhibition of fungal growth is determined photometrically after 2 to 7 days, depending on the pathosystem, and percent antifungal activity relative to the untreated check is calculated.

Example 1: Fungicidal activity against *Puccinia recondita* f. sp. *tritici* / wheat / leaf disc preventative (Brown rust)

Wheat leaf segments cv. Kanzler were placed on agar in multiwell plates (24-well format) and sprayed with the formulated test compound diluted in water. The leaf disks were inoculated with a spore suspension of the fungus 1 day after application. The inoculated leaf segments were incubated at 19°C and 75% relative humidity (rh) under a light regime of 12 hours light / 12 hours darkness in a climate cabinet and the activity of a compound was assessed as percent disease control compared to untreated when an appropriate level of disease damage appears in untreated check leaf segments (7 to 9 days after application).

The following compounds at 200 ppm in the applied formulation give at least 80% disease control in this test when compared to untreated control leaf disks under the same conditions, which show extensive disease development.

Compounds (from Table T1) 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, and 1.7.

Compounds (from Table T2) 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 2.10, 2.11, 2.12, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.23, 2.24, 2.25, 2.26, 2.27, 2.28, 2.29, 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37, 2.38, 2.39, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48, 2.49, 2.50, 2.51, 2.52, 2.53, 2.54, 2.56, 2.57, 2.58, 2.59, 2.60, 2.61, 2.62, 2.63, 2.64, 2.65, 2.66, 2.67, 2.68, 2.69, 2.70, 2.71, 2.72, 2.73, 2.74, 2.75, 2.77, 2.78, 2.79, and 2.80.

Example 2: Fungicidal activity against *Puccinia recondita* f. sp. *tritici* / wheat / leaf disc curative (Brown rust)

Wheat leaf segments cv. Kanzler are placed on agar in multiwell plates (24-well format). The leaf segments are then inoculated with a spore suspension of the fungus. Plates were stored in darkness at 19°C and 75% relative humidity. The formulated test compound diluted in water was applied 1 day after inoculation. The leaf segments were incubated at 19°C and 75% relative humidity under a light regime of 12 hours light / 12 hours darkness in a climate cabinet and the activity of a compound was assessed as percent disease control compared to untreated when an appropriate level of disease damage appears in untreated check leaf segments (6 to 8 days after application).

The following compounds at 200 ppm in the applied formulation give at least 80% disease control in this test when compared to untreated control leaf disks under the same conditions, which show extensive disease development.

Compounds (from Table T1) 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, and 1.7.

5 Compounds (from Table T2) 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 2.11, 2.12, 2.15, 2.16, 2.17, 2.19, 2.20, 2.21, 2.23, 2.24, 2.25, 2.26, 2.29, 2.30, 2.31, 2.32, 2.33, 2.35, 2.36, 2.37, 2.42, 2.43, 2.56, 2.57, 2.58, 2.59, 2.62, 2.63, 2.64, 2.66, 2.67, 2.69, 2.72, 2.73, 2.79, and 2.80.

10 Example 3: Fungicidal activity against *Phakopsora pachyrhizi* / soybean / leaf disc preventative (Asian soybean rust)

15 Soybean leaf disks are placed on water agar in multiwell plates (24-well format) and sprayed with the formulated test compound diluted in water. One day after application leaf discs are inoculated by spraying a spore suspension on the lower leaf surface. After an incubation period in a climate cabinet of 24-36 hours in darkness at 20°C and 75% rh leaf disc are kept at 20°C with 12 h light/day and 75% rh. The activity of a compound is assessed as percent disease control compared to untreated when an appropriate level of disease damage appears in untreated check leaf disks (12 to 14 days after application).

20 The following compounds at 200 ppm in the applied formulation give at least 80% disease control in this test when compared to untreated control leaf disks under the same conditions, which show extensive disease development.

Compounds (from Table T1) 1.1, 1.3, 1.4, and 1.7.

25 Compounds (from Table T2) 2.1, 2.2, 2.3, 2.4, 2.6, 2.8, 2.9, 2.11, 2.12, 2.14, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.23, 2.24, 2.25, 2.29, 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37, 2.40, 2.42, 2.43, 2.45, 2.46, 2.52, 2.53, 2.58, 2.59, 2.62, 2.66, 2.67, 2.72, 2.74, 2.75, and 2.79.

Example 4: Fungicidal activity against *Glomerella lagenarium* (*Colletotrichum lagenarium*) liquid culture / cucumber / preventative (Anthracnose)

30 Conidia of the fungus from cryogenic storage are directly mixed into nutrient broth (PDB - potato dextrose broth). After placing a (DMSO) solution of test compound into a microtiter plate (96-well format), the nutrient broth containing the fungal spores is added. The test plates are incubated at 24°C and the inhibition of growth is measured photometrically 3 to 4 days after application.

35 The following compounds at 20 ppm in the applied formulation give at least 80% disease control in this test when compared to untreated control under the same conditions, which show extensive disease development.

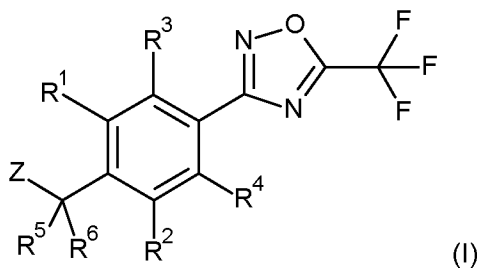
Compounds (from Table T1) 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, and 1.7.

40 Compounds (from Table T2) 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.23, 2.24, 2.25, 2.26, 2.27, 2.28, 2.29, 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37, 2.38, 2.39, 2.40, 2.41, 2.42, 2.43, 2.44, 2.45, 2.46, 2.47, 2.48, 2.50,

2.51, 2.52, 2.53, 2.54, 2.55, 2.56, 2.57, 2.58, 2.59, 2.60, 2.61, 2.62, 2.63, 2.64, 2.65, 2.66, 2.67, 2.68, 2.69, 2.70, 2.71, 2.72, 2.73, 2.74, 2.75, 2.77, 2.78, 2.79, and 2.80.

CLAIMS:

1. A compound of formula (I):



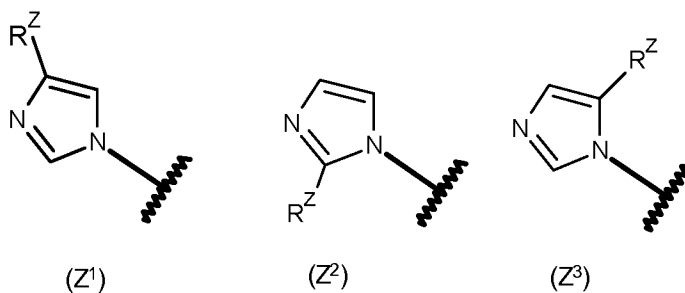
5

wherein R^1, R^2, R^3, R^4 are independently selected from hydrogen or fluoro and wherein 0, 1 or 2 of R^1, R^2, R^3 and R^4 are fluoro;

R^5 and R^6 are independently selected from hydrogen or methyl;

10

Z is selected from Z^1, Z^2 , or Z^3 :



and R^Z is R^7 , wherein

- 15 (i) R^7 represents $-C(O)N(R^{7a})(R^{7b})$, wherein:

R^{7a} is C_{1-5} alkyl, C_{1-4} haloalkyl, cyano C_{1-4} alkyl, hydroxy C_{1-4} alkyl, C_{1-2} alkoxy C_{1-4} alkyl, C_{1-2} haloalkoxy C_{1-4} alkyl, C_{3-5} alkenyl, C_{3-5} alkynyl, amino C_{1-4} alkyl, amino, N,N-di C_{1-2} alkylamino, N-formyl-N- C_{1-2} alkylamino, N- C_{1-2} alkylcarbonyl-N- C_{1-2} alkylamino, pyrrolidin-1-amino, piperidin-1-amino, morpholin-
20 4-amino, N- C_{1-2} alkylamino C_{1-4} alkyl, N,N-di C_{1-2} alkylamino C_{1-4} alkyl, hydroxyl, C_{1-4} alkoxy, C_{3-4} alkenyloxy, C_{2-4} haloalkyloxy, C_{3-4} alkynyloxy, cyclopropyl C_{1-2} alkoxy; or

R^{7a} is C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-2} alkyl, phenyl, phenyl C_{1-2} alkyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members
25 independently selected from the group consisting of O, S, N or $S(O)_2$, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 2, 3 or 4 heteroatoms individually selected from N, O and S,

and wherein the cycloalkyl, phenyl, heterocyclyl, or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, amino, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O), and

5

R^{7b} is hydrogen, C_{1-4} alkyl, C_{1-4} haloalkyl or cyclopropyl, or

R^{7a} and R^{7b} together with the nitrogen atom to which they are bonded, form a 4- to 6-membered monocycle optionally containing an additional heteroatom or group selected from O, S, $S(O)_2$, $C(O)$ and NR^8 , or

10

R^{7a} and R^{7b} together with the nitrogen atom to which they are bonded, form a 5- to 8-membered spirobicyclic ring system optionally containing an additional heteroatom or group selected from O, $C(O)$, and NR^8 ;

15

R^8 is hydrogen, methyl, methoxy, formyl or acyl;

or

20

(ii) R^7 represents $-C(O)OR^{7c}$, wherein:

R^{7c} is C_{2-5} alkyl, C_{1-4} haloalkyl, cyano C_{1-4} alkyl, hydroxy C_{1-4} alkyl, C_{1-2} alkoxy C_{2-4} alkyl, C_{1-2} alkoxy C_{1-2} alkoxy C_{1-4} alkyl, C_{1-2} haloalkoxy C_{1-4} alkyl, C_{3-5} alkenyl, C_{3-5} alkynyl, C_{3-4} haloalkenyl, N- C_{1-3} alkylamino C_{1-4} alkyl, N,N-di- C_{1-3} alkylamino C_{1-4} alkyl; or

25

R^{7c} is C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-2} alkyl, phenyl, phenyl C_{1-2} alkyl, heterocyclyl or heterocyclyl C_{1-2} alkyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N or $S(O)_2$, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, or heteroaryl or heteroaryl C_{1-2} alkyl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1, 2, 3 or 4 heteroatoms individually selected from N, O and S,

30

and wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, cyclopropyl or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O);

35

or

40

(iii) R^7 represents $-C(O)C(O)N(R^{7d})(R^{7e})$, wherein

R^{7d} is C₁₋₅alkyl, C₁₋₄haloalkyl, cyanoC₁₋₄alkyl, hydroxyC₁₋₄alkyl, C₁₋₃alkoxyC₂₋₄alkyl, C₁₋₂haloalkoxyC₁₋₄alkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, hydroxyl, aminoC₁₋₄alkyl, N-C₁₋₄alkylaminoC₁₋₄alkyl, N,N-diC₁₋₂alkylamino, pyrrolidin-1-amino, piperidin-1-amino, morpholin-4-amino, C₁₋₅alkoxy, C₃₋₄haloalkyloxy, C₃₋₄alkenyloxy, C₃₋₄alkynyloxy, cyclopropylC₁₋₂alkoxy, (C₁₋₄alkyl)-O-N=C(H)C₁₋₄alkyl-, or

R^{7d} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1, 2, or 3 ring members independently selected from the group consisting of O, S, N, SO₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, or heteroaryl wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S,

wherein the cycloalkyl, phenyl, heterocyclyl or heteroaryl moiety is optionally substituted by 1 or 2 substituents, which may be the same or different, selected from hydroxyl, formyl, acyl, cyano, halogen, methyl, difluoromethyl, trifluoromethyl, methoxy, ethoxy, or difluoromethoxy, or the cycloalkyl or heterocyclyl moiety is optionally substituted by 1 or 2 groups which are oxo (=O); and

R^{7e} is hydrogen, C₁₋₄alkyl, C₁₋₄fluoroalkyl, cyclopropyl, cyclopropylmethyl;

or

(iv) R⁷ represents -C(O)C(O)-OR^{7f}, wherein:

R^{7f} is hydrogen, C₁₋₅alkyl, C₁₋₄haloalkyl, C₃₋₅alkenyl, C₃₋₅alkynyl, or

R^{7f} is C₃₋₆cycloalkyl, C₃₋₆cycloalkylC₁₋₂alkyl, phenyl, heterocyclyl, wherein the heterocyclyl moiety is a 4- to 6-membered non-aromatic ring which comprises 1 or 2 ring members independently selected from the group consisting of O, S, N, SO₂, with the proviso that the heterocycle cannot contain 2 contiguous atoms selected from O and S, or heteroaryl, wherein the heteroaryl moiety is a 5- or 6-membered aromatic ring which comprises 1 or 2 heteroatoms individually selected from N, O and S; or

(v) R⁷ represents -C(O)C(O)R^{7g}, wherein:

R^{7g} is hydrogen, C₁₋₅alkyl, or cyclopropyl;

or

(vi) R⁷ represents (C₁₋₄alkyl)-O-N=C(H)-, (C₁₋₄haloalkyl)-O-N=C(H)-, (C₃₋₅alkenyl)-O-N=C(H)-, (C₃₋₅alkynyl)-O-N=C(H)-, or benzyl-O-N=C(H)-;

or a salt or an N-oxide thereof.

2. A compound according to claim 1, wherein R¹ to R⁴ are hydrogen.
- 5 3. A compound according to claim 1 or claim 2, wherein R⁵ and R⁶ are hydrogen.
4. A compound according to any one of claims 1 to 3, wherein R⁷ represents -C(O)N(R^{7a})(R^{7b}).
5. A compound according to any one of claims 1 to 4, wherein R^{7a} is C₁₋₄alkyl, C₁₋₂fluoroalkyl,
10 cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₁₋₂alkyl, C₁₋₂fluoroalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl,
aminoC₁₋₂alkyl, amino, hydroxyl, C₁₋₂alkoxy, C₃₋₄alkenyloxy, C₃₋₄haloalkyloxy, C₃₋₄alkynyloxy.
6. A compound according to any one of claims 1 to 5, wherein R^{7b} is hydrogen, methyl, ethyl,
difluoromethyl, trifluoromethyl or cyclopropyl.
- 15 7. A compound according to any one of claims 1 to 3, wherein R⁷ represents -C(O)OR^{7c}.
8. A compound according to any one of claims 1 to 3 or 7, wherein R^{7c} is C₂₋₅alkyl, C₁₋₄fluoroalkyl,
20 cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₂alkyl, C₁₋₂alkoxyC₁₋₂alkoxyC₁₋₂alkyl, C₁₋₂haloalkoxyC₁₋₂
2alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, C₃₋₄haloalkenyl, N-C₁₋₂alkylaminoC₁₋₃alkyl, N,N-di-C₁₋₂alkylaminoC₁₋₂
2alkyl.
9. A compound according to any one of claims 1 to 3, wherein R⁷ represents -C(O)C(O)N(R^{7d})(R^{7e})
wherein:
25 R^{7d} is C₁₋₄alkyl, C₁₋₂fluoroalkyl, cyanoC₁₋₂alkyl, hydroxyC₁₋₂alkyl, C₁₋₂alkoxyC₂alkyl, C₁₋₂
2haloalkoxyC₁₋₂alkyl, C₃₋₄alkenyl, C₃₋₄alkynyl, hydroxyl, aminoC₁₋₂alkyl, N-C₁₋₂alkylaminoC₁₋₂alkyl, C₁₋₄
4alkoxy, C₃₋₄haloalkyloxy, C₃₋₄alkenyloxy, C₃₋₄alkynyloxy, and
R^{7e} is hydrogen, methyl, ethyl, difluoromethyl, trifluoromethyl or cyclopropyl.
- 30 10. A compound according to any one of claims 1 to 3, wherein R⁷ represents (C₁₋₂alkyl)-O-
N=C(H)-, (C₁₋₂fluoroalkyl)-O-N=C(H)-, (C₃₋₄alkenyl)-O-N=C(H)-, (C₃₋₄alkynyl)-O-N=C(H)-, or benzyl-O-
N=C(H)-.
11. A compound according to any one of claims 1 to 3 or 10, wherein R⁷ represents (C₁₋₂alkyl)-O-
35 N=C(H)- or (C₁₋₂fluoroalkyl)-O-N=C(H)-.
12. An agrochemical composition comprising a fungicidally effective amount of a compound of
Formula (I) according to any one of claims 1 to 11.

13. The composition according to claim 12, further comprising at least one additional active ingredient and/or an agrochemically-acceptable diluent or carrier.

5 14. A method of controlling or preventing infestation of useful plants by phytopathogenic microorganisms, wherein a fungicidally effective amount of a compound of Formula (I) according to any of claims 1 to 11, or a composition comprising this compound as active ingredient, is applied to the plants, to parts thereof or the locus thereof.

15. Use of a compound of Formula (I) according to any one of claims 1 to 11 as a fungicide.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/068694

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D413/10 A01N43/72
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
C07D A61K

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 2017/118689 A1 (SYNGENTA PARTICIPATIONS AG [CH]) 13 July 2017 (2017-07-13) Abstract; claims; pages 63-133, table 1: in particular pages 80-81, entries 1.88, 1.89. -----	1-15
A	WO 2017/093348 A1 (SYNGENTA PARTICIPATIONS AG [CH]) 8 June 2017 (2017-06-08) Abstract; claims; pages 70-84, tables A-D: examples. -----	1-15
A	WO 2017/076740 A1 (BASF SE [DE]) 11 May 2017 (2017-05-11) Abstract; claims; pages 75-81, tables I-IV: examples. -----	1-14

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 15 August 2018	Date of mailing of the international search report 27/08/2018
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