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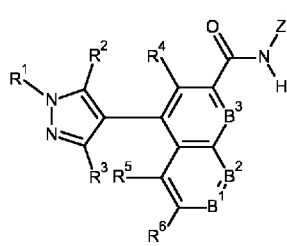
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(54) Title: MICROBIOCIDAL PYRAZOLE DERIVATIVES



(I)

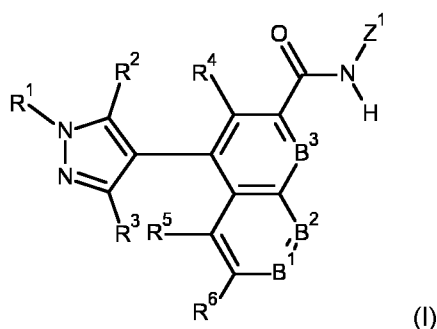
(57) Abstract: A compound of formula (I) wherein the substituents are as defined in claim 1, and the agrochemically acceptable salts, stereoisomers, enantiomers, tautomers and N-oxides of those compounds, which can be used as fungicides.



MICROBIOCIDAL PYRAZOLE DERIVATIVES

The present invention relates to microbiocidal pyrazole derivatives, e.g. as active ingredients, which have microbiocidal activity, in particular fungicidal activity. The invention also relates to preparation of these pyrazole derivatives, to intermediates useful in the preparation of these pyrazole derivatives, to the preparation of these intermediates, to agrochemical compositions which comprise at least one of the pyrazole derivatives, to preparation of these compositions and to the use of the pyrazole 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, in particular fungi.

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



wherein

B¹ is selected from CR⁷, or N;

B² is selected from CR⁸, or N;

B³ is selected from CR⁹, or N;

R¹ is selected from hydrogen, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, or C₃-C₆cycloalkyl

R² is selected from hydrogen, halogen, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₃-C₆cycloalkyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄alkoxy-C-C₁-C₄alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄alkyl-carbonimidoyl, or C₁-C₄ alkoxycarbonyl;

R³ is selected from hydrogen, halogen, C₁-C₄ haloalkyl, or C₁-C₄ alkyl;

R⁴ is selected from hydrogen, halogen, C₁-C₄ haloalkyl, C₃-C₆ cycloalkyl, or C₁-C₄ alkyl;

R⁵, R⁶, R⁷, R⁸ and R⁹ are independently selected from hydrogen, halogen, hydroxy, amino, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, carbamoyl, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-C₄alkyl, N-C₁-C₄alkoxy-C-C₁-C₄alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, C₁-C₄ alkylamino, C₁-C₄ dialkylamino, trifluoromethylsulfonyloxy, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic

heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl, and 5- to 6-membered saturated, partially saturated or aromatic heterocycle are unsubstituted or substituted with 1, 2, or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl and C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and

Z¹ is selected from C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₄alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and said 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy;

or an agrochemically acceptable salt, stereoisomer or N-oxide thereof.

Surprisingly, it has been found that the 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.

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) according to the invention. Such an agricultural composition may further comprise at least one additional active ingredient and/or an agrochemically-acceptable diluent or carrier.

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) according to the invention, or a composition comprising the compound of formula (I), is applied to the plants, to parts thereof or the locus thereof.

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

Compounds of formula (I) which have at least one basic centre can form, for example, acid addition salts, for example with strong inorganic acids such as mineral acids, for example perchloric acid, sulfuric acid, nitric

acid, nitrous acid, a phosphorus acid or a hydrohalic acid, with strong organic carboxylic acids, such as C₁-C₄alkanecarboxylic acids which are unsubstituted or substituted, for example by halogen, for example acetic acid, such as saturated or unsaturated dicarboxylic acids, for example oxalic acid, malonic acid, succinic acid, maleic acid, fumaric acid or phthalic acid, such as hydroxycarboxylic acids, for example ascorbic acid, lactic acid, malic acid, tartaric acid or citric acid, or such as benzoic acid, or with organic sulfonic acids, such as C₁-C₄ alkane- or arylsulfonic acids which are unsubstituted or substituted, for example by halogen, for example methane- or p-toluenesulfonic acid. Compounds of formula (I) which have at least one acidic group can form, for example, salts with bases, for example mineral salts such as alkali metal or alkaline earth metal salts, for example sodium, potassium or magnesium salts, or salts with ammonia or an organic amine, such as morpholine, piperidine, pyrrolidine, a mono-, di- or tri-lower-alkylamine, for example ethyl-, diethyl-, triethyl- or dimethylpropylamine, or a mono-, di- or trihydroxy-lower-alkylamine, for example mono-, di- or triethanolamine.

In each case, the compounds of formula (I) according to the invention are in free form, in oxidized form as a N-oxide or in salt form, e.g. an agronomically usable salt form.

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. Albini and S. Pietra, CRC Press, Boca Raton 1991.

The compounds of formula (I) according to the invention also include hydrates which may be formed during the salt formation.

Where substituents are indicated as being "optionally substituted", this means that they may or may not carry one or more identical or different substituents, e.g., one, two or three R^x substituents. For example, C₁-C₆alkyl substituted by 1, 2 or 3 halogens, may include, but not be limited to, -CH₂Cl, -CHCl₂, -CCl₃, -CH₂F, -CHF₂, -CF₃, -CH₂CF₃ or -CF₂CH₃ groups. As another example, C₁-C₆alkoxy substituted by 1, 2 or 3 halogens, may include, but not be limited to, CH₂ClO-, CHCl₂O-, CCl₃O-, CH₂FO-, CHF₂O-, CF₃O-, CF₃CH₂O- or CH₃CF₂O- groups.

As used herein, the term "optionally substituted", means, that said groups are unsubstituted or substituted with one or more identical or different substituents. The term "optionally substituted" can be used interchangeably with "can be unsubstituted or substituted". As used herein, the term "1 to 3 substituents" can be used interchangeably with "1-3 substituents" or "1, 2 or 3 substituents".

As used herein, the term "halogen" or "halo" refers to fluorine (fluoro), chlorine (chloro), bromine (bromo) or iodine (iodo), preferably fluorine, chlorine or bromine. This also applies, correspondingly, to halogen in combination with other meanings, such as haloalkyl, haloalkenyl, haloalkynyl, haloalkoxy, and halocycloalkyl.

As used herein, amino means a -NH₂ group.

As used herein, cyano means a -CN group.

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

As used herein, the term "carboxylic acid" means a -COOH group.

As used herein, the term "C₁-C_n-alkyl" refers to a saturated straight-chain or branched hydrocarbon radical attached via any of the carbon atoms having 1 to n carbon atoms, for example, any one of the radicals methyl, ethyl, n-propyl, 1-methylbutyl, 2-methylbutyl, 3-methylbutyl, 2, 2-dimethylpropyl, 1-ethylpropyl, n-hexyl, n-pentyl, 1,1-dimethylpropyl, 1,2-dimethylpropyl, 1-methylpentyl, 2-methylpentyl, 3-methylpentyl, 4-methylpentyl, 1,1-dimethylbutyl, 1,2-dimethylbutyl, 1,3-dimethylbutyl, 2,2-dimethylbutyl, 2,3-dimethylbutyl, 3,3-dimethylbutyl, 1-ethylbutyl, 2-ethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1-ethyl-1-methylpropyl, or 1-ethyl-2-methylpropyl.

As used herein, the term "C₂-C_n-alkenyl" refers to a straight or branched alkenyl chain moiety having from two to n carbon atoms and one or two double bonds, for example, ethenyl, prop-1-enyl, but-2-enyl.

As used herein, the term "C₂-C_n-alkynyl" refers to a straight or branched alkynyl chain moiety having from two to n carbon atoms and one triple bond, for example, ethynyl, prop-2-ynyl, but-3-ynyl,

As used herein, the term "C₃-C_n-cycloalkyl" refers to three (3) to n membered cycloalkyl radical such as cyclopropyl, cyclobutyl, cyclopentyl and cyclohexyl.

As used herein, the term "C₁-C_n-alkoxy" refers to a straight-chain or branched saturated alkyl radical having one (1) to n carbon atoms (as mentioned above) which is attached via an oxygen atom, i.e., for example, any one of the radicals methoxy, ethoxy, n-propoxy, 1-methylethoxy, n-butoxy, 1-methylpropoxy, 2-methylpropoxy and 1,1-dimethylethoxy. The term "C₂-C_n-alkenyloxy" as used herein refers to a straight-chain or branched alkenyl chain having two (2) to n carbon atoms (as mentioned above) which is attached via an oxygen atom.

As used herein, the term "C₁-C_n-alkoxy-C₁-C_n-alkyl" refers to an alkyl radical (as mentioned above) substituted with a C₁-C_n-alkoxy group. Examples are methoxymethyl, methoxyethyl, ethoxymethyl and propoxymethyl.

As used herein, the term "C₃-C_n-cycloalkyl-C₁-C_n-alkyl" refers to an alkyl radical (as mentioned above) substituted with a C₃-C_n-cycloalkyl group. Examples are cyclopropylmethyl, cyclopropylethyl. Similarly, the term "C₃-C_n-halocycloalkyl-C₁-C_n-alkyl" refers to an alkyl radical substituted with cycloalkyl group, wherein the cycloalkyl group is substituted by one or more of the same or different halogen atoms. Examples are 3,3-difluorobutylmethyl and 1-chlorocyclopropylmethyl.

As used herein, the term "C₁-C_n-haloalkyl" refers to a straight-chain or branched saturated alkyl radical attached via any of the carbon atoms having 1 to n carbon atoms (as mentioned above), where some or all of the hydrogen atoms in these radicals may be replaced by fluorine, chlorine, bromine and/or iodine, i.e., for example, any one of chloromethyl, dichloromethyl, trichloromethyl, fluoromethyl, difluoromethyl, trifluoromethyl, chlorofluoromethyl, dichlorofluoromethyl, chlorodifluoromethyl, 2-fluoroethyl, 2-chloroethyl, 2-bromoethyl, 2-iodoethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 2-chloro-2-fluoroethyl, 2-chloro-2,2-difluoroethyl, 2,2-dichloro-2-fluoroethyl, 2,2,2-trichloroethyl, pentafluoroethyl, 2-fluoropropyl, 3-fluoropropyl, 2,2-difluoropropyl, 2,3-difluoropropyl, 2-chloropropyl, 3-chloropropyl, 2,3-dichloropropyl, 2-bromopropyl, 3-bromopropyl, 3,3,3-trifluoropropyl, 3,3,3-trichloropropyl, 2,2,3,3,3-pentafluoropropyl, heptafluoropropyl, 1-(fluoromethyl)-2-fluoroethyl, 1-(chloromethyl)-2-chloroethyl, 1-(bromomethyl)-2-bromoethyl, 4-fluorobutyl, 4-chlorobutyl, 4-bromobutyl or nonafluorobutyl. Accordingly, a term "C₁-C₂fluoroalkyl" would refer to a C₁-C₂alkyl radical which

carries 1, 2, 3, 4, or 5 fluorine atoms, for example, any one of difluoromethyl, trifluoromethyl, 1-fluoroethyl, 2-fluoroethyl, 2,2-difluoroethyl, 2,2,2-trifluoroethyl, 1,1,2,2-tetrafluoroethyl or pentafluoroethyl. Similarly, the term “C₂-C_n-haloalkenyl” or “C₂-C_n-haloalkynyl” as used herein refers to a C₂-C_n-alkenyl or C₂-C_n-alkynyl radical respectively substituted with one or more halogen atoms which may be the same or different. Similarly, the term “C₃-C_n-halocycloalkyl” or “C₁-C_n-haloalkoxy” as used herein refers to a C₃-C_n-cycloalkyl radical or C₁-C_n-alkoxyl radical respectively substituted with one or more halo atoms which may be the same or different.

As used herein, the term “C₁-C_n-alkylthio” or “C₁-C_n-alkylsulfanyl” refers to a C₁-C_n-alkyl group linked through a sulfur atom.

As used herein, the term “C₁-C_n-haloalkylthio” or “C₁-C_n-haloalkylsulfanyl” refers to a C₁-C_n-haloalkyl group linked through a sulfur atom.

As used herein, the term “C₁-C_n-alkylsulfinyl” refers to a C₁-C_n-alkyl group linked through the sulfur atom of a sulfinyl (or S(=O)-) group.

As used herein, the term “C₁-C_n-alkylsulfonyl” refers to a C₁-C_n-alkyl group linked through the sulfur atom of a sulfonyl (or S(=O)₂-) group.

As used herein, the term “C₁-C_n-alkylsulfonyl-C₁-C_n-alkyl” refers to an a C₁-C_n-alkyl radical substituted with a C₁-C_n-alkylsulfonyl group.

As used herein, the term “C₁-C_n-alkylcarbonyl” refers to a C₁-C_n-alkyl group linked through the carbon atom of a carbonyl (C=O) group.

As used herein, the term “C₁-C_n-alkoxycarbonyl” refers to a C₁-C_n-alkoxy moiety linked through a carbon atom of a carbonyl (or C=O) group.

As used herein, the term “C₁-C_n-alkoxycarbonyl-C₁-C_n-alkyl” refers to a C₁-C_n-alkyl radical substituted by a C₁-C_n-alkoxycarbonyl group.

As used herein, the term “benzoyl” refers to a phenyl group linked through the carbon atom of a carbonyl (C=O) group.

As used herein, the term “C₁-C_n-alkylaminocarbonyl” refers to a group of the formula R_aNHC(=O)-, wherein R_a is a C₁-C_n-alkyl group, as generally defined above, linked through the carbon atom of a carbonyl (C=O) group.

As used herein, the term “di(C₁-C_n-alkyl)aminocarbonyl” refers to a radical of the formula R_aNR_bC(=O), where R_a is a C₁-C_n-alkyl radical as generally defined above, and R_b is a C₁-C_n-alkyl radical as generally defined above, linked through the carbon atom of a carbonyl (C=O) group.

As used herein, the term “N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl” refers to a radical of the formula -C(R_a)=NO(R_b) where R_a is a C₁-C₄-alkyl radical as generally defined above, and R_b is a C₁-C₄-alkyl radical as generally defined above.

As used herein the term “N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl” refers to a radical of the formula -C(R_a)=NOH where R_a is a C₁-C₄-alkyl radical as generally defined above.

As used herein, the term "cyano-C₁-C_n-alkyl" refers to C₁-C_n-alkyl radical having 1 to n carbon atoms (as mentioned above), where one of the hydrogen atoms in the radical is replaced by a cyano group: for example, cyano-methyl, 2-cyano-ethyl, 2-cyano-propyl, 3-cyano-propyl, 1-(cyano-methyl)-2-ethyl, 1-(methyl)-2-cyano-ethyl, 4-cyanobutyl, and the like. Similarly, the term "cyano-C₃-C_n-cycloalkyl" refers to a C₃-C_n-cycloalkyl radical substituted with one of the hydrogen atoms by a cyano group; and the term "cyano-C₃-C_n-cycloalkyl-C₁-C_n-alkyl" refers to an C₁-C_n-alkyl radical having a cyano-C₃-C_n-cycloalkyl group.

As used herein, the term "heteroaryl" refers to a 5- or 6-membered aromatic monocyclic ring radical which comprises 1, 2, 3 or 4 heteroatoms individually selected from N, O and S. Examples of heteroaryl include, but are not limited to, furanyl, pyrrolyl, thienyl, pyrazolyl, imidazolyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, triazolyl, tetrazolyl, pyrazinyl, pyridazinyl, pyrimidyl or pyridyl. The term "heteroaryl-C₁-C_n-alkyl" or "heteroaryl-C₃-C_n-cycloalkyl" refers to an C₁-C_n-alkyl or C₃-C_n-cycloalkyl radical respectively substituted by a heteroaryl group. The heteroaryl-C₁-C_n-alkyl or heteroaryl-C₃-C_n-cycloalkyl radical may be substituted on heteroaryl, alkyl and/or cycloalkyl group as appropriate.

As used herein the term "4-, 5-, or 6-membered saturated, partially unsaturated or aromatic heterocycle" containing 1, 2 or 3 heteroatoms" or "containing heteroatom groups", wherein those heteroatom(s) (group(s)) are selected from N, O, S, NO, SO and SO² and are ring members, or selected from N, O and S and are ring members, refers to monocyclic radicals, the monocyclic radicals being saturated, partially unsaturated or aromatic. The heterocyclic radical may be attached to the remainder of the molecule via a carbon ring member or via a nitrogen ring member.

The term "4-, 5-, or 6-membered saturated, partially unsaturated or aromatic heterocycle" can be used throughout this description interchangeably with "4-, 5-, or 6-membered saturated, partially unsaturated or aromatic heteroaryl".

Examples of 4-, 5-, or 6-membered saturated heterocyclic rings or heterocycles include, but are not limited to: 2-tetrahydrofuranyl, 3-tetrahydrofuranyl, 2-tetrahydrothienyl, 3-tetrahydrothienyl, 2-pyrrolidinyl, 3-pyrrolidinyl, 3-pyrazolidinyl, 4-pyrazolidinyl, 5-pyrazolidinyl, 2-imidazolidinyl, 4-imidazolidinyl, 2-oxazolidinyl, 4-oxazolidinyl, 5-oxazolidinyl, 3-isoxazolidinyl, 4-isoxazolidinyl, 5-isoxazolidinyl, 2-thiazolidinyl, 4-thiazolidinyl, 5-thiazolidinyl, 3-isothiazolidinyl, 4-isothiazolidinyl, 5-isothiazolidinyl, 1,2,4-oxadiazolidin-3-yl, 1,2,4-oxadiazolidin-5-yl, 1,2,4-thiadiazolidin-3-yl, 1,2,4-thiadiazolidin-5-yl, 1,2,4-triazolidin-3-yl, 1,3,4-oxadiazolidin-2-yl, 1,3,4-thiadiazolidin-2-yl, 1,3,4-triazolidin-2-yl, 2-tetrahydropyranyl, 4-tetrahydropyranyl, 1,3-dioxan-5-yl, 1,4-dioxan-2-yl, 2-piperidinyl, 3-piperidinyl, 4-piperidinyl, 3-hexahydropyridazinyl, 4-hexahydropyridazinyl, 2-hexahydropyrimidinyl, 4-hexahydropyrimidinyl, 5-hexahydropyrimidinyl, 2-piperazinyl, 1,3,5-hexahydrotriazin-2-yl and 1,2,4-hexahydrotriazin-3-yl, 2-morpholinyl, 3-morpholinyl, 2-thiomorpholinyl, 3-thiomorpholinyl, 1-oxothiomorpholin-2-yl, 1-oxothiomorpholin-3-yl, 1,1-dioxothiomorpholin-2-yl, 1,1-dioxothiomorpholin-3-yl, hexahydroazepin-1-, -2-, -3- or -4-yl, hexahydrooxepinyl, hexahydro-1,3-diazepinyl, hexahydro-1,4-diazepinyl, hexahydro-1,3-oxazepinyl, hexahydro-1,4-oxazepinyl, hexahydro-1,3-dioxepinyl, hexahydro-1,4-dioxepinyl and the like.

Examples of 4-, 5-, or 6-membered partially unsaturated heterocyclic rings or heterocycles include: 2,3-dihydrofuran-2-yl, 2,3-dihydrofuran-3-yl, 2,4-dihydrofuran-2-yl, 2,4-dihydrofuran-3-yl, 2,3-dihydrothien-2-yl, 2,3-dihydrothien-3-yl, 2,4-dihydrothien-2-yl, 2,4-dihydrothien-3-yl, 2-pyrrolin-2-yl, 2-pyrrolin-3-yl, 3-pyrrolin-2-yl, 3-pyrrolin-3-yl, 2-isoxazolin-3-yl, 3-isoxazolin-3-yl, 4-isoxazolin-3-yl, 2-isoxazolin-4-yl, 3-isoxazolin-4-yl, 4-isoxazolin-4-yl, 2-isoxazolin-5-yl, 3-isoxazolin-5-yl, 4-isoxazolin-5-yl, 2-isothiazolin-3-yl, 3-isothiazolin-3-yl, 4-isothiazolin-3-yl, 2-isothiazolin-4-yl, 3-isothiazolin-4-yl, 4-isothiazolin-4-yl, 2-isothiazolin-5-yl, 3-isothiazolin-5-yl, 4-isothiazolin-5-yl, 2,3-dihydropyrazol-1-yl, 2,3-dihydropyrazol-2-yl, 2,3-dihydropyrazol-3-yl, 2,3-dihydropyrazol-4-yl, 2,3-dihydropyrazol-5-yl, 3,4-dihydropyrazol-1-yl, 3,4-dihydropyrazol-3-yl, 3,4-dihydropyrazol-4-yl, 3,4-dihydropyrazol-5-yl, 4,5-dihydropyrazol-1-yl, 4,5-dihydropyrazol-3-yl, 4,5-dihydropyrazol-4-yl, 4,5-dihydropyrazol-5-yl, 2,3-dihydrooxazol-2-yl, 2,3-dihydrooxazol-3-yl, 2,3-dihydrooxazol-4-yl, 2,3-dihydrooxazol-5-yl, 3,4-dihydrooxazol-2-yl, 3,4-dihydrooxazol-3-yl, 3,4-dihydrooxazol-4-yl, 3,4-dihydrooxazol-5-yl, 3,4-dihydrooxazol-2-yl, 3,4-dihydrooxazol-3-yl, 3,4-dihydrooxazol-4-yl, 2-,3-,4-,5- or 6-di- or tetrahydropyridinyl, 3-di- or tetrahydropyridazinyl, 4-di- or tetrahydropyridazinyl, 2-di- or tetrahydropyrimidinyl, 4-di- or tetrahydropyrimidinyl, 5-di- or tetrahydropyrimidinyl, di- or tetrahydropyrazinyl, 1,3,5-di- or tetrahydrotriazin-2-yl, 1,2,4-di- or tetrahydrotriazin-3-yl, 2,3,4,5-tetrahydro[1H]azepin-1-,2-,3-,4-,5-,6- or -7-yl, 3,4,5,6-tetrahydro[2H]azepin-2-,3-,4-,5-,6- or -7-yl, 2,3,4,7-tetrahydro[1H]azepin-1-,2-,3-,4-,5-,6- or -7-yl, 2,3,6,7-tetrahydro[1H]azepin-1-,2-,3-,4-,5-,6- or -7-yl, tetrahydrooxepinyl, such as 2,3,4,5-tetrahydro[1H]oxepin-2-,3-,4-,5-,6- or -7-yl, 2,3,4,7-tetrahydro[1H]oxepin-2-,3-,4-,5-,6- or -7-yl, 2,3,6,7-tetrahydro[1H]oxepin-2-,3-,4-,5-,6- or -7-yl, tetrahydro-1,3-diazepinyl, tetrahydro-1,4-diazepinyl, tetrahydro-1,3-oxazepinyl, tetrahydro-1,4-oxazepinyl, tetrahydro-1,3-dioxepinyl and tetrahydro-1,4-dioxepinyl.

Examples of 5- or 6-membered aromatic heterocyclic rings or heterocycles, also termed heteroaromatic rings or heteroaryl, include: 2-furyl, 3-furyl, 2-thienyl, 3-thienyl, 2-pyrrolyl, 3-pyrrolyl, 3-pyrazolyl, 4-pyrazolyl, 5-pyrazolyl, 2-oxazolyl, 4-oxazolyl, 5-oxazolyl, 2-thiazolyl, 4-thiazolyl, 5-thiazolyl, 2-imidazolyl, 4-imidazolyl, 1,3,4-triazol-2-yl, 2-pyridinyl, 3-pyridinyl, 4-pyridinyl, 3-pyridazinyl, 4-pyridazinyl, 2-pyrimidinyl, 4-pyrimidinyl, 5-pyrimidinyl and 2-pyrazinyl.

As used herein, the term "heterocyclyl", "heterocycle" or "heterocyclic" refers to a stable 4-, 5- or 6-membered non-aromatic monocyclic ring radical which comprises 1, 2, or 3 heteroatoms individually selected from nitrogen, oxygen and sulfur, with the proviso of only one O or S. 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, pyrrolinyl, pyrrolidyl, tetrahydrofuranyl, tetrahydrothienyl, tetrahydrothiopyranyl, piperidyl, piperazinyl, tetrahydropyranyl, dioxolanyl, morpholinyl, oxazinanyl, oxetanyl, or δ -lactamyl.

As used herein, the term "controlling" refers to reducing the number of pests, eliminating pests and/or preventing further pest damage such that damage to a plant or to a plant derived product is reduced.

As used herein, the term "pest" refers to insects, and molluscs that are found in agriculture, horticulture, forestry, the storage of products of vegetable origin (such as fruit, grain and timber); and those pests associated with the damage of man-made structures. The term pest encompasses all stages in the life cycle of the pest.

As used herein, the term "effective amount" refers to the amount of the compound, or a salt thereof, which, upon single or multiple applications provides the desired effect.

An effective amount is readily determined by the skilled person in the art, using known techniques and by observing results obtained under analogous circumstances. In determining the effective amount, a number of factors are considered including, but not limited to the type of plant or derived product to be applied; the pest to be controlled & its lifecycle; the particular compound applied; the type of application; and other relevant circumstances.

As used herein, the term "room temperature" or "RT" or "rt" refer to a temperature of about 15° C to about 35° C. For example, rt can refer to a temperature of about 20° C to about 30° C.

The following list provides definitions, including preferred definitions, for substituents R¹, R², R³, R⁴, R⁵, R⁶, R⁷, R⁸, R⁹, B¹, B², B³ and Z¹ with reference to the compounds of formula (I) of the present 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.

In one embodiment R¹ is selected from hydrogen, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, or C₃-C₆cycloalkyl. Preferably R¹ is C₁-C₄ alkyl. More preferably R¹ is methyl, ethyl, or isopropyl. Even more preferably R¹ is methyl.

In one embodiment R² is selected from hydrogen, halogen, C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₃-C₆cycloalkyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, or C₁-C₄ alkoxy-carbonyl. Preferably R² is hydrogen, halogen, C₁-C₄ alkyl, C₃-C₆cycloalkyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, or N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl. More preferably R² is hydrogen, halogen, methyl, ethyl, cyclopropyl, C₁-C₂ alkylcarbonyl, N-C₁-C₂ alkoxy-C-C₁-C₂ alkyl-carbonimidoyl, or N-hydroxy-C-C₁-C₂ alkyl-carbonimidoyl. Even more preferably R² is hydrogen, fluorine, chlorine, bromine, methyl, ethyl, cyclopropyl, acetyl, -C(CH₃)=NOCH₃, -C(CH₃)=NOCH₂CH₃, or -C(CH₃)=NOH. Still even more preferably R² is hydrogen, fluorine, chlorine, or methyl. Most preferably R² is hydrogen, chlorine, or methyl.

In one embodiment R³ is selected from hydrogen, halogen, C₁-C₄ haloalkyl, or C₁-C₄ alkyl. Preferably R³ is hydrogen, or C₁-C₄ alkyl. More preferably R³ is hydrogen, or methyl. Most preferably R³ is hydrogen.

In one embodiment R⁴ is selected from hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆ cycloalkyl. Preferably R⁴ is hydrogen, chlorine, bromine, fluorine, methyl, ethyl, trifluoromethyl, difluoromethyl, or cyclopropyl. More preferably R⁴ is hydrogen, chlorine, bromine, or methyl. Most preferably R⁴ is hydrogen.

In one embodiment R⁵ is selected from hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄ alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxy-carbonyl, C₁-C₄ alkylcarbonyl, carbamoyl, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-C₄alkyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, amino, C₁-C₄ alkylamino, C₁-C₄ dialkylamino, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl;

wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl, and 5- to 6-membered saturated, partially saturated or aromatic heterocycle are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably R⁵ is hydrogen, halogen, C₁-C₄ alkyl, or cyano. More preferably R⁵ is hydrogen, fluorine, chlorine, bromine, methyl, or cyano. Even more preferably R⁵ is hydrogen, fluorine, methyl, or cyano. Still more preferably R⁵ is hydrogen or cyano. Most preferably R⁵ is hydrogen.

In one embodiment R⁶ is selected from hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄ alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, carbamoyl, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-C₄alkyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, amino, C₁-C₄ alkylamino, C₁-C₄ dialkylamino, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl, and 5- to 6-membered saturated, partially saturated or aromatic heterocycle are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably R⁶ is hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, hydroxy, cyano, or C₃-C₆-cycloalkyl, wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. More preferably R⁶ is hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl. Even more preferably R⁶ is hydrogen, chlorine, bromine, fluorine, methyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, or cyclopropyl. Still more preferably R⁶ is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl. Still even more preferably R⁶ is hydrogen, cyano, or cyclopropyl. Still even more preferably R⁶ is hydrogen or cyano. Most preferably R⁶ is hydrogen.

In one embodiment B¹ is selected from CR⁷ or N. In another embodiment B¹ is CR⁷. In another embodiment B¹ is N.

In one embodiment R⁷ is selected from hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄ alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-

hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, amino, C₁-C₄ alkylamino, C₁-C₄ dialkylamino, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-C₄alkyl, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl, and 5- to 6-membered saturated, partially saturated or aromatic heterocycle are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably R⁷ is hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxy-carbonyl, C₁-C₄ alkyl-carbonyl, hydroxy, cyano, or C₃-C₆-cycloalkyl, wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. More preferably R⁷ is hydrogen, halogen, cyano, hydroxy, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, or C₃-C₆-cycloalkyl, and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 substituent selected from halogen, cyano, or C₁-C₄alkyl. Still more preferably R⁷ is hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl. Still even more preferably R⁷ is hydrogen, chlorine, bromine, fluorine, methyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, or cyclopropyl. Even more preferably R⁷ is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl. Still even more preferably R⁷ is hydrogen, cyano, or cyclopropyl. Most preferably R⁷ is hydrogen or cyano.

In one embodiment B² is selected from CR⁸ or N. In another embodiment B² is CR⁸. In another embodiment B² is N.

In one embodiment R⁸ is selected from hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxy-carbonyl, C₁-C₄ alkyl-carbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, amino, C₁-C₄ alkylamino, C₁-C₄ dialkylamino, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-C₄alkyl, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl, and 5 to 6 membered saturated, partially saturated or aromatic heterocycle are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably R⁸ is hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-

C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, amino, C₁-C₄ alkylamino, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, C₁-C₄ dialkylamino, hydroxy, cyano, or C₃-C₆-cycloalkyl, wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. More preferably R⁸ is hydrogen, halogen, cyano, hydroxy, C₁-C₄alkyl, C₁-C₄ haloalkyl, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, or C₃-C₆-cycloalkyl, and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 substituent selected from halogen, cyano, or C₁-C₄alkyl. Still more preferably R⁸ is hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl. Still even more preferably R⁸ is hydrogen, chlorine, bromine, fluorine, methyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, or cyclopropyl. Even more preferably R⁸ is hydrogen, chlorine, bromine, fluorine, difluoromethyl, methyl, cyano, or cyclopropyl. Still even more preferably R⁸ is hydrogen, cyano, difluoromethyl, or cyclopropyl. Still even more preferably R⁸ is hydrogen. Most preferably R⁸ is hydrogen or cyano. Still even more preferably R⁸ is hydrogen.

In one embodiment B³ is selected from CR⁹ or N. In another embodiment B³ is CR⁹. In another embodiment B³ is N.

In one embodiment R⁹ is selected from hydrogen, halogen, C₁-C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄ alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, amino, C₁-C₄ alkylamino, C₁-C₄ dialkylamino, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-C₄alkyl, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl, and 5- to 6-membered saturated, partially saturated or aromatic heterocycle are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably R⁹ is hydrogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆-cycloalkyl. More preferably R⁹ is hydrogen, halogen, methyl, cyano, difluoromethyl, or cyclopropyl. Even more preferably R⁹ is hydrogen, chlorine, bromine, methyl, cyano, difluoromethyl, or cyclopropyl. Most preferably R⁹ is hydrogen or cyano. Still even more preferably R⁹ is hydrogen.

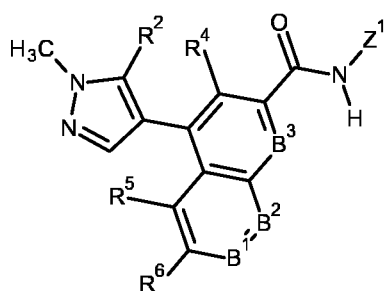
In one embodiment Z¹ is selected from C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents selected from halogen C₁-C₄ alkyl, C₂-C₄ alkenyl, C₂-C₄ alkynyl, C₁-C₄ haloalkyl, C₁-C₄ alkoxy, C₁-C₄ haloalkoxy, C₂-C₄alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄ alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, N-C₁-C₄ alkoxy-C-C₁-C₄

alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, hydroxy, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and said 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2, or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and said 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy. Preferably Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxycarbonyl, C₁-C₄ alkylcarbonyl, phenyl, 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 substituent selected from halogen, cyano, or C₁-C₄ alkyl.

The present invention, accordingly, makes available a compound of formula (I) having R¹, R², R³, R⁴, R⁵, R⁶, R⁷, R⁸, R⁹, B¹, B², B³ and Z¹ as defined above in all combinations / each permutation.

Embodiments according to the invention are provided as set out below.

In an embodiment of the invention, the compound of formula (I) may be a compound of formula (I-A) wherein R¹ is methyl, R³ is hydrogen and



(I-A)

wherein R^2 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 , B^1 , B^2 , B^3 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A) of the invention,

R^2 is hydrogen, chlorine, or methyl;

5 R^4 is hydrogen; and

R^5 , R^6 , R^7 , R^8 , R^9 , B^1 , B^2 , B^3 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A) of the invention,

R^2 is hydrogen, chlorine, or methyl;

10 R^4 is hydrogen;

R^5 is hydrogen, halogen, C_1 - C_4 alkyl, or cyano;

R^6 is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl;

B^1 is CR^7 , or N;

B^2 is CR^8 , or N;

15 B^3 is CR^9 , or N; and

R^7 , R^8 , R^9 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A) of the invention,

R^2 is hydrogen, chlorine, or methyl;

R^4 is hydrogen;

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

B^1 is CR^7 or N;

B^2 is CR^8 or N;

B^3 is CR^9 or N; and

R^7 , R^8 , R^9 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

25 Preferably, in the compound of formula (I-A) of the invention,

R^2 is hydrogen, chlorine, or methyl;

R^4 is hydrogen;

R^5 is hydrogen, halogen, C_1 - C_4 alkyl, or cyano;

R^6 is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl;

30 B^1 is CR^7 or N;

B^2 is CR^8 or N;

B^3 is CR^9 or N;

R^7 and R^8 are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

35 R^9 is hydrogen, cyano, C_1 - C_4 alkyl, C_1 - C_4 haloalkyl, or C_3 - C_6 -cycloalkyl; and

Z¹ is as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A) of the invention,

R² is hydrogen, chlorine, or methyl;

R⁴ is hydrogen;

5 R⁵ and R⁶ are independently selected from hydrogen or cyano;

B¹ is CR⁷ or N;

B² is CR⁸ or N;

B³ is CR⁹ or N;

10 R⁷ and R⁸ are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

R⁹ is hydrogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆-cycloalkyl; and

Z¹ is as defined for the compounds of formula (I) according to the present invention.

15 Preferably, in the compound of formula (I-A) of the invention,

R² is hydrogen, chlorine, or methyl;

R⁴ is hydrogen;

R⁵ and R⁶ are independently selected from hydrogen or cyano;

B¹ is CR⁷ or N;

20 B² is CR⁸ or N;

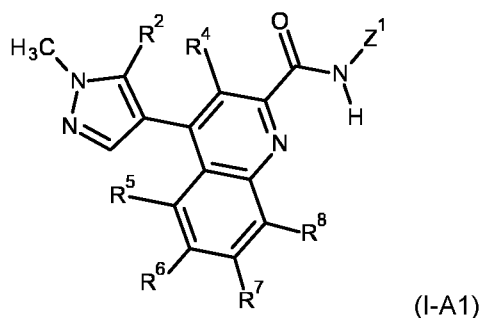
B³ is CR⁹ or N;

25 R⁷ and R⁸ are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

R⁹ is hydrogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆-cycloalkyl; and

30 Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, carbonyl, C₁-C₄ alkylcarbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and said 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents
35 independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

In an embodiment of the invention, the compound of formula (I) may be a compound of formula (I-A1), wherein R¹ is methyl, R³ is hydrogen, B¹ is CR⁷, B² is CR⁸ and B³ is N and



wherein R^2 , R^4 , R^5 , R^6 , R^7 , R^8 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A1) of the invention,

5 R^2 is hydrogen, chlorine, or methyl;

R^4 is hydrogen; and

R^5 , R^6 , R^7 , R^8 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A1) of the invention,

R^2 is hydrogen, chlorine, or methyl;

10 R^4 is hydrogen;

R^5 is hydrogen, halogen, C_1 - C_4 alkyl, or cyano;

R^6 is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl;

R^7 and R^8 are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, 15 methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

and Z^1 is as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A1) of the invention,

R^2 is hydrogen, chlorine, or methyl;

20 R^4 is hydrogen;

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

R^7 and R^8 are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or 25 methylcyclopropyl;

and Z^1 is as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A1) of the invention,

R^2 is hydrogen, chlorine, or methyl;

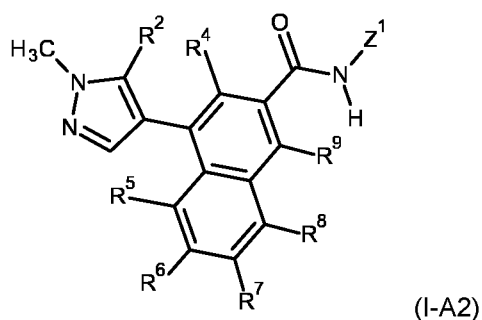
R^4 is hydrogen;

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

R^7 and R^8 are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl; and

- 5 Z^1 is C_1 - C_6 alkyl, wherein said C_1 - C_6 alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C_1 - C_4 haloalkyl, C_1 - C_4 alkyl, C_1 - C_4 haloalkoxy, C_1 - C_4 alkoxy, C_1 - C_4 alkylcarbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said
- 10 phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C_1 - C_4 haloalkyl, cyano, C_1 - C_4 alkyl, or C_1 - C_4 alkoxy; and wherein said C_3 - C_6 -cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C_1 - C_4 haloalkyl, cyano, C_1 - C_4 alkyl, or C_1 - C_4 alkoxy.

- In an embodiment of the invention, the compound of formula (I) may be a compound of formula (I-A2), wherein
- 15 R^1 is methyl, R^3 is hydrogen, B^1 is CR^7 , B^2 is CR^8 and B^3 is CR^9 and



wherein R^2 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

- Preferably, in the compound of formula (I-A2) of the invention,
- 20 R^2 is hydrogen, chlorine, or methyl;
 R^4 is hydrogen; and
 R^5 , R^6 , R^7 , R^8 , R^9 and Z^1 are as defined for the compounds of formula (I) according to the present invention.

- Preferably, in the compound of formula (I-A2) of the invention,
- R^2 is hydrogen, chlorine, or methyl;
- 25 R^4 is hydrogen;
 R^5 is hydrogen, halogen, C_1 - C_4 alkyl, or cyano;
 R^6 is hydrogen, chlorine, bromine, fluorine, methyl, cyano or cyclopropyl;
 R^7 and R^8 are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy,

methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

R⁹ is hydrogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆-cycloalkyl; and

Z¹ is as defined for the compounds of formula (I) according to the present invention.

5 Preferably, in the compound of formula (I-A2) of the invention,

R² is hydrogen, chlorine, or methyl;

R⁴ is hydrogen;

R⁵ and R⁶ are independently selected from hydrogen or cyano;

R⁷ and R⁸ are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl,

10 trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

R⁹ is hydrogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆-cycloalkyl; and

Z¹ is as defined for the compounds of formula (I) according to the present invention.

15 Preferably, in the compound of formula (I-A2) of the invention,

R² is hydrogen, chlorine, or methyl;

R⁴ is hydrogen;

R⁵ and R⁶ are independently selected from hydrogen or cyano;

R⁷ and R⁸ are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl,

20 trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl;

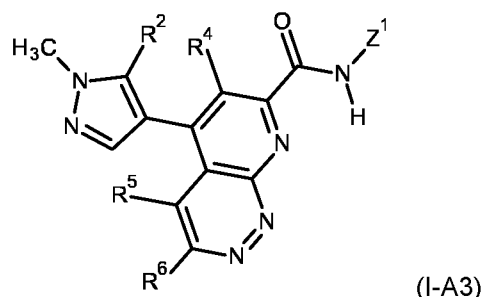
R⁹ is hydrogen, cyano, C₁-C₄ alkyl, C₁-C₄ haloalkyl, or C₃-C₆-cycloalkyl; and

Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents

25 independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, carbonyl, C₁-C₄ alkylcarbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or

30 substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

In an embodiment of the invention, the compound of formula (I) may be a compound of formula (I-A3), wherein R¹ is methyl, R³ is hydrogen, B¹, B² and B³ are N and



wherein R², R⁴, R⁵, R⁶ and Z¹ are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A3) of the invention,

R² is hydrogen, chlorine, or methyl;

5 R⁴ is hydrogen; and

R⁵, R⁶ and Z¹ are as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A3) of the invention,

R² is hydrogen, chlorine, or methyl;

R⁴ is hydrogen;

10 R⁵ and R⁶ are independently selected from hydrogen or cyano; and

Z¹ is as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A3) of the invention,

R² is hydrogen, chlorine, or methyl;

R⁴ is hydrogen;

15 R⁵ is hydrogen, halogen, C₁-C₄ alkyl, or cyano;

R⁶ is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl; and

Z¹ is as defined for the compounds of formula (I) according to the present invention.

Preferably, in the compound of formula (I-A3) of the invention,

R² is hydrogen, chlorine, or methyl;

20 R^4 is hydrogen;

R⁵ is hydrogen, halogen, C₁-C₄ alkyl, or cyano;

R⁶ is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl; and

Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxycarbonyl, C₁-

25 C₄ alkylcarbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl,

or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

Preferably, in the compound of formula (I-A3) of the invention,

R² is hydrogen, chlorine, or methyl;

5 R⁴ is hydrogen;

R⁵ and R⁶ are independently selected from hydrogen or cyano; and

Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, carbonyl, C₁-C₄ alkylcarbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein

10 any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents
15 independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy.

The presence of one or more possible asymmetric carbon atoms in any of the compounds selected from compounds of formula (I), (I-A), (I-A1), (I-A2) and (I-A3), or compounds selected from compounds listed in Tables A-1 to A-23, or Table P (below), according to the invention means that the compounds may occur in chiral isomeric forms, i.e., enantiomeric or diastereomeric forms.

20 More preferably, the compound of formula (I) according to the invention is selected from compounds listed in any one of Tables A-1 to A-23.

Even more preferably the compound of formula (I) according to the invention is selected from compounds listed in Table P (below).

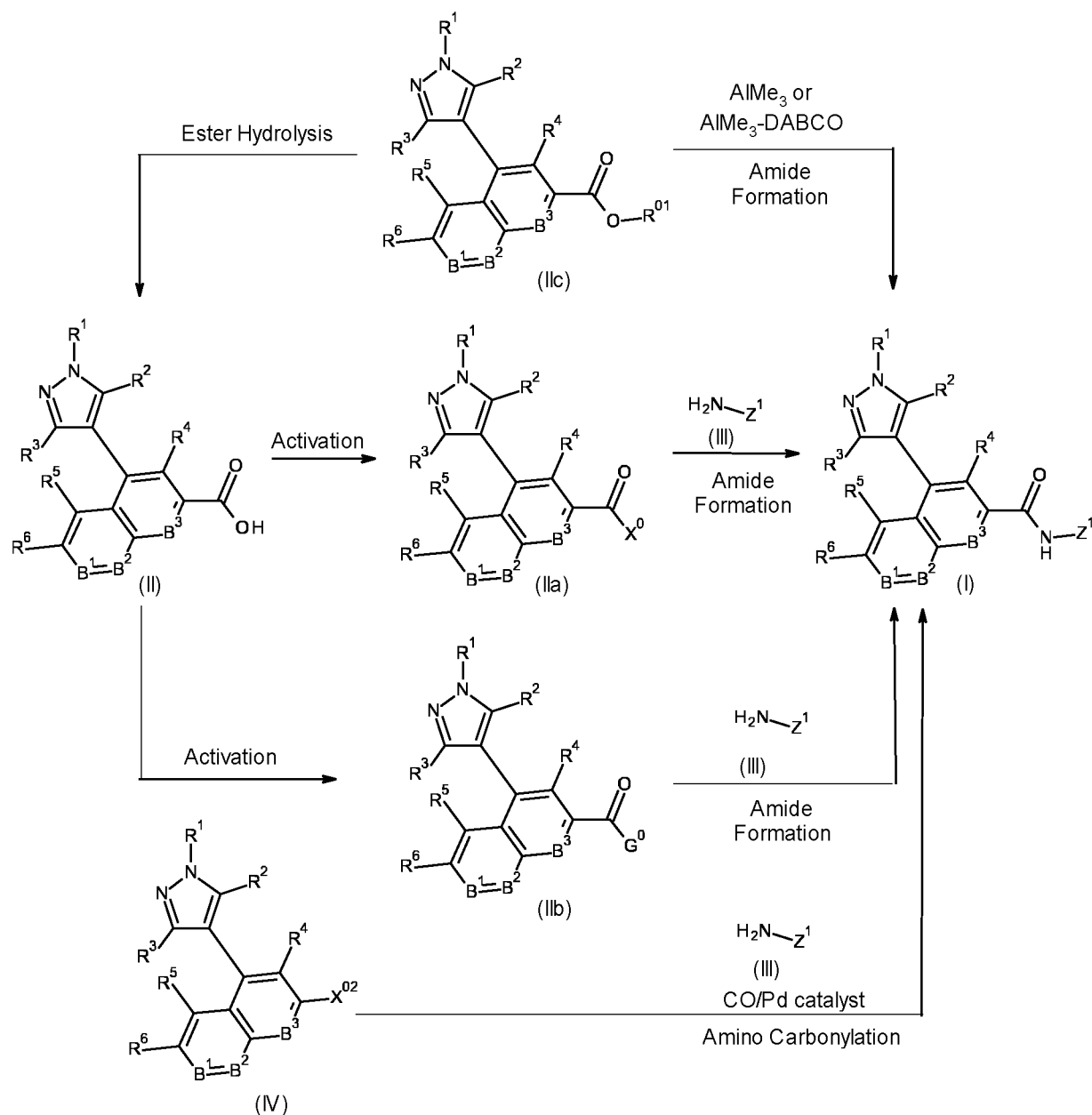
The compounds of formula (I) according to the present invention can be made as shown in the following
25 Schemes 1 to 10 below, in which, unless otherwise stated, the definition of each variable is as defined above for a compound of formula (I).

In particular, compounds of formula (I), wherein R¹, R², R³, R⁴, R⁵, R⁶, R⁷, R⁸, R⁹, B¹, B², B³ and Z¹ are as described under formula (I) in can be prepared as described in Schemes 1 to 10 below, in which, unless otherwise stated, the definition of each variable is as defined above for a compound of formula (I).

30 In any of the Schemes 1 to 10 below, the presence of one or more possible asymmetric carbon atoms in a compound of formula (I) according to the invention means that the compounds may occur in chiral isomeric forms, i.e., enantiomeric or diastereomeric forms.

Compounds of formula (I) may be prepared by a person skilled in the art following known methods. More specifically, compounds of formula (I) may be prepared from compounds of formula (II) or a salt thereof,
35 wherein Z¹ as defined above for the compound of formula (I) by reaction with a compound of formula (II),

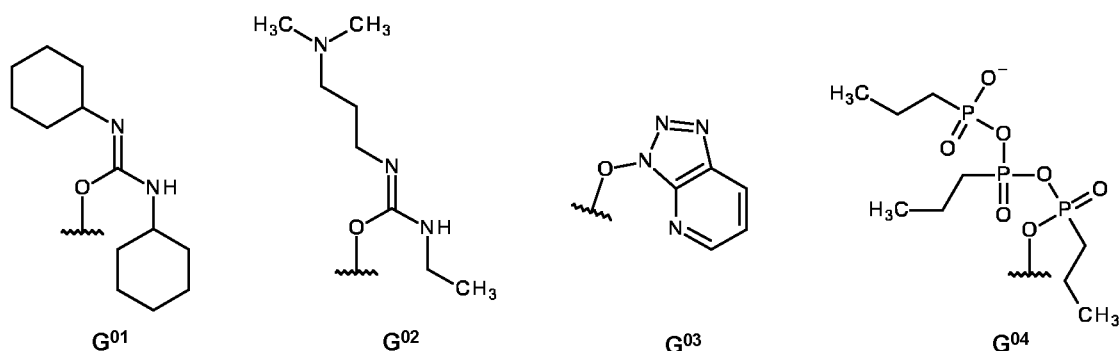
wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 , B^1 , B^2 and B^3 , are as defined above for the compound of formula (I). This reaction is shown in Scheme 1.



Scheme 1

- 5 In Scheme 1, compounds of formula (II), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 , B^1 , B^2 and B^3 , are as defined above for the compound of formula (I) are activated to compounds of formula (IIa) by methods known to a person skilled in the art and described, for example, in *Tetrahedron* **2005**, *61* (46), 10827-10852. For example, compounds of formula (IIa), where X^0 is halogen, are formed by treatment of compounds of formula (II) with, for example, oxalyl chloride or thionyl chloride in the presence of catalytic quantities of N,N-dimethylformamide (DMF) in inert solvents such as methylene dichloride or tetrahydrofuran (THF) at temperatures between 20°C
- 10

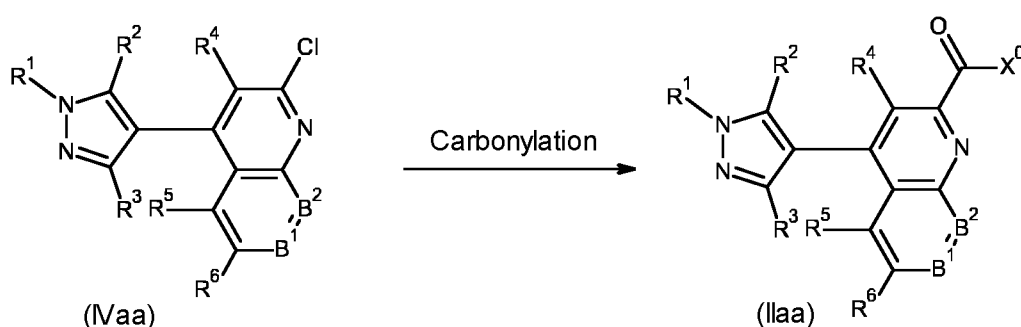
to 100°C, preferably 25°C. Treatment of compounds of formula (IIa) with compounds of formula (III), wherein Z¹ is as defined above for the compound of formula (I), optionally in the presence of a base, e.g. triethylamine or pyridine, leads to compounds of formula (I). Alternatively, compounds of formula (I) may be prepared by treatment of compounds of formula (II) with dicyclohexyl carbodiimide (DCC), 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide (EDC) or 1-[bis(dimethylamino)methylene]-1H-1,2,3-triazolo[4,5-b]pyridinium 3-oxide hexafluorophosphate (HATU) to give the activated compound of formula (IIb), wherein G⁰ is G⁰¹, G⁰² or G⁰³ as set forth below, in an inert solvent, e.g. pyridine, DMF, acetonitrile, CH₂Cl₂ or THF, optionally in the presence of a base, e.g. triethylamine, at temperatures between 30°C and 180°C. Finally, a compound of formula (II) can also be activated by reaction with a coupling reagent such as propanephosphonic acid anhydride (T3P) to provide compounds of formula (IIa), wherein G⁰ is G⁰⁴ as set forth below, as described for example in *Synthesis* **2013**, 45, 1569. Further reaction with an amine (or a salt thereof) of the compound of formula (III) leads to compounds of formula (I).



Further compounds of formula (II) can be prepared from compounds of formula (IIc), wherein R¹, R², R³, R⁴, R⁵, R⁶, B¹, B² and B³ are as described in formula (I), and R⁰¹ is C₁-C₄alkyl, by ester hydrolysis. A variety of conditions can be used, as for example aqueous sodium hydroxide or lithium hydroxide and an organic water miscible solvent like THF or dimethoxyethane or methanol or ethanol. Such ester hydrolyses are well known to those skilled in the art. Alternatively compounds of formula (IIc) can also be directly converted to compounds of formula (I) by reacting compounds of formula (IIc) with compounds of formula (III) in the presence of trimethyl aluminium (AlMe₃), or trimethyl aluminium-DABCO complex (AlMe₃-DABCO) in an inert solvent such as toluene or methylene chloride. Such reactions have been reported in the literature (see *Tetrahedron Lett.* **1977**, 4171-4174, *Tetrahedron Lett.* **2006**, 5767-5769, and references cited therein). A further method to prepare compounds of formula (I) involves amino carbonylation of compounds of formula (III) with compounds of formula (IV), wherein R¹, R², R³, R⁴, R⁵, R⁶, B¹, B², and B³, are as defined in compounds of formula (I), and X⁰² is halogen, preferably Cl, Br or I. Such amino carbonylations involve treatment of compounds of formula (III) with compounds of formula (IV) under a carbon monoxide atmosphere between 1-10ba, in the presence of a palladium catalyst, for example [1,3-Bis(diphenylphosphino)propane] palladium(II) chloride in an inert solvent such as methyl-THF or THF and a base such as triethyl amine. Such amino carbonylation reactions are well known to those skilled in the art and similar reactions have been reported in for example *Org. Lett.* **2007**, 9, 4575-4578, or *Org. Lett.* **2015**, 17, 3236-3239.

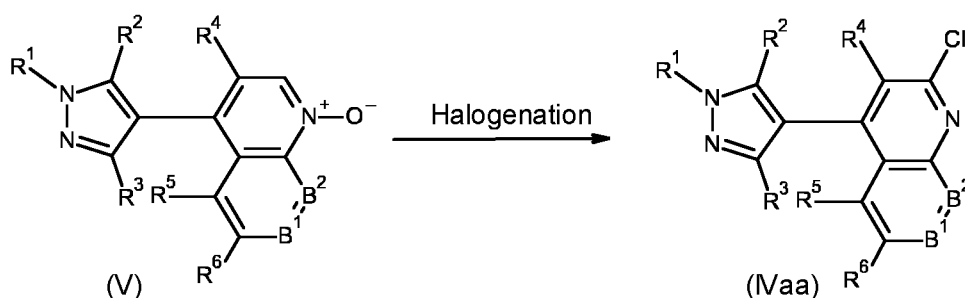
Compounds of formula (II) and (IIc) are commercially available or can be synthesized as described *vide infra*.

Compounds of formula (IIa), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I), B^3 is N, and X^0 is C₁-C₄ alkyl, namely compounds of formula (IIaa), may be prepared by reacting compounds of formula (IVa) wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I), and B^3 is N, namely compounds of formula (IVaa), in a high-pressure reactor typically under a carbon monoxide between 1-10ba using palladium-catalyzed conditions analogously to conditions described in US20150218102 or WO98/04557. This reaction is carried out in the presence of an alcohol X^0 -OH wherein X^0 is C₁-C₄ alkyl and a base, for example triethylamine, to give the corresponding ester where X^0 is C₁-C₄ alkyl (Scheme 2).



Scheme 2

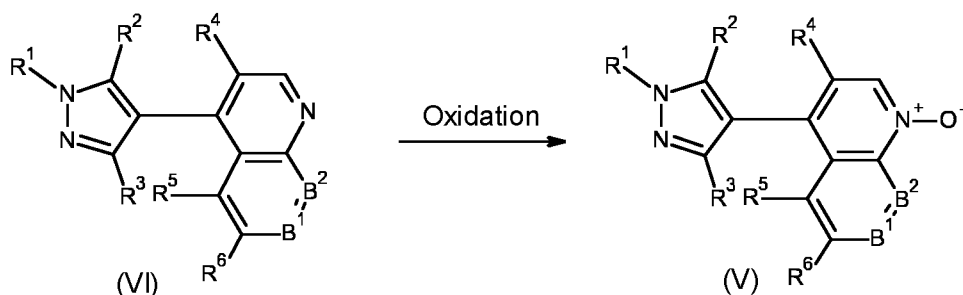
Compounds of formula (IVaa), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I), and B^3 is nitrogen, may be prepared by reacting compounds of formula (V), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I), and B^3 is N⁺-O⁻ (N-oxide), with a chlorinating agent such as phosphorus oxychloride, oxalyl chloride or thionyl chloride neat or in a presence of an inert solvent. Similar reactions have been described for example in *Tetrahedron Lett.* **2014**, 55(51), 7130-7132 (Scheme 3).



Scheme 3

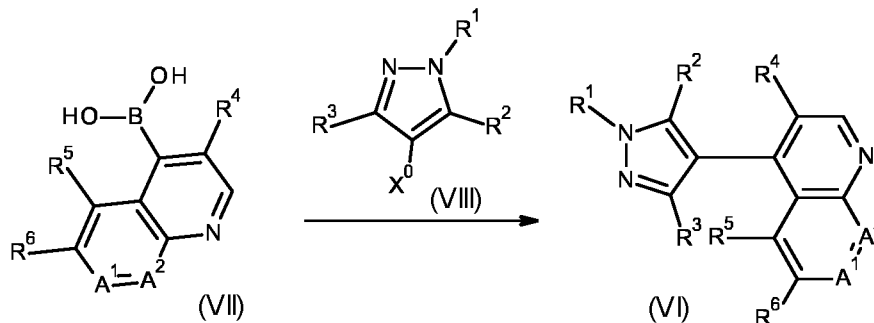
Compound of formula (V), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I), may be prepared by reacting compounds of formula (VI) wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I) with an oxidizing agent such as hydrogen peroxide in acetic acid or m-Chloroperbenzoic acid in a presence of solvent. Similar reactions have been described in

WO04/052370 or *Adv. Synth. Cat.* **2020**, 362(24), 5777-5782. Such oxidations can also be performed in presence of oxygen using ruthenium as catalyst as described in *Chem. Comm.* **2002**, 10, 1040-1041 (Scheme 4).



Scheme 4

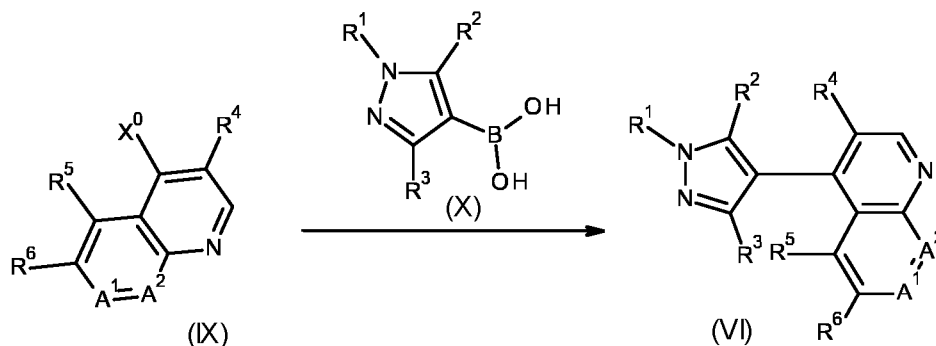
Compounds of formula (VI), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 , and B^2 are as defined above for the compound of formula (I), may be prepared by reacting compounds of formula (VIII), wherein R^1 , R^2 and R^3 are as defined above for the compound of formula (I) and X^0 is halogen, preferably chlorine, bromine or iodine, with compounds of formula (VII), wherein R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I), by means of a C-C bond formation reaction typically under palladium-catalyzed (alternatively nickel-catalyzed) cross-coupling conditions (Scheme 5).



Scheme 5

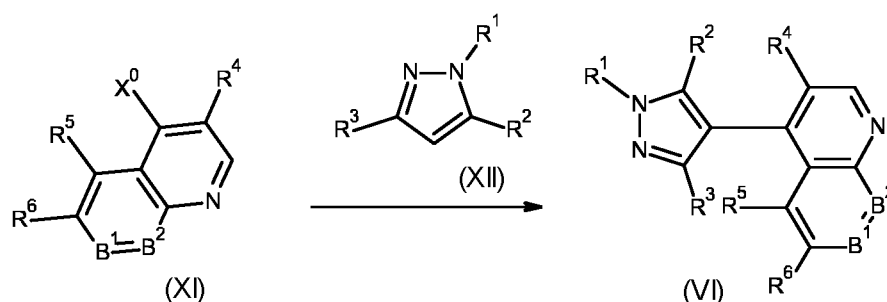
Suzuki-Miyaura cross-coupling reactions between compounds of formula (VII) and compounds of formula (VIII) are well known to a person skilled in the art and are usually carried out in the presence of a palladium catalyst, such as tetrakis(triphenylphosphine)-palladium(0) or [1,1'-bis(diphenylphosphino)ferrocene] palladium(II) dichloride dichloromethane complex, and a base, such as sodium or potassium carbonate, in a solvent, such as N,N-dimethylformamide, dioxane or dioxane-water mixtures, at temperatures between room temperature and 160°C, optionally under microwave heating conditions, and preferably under inert atmosphere. Such reactions have been reviewed for example in *J. Organomet. Chem.* **1999**, 576, 147-168. A person skilled in the art will also recognize that the reaction can be performed by reacting a compound of formula (X), wherein R^1 , R^2 and R^3 are as defined above for the compound of formula (I), with a compound of formula (IX), wherein R^4 , R^5 , R^6 , R^7 , B^1 and B^2 are as defined above for the compound of formula (I) and X^0 is

halogen, preferably chlorine, bromine or iodine, to provide a compound of formula (VI), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I) (Scheme 6).



Scheme 6

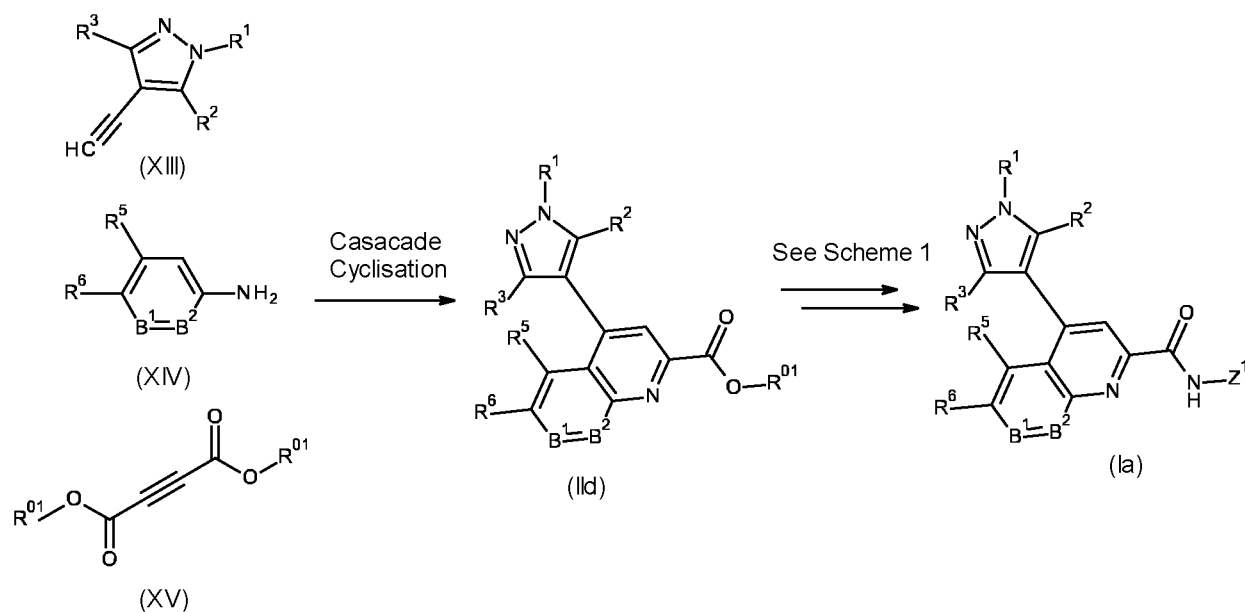
- 5 A further cross-coupling chemistry, namely C-H activation, can also be used to prepare compounds of formula (VI), wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I). (Scheme 7).



Scheme 7

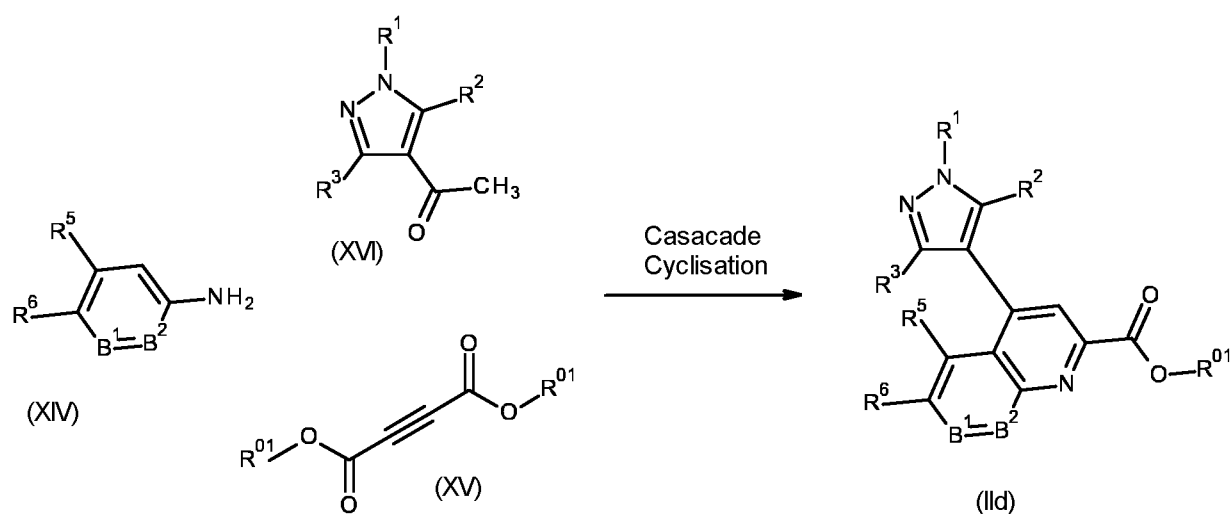
- 10 As shown in Scheme 7, compounds of formula (XI), wherein R^4 , R^5 , R^6 , B^1 and B^2 are as defined above for the compound of formula (I) and X^0 is halogen, preferably chlorine, bromine or iodine, are reacted with compounds of formula (XII), wherein R^1 , R^2 and R^3 are as defined above for the compound of formula (I), in the presence of a palladium catalyst, typically palladium acetate $Pd(OAc)_2$, a suitable ligand, for example 1,10-phenanthroline, in the presence of a base such as cesium carbonate or potassium carbonate, in inert solvents
15 such as chlorobenzene, toluene or xylene at temperatures between rt and $180^\circ C$, optionally under microwave heating conditions, preferably under inert atmosphere. Similar reactions have been reported in the literature for example in *Chem. Sci.* **2013**, 4, 2374-2379.

An alternative synthesis of compounds of formula (I) wherein R^1 , R^2 , R^3 , R^5 , R^6 , B^1 , B^2 and Z^1 are as described in formula (I), B^3 is nitrogen, and R^4 is hydrogen, namely compounds of formula (I-A), is shown in scheme 8.



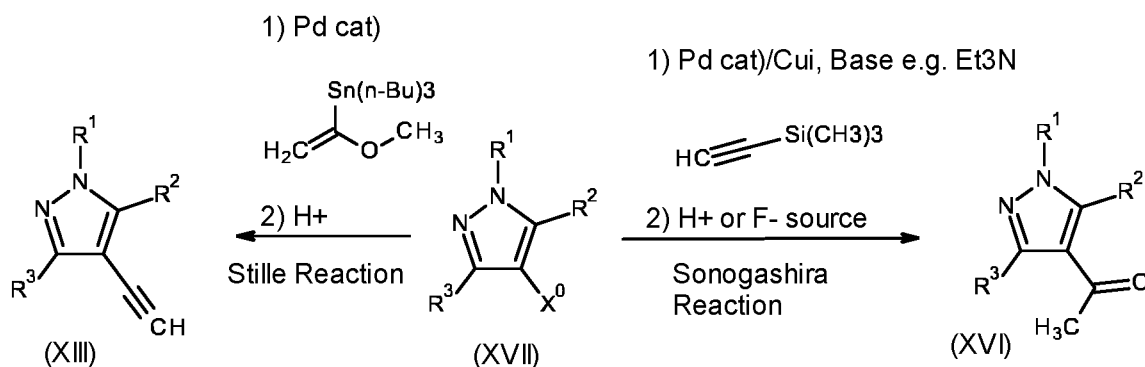
Scheme 8

As shown in scheme 9, a compound of formula (XIII), wherein R^1 , R^2 and R^3 are as previously described for formula (I) are treated with a compound of formula (XIV) wherein R^5 , R^6 , B^1 , and B^2 are as previously defined, and compounds of formula (XV), wherein R^{01} is C_1 - C_4 alkyl, under silver/triflic acid catalysis conditions, in an inert solvent such as methanol, to yield compounds of formula (IId) wherein R^1 , R^2 , R^3 , R^5 , R^6 , B^1 , B^2 and R^{01} are as previously defined. Compounds of formula (IId) are converted to compounds of formula (I-A) using the methods described in scheme 1. Such reactions have been described in for example in *Tetrahedron Lett.* **2019**, 60 (14), 965-970. A very similar type of reaction can be used to produce compounds of formula (IId) as shown in scheme 9.



Scheme 9

In this case, and acetyl compound of formula (XVI) is used and the catalyst system is Cu(II)triflate/triflic acid, in acetonitrile under air (see *Org. Chem. Front.* **2018**, 5, 1713-1718). Compounds of formula (XIII) and (XVI) can be readily prepared from compounds of formula (XVII), wherein R^1 , R^2 and R^3 are as previously defined and X^0 is halogen, preferably chlorine, bromine or iodine, by a palladium catalysed Sonogashira and Stille couplings, respectively, which are well known to those skilled in the art (scheme 10).



Scheme 10

All other compounds noted in schemes 1-10 but not specifically described, can be prepared according to methods known to those skilled in that art, or are commercially available.

Salts of compounds of formula (I) may be prepared in a manner known *per se*. Thus, for example, acid addition salts of compounds of formula (I) are obtained by treatment with a suitable acid or a suitable ion exchanger reagent and salts with bases are obtained by treatment with a suitable base or with a suitable ion exchanger reagent.

Salts of compounds of formula (I) can be converted in the customary manner into the free compounds (I), acid addition salts, for example, by treatment with a suitable basic compound or with a suitable ion exchanger reagent and salts with bases, for example, by treatment with a suitable acid or with a suitable ion exchanger reagent.

Salts of compounds of formula (I) can be converted in a manner known *per se* into other salts of compounds of formula (I), acid addition salts, for example, into other acid addition salts, for example by treatment of a salt of inorganic acid such as hydrochloride with a suitable metal salt such as a sodium, barium or silver salt, of an acid, for example with silver acetate, in a suitable solvent in which an inorganic salt which forms, for example silver chloride, is insoluble and thus precipitates from the reaction mixture.

Depending on the procedure or the reaction conditions, the compounds of formula (I), which have salt-forming properties, can be obtained in free form or in the form of salts.

The compounds of formula (I) and, where appropriate, the tautomer's thereof, in each case in free form or in salt form, can be present in the form of one of the isomers which are possible or as a mixture of these, for example in the form of pure isomers, such as antipodes and/or diastereomers, or as isomer mixtures, such as enantiomer mixtures, for example racemates, or diastereomer mixtures, depending on the number, absolute

and relative configuration of asymmetric carbon atoms which occur in the molecule and/or depending on the configuration of non-aromatic double bonds which occur in the molecule, the invention relates to the pure isomers and also to all isomer mixtures which are possible and is to be understood in each case in this sense hereinabove and herein below, even when stereochemical details are not mentioned specifically in each case.

5 Diastereomeric mixtures or racemic mixtures of compounds of formula (I), in free form or in salt form, which can be obtained depending on which starting materials and procedures have been chosen can be separated in a known manner into the pure diastereomers or racemates on the basis of the physicochemical differences of the components, for example by fractional crystallization, distillation and/or chromatography.

Enantiomeric mixtures, such as racemates, which can be obtained in a similar manner can be resolved into
10 the optical antipodes by known methods, for example by recrystallization from an optically active solvent, by chromatography on chiral adsorbents, for example high-performance liquid chromatography (HPLC) on acetyl cellulose, with the aid of suitable microorganisms, by cleavage with specific, immobilized enzymes, via the formation of inclusion compounds, for example using chiral crown ethers, where only one enantiomer is complexed, or by conversion into diastereomeric salts, for example by reacting a basic end-product racemate with
15 an optically active acid, such as a carboxylic acid, for example camphor, tartaric or malic acid, or sulfonic acid, for example camphorsulfonic acid, and separating the diastereomer mixture which can be obtained in this manner, for example by fractional crystallization based on their differing solubilities, to give the diastereomers, from which the desired enantiomer can be set free by the action of suitable agents, for example basic agents.

Pure diastereomers or enantiomers can be obtained according to the invention not only by separating suitable
20 isomer mixtures, but also by generally known methods of diastereoselective or enantioselective synthesis, for example by carrying out the process according to the invention with starting materials of a suitable stereochemistry.

It is advantageous to isolate or synthesize in each case the biologically more effective isomer, for example enantiomer or diastereomer, or isomer mixture, for example enantiomer mixture or diastereomer mixture, if the
25 individual components have a different biological activity.

As an example, compounds with more than one asymmetric carbon atoms may exist in diastereomeric forms which can be optionally separated using for example supercritical fluid chromatography (SFC) chromatography with chiral columns. Such diastereomers can show a different fungicidal activity profile, but all isomers and diastereomers form part of this invention.

30 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.

The compounds selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as
35 listed in Table P (below) according to the invention 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 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 selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as listed in Table P (below) according to the invention is applied to the plants, to parts thereof or the locus thereof.

It is also possible to use a compound selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as listed in Table P (below) according to the invention 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 selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as listed in Table P (below) according to the invention 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) according to the invention 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 selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as listed in Table P (below) according to the invention 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*, *Cephalosporium 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*, *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 lindbergii*, *Leveillula taurica*, *Lophodermium seditiosum*, *Microdochium nivale*, *Microsporum* spp., *Monilinia* spp., *Mucor* spp., *Mycosphaerella* spp. including *M. 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* 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. tritici*, *Pyrenopeziza* spp., *Pyrenophora* spp., *Pyricularia* spp. including *P. oryzae*, *Pythium* spp. including *P. 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 necator*, *Urocystis* spp., *Ustilago* spp., *Venturia* spp. including *V. inaequalis*, *Verticillium* spp., and *Xanthomonas* spp.

The compounds of formula (I) according to the invention 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 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 tritcale and wheat; fibre plants for example cotton, flax, hemp, jute and sisal; field crops 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 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.

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 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®.

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); 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 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); Nature-Gard® Agrisure® GT Advantage (GA21 glyphosate-tolerant trait), Agrisure® CB Advantage (Bt11 corn borer (CB) trait), Agrisure® RW (corn rootworm trait) and Protecta®.

The term "crops" is to be understood as including also crop plants which have been so transformed using 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*, such as delta-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-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 delta-endotoxins, for example Cry1Ab, Cry1Ac, Cry1F, Cry1Fa2, Cry2Ab, Cry3A, Cry3Bb1 or Cry9C, or vegetative 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, WO02/15701). 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 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 WO2003/018810).

Examples of such toxins or transgenic plants capable of synthesising such toxins are disclosed, for example, in EP-0374753, WO93/07278, WO95/34656, EP0427529, EP0451878 and WO03/052073.

The processes for the preparation of such transgenic plants are generally known to a 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 WO95/34656, EP0367474, EP0401979 and WO90/13651.

The toxin contained in the transgenic plants imparts to the plants tolerance to harmful insects. 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 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 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:

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.
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.
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 WO2003/018810.
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.
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.
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 the European corn borer.

5 The compounds of formula (I) according to the invention may be used in controlling or preventing phytopathogenic diseases, especially phytopathogenic fungi such as *Alternaria* species in fruits, vegetables and potatoes; *Botrytis cinerea* in strawberries, tomatoes, sunflower, pulse crops, vegetables and grapes; *Rhizoctonia solani* in potatoes and vegetables; *Uncinula necator* in grapes; *Cladosporium cucumerinum*, *Didymella bryoniae*, *Sphaerotheca fuliginea* and *Glomerella lagenarium* in cucurbits; *Leveillula taurica* in cucurbits and solanaceous crops; *Fusarium* spp. in cereals; *Leptosphaeria* spp. in cereals; and *Zymospetoria* spp. in cereals.

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.

15 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.

25 The compounds of formula (I) according to the invention 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 WO1997/33890.

35 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.

- 5 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 a person skilled in the art.

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, 10 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- 15 butyrolactone, glycerol, glycerol diacetate, glycerol monoacetate, glycerol triacetate, hexadecane, hexylene glycol, isoamyl acetate, 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 20 acid, propylene glycol, propylene glycol monomethyl ether, p-xylene, toluene, 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 agents, when used, 30 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 35 as tridecyl alcohol-C.sub. 16 ethoxylate; soaps, such as sodium stearate; alkylnaphthalenesulfonate salts, such as sodium dibutyl naphthalenesulfonate; 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, sequestering agents, neutralising agents and buffers, corrosion inhibitors, dyes, odorants, spreading agents, penetration aids, micronutrients, emollients, lubricants and sticking agents.

In addition, further, other biocidal active ingredients or compositions may be combined with the compositions of the invention and used in the methods of the invention and applied simultaneously 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 biocidal 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 "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.

The compounds of formula (I) according to the invention 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-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) according to the invention may be used in the form of (fungicidal) compositions for controlling or protecting against phytopathogenic microorganisms, comprising as active ingredient at least one compound of formula (I) or of at least one preferred individual compound as defined herein, in free form or in agrochemical 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 of formula (I) according to the invention, an agriculturally acceptable carrier and optionally an adjuvant. An agricultural acceptable carrier is for example a carrier that is suitable for agricultural use. Agricultural carriers are well known in the art. Preferably, said composition may comprise at least one or more pesticidal-active compounds, for example an additional fungicidal active ingredient in addition to the compound of formula (I).

The compound of formula (I) according to the invention may be the sole active ingredient of a composition or it may be 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.

5 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
10 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
15 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 include the following: petroleum oils, 1,1-bis(4-chlorophenyl)-2-ethoxyethanol, 2,4-dichlorophenyl benzenesulfonate, 2-fluoro-N-methyl-N-1-naphthylacetamide, 4-
20 chlorophenyl phenyl sulfone, acetoprole, aldoxycarb, amidithion, amidothioate, amiton, amiton hydrogen oxalate, amitraz, aramite, arsenous oxide, azobenzene, azothoate, benomyl, benoxa-fos, benzyl benzoate, bixafen, brofenvalerate, bromocyclen, bromophos, bromopropylate, buprofezin, butocarboxim, butoxycarboxim, butylpyridaben, calcium polysulfide, camphechlor, carbanolate, carbophenothion, cymiazole, chinomethionat, chlorbenside, chlordimeform, chlordimeform hydrochloride, chlorfenethol, chlorfenson,
25 chlorfensulfide, chlorobenzilate, chloromebuform, chloromethiuron, chloropropylate, chlorthiophos, cinerin I, cinerin II, cinerins, closantel, coumaphos, crotamiton, crotoxyphos, cufraneb, cyanthoate, DCPM, DDT, demephion, demephion-O, demephion-S, demeton-methyl, demeton-O, demeton-O-methyl, demeton-S, demeton-S-methyl, demeton-S-methylsulfon, dichlofluanid, dichlorvos, dicliphos, dienochlor, dimefox, dinex, dinex-diclexine, dinocap-4, dinocap-6, dinocron, dinopenton, dinosulfon, dinoterbon, dioxathion, diphenyl
30 sulfone, disulfiram, DNOC, dofenapyn, doramectin, endothion, eprinomectin, ethoate-methyl, etrimfos, fenazaflor, fenbutatin oxide, fenothiocarb, fenpyrad, fenpyroximate, fenpyrazamine, fenson, fentrifanil, flubenzimine, flucycloxuron, fluenetil, fluorbenside, FMC 1137, formetanate, formetanate hydrochloride, formparanate, gamma-HCH, glyodin, halfenprox, hexadecyl cyclopropanecarboxylate, isocarbophos, jasmolin I, jasmolin II, jodfenphos, lindane, malonoben, mecarbam, mephosfolan, mesulfen, methacrifos, methyl
35 bromide, metolcarb, mexacarbate, milbemycin oxime, mipafox, monocrotophos, morphothion, moxidectin, naled, 4-chloro-2-(2-chloro-2-methyl-propyl)-5-[(6-iodo-3-pyridyl)methoxy]pyridazin-3-one, nifluridide, nikkomycins, nitrilacarb, nitrilacarb 1:1 zinc chloride complex, omethoate, oxydeprofos, oxydisulfoton, pp'-DDT,

parathion, permethrin, phenkapton, phosalone, phosfolan, phosphamidon, polychloroterpenes, polynactins, proclonol, promacyl, propoxur, prothidathion, prothoate, pyrethrin I, pyrethrin II, pyrethrins, pyridaphenthion, pyrimitate, quinalphos, quintiofos, R-1492, phosglycin, rotenone, schradan, sebufos, selamectin, sophamide, SSI-121, sulfiram, sulfluramid, sulfotep, sulfur, diflovidazin, tau-fluvalinate, TEPP, terbam, tetradifon, tetrasul, thiafenox, thiocarboxime, thiofanox, thiometon, thioquinox, thuringiensin, triamiphos, triarathene, triazophos, triazuron, trifenofos, trinactin, vamidothion, vaniliprole, bethoxazin, copper dioctanoate, copper sulfate, cybutryne, dichlone, dichlorophen, endothal, fentin, hydrated lime, nabam, quinoxamine, quinonamid, simazine, triphenyltin acetate, triphenyltin hydroxide, crufomate, piperazine, thiophanate, chloralose, fenthion, pyridin-4-amine, strychnine, 1-hydroxy-1H-pyridine-2-thione, 4-(quinoxalin-2-ylamino)benzenesulfonamide, 8-hydroxyquinoline sulfate, bronopol, copper hydroxide, cresol, dipyrithione, dodicin, fenaminosulf, formaldehyde, hydrargaphen, kasugamycin, kasugamycin hydrochloride hydrate, nickel bis(dimethyldithiocarbamate), nitrapyrin, othilinone, oxolinic acid, oxytetracycline, potassium hydroxyquinoline sulfate, probenazole, streptomycin, streptomycin sesquisulfate, tecloftalam, thiomersal, Adoxophyes orana GV, Agrobacterium radiobacter, Amblyseius spp., Anagrapha falcifera NPV, Anagrus atomus, Aphelinus abdominalis, Aphidius colemani, Aphidoletes aphidimyza, Autographa californica NPV, Bacillus sphaericus Neide, Beauveria brongniartii, Chrysoperla carnea, Cryptolaemus montrouzieri, Cydia pomonella GV, Dacnusa sibirica, Diglyphus isaea, Encarsia formosa, Eretmocerus eremicus, Heterorhabditis bacteriophora and H. megidis, Hippodamia convergens, Leptomastix dactylopii, Macrolophus caliginosus, Mamestra brassicae NPV, Metaphycus helvolus, Metarhizium anisopliae var. acridum, Metarhizium anisopliae var. anisopliae, Neodiprion sertifer NPV and N. lecontei NPV, Orius spp., Paecilomyces fumosoroseus, Phytoseiulus persimilis, Steinernema bibionis, Steinernema carpocapsae, Steinernema feltiae, Steinernema glaseri, Steinernema riobrave, Steinernema riobravis, Steinernema scapterisci, Steinernema spp., Trichogramma spp., Typhlodromus occidentalis, Verticillium lecanii, apholate, bisazir, busulfan, dimatif, hemel, hempa, metepa, methiotepa, methyl apholate, morzid, penfluron, tepa, thiohempa, thiotepa, tretamine, uredepa, (E)-dec-5-en-1-yl acetate with (E)-dec-5-en-1-ol, (E)-tridec-4-en-1-yl acetate, (E)-6-methylhept-2-en-4-ol, (E,Z)-tetradeca-4,10-dien-1-yl acetate, (Z)-dodec-7-en-1-yl acetate, (Z)-hexadec-11-enal, (Z)-hexadec-11-en-1-yl acetate, (Z)-hexadec-13-en-11-yn-1-yl acetate, (Z)-icos-13-en-10-one, (Z)-tetradec-7-en-1-yl, (Z)-tetradec-9-en-1-ol, (Z)-tetradec-9-en-1-yl acetate, (7E,9Z)-dodeca-7,9-dien-1-yl acetate, (9Z,11E)-tetradeca-9,11-dien-1-yl acetate, (9Z,12E)-tetradeca-9,12-dien-1-yl acetate, 14-methyloctadec-1-ene, 4-methylnonan-5-ol with 4-methylnonan-5-one, alpha-multistriatin, brevicomin, codlure, codlemone, cuelure, disparlure, dodec-8-en-1-yl acetate, dodec-9-en-1-yl acetate, dodeca-8,10-dien-1-yl acetate, dominicalure, ethyl 4-methyloctanoate, eugenol, frontaline, grandlure, grandlure I, grandlure II, grandlure III, grandlure IV, hexalure, ipsdienol, ipsenol, japonilure, lineatin, litlure, looplure, medlure, megatomoic acid, methyl eugenol, muscalure, octadeca-2,13-dien-1-yl acetate, octadeca-3,13-dien-1-yl acetate, orfralure, oryctalure, ostramone, siglure, sordidin, sulcatol, tetradec-11-en-1-yl acetate, trimedlure, trimedlure A, trimedlure B1, trimedlure B2, trimedlure C, trunc-call, 2-(octylthio)ethanol, butopyronoxyl, butoxy(polypropylene glycol), dibutyl adipate, dibutyl phthalate, dibutyl succinate, diethyltoluamide, dimethyl carbate, dimethyl phthalate, ethyl hexanediol, hexamide, methoquin-butyl, methylneodecanamide, oxamate, picaridin, 1-dichloro-1-nitroethane, 1,1-dichloro-

2,2-bis(4-ethylphenyl)ethane, 1,2-dichloropropane with 1,3-dichloropropene, 1-bromo-2-chloroethane, 2,2,2-trichloro-1-(3,4-dichlorophenyl)ethyl acetate, 2,2-dichlorovinyl 2-ethylsulfinylethyl methyl phosphate, 2-(1,3-dithiolan-2-yl)phenyl dimethylcarbamate, 2-(2-butoxyethoxy)ethyl thiocyanate, 2-(4,5-dimethyl-1,3-dioxolan-2-yl)phenyl methylcarbamate, 2-(4-chloro-3,5-xylyloxy)ethanol, 2-chlorovinyl diethyl phosphate, 2-imidazolidone, 2-isovalerylindan-1,3-dione, 2-methyl(prop-2-ynyl)aminophenyl methylcarbamate, 2-thiocyanatoethyl laurate, 3-bromo-1-chloroprop-1-ene, 3-methyl-1-phenylpyrazol-5-yl dimethylcarbamate, 4-methyl(prop-2-ynyl)amino-3,5-xylyl methylcarbamate, 5,5-dimethyl-3-oxocyclohex-1-enyl dimethylcarbamate, acethion, acrylonitrile, aldrin, allosamidin, allyxycarb, alpha-ecdysone, aluminium phosphide, aminocarb, anabasine, athidathion, azamethiphos, *Bacillus thuringiensis* delta endotoxins, barium hexafluorosilicate, barium polysulfide, barthrin, Bayer 22/190, Bayer 22408, beta-cyfluthrin, beta-cypermethrin, bioethanomethrin, biopermethrin, bis(2-chloroethyl) ether, borax, bromfeninfos, bromo-DDT, bufencarb, butacarb, butathiofos, butonate, calcium arsenate, calcium cyanide, carbon disulfide, carbon tetrachloride, cartap hydrochloride, cevadine, chlorbicyclen, chlordane, chlordecone, chloroform, chloropicrin, chlorphoxim, chlorprazophos, cis-resmethrin, cismethrin, clocythrins, copper acetoarsenite, copper arsenate, copper oleate, coumithoate, cryolite, CS 708, cyanofenphos, cyanophos, cyfluthrin, cythioate, d-tetramethrin, DAEP, dazomet, decarbofuran, diamidafos, dicapthon, dichlofenthion, dicresyl, dicyclanil, dieldrin, diethyl 5-methylpyrazol-3-yl phosphate, dilor, dimefluthrin, dimetan, dimethrin, dimethylvinphos, dimetilan, dinoprop, dinosam, dinoseb, diofenolan, dioxabenzofos, dithicrofos, DSP, ecdysterone, EI 1642, EMPC, EPBP, etaphos, ethiofencarb, ethyl formate, ethylene dibromide, ethylene dichloride, ethylene oxide, EXD, fenchlorphos, fenethacarb, fenitrothion, fenoxacrim, fenpirithrin, fensulfothion, fenthion-ethyl, flucufuron, fosmethilan, fospirate, fosthietan, furathiocarb, furethrin, guazatine, guazatine acetates, sodium tetrathiocarbonate, halfenprox, HCH, HEOD, heptachlor, heterophos, HHDN, hydrogen cyanide, hyquincarb, IPSP, isazofos, isobenzan, isodrin, isofenphos, isolane, isoprothiolane, isoxathion, juvenile hormone I, juvenile hormone II, juvenile hormone III, kelevan, kinoprene, lead arsenate, leptophos, lirimfos, lythidathion, m-cumenyl methylcarbamate, magnesium phosphide, mazidox, mecarphon, menazon, mercurous chloride, mesulfenfos, metam, metam-potassium, metam-sodium, methanesulfonyl fluoride, methocrotophos, methoprene, methothrin, methoxychlor, methyl isothiocyanate, methylchloroform, methylene chloride, metoxadiazone, mirex, naftalofos, naphthalene, NC-170, nicotine, nicotine sulfate, nithiazine, nornicotine, O-5-dichloro-4-iodophenyl O-ethyl ethylphosphonothioate, O,O-diethyl O-4-methyl-2-oxo-2H-chromen-7-yl phosphorothioate, O,O-diethyl O-6-methyl-2-propylpyrimidin-4-yl phosphorothioate, O,O,O',O'-tetrapropyl dithiopyrophosphate, oleic acid, para-dichlorobenzene, parathion-methyl, pentachlorophenol, pentachlorophenyl laurate, PH 60-38, phenkapton, phosnichlor, phosphine, phoxim-methyl, pirimetaphos, polychlorodicyclopentadiene isomers, potassium arsenite, potassium thiocyanate, precocene I, precocene II, precocene III, primidophos, profluthrin, promecarb, prothiofos, pyrazophos, pyresmethrin, quassia, quinalphos-methyl, quinothion, rafoxanide, resmethrin, rotenone, kadethrin, ryania, ryanodine, sabadilla, schradan, sebufos, SI-0009, thiapronil, sodium arsenite, sodium cyanide, sodium fluoride, sodium hexafluorosilicate, sodium pentachlorophenoxide, sodium selenate, sodium thiocyanate, sulcofuron, sulcofuron-sodium, sulfuryl fluoride, sulprofos, tar oils, tazimcarb, TDE, tebupirimfos, temephos, terallethrin, tetrachloroethane, thicrofos, thiocyclam, thiocyclam hydrogen oxalate,

thionazin, thiosultap, thiosultap-sodium, tralomethrin, transpermethrin, triazamate, trichlormetaphos-3, trichloronat, trimethacarb, tolprocarb, triclopyricarb, triprene, veratridine, veratrine, XMC, zetamethrin, zinc phosphide, zolaprofos, meperfluthrin, tetramethylfluthrin, bis(tributyltin) oxide, bromoacetamide, ferric phosphate, niclosamide-olamine, tributyltin oxide, pyrimorph, trifenmorph, 1,2-dibromo-3-chloropropane, 1,3-dichloropropene, 3,4-dichlorotetrahydrothiophene 1,1-dioxide, 3-(4-chlorophenyl)-5-methylrhodanine, 5-methyl-6-thioxo-1,3,5-thiadiazinan-3-ylacetic acid, 6-isopentenylaminopurine, anisiflupurin, benclonthiaz, cytokinins, DCIP, furfural, isamidofos, kinetin, Myrothecium verrucaria composition, tetrachlorothiophene, xlenols, zeatin, potassium ethylxanthate, acibenzolar, acibenzolar-S-methyl, Reynoutria sachalinensis extract, alpha-chlorohydrin, antu, barium carbonate, bisthiosemi, brodifacoum, bromadiolone, bromethalin, chlorophacinone, cholecalciferol, coumachlor, coumafuryl, coumatetralyl, crimidine, difenacoum, difethialone, diphacinone, ergocalciferol, flocoumafen, fluoroacetamide, flupropadine, flupropadine hydrochloride, norbormide, phosacetim, phosphorus, pindone, pyrinuron, scilliroside, sodium fluoroacetate, thallium sulfate, warfarin, 2-(2-butoxyethoxy)ethyl piperonylate, 5-(1,3-benzodioxol-5-yl)-3-hexylcyclohex-2-enone, farnesol with nerolidol, verbutin, MGK 264, piperonyl butoxide, piprotal, propyl isomer, S421, sesamex, sesasmolin, sulfoxide, anthraquinone, copper naphthenate, copper oxychloride, dicyclopentadiene, thiram, zinc naphthenate, ziram, imanin, ribavirin, chloroinconazide, mercuric oxide, thiophanate-methyl, azaconazole, bitertanol, bromuconazole, cyproconazole, difenoconazole, diniconazole, epoxiconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, furametpyr, hexaconazole, imazalil, imibenconazole, ipconazole, metconazole, myclobutanil, paclobutrazole, pefurazoate, penconazole, prothioconazole, pyrifenoxy, prochloraz, propiconazole, pyrisoxazole, simeconazole, tebuconazole, tetraconazole, triadimefon, triadimenol, triflumizole, triticonazole, ancymidol, fenarimol, nuarimol, bupirimate, dimethirimol, ethirimol, dodemorph, fenpropidin, fenpropimorph, spiroxamine, tridemorph, cyprodinil, mepanipyrim, pyrimethanil, fenpiclonil, fludioxonil, benalaxyl, furalaxyl, metalaxyl, R-metalaxyl, ofurace, oxadixyl, carbendazim, debacarb, fuberidazole, thiabendazole, chlozolate, dichlozoline, myclozoline, procymidone, vinclozoline, boscalid, carboxin, fenfuram, flutolanil, mepronil, oxycarboxin, penthiopyrad, thifluzamide, dodine, iminoctadine, azoxystrobin, dimoxystrobin, enestroburin, fenaminstrobin, flufenoxystrobin, fluoxastrobin, kresoxim-methyl, metominostrobin, trifloxystrobin, orysastrobin, picoxystrobin, pyraclostrobin, pyrametostrobin, pyraoxystrobin, ferbam, mancozeb, maneb, metiram, propineb, zineb, captafol, captan, fluoroimide, folpet, tolylfluanid, bordeaux mixture, copper oxide, mancopper, oxine-copper, nitrothal-isopropyl, edifenphos, iprobenphos, phosdiphen, tolclofos-methyl, anilazine, benthiavalicarb, blasticidin-S, chloroneb, chlorothalonil, cyflufenamid, cymoxanil, cyclobutirfluram, diclocymet, diclomezine, dicloran, diethofencarb, dimethomorph, flumorph, dithianon, ethaboxam, etridiazole, famoxadone, fenamidone, fenoxanil, ferimzone, fluazinam, flumetysulfurim, fluopicolide, fluoxystrobin, flusulfamide, fluxapyroxad, fenhexamid, fosetylaluminium, hymexazol, iprovalicarb, cyazofamid, methasulfocarb, metrafenone, pencycuron, phthalide, polyoxins, propamocarb, pyribencarb, proquinazid, pyroquilon, pyriofenone, quinoxifen, quintozone, tiadinil, triazoxide, tricyclazole, triforine, validamycin, valifenalate, zoxamide, mandipropamid, flubeneteram, isopyrazam, sedaxane, benzovindiflupyr, pydiflumetofen, 3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxylic acid (3',4',5'-trifluoro-biphenyl-2-yl)-amide, isoflucypram, isotianil, dipymetitrone, 6-ethyl-5,7-dioxo-

pyrrolo[4,5][1,4]dithiino[1,2-c]isothiazole-3-carbonitrile, 2-(difluoromethyl)-N-[3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide, 4-(2,6-difluorophenyl)-6-methyl-5-phenyl-pyridazine-3-carbonitrile, (R)-3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide, 4-(2-bromo-4-fluoro-phenyl)-N-(2-chloro-6-fluoro-phenyl)-2,5-dimethyl-pyrazol-3-amine, 4-(2-bromo-4-fluorophenyl)-N-(2-chloro-6-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, fluindapyr, coumethoxystrobin (jiaxiangjunzhi), lvbenmixianan, dichlobentiazox, mandestrobin, 3-(4,4-difluoro-3,4-dihydro-3,3-dimethylisoquinolin-1-yl)quinolone, 2-[2-fluoro-6-[(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol, oxathiapirolin, tert-butyl N-[6-[[[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate, pyraziflumid, inpyrflumax, trolprocarb, mefentrifluconazole, ipfentrifluconazole, 2-(difluoromethyl)-N-[(3R)-3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide, N'-(2,5-dimethyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine, N'-[4-(4,5-dichlorothiazol-2-yl)oxy-2,5-dimethyl-phenyl]-N-ethyl-N-methyl-formamidine, [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, but-3-ynyl N-[6-[(Z)-[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate, methyl N-[[5-[4-(2,4-dimethylphenyl)triazol-2-yl]-2-methyl-phenyl]methyl]carbamate, 3-chloro-6-methyl-5-phenyl-4-(2,4,6-trifluorophenyl)pyridazine, pyridachlometyl, 3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide, 1-[2-[1-(4-chlorophenyl)pyrazol-3-yl]oxymethyl]-3-methyl-phenyl]-4-methyl-tetrazol-5-one, 1-methyl-4-[3-methyl-2-[2-methyl-4-(3,4,5-trimethylpyrazol-1-yl)phenoxy]methyl]phenyl]tetrazol-5-one, aminopyrifin, ametocradin, amisulbrom, penflufen, (Z,2E)-5-[1-(4-chlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-pent-3-enamide, florylpicoxamid, fencicoxamid, metarylpicoxamid, tebufloquin, ipflufenquin, quinfumelin, isofetamid, ethyl 1-[[4-[2-(trifluoromethyl)-1,3-dioxolan-2-yl]methoxy]phenyl]methyl]pyrazole-3-carboxylate (may be prepared from the methods described in WO2020/056090), ethyl 1-[[4-(Z)-2-ethoxy-3,3,3-trifluoro-prop-1-enoxy]phenyl]methyl]pyrazole-3-carboxylate (may be prepared from the methods described in WO2020/056090), methyl N-[[4-[1-(4-cyclopropyl-2,6-difluoro-phenyl)pyrazol-4-yl]-2-methyl-phenyl]methyl]carbamate (may be prepared from the methods described in WO2020/097012), methyl N-[[4-[1-(2,6-difluoro-4-isopropyl-phenyl)pyrazol-4-yl]-2-methyl-phenyl]methyl]carbamate (may be prepared from the methods described in WO2020/097012), 6-chloro-3-(3-cyclopropyl-2-fluoro-phenoxy)-N-[2-(2,4-dimethylphenyl)-2,2-difluoro-ethyl]-5-methyl-pyridazine-4-carboxamide (may be prepared from the methods described in WO2020/109391), 6-chloro-N-[2-(2-chloro-4-methyl-phenyl)-2,2-difluoro-ethyl]-3-(3-cyclopropyl-2-fluoro-phenoxy)-5-methyl-pyridazine-4-carboxamide (may be prepared from the methods described in WO2020/109391), 6-chloro-3-(3-cyclopropyl-2-fluoro-phenoxy)-N-[2-(3,4-dimethylphenyl)-2,2-difluoro-ethyl]-5-methyl-pyridazine-4-carboxamide (may be prepared from the methods described in WO2020/109391), N-[2-[2,4-dichloro-phenoxy]phenyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide, N-[2-[2-chloro-4-(trifluoromethyl)phenoxy]phenyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide, benzothioestrobin, phenamacril, 5-amino-1,3,4-thiadiazole-2-thiol zinc salt (2:1), fluopyram, flufenoxadiazam, flutianil, fluopimomide, pyrapropoyne, picarbutrazox, 2-(difluoromethyl)-N-(3-ethyl-1,1-dimethyl-indan-4-yl)pyridine-3-carboxamide, 2-(difluoromethyl)-N-((3R)-1,1,3-trimethylindan-4-yl)pyridine-3-carboxamide, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy]benzonitrile, metyltetraprole, α -(1,1-dimethylethyl)- α -[4'-(trifluoromethoxy)[1,1'-biphenyl]-4-yl]-5-

pyrimidinemethanol, fluoxapiprolin, enoxastrobin, methyl (Z)-3-methoxy-2-[2-methyl-5-[4-(trifluoromethyl)triazol-2-yl]phenoxy]prop-2-enoate, methyl (Z)-3-methoxy-2-[2-methyl-5-(4-propyltriazol-2-yl)phenoxy]prop-2-enoate, methyl (Z)-2-[5-(3-isopropylpyrazol-1-yl)-2-methyl-phenoxy]-3-methoxy-prop-2-enoate, methyl (Z)-3-methoxy-2-[2-methyl-5-(3-propylpyrazol-1-yl)phenoxy]prop-2-enoate, methyl (Z)-3-methoxy-2-[2-methyl-5-[3-(trifluoromethyl)pyrazol-1-yl]phenoxy]prop-2-enoate (these compounds may be prepared from the methods described in WO2020/079111), methyl (Z)-2-(5-cyclohexyl-2-methyl-phenoxy)-3-methoxy-prop-2-enoate, methyl (Z)-2-(5-cyclopentyl-2-methyl-phenoxy)-3-methoxy-prop-2-enoate (these compounds may be prepared from the methods described in WO2020/193387), 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy] benzonitrile, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(5-sulfanyl-1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy] benzonitrile, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(5-thioxo-4H-1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy]benzonitrile, trinexapac, coumoxystrobin, zhongshengmycin, thiodiazole copper, zinc thiazole, amectottractin, iprodione, seboctylamine, N'-[5-bromo-2-methyl-6-[(1S)-1-methyl-2-propoxy-ethoxy]-3-pyridyl]-N-ethyl-N-methyl-formamidine, N'-[5-bromo-2-methyl-6-[(1R)-1-methyl-2-propoxy-ethoxy]-3-pyridyl]-N-ethyl-N-methyl-formamidine, N'-[5-bromo-2-methyl-6-(1-methyl-2-propoxy-ethoxy)-3-pyridyl]-N-ethyl-N-methyl-formamidine, N'-[5-chloro-2-methyl-6-(1-methyl-2-propoxy-ethoxy)-3-pyridyl]-N-ethyl-N-methyl-formamidine, N'-[5-bromo-2-methyl-6-(1-methyl-2-propoxy-ethoxy)-3-pyridyl]-N-isopropyl-N-methyl-formamidine (these compounds may be prepared from the methods described in WO2015/155075); N'-[5-bromo-2-methyl-6-(2-propoxypropoxy)-3-pyridyl]-N-ethyl-N-methyl-formamidine (this compound may be prepared from the methods described in IPCOM000249876D); N-isopropyl-N'-[5-methoxy-2-methyl-4-(2,2,2-trifluoro-1-hydroxy-1-phenyl-ethyl)phenyl]-N-methyl-formamidine, N'-[4-(1-cyclopropyl-2,2,2-trifluoro-1-hydroxy-ethyl)-5-methoxy-2-methyl-phenyl]-N-isopropyl-N-methyl-formamidine (these compounds may be prepared from the methods described in WO2018/228896); N-ethyl-N'-[5-methoxy-2-methyl-4-[(2-trifluoromethyl)oxetan-2-yl]phenyl]-N-methyl-formamidine, N-ethyl-N'-[5-methoxy-2-methyl-4-[(2-trifluoromethyl)tetrahydrofuran-2-yl]phenyl]-N-methyl-formamidine (these compounds may be prepared from the methods described in WO2019/110427); N-[(1R)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide, N-[(1S)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide, N-[(1R)-1-benzyl-3,3,3-trifluoro-1-methyl-propyl]-8-fluoro-quinoline-3-carboxamide, N-[(1S)-1-benzyl-3,3,3-trifluoro-1-methyl-propyl]-8-fluoro-quinoline-3-carboxamide, N-[(1R)-1-benzyl-1,3-dimethyl-butyl]-7,8-difluoro-quinoline-3-carboxamide, N-[(1S)-1-benzyl-1,3-dimethyl-butyl]-7,8-difluoro-quinoline-3-carboxamide, 8-fluoro-N-[(1R)-1-[(3-fluorophenyl)methyl]-1,3-dimethyl-butyl]quinoline-3-carboxamide, 8-fluoro-N-[(1S)-1-[(3-fluorophenyl)methyl]-1,3-dimethyl-butyl]quinoline-3-carboxamide, N-[(1R)-1-benzyl-1,3-dimethyl-butyl]-8-fluoro-quinoline-3-carboxamide, N-[(1S)-1-benzyl-1,3-dimethyl-butyl]-8-fluoro-quinoline-3-carboxamide, N-[(1R)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide, N-[(1S)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide (these compounds may be prepared from the methods described in WO2017/153380); 1-(6,7-dimethylpyrazolo[1,5-a]pyridin-3-yl)-4,4,5-trifluoro-3,3-dimethyl-isoquinoline, 1-(6,7-dimethylpyrazolo[1,5-a]pyridin-3-yl)-4,4,6-trifluoro-3,3-dimethyl-isoquinoline, 4,4-difluoro-3,3-dimethyl-1-(6-methylpyrazolo[1,5-a]pyridin-3-yl)isoquinoline, 4,4-difluoro-3,3-dimethyl-1-(7-methylpyrazolo[1,5-a]pyridin-3-yl)isoquinoline, 1-(6-

chloro-7-methyl-pyrazolo[1,5-a]pyridin-3-yl)-4,4-difluoro-3,3-dimethyl-isoquinoline (these compounds may be prepared from the methods described in WO2017/025510); 1-(4,5-dimethylbenzimidazol-1-yl)-4,4,5-trifluoro-3,3-dimethyl-isoquinoline, 1-(4,5-dimethylbenzimidazol-1-yl)-4,4-difluoro-3,3-dimethyl-isoquinoline, 6-chloro-4,4-difluoro-3,3-dimethyl-1-(4-methylbenzimidazol-1-yl)isoquinoline, 4,4-difluoro-1-(5-fluoro-4-methylbenzimidazol-1-yl)-3,3-dimethyl-isoquinoline, 3-(4,4-difluoro-3,3-dimethyl-1-isoquinolyl)-7,8-dihydro-6H-cyclopenta[e]benzimidazole (these compounds may be prepared from the methods described in WO2016/156085); N-methoxy-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]cyclopropanecarboxamide, N,2-dimethoxy-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide, N-ethyl-2-methyl-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide, 1-methoxy-3-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea, 1,3-dimethoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea, 3-ethyl-1-methoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea, N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide, 4,4-dimethyl-2-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]isoxazolidin-3-one, 5,5-dimethyl-2-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]isoxazolidin-3-one, ethyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]pyrazole-4-carboxylate, N,N-dimethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]-1,2,4-triazol-3-amine (these compounds may be prepared from the methods described in WO2017/055473, WO2017/055469, WO2017/093348 and WO2017/118689); 2-[6-(4-chlorophenoxy)-2-(trifluoromethyl)-3-pyridyl]-1-(1,2,4-triazol-1-yl)propan-2-ol (this compound may be prepared from the methods described in WO2017/029179); 2-[6-(4-bromophenoxy)-2-(trifluoromethyl)-3-pyridyl]-1-(1,2,4-triazol-1-yl)propan-2-ol (this compound may be prepared from the methods described in WO2017/029179); 3-[2-(1-chlorocyclopropyl)-3-(2-fluorophenyl)-2-hydroxy-propyl]imidazole-4-carbonitrile (this compound may be prepared from the methods described in WO2016/156290); 3-[2-(1-chlorocyclopropyl)-3-(3-chloro-2-fluorophenyl)-2-hydroxy-propyl]imidazole-4-carbonitrile (this compound may be prepared from the methods described in WO2016/156290); (4-phenoxyphenyl)methyl 2-amino-6-methyl-pyridine-3-carboxylate (this compound may be prepared from the methods described in WO2014/006945); 2,6-Dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone (this compound may be prepared from the methods described in WO2011/138281) N-methyl-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzenecarbothioamide; N-methyl-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide; (Z,2E)-5-[1-(2,4-dichlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-pent-3-enamide (this compound may be prepared from the methods described in WO2018/153707); N'-(2-chloro-5-methyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine; N'-[2-chloro-4-(2-fluorophenoxy)-5-methyl-phenyl]-N-ethyl-N-methyl-formamidine (this compound may be prepared from the methods described in WO2016/202742); 2-(difluoromethyl)-N-[(3S)-3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide (this compound may be prepared from the methods described in WO2014/095675); (5-methyl-2-pyridyl)-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methanone, (3-methylisoxazol-5-yl)-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methanone (these compounds may be prepared from the methods described in WO2017/220485); 2-oxo-N-propyl-2-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]acetamide (this compound may be prepared from the methods described in

WO2018/065414); ethyl 1-[[5-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]-2-thienyl]methyl]pyrazole-4-carboxylate (this compound may be prepared from the methods described in WO2018/158365); 2,2-difluoro-N-methyl-2-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]acetamide, N-[(E)-methoxyiminomethyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide, N-[(Z)-methoxyiminomethyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide, N-[N-methoxy-methyl-carbonimidoyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide (these compounds may be prepared from the methods described in WO2018/202428).

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 EP0357460, EP0444964 and EP0594291. Additional anthelmintic agents include semisynthetic and biosynthetic avermectin/milbemycin derivatives such as those described in US5,015,630, WO9415944 and WO9522552. 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. 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 US5478855, US4639771 and DE-19520936.

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 WO9615121 and also with anthelmintic active cyclic depsipeptides such as those described in WO9611945, WO9319053, WO9325543, EP0626375, EP0382173, WO9419334, EP0382173, and EP0503538.

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 WO95/19363 or WO04/72086, particularly the compounds disclosed therein.

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:

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, flupyrzafos, 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, pirimiphos, pirimiphos- methyl, profenofos, propaphos, proetamphos, prothiofos, pyraclofos, pyridapenthion, quinalphos, sulprophos, temephos, terbufos, 5 tebupirimfos, tetrachlorvinphos, thimeton, triazophos, trichlorfon, vamidothion.

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

10 Pyrethroids: acrinathin, allethrin, alphamethrin, 5-benzyl-3-furylmethyl (E)-(1R)-cis-2,2-dimethyl-3-(2-oxothiolan-3-ylidenemethyl)cyclopropanecarboxylate, bifenthrin, beta-cyfluthrin, cyfluthrin, alpha-cypermethrin, beta-cypermethrin, bioallethrin, bioallethrin((S)-cyclopentylisomer), bioresmethrin, bifenthrin, NCI-85193, cycloprothrin, cyhalothrin, cythithrin, cyphenothrin, deltamethrin, empenthrin, esfenvalerate, ethofenprox, fenfluthrin, fenpropathrin, fenvalerate, flucythrinate, flumethrin, fluvalinate (D isomer), imiprothrin, 15 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, 20 buprofezin, diofenolan, hexythiazox, etoxazole, chlorfentazine; b) ecdysone antagonists: halofenozide, methoxyfenozide, tebufenozide; c) juvenoids: pyriproxyfen, methoprene (including S-methoprene), fenoxycarb; d) lipid biosynthesis inhibitors: spiroadiclofen.

Other antiparasitics: acequinocyl, amitraz, AKD-1022, ANS-118, azadirachtin, *Bacillus thuringiensis*, bensultap, bifenazate, binapacryl, bromopropylate, BTG-504, BTG-505, camphechlor, cartap, chlorobenzilate, 25 chlordimeform, chlorfenapyr, chromafenozide, clothianidine, cyromazine, diaclofen, diafenthiuron, DBI-3204, dinactin, dihydroxymethyl-dihydroxypyrrolidine, dinobuton, dinocap, endosulfan, ethiprole, ethofenprox, fenazaquin, flumite, MTI- 800, fenpyroximate, fluacrypyrim, flubenzimine, flubrocyclothrinate, flufenzine, flufenprox, fluproxyfen, halofenprox, hydramethylnon, IKI-220, kanemite, NC-196, neem guard, nidinortofuran, nitenpyram, SD-35651, WL-108477, piridaryl, propargite, prothifentbutate, pymethrozine, pyridaben, pyrimidifen, 30 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, verbutin, vertalec, YI-5301.

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

35 Bactericides: chlortetracycline, oxytetracycline, streptomycin.

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

The following mixtures of the compounds of Formula (I) with active ingredients are preferred. The abbreviation
 5 "TX" means one compound selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as listed in Table P (below):

a compound selected from the group of substances consisting of petroleum oils + TX, 1,1-bis(4-chlorophenyl)-
 2-ethoxyethanol + TX, 2,4-dichlorophenyl benzenesulfonate + TX, 2-fluoro-N-methyl-N-1-naphthylacetamide
 10 + TX, 4-chlorophenyl phenyl sulfone + TX, acetoprole + TX, aldoxycarb + TX, amidithion + TX, amidothioate + TX, amiton + TX, amiton hydrogen oxalate + TX, amitraz + TX, aramite + TX, arsenous oxide + TX, azobenzene + TX, azothoate + TX, benomyl + TX, benoxafos + TX, benzyl benzoate + TX, bixafen + TX, brofenvalerate + TX, bromocyclen + TX, bromophos + TX, bromopropylate + TX, buprofezin + TX, butocarboxim + TX, butoxycarboxim + TX, butylpyridaben + TX, calcium polysulfide + TX, camphechlor + TX, carbanolate + TX, carbophenothion + TX, cymiazole + TX, chinomethionat + TX, chlorbenside + TX, chlordimeform + TX, chlordimeform hydrochloride + TX, chlorfenethol + TX, chlorfenson + TX, chlorfensulfide + TX, chlorobenzilate + TX, chloromebuform + TX, chloromethiuron + TX, chloropropylate + TX, chlorthiophos + TX, cinerin I + TX, cinerin II + TX, cinerins + TX, closantel + TX, coumaphos + TX, crotamiton + TX, crotoxyphos + TX, cufraneb + TX, cyanthoate + TX, DCPM + TX, DDT + TX, demephion + TX, demephion-O + TX, demephion-S + TX, demeton-methyl + TX, demeton-O + TX, demeton-O-methyl + TX, demeton-S + TX, demeton-S-methyl + TX, demeton-S-methylsulfon + TX, dichlofluanid + TX, dichlorvos + TX, dicliphos + TX, dienochlor + TX, dimefox + TX, dinex + TX, dinex-diclexine + TX, dinocap-4 + TX, dinocap-6 + TX, dinocton + TX, dinopenton + TX, dinosulfon + TX, dinoterbon + TX, dioxathion + TX, diphenyl sulfone + TX, disulfiram + TX, DNOC + TX, dofenapyn + TX, doramectin + TX, endothion + TX, eprinomectin + TX, ethoate-methyl + TX, etrimfos + TX, fenazaflor + TX, fenbutatin oxide + TX, fenothiocarb + TX, fenpyrad + TX, fenpyroximate + TX, fenpyrazamine + TX, fenson + TX, fentrifanil + TX, flubenzimine + TX, flucycloxuron + TX, fluenetil + TX, fluorbenside + TX, FMC 1137 + TX, formetanate + TX, formetanate hydrochloride + TX, formparanate + TX, gamma-HCH + TX, glyodin + TX, halfenprox + TX, hexadecyl cyclopropanecarboxylate + TX, isocarbophos + TX, jasmolin I + TX, jasmolin II + TX, jodfenphos + TX, lindane + TX, malonoben + TX, mecarbam + TX, mephosfolan + TX, mesulfen + TX, methacrifos + TX, methyl bromide + TX, metolcarb + TX, mexacarbate + TX, milbemycin oxime + TX, mipafox + TX, monocrotophos + TX, morphothion + TX, moxidectin + TX, naled + TX, 4-chloro-2-(2-chloro-2-methyl-propyl)-5-[(6-iodo-3-pyridyl)methoxy]pyridazin-3-one + TX, nifluridide + TX, nikkomycins + TX, nitrilacarb + TX, nitrilacarb 1:1 zinc chloride complex + TX, omethoate + TX, oxydeprofos + TX, oxydisulfoton + TX, pp'-DDT + TX, parathion + TX, permethrin + TX, phenkapton + TX, phosalone + TX, phosfolan + TX, phosphamidon + TX, polychloroterpenes + TX, polynactins + TX, proclonol + TX, promacyl + TX, propoxur + TX, prothidathion + TX, prothoate + TX, pyrethrin I + TX, pyrethrin II + TX, pyrethrins + TX, pyridaphenthion + TX, pyrimitate + TX, quinalphos + TX, quintiofos + TX, R-1492 + TX, phosglycin + TX, rotenone + TX, schradan

+ TX, sebufos + TX, selamectin + TX, sophamide + TX, SSI-121 + TX, sulfiram + TX, sulfluramid + TX, sulfotep + TX, sulfur + TX, diflovidazin + TX, tau-fluvalinate + TX, TEPP + TX, terbam + TX, tetradifon + TX, tetrasul + TX, thiafenox + TX, thiocarboxime + TX, thiofanox + TX, thiometon + TX, thioquinox + TX, thuringiensin + TX, triamiphos + TX, triarathene + TX, triazophos + TX, triazuron + TX, trifenofos + TX, trinactin + TX, vamidothion

5 + TX, vaniliprole + TX, bethoxazin + TX, copper dioctanoate + TX, copper sulfate + TX, cybutryne + TX, dichlone + TX, dichlorophen + TX, endothal + TX, fentin + TX, hydrated lime + TX, nabam + TX, quinoclamine + TX, quinonamid + TX, simazine + TX, triphenyltin acetate + TX, triphenyltin hydroxide + TX, crufomate + TX, piperazine + TX, thiophanate + TX, chloralose + TX, fenthion + TX, pyridin-4-amine + TX, strychnine + TX, 1-hydroxy-1H-pyridine-2-thione + TX, 4-(quinoxalin-2-ylamino)benzenesulfonamide + TX, 8-hydroxyquinoline

10 sulfate + TX, bronopol + TX, copper hydroxide + TX, cresol + TX, dipyrithione + TX, dodicin + TX, fenaminosulf + TX, formaldehyde + TX, hydrargaphen + TX, kasugamycin + TX, kasugamycin hydrochloride hydrate + TX, nickel bis(dimethyldithiocarbamate) + TX, nitrapyrin + TX, octhilinone + TX, oxolinic acid + TX, oxytetracycline + TX, potassium hydroxyquinoline sulfate + TX, probenazole + TX, streptomycin + TX, streptomycin sesquisulfate + TX, tecloftalam + TX, thiomersal + TX, Adoxophyes orana GV + TX, Agrobacterium radiobacter

15 + TX, Amblyseius spp. + TX, Anagrapta falcifera NPV + TX, Anagrus atomus + TX, Aphelinus abdominalis + TX, Aphidius colemani + TX, Aphidoletes aphidimyza + TX, Autographa californica NPV + TX, Bacillus sphaericus Neide + TX, Beauveria brongniartii + TX, Chrysoperla carnea + TX, Cryptolaemus montrouzieri + TX, Cydia pomonella GV + TX, Dacnusa sibirica + TX, Diglyphus isaea + TX, Encarsia formosa + TX, Eretmocerus eremicus + TX, Heterorhabditis bacteriophora and H. megidis + TX, Hippodamia convergens +

20 TX, Leptomastix dactylopii + TX, Macrolophus caliginosus + TX, Mamestra brassicae NPV + TX, Metaphycus helvolus + TX, Metarhizium anisopliae var. acridum + TX, Metarhizium anisopliae var. anisopliae + TX, Neodiprion sertifer NPV and N. lecontei NPV + TX, Orius spp. + TX, Paecilomyces fumosoroseus + TX, Phytoseiulus persimilis + TX, Steinernema bibionis + TX, Steinernema carpocapsae + TX, Steinernema feltiae + TX, Steinernema glaseri + TX, Steinernema riobrave + TX, Steinernema riobrave + TX, Steinernema

25 scapterisci + TX, Steinernema spp. + TX, Trichogramma spp. + TX, Typhlodromus occidentalis + TX, Verticillium lecanii + TX, apholate + TX, bisazir + TX, busulfan + TX, dimatif + TX, hemel + TX, hempa + TX, metepa + TX, methiotepa + TX, methyl apholate + TX, morzid + TX, penfluron + TX, tepa + TX, thiohempa + TX, thiotepa + TX, tretamine + TX, uredepa + TX, (E)-dec-5-en-1-yl acetate with (E)-dec-5-en-1-ol + TX, (E)-tridec-4-en-1-yl acetate + TX, (E)-6-methylhept-2-en-4-ol + TX, (E,Z)-tetradeca-4,10-dien-1-yl acetate + TX,

30 (Z)-dodec-7-en-1-yl acetate + TX, (Z)-hexadec-11-enal + TX, (Z)-hexadec-11-en-1-yl acetate + TX, (Z)-hexadec-13-en-11-yn-1-yl acetate + TX, (Z)-icos-13-en-10-one + TX, (Z)-tetradec-7-en-1-yl acetate + TX, (Z)-tetradec-9-en-1-yl acetate + TX, (7E,9Z)-dodeca-7,9-dien-1-yl acetate + TX, (9Z,11E)-tetradeca-9,11-dien-1-yl acetate + TX, (9Z,12E)-tetradeca-9,12-dien-1-yl acetate + TX, 14-methyloctadec-1-ene + TX, 4-methylnonan-5-ol with 4-methylnonan-5-one + TX, alpha-multistriatin + TX, brevicomin + TX,

35 codlure + TX, codlemone + TX, cuelure + TX, disparlure + TX, dodec-8-en-1-yl acetate + TX, dodec-9-en-1-yl acetate + TX, dodeca-8,10-dien-1-yl acetate + TX, dominicalure + TX, ethyl 4-methyloctanoate + TX, eugenol + TX, frontaline + TX, grandlure + TX, grandlure I + TX, grandlure II + TX, grandlure III + TX, grandlure IV + TX, hexalure + TX, ipsdienol + TX, ipsenol + TX, japonilure + TX, lineatin + TX, litlure + TX, looplure + TX, medlure

+ TX, megatomoic acid + TX, methyl eugenol + TX, muscalure + TX, octadeca-2,13-dien-1-yl acetate + TX, octadeca-3,13-dien-1-yl acetate + TX, orfralure + TX, oryctalure + TX, ostramone + TX, siglure + TX, sordidin + TX, sulcatol + TX, tetradec-11-en-1-yl acetate + TX, trimedlure + TX, trimedlure A + TX, trimedlure B₁ + TX, trimedlure B₂ + TX, trimedlure C + TX, trunc-call + TX, 2-(octylthio)ethanol + TX, butopyronoxyl + TX, butoxy(polypropylene glycol) + TX, dibutyl adipate + TX, dibutyl phthalate + TX, dibutyl succinate + TX, diethyltoluamide + TX, dimethyl carbate + TX, dimethyl phthalate + TX, ethyl hexanediol + TX, hexamide + TX, methoquin-butyl + TX, methylneodecanamide + TX, oxamate + TX, picaridin + TX, 1-dichloro-1-nitroethane + TX, 1,1-dichloro-2,2-bis(4-ethylphenyl)ethane + TX, 1,2-dichloropropane with 1,3-dichloropropene + TX, 1-bromo-2-chloroethane + TX, 2,2,2-trichloro-1-(3,4-dichlorophenyl)ethyl acetate + TX, 2,2-dichlorovinyl 2-ethylsulfinyethyl methyl phosphate + TX, 2-(1,3-dithiolan-2-yl)phenyl dimethylcarbamate + TX, 2-(2-butoxyethoxy)ethyl thiocyanate + TX, 2-(4,5-dimethyl-1,3-dioxolan-2-yl)phenyl methylcarbamate + TX, 2-(4-chloro-3,5-xylyloxy)ethanol + TX, 2-chlorovinyl diethyl phosphate + TX, 2-imidazolidone + TX, 2-isovalerylindan-1,3-dione + TX, 2-methyl(prop-2-ynyl)aminophenyl methylcarbamate + TX, 2-thiocyanatoethyl laurate + TX, 3-bromo-1-chloroprop-1-ene + TX, 3-methyl-1-phenylpyrazol-5-yl dimethylcarbamate + TX, 4-methyl(prop-2-ynyl)amino-3,5-xylyl methylcarbamate + TX, 5,5-dimethyl-3-oxocyclohex-1-enyl dimethylcarbamate + TX, acethion + TX, acrylonitrile + TX, aldrin + TX, allosamidin + TX, allyxcarb + TX, alpha-ecdysone + TX, aluminium phosphide + TX, aminocarb + TX, anabasine + TX, athidathion + TX, azamethiphos + TX, *Bacillus thuringiensis* delta endotoxins + TX, barium hexafluorosilicate + TX, barium polysulfide + TX, barthrin + TX, Bayer 22/190 + TX, Bayer 22408 + TX, beta-cyfluthrin + TX, beta-cypermethrin + TX, bioethanomethrin + TX, biopermethrin + TX, bis(2-chloroethyl) ether + TX, borax + TX, bromfenvinfos + TX, bromo-DDT + TX, bufencarb + TX, butacarb + TX, butathiofos + TX, butonate + TX, calcium arsenate + TX, calcium cyanide + TX, carbon disulfide + TX, carbon tetrachloride + TX, cartap hydrochloride + TX, cevadine + TX, chlorbicyclen + TX, chlordane + TX, chlordecone + TX, chloroform + TX, chloropicrin + TX, chlorphoxim + TX, chlorprazophos + TX, cis-resmethrin + TX, cismethrin + TX, clocythrins + TX, copper acetoarsenite + TX, copper arsenate + TX, copper oleate + TX, coumthioate + TX, cryolite + TX, CS 708 + TX, cyanofenphos + TX, cyanophos + TX, cyclethrin + TX, cythioate + TX, d-tetramethrin + TX, DAEP + TX, dazomet + TX, decarbofuran + TX, diamidafos + TX, dicapthon + TX, dichlofenthion + TX, dicresyl + TX, dicyclanil + TX, dieldrin + TX, diethyl 5-methylpyrazol-3-yl phosphate + TX, dilor + TX, dimefluthrin + TX, dimetan + TX, dimethrin + TX, dimethylvinphos + TX, dimetilan + TX, dinoprop + TX, dinosam + TX, dinoseb + TX, diofenolan + TX, dioxabenzofos + TX, dithicrofos + TX, DSP + TX, ecdysterone + TX, EI 1642 + TX, EMPC + TX, EPBP + TX, etaphos + TX, ethiofencarb + TX, ethyl formate + TX, ethylene dibromide + TX, ethylene dichloride + TX, ethylene oxide + TX, EXD + TX, fenchlorphos + TX, fenethacarb + TX, fenitrothion + TX, fenoxacrim + TX, fenpirithrin + TX, fensulfothion + TX, fenthion-ethyl + TX, flucofuron + TX, fosmethilan + TX, fospirate + TX, fosthietan + TX, furathiocarb + TX, furethrin + TX, guazatine + TX, guazatine acetates + TX, sodium tetrathiocarbonate + TX, halfenprox + TX, HCH + TX, HEOD + TX, heptachlor + TX, heterophos + TX, HHDN + TX, hydrogen cyanide + TX, hyquincarb + TX, IPSP + TX, isazofos + TX, isobenzan + TX, isodrin + TX, isofenphos + TX, isolane + TX, isoprothiolane + TX, isoxathion + TX, juvenile hormone I + TX, juvenile hormone II + TX, juvenile hormone III + TX, kelevan + TX, kinoprene + TX, lead arsenate + TX, leptophos +

TX, lirimfos + TX, lythidathion + TX, m-cumenyl methylcarbamate + TX, magnesium phosphide + TX, mazidox + TX, mecarphon + TX, menazon + TX, mercurous chloride + TX, mesulfenfos + TX, metam + TX, metam-potassium + TX, metam-sodium + TX, methanesulfonyl fluoride + TX, methocrotophos + TX, methoprene + TX, methothrin + TX, methoxychlor + TX, methyl isothiocyanate + TX, methylchloroform + TX, methylene chloride + TX, metoxadiazone + TX, mirex + TX, naftalofos + TX, naphthalene + TX, NC-170 + TX, nicotine + TX, nicotine sulfate + TX, nithiazine + TX, nor nicotine + TX, O-5-dichloro-4-iodophenyl O-ethyl ethylphosphonothioate + TX, O,O-diethyl O-4-methyl-2-oxo-2H-chromen-7-yl phosphorothioate + TX, O,O-diethyl O-6-methyl-2-propylpyrimidin-4-yl phosphorothioate + TX, O,O,O',O'-tetrapropyl dithiopyrophosphate + TX, oleic acid + TX, para-dichlorobenzene + TX, parathion-methyl + TX, pentachlorophenol + TX, pentachlorophenyl laurate + TX, PH 60-38 + TX, phenkapton + TX, phosnichlor + TX, phosphine + TX, phoxim-methyl + TX, pirimetaphos + TX, polychlorodicyclopentadiene isomers + TX, potassium arsenite + TX, potassium thiocyanate + TX, precocene I + TX, precocene II + TX, precocene III + TX, primidophos + TX, profluthrin + TX, promecarb + TX, prothiofos + TX, pyrazophos + TX, pyresmethrin + TX, quassia + TX, quinalphos-methyl + TX, quinothion + TX, rafoxanide + TX, resmethrin + TX, rotenone + TX, kadethrin + TX, ryania + TX, ryanodine + TX, sabadilla) + TX, schradan + TX, sebufos + TX, SI-0009 + TX, thiapronil + TX, sodium arsenite + TX, sodium cyanide + TX, sodium fluoride + TX, sodium hexafluorosilicate + TX, sodium pentachlorophenoxide + TX, sodium selenate + TX, sodium thiocyanate + TX, sulcofuron + TX, sulcofuron-sodium + TX, sulfuryl fluoride + TX, sulprofos + TX, tar oils + TX, tazimcarb + TX, TDE + TX, tebupirimfos + TX, temephos + TX, terallethrin + TX, tetrachloroethane + TX, thicrofos + TX, thiocyclam + TX, thiocyclam hydrogen oxalate + TX, thionazin + TX, thiosultap + TX, thiosultap-sodium + TX, tralomethrin + TX, transpermethrin + TX, triazamate + TX, trichlormetaphos-3 + TX, trichloronat + TX, trimethacarb + TX, tolprocarb + TX, triclopyricarb + TX, triprene + TX, veratridine + TX, veratrine + TX, XMC + TX, zetamethrin + TX, zinc phosphide + TX, zolaprofos + TX, and meperfluthrin + TX, tetramethylfluthrin + TX, bis(tributyltin) oxide + TX, bromoacetamide + TX, ferric phosphate + TX, niclosamide-olamine + TX, tributyltin oxide + TX, pyrimorph + TX, trifenmorph + TX, 1,2-dibromo-3-chloropropane + TX, 1,3-dichloropropene + TX, 3,4-dichlorotetrahydrothiophene 1,1-dioxide + TX, 3-(4-chlorophenyl)-5-methylrhodanine + TX, 5-methyl-6-thioxo-1,3,5-thiadiazinan-3-ylacetic acid + TX, 6-isopentenylaminopurine + TX, 2-fluoro-N-(3-methoxyphenyl)-9H-purin-6-amine + TX, benclothiaz + TX, cytokinins + TX, DCIP + TX, furfural + TX, isamidofos + TX, kinetin + TX, Myrothecium verrucaria composition + TX, tetrachlorothiophene + TX, xlenols + TX, zeatin + TX, potassium ethylxanthate + TX, acibenzolar + TX, acibenzolar-S-methyl + TX, Reynoutria sachalinensis extract + TX, alpha-chlorohydrin + TX, antu + TX, barium carbonate + TX, bithiosemi + TX, brodifacoum + TX, bromadiolone + TX, bromethalin + TX, chlorophacinone + TX, cholecalciferol + TX, coumachlor + TX, coumafuryl + TX, coumatetralyl + TX, crimidine + TX, difenacoum + TX, difethialone + TX, diphacinone + TX, ergocalciferol + TX, flocoumafen + TX, fluoroacetamide + TX, flupropadine + TX, flupropadine hydrochloride + TX, norbormide + TX, phosacetim + TX, phosphorus + TX, pindone + TX, pyrinuron + TX, scilliroside + TX, sodium fluoroacetate + TX, thallium sulfate + TX, warfarin + TX, 2-(2-butoxyethoxy)ethyl piperonylate + TX, 5-(1,3-benzodioxol-5-yl)-3-hexylcyclohex-2-enone + TX, farnesol with nerolidol + TX, verbutin + TX, MGK 264 + TX, piperonyl butoxide + TX, piprotal + TX, propyl isomer + TX, S421 + TX, sesamex + TX, sesasmolin + TX,

sulfoxide + TX, anthraquinone + TX, copper naphthenate + TX, copper oxychloride + TX, dicyclopentadiene + TX, thiram + TX, zinc naphthenate + TX, ziram + TX, imanin + TX, ribavirin + TX, mercuric oxide + TX, thiophanate-methyl + TX, azaconazole + TX, bitertanol + TX, bromuconazole + TX, cyproconazole + TX, difenoconazole + TX, diniconazole + TX, epoxiconazole + TX, fenbuconazole + TX, fluquinconazole + TX, flusilazole + TX, flutriafol + TX, furametpyr + TX, hexaconazole + TX, imazalil + TX, imibenconazole + TX, ipconazole + TX, metconazole + TX, myclobutanil + TX, paclobutrazole + TX, pefurazoate + TX, penconazole + TX, prothioconazole + TX, pyrifenoxy + TX, prochloraz + TX, propiconazole + TX, pyrisoxazole + TX, -simeconazole + TX, tebuconazole + TX, tetraconazole + TX, triadimefon + TX, triadimenol + TX, triflumizole + TX, triticonazole + TX, ancymidol + TX, fenarimol + TX, nuarimol + TX, bupirimate + TX, dimethirimol + TX, ethirimol + TX, dodemorph + TX, fenpropidin + TX, fenpropimorph + TX, spiroxamine + TX, tridemorph + TX, cyprodinil + TX, mepanipyrim + TX, pyrimethanil + TX, fenpiclonil + TX, fludioxonil + TX, benalaxyl + TX, furalaxyl + TX, metalaxyl - + TX, Rmetalaxyl + TX, ofurace + TX, oxadixyl + TX, carbendazim + TX, debacarb + TX, fuberidazole + TX, thiabendazole + TX, chlozoline + TX, dichlozoline + TX, myclozoline + TX, procymidone + TX, vinclozoline + TX, boscalid + TX, carboxin + TX, fenfuram + TX, flutolanil + TX, mepronil + TX, oxycarboxin + TX, penthiopyrad + TX, thifluzamide + TX, dodine + TX, iminoctadine + TX, azoxystrobin + TX, dimoxystrobin + TX, enestroburin + TX, fenaminostrobin + TX, flufenoxystrobin + TX, fluoxastrobin + TX, kresoxim-methyl + TX, metominostrobin + TX, trifloxystrobin + TX, orysastrobin + TX, picoxystrobin + TX, pyraclostrobin + TX, pyrametostrobin + TX, pyraoxystrobin + TX, ferbam + TX, mancozeb + TX, maneb + TX, metiram + TX, propineb + TX, zineb + TX, captan + TX, fluoroimide + TX, folpet + TX, tolylfluanid + TX, bordeaux mixture + TX, copper oxide + TX, mancopper + TX, oxine-copper + TX, nitrothal-isopropyl + TX, edifenphos + TX, iprobenphos + TX, phosdiphen + TX, tolclofos-methyl + TX, anilazine + TX, benthiavalicarb + TX, blastidicidin-S + TX, chloroneb + TX, chlorothalonil + TX, cyflufenamid + TX, cymoxanil + TX, cyclobutirfluram + TX, diclocymet + TX, diclomezine + TX, dicloran + TX, diethofencarb + TX, dimethomorph + TX, flumorph + TX, dithianon + TX, ethaboxam + TX, etridiazole + TX, famoxadone + TX, fenamidone + TX, fenoxanil + TX, ferimzone + TX, fluazinam + TX, fluopicolide + TX, flusulfamide + TX, fluxapyroxad + TX, fenhexamid + TX, fosetyl-aluminium + TX, hymexazol + TX, iprovalicarb + TX, cyazofamid + TX, methasulfocarb + TX, metrafenone + TX, pencycuron + TX, phthalide + TX, polyoxins + TX, propamocarb + TX, pyribencarb + TX, proquinazid + TX, pyroquilon + TX, pyriofenone + TX, quinoxifen + TX, quintozone + TX, tiadinil + TX, triazoxide + TX, tricyclazole + TX, triforine + TX, validamycin + TX, valifenalate + TX, zoxamide + TX, mandipropamid + TX, flubeneteram + TX, isopyrazam + TX, sedaxane + TX, benzovindiflupyr + TX, pydiflumetofen + TX, 3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxylic acid (3',4',5'-trifluoro-biphenyl-2-yl)-amide + TX, isoflucypram + TX, isotianil + TX, dipymetitrone + TX, 6-ethyl-5,7-dioxo-pyrrolo[4,5][1,4]dithiino[1,2-c]isothiazole-3-carbonitrile + TX, 2-(difluoromethyl)-N-[3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX, 4-(2,6-difluorophenyl)-6-methyl-5-phenyl-pyridazine-3-carbonitrile + TX, (R)-3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide + TX, 4-(2-bromo-4-fluoro-phenyl)-N-(2-chloro-6-fluoro-phenyl)-2,5-dimethyl-pyrazol-3-amine + TX, 4-(2-bromo-4-fluorophenyl)-N-(2-chloro-6-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine + TX, fluindapyr + TX, coumethoxystrobin (jiexiangjunzhi) + TX, lvbenmixianan + TX, dichlobentiazox + TX, mandestrobin + TX, 3-(4,4-difluoro-3,4-

dihydro-3,3-dimethylisoquinolin-1-yl)quinolone + TX, 2-[2-fluoro-6-[(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol + TX, oxathiapiprolin + TX, tert-butyl N-[6-[[[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate + TX, pyraziflumid + TX, inpyrfluxam + TX, trolprocarb + TX, mefentrifluconazole + TX, ipfentrifluconazole + TX, 2-(difluoromethyl)-N-[(3R)-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 + 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 + TX, but-3-ynyl N-[6-[(Z)-[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate + 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 + TX, pyridachlometyl + TX, 3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide + TX, 1-[2-[[1-(4-chlorophenyl)pyrazol-3-yl]oxymethyl]-3-methyl-phenyl]-4-methyl-tetrazol-5-one + TX, 1-methyl-4-[3-methyl-2-[[2-methyl-4-(3,4,5-trimethylpyrazol-1-yl)phenoxy]methyl]phenyl]tetrazol-5-one + TX, aminopyrifin + TX, ametocradin + TX, amisulbrom + TX, penflufen + TX, (Z,E)-5-[1-(4-chlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-pent-3-enamide + TX, florylpicoxamid + TX, fempicoxamid + TX, tebufloquin + TX, ipflufenquin + TX, quinofumelin + TX, isofetamid + TX, N-[2-[2,4-dichloro-phenoxy]phenyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide + TX, N-[2-[2-chloro-4-(trifluoromethyl)phenoxy]phenyl]-3-(difluoromethyl)-1-methyl-pyrazole-4-carboxamide + TX, benzothiostrubin + TX, phenamacril + TX, 5-amino-1,3,4-thiadiazole-2-thiol zinc salt (2:1) + TX, fluopyram + TX, flutianil + TX, fluopimomide + TX, pyrapropoyne + TX, picarbutrazox + TX, 2-(difluoromethyl)-N-(3-ethyl-1,1-dimethyl-indan-4-yl)pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-((3R)-1,1,3-trimethylindan-4-yl)pyridine-3-carboxamide + TX, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy]benzonitrile + TX, metyltetraprole + TX, α -(1,1-dimethylethyl)- α -[4'-(trifluoromethoxy)[1,1'-biphenyl]-4-yl]-5-pyrimidinemethanol + TX, fluoxapiprolin + TX, enoxastrobin + TX, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy]benzonitrile + TX, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(5-sulfanyl-1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy]benzonitrile + TX, 4-[[6-[2-(2,4-difluorophenyl)-1,1-difluoro-2-hydroxy-3-(5-thioxo-4H-1,2,4-triazol-1-yl)propyl]-3-pyridyl]oxy]benzonitrile + TX, trinexapac + TX, coumoxystrobin + TX, zhongshengmycin + TX, thiodiazole copper + TX, zinc thiazole + TX, amectotractin + TX, iprodione + TX, N-octyl-N'-[2-(octylamino)ethyl]ethane-1,2-diamine + TX; N'-[5-bromo-2-methyl-6-[(1S)-1-methyl-2-propoxy-ethoxy]-3-pyridyl]-N-ethyl-N-methyl-formamidine + TX, N'-[5-bromo-2-methyl-6-[(1R)-1-methyl-2-propoxy-ethoxy]-3-pyridyl]-N-ethyl-N-methyl-formamidine + TX, N'-[5-bromo-2-methyl-6-(1-methyl-2-propoxy-ethoxy)-3-pyridyl]-N-ethyl-N-methyl-formamidine + TX, N'-[5-chloro-2-methyl-6-(1-methyl-2-propoxy-ethoxy)-3-pyridyl]-N-ethyl-N-methyl-formamidine + TX, N'-[5-bromo-2-methyl-6-(1-methyl-2-propoxy-ethoxy)-3-pyridyl]-N-isopropyl-N-methyl-formamidine + TX (these compounds may be prepared from the methods described in WO2015/155075); N'-[5-bromo-2-methyl-6-(2-propoxypropoxy)-3-pyridyl]-N-ethyl-N-methyl-formamidine + TX (this compound may be prepared from the methods described in IPCOM000249876D); N-isopropyl-N'-[5-methoxy-2-methyl-4-(2,2,2-trifluoro-1-hydroxy-1-phenyl-ethyl)phenyl]-N-methyl-formamidine + TX, N'-[4-(1-cyclopropyl-2,2,2-trifluoro-1-hydroxy-ethyl)-5-methoxy-2-methyl-phenyl]-N-isopropyl-N-methyl-

formamidine + TX (these compounds may be prepared from the methods described in WO2018/228896); N-ethyl-N'-[5-methoxy-2-methyl-4-[2-trifluoromethyl]oxetan-2-yl]phenyl]-N-methyl-formamidine + TX, N-ethyl-N'-[5-methoxy-2-methyl-4-[2-trifluoromethyl]tetrahydrofuran-2-yl]phenyl]-N-methyl-formamidine + TX (these compounds may be prepared from the methods described in WO2019/110427); N-[(1R)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1R)-1-benzyl-3,3,3-trifluoro-1-methyl-propyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-3,3,3-trifluoro-1-methyl-propyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1R)-1-benzyl-1,3-dimethyl-butyl]-7,8-difluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-1,3-dimethyl-butyl]-7,8-difluoro-quinoline-3-carboxamide + TX, 8-fluoro-N-[(1R)-1-[(3-fluorophenyl)methyl]-1,3-dimethyl-butyl]quinoline-3-carboxamide + TX, 8-fluoro-N-[(1S)-1-[(3-fluorophenyl)methyl]-1,3-dimethyl-butyl]quinoline-3-carboxamide + TX, N-[(1R)-1-benzyl-1,3-dimethyl-butyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-1,3-dimethyl-butyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1R)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-3-chloro-1-methyl-but-3-enyl]-8-fluoro-quinoline-3-carboxamide + TX (these compounds may be prepared from the methods described in WO2017/153380); 1-(6,7-dimethylpyrazolo[1,5-a]pyridin-3-yl)-4,4,5-trifluoro-3,3-dimethyl-isoquinoline + TX, 1-(6,7-dimethylpyrazolo[1,5-a]pyridin-3-yl)-4,4,6-trifluoro-3,3-dimethyl-isoquinoline + TX, 4,4-difluoro-3,3-dimethyl-1-(6-methylpyrazolo[1,5-a]pyridin-3-yl)isoquinoline + TX, 4,4-difluoro-3,3-dimethyl-1-(7-methylpyrazolo[1,5-a]pyridin-3-yl)isoquinoline + TX, 1-(6-chloro-7-methyl-pyrazolo[1,5-a]pyridin-3-yl)-4,4-difluoro-3,3-dimethyl-isoquinoline + TX (these compounds may be prepared from the methods described in WO2017/025510); 1-(4,5-dimethylbenzimidazol-1-yl)-4,4,5-trifluoro-3,3-dimethyl-isoquinoline + TX, 1-(4,5-dimethylbenzimidazol-1-yl)-4,4-difluoro-3,3-dimethyl-isoquinoline + TX, 6-chloro-4,4-difluoro-3,3-dimethyl-1-(4-methylbenzimidazol-1-yl)isoquinoline + TX, 4,4-difluoro-1-(5-fluoro-4-methyl-benzimidazol-1-yl)-3,3-dimethyl-isoquinoline + TX, 3-(4,4-difluoro-3,3-dimethyl-1-isoquinolyl)-7,8-dihydro-6H-cyclopenta[e]benzimidazole + TX (these compounds may be prepared from the methods described in WO2016/156085); N-methoxy-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]cyclopropanecarboxamide + TX, N,2-dimethoxy-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide + TX, N-ethyl-2-methyl-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide + TX, 1-methoxy-3-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea + TX, 1,3-dimethoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea + TX, 3-ethyl-1-methoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea + TX, N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide + TX, 4,4-dimethyl-2-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]isoxazolidin-3-one + TX, 5,5-dimethyl-2-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]isoxazolidin-3-one + TX, ethyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]pyrazole-4-carboxylate + TX, N,N-dimethyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]-1,2,4-triazol-3-amine + TX. The compounds in this paragraph may be prepared from the methods described in WO2017/055473, WO2017/055469, WO2017/093348 and WO2017/118689; 2-[6-(4-chlorophenoxy)-2-(trifluoromethyl)-3-pyridyl]-1-(1,2,4-triazol-1-yl)propan-2-ol + TX (this compound may be prepared from the methods described in WO2017/029179); 2-[6-(4-bromophenoxy)-2-(trifluoromethyl)-3-

pyridyl]-1-(1,2,4-triazol-1-yl)propan-2-ol + TX (this compound may be prepared from the methods described in WO2017/029179); 3-[2-(1-chlorocyclopropyl)-3-(2-fluorophenyl)-2-hydroxy-propyl]imidazole-4-carbonitrile + TX (this compound may be prepared from the methods described in WO2016/156290); 3-[2-(1-chlorocyclopropyl)-3-(3-chloro-2-fluoro-phenyl)-2-hydroxy-propyl]imidazole-4-carbonitrile + TX (this compound may be prepared from the methods described in WO2016/156290); (4-phenoxyphenyl)methyl 2-amino-6-methyl-pyridine-3-carboxylate + TX (this compound may be prepared from the methods described in WO2014/006945); 2,6-Dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone + TX (this compound may be prepared from the methods described in WO2011/138281); N-methyl-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzenecarbothioamide + TX; N-methyl-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide + TX; (Z,2E)-5-[1-(2,4-dichlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-pent-3-enamide + TX (this compound may be prepared from the methods described in WO2018/153707); N'-(2-chloro-5-methyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine + TX; N'-(2-chloro-4-(2-fluorophenoxy)-5-methyl-phenyl)-N-ethyl-N-methyl-formamidine + TX (this compound may be prepared from the methods described in WO2016/202742); 2-(difluoromethyl)-N-[(3S)-3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX (this compound may be prepared from the methods described in WO2014/095675); (5-methyl-2-pyridyl)-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methanone + TX, (3-methylisoxazol-5-yl)-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methanone + TX (these compounds may be prepared from the methods described in WO2017/220485); 2-oxo-N-propyl-2-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]acetamide + TX (this compound may be prepared from the methods described in WO2018/065414); ethyl 1-[[5-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]-2-thienyl]methyl]pyrazole-4-carboxylate + TX (this compound may be prepared from the methods described in WO2018/158365); 2,2-difluoro-N-methyl-2-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]acetamide + TX, N-[(E)-methoxyiminomethyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide + TX, N-[(Z)-methoxyiminomethyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide + TX, N-[N-methoxy-C-methyl-carbonimidoyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide + TX (these compounds may be prepared from the methods described in WO2018/202428), chloroinconazole + TX, flumetylsulfurim + TX, fluoxytioconazole + TX, flufenoxadiazam + TX, metarylpicoxamid + TX.

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
5 "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 selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables
10 A-1 to A-23, or a compound as listed in Table P (below) is preferably in a mixing ratio of from 100:1 to 1:100, 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, and still more especially from 5:1 to 1:5. 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
15 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 selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), or (I-A3), or one compound selected from the group consisting of the compounds as represented in Tables A-1 to A-23, or a compound as listed in Table P (below), and one or more active ingredients as described above can
20 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 a compound selected from the compounds of formula (I), (I-A), (I-A1), (I-A2), (I-A3), or one compound selected from the group consisting of the compounds
25 as represented in Tables A-1 to A-23, or a compound as listed in Table P (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
30 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
35 (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) according to the invention 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 defined herein, or of a fungicidal or insecticidal mixture comprising at least one compound of formula (I) or at least one preferred individual compound as defined herein, in admixture with other fungicides or insecticides as described above, for 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 invention is related to a method of controlling or preventing an 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 of non-living materials by phytopathogenic or spoilage microorganisms or organisms potentially harmful to man, especially fungal organisms, which comprises the application of a compound of formula (I) according to the invention or of a preferred individual compound as defined herein as active ingredient to the plants, to parts of the plants or to the locus thereof, to the propagation material thereof, or to any part of the non-living materials.

Controlling or preventing means reducing infestation by insects or 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 microorganisms, especially fungal organisms, or insects which comprises the application of a compound of formula (I) according to the invention, or an agrochemical composition which contains at least one compound of formula (I), 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) according to the invention can also penetrate the plant through the roots via the soil (systemic action) by drenching the locus of 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) according to the invention and, if desired, a 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 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.

The term "g a.i./ha" as used herein refer to the application rate given in gram [g] of active ingredient [a.i.] per unit of surface [ha]. The unit hectare (symbol ha) is the metric unit of area that equals a square with 100 m side (1 hm²) or 10,000 square meters. Hectare is a commonly used unit of area in the metric system.

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.

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 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.

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 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.

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 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) according to the invention optionally together with other active agents, particularly microbiocides or conservatives or the like. Concentrated forms of compositions 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 normally use dilute formulations.

The rates of application vary within wide limits and depend on the nature of the soil, the method of application, the crop plant, the pest to be controlled, the prevailing climatic conditions, and other factors governed by the method of application, the time of application and the target crop. As a general guideline, compounds may be applied at a rate of from 1 to 2000 l/ha, especially from 10 to 1000 l/ha.

Preferred formulations can have the following compositions (weight %):

Emulsifiable concentrates:

active ingredient:	1 to 95 %, preferably 60 to 90 %
surface-active agent:	1 to 30 %, preferably 5 to 20 %
liquid carrier:	1 to 80 %, preferably 1 to 35 %

Dusts:

active ingredient:	0.1 to 10 %, preferably 0.1 to 5 %
solid carrier:	99.9 to 90 %, preferably 99.9 to 99 %

Suspension concentrates:

active ingredient:	5 to 75 %, preferably 10 to 50 %
water:	94 to 24 %, preferably 88 to 30 %
surface-active agent:	1 to 40 %, preferably 2 to 30 %

Wettable powders:

active ingredient:	0.5 to 90 %, preferably 1 to 80 %
surface-active agent:	0.5 to 20 %, preferably 1 to 15 %
solid carrier:	5 to 95 %, preferably 15 to 90 %

Granules:

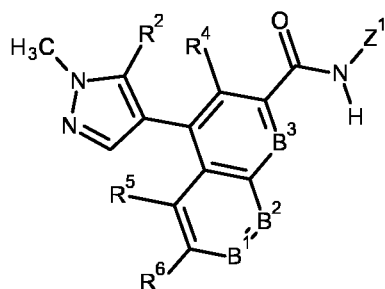
active ingredient:	0.1 to 30 %, preferably 0.1 to 15 %
solid carrier:	99.5 to 70 %, preferably 97 to 85 %

The disclosure in the present application makes available each and every combination of embodiments disclosed herein.

The compounds according to the following Tables A-1 to A-23 may be prepared according to the methods described above. The examples which follow are intended to illustrate the invention and show preferred compounds of formula (I). In any of Tables A-1 to A-23 below, the presence of one or more possible asymmetric

carbon atoms in a compound of formula (I) according to the invention means that the compounds may occur in chiral isomeric forms, i.e., enantiomeric or diastereomeric forms.

Table A: This table discloses 32 substituent definitions Z¹ of compounds of the formula (I-A) according to the invention:



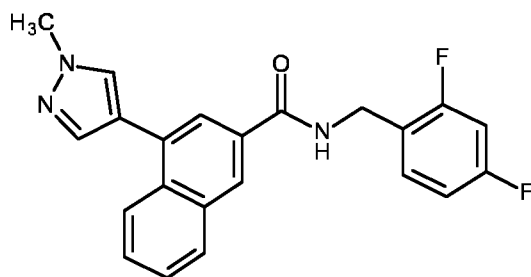
(I-A)

wherein Z¹ according to compounds of Formula (I) of the invention is as defined below:

Index	Z ¹	Index	Z ¹
1	(2,4-difluorophenyl)methyl	19	4-cyclopropylbutyl
2	2-(2,4-difluorophenyl)ethyl	20	4-fluorobutyl
3	(4-fluoro-4-methyl-pentyl)	21	4-methylpent-4-enyl
4	2-(3,5-difluoro-2-pyridyl)ethyl	22	5,5,5-trifluoropentyl
5	(3,5-difluoro-2-pyridyl)methyl	23	5,5-difluorohexyl
6	2-cyclobutylethyl	24	5,5-difluoropentyl
7	2-cyclohexylethyl	25	5,5-dimethylhexyl
8	2-cyclopentylethyl	26	5-fluoropentyl
9	2-cyclopropylethyl	27	5-methylhexyl
10	3-(1-methylcyclopropyl)propyl	28	6-methylheptyl
11	3,3-difluoropentyl	29	butyl
12	3-cyclobutylpropyl	30	cyclopropylmethyl
13	3-cyclohexylpropyl	31	heptyl
14	3-cyclopentylpropyl	32	hex-4-ynyl

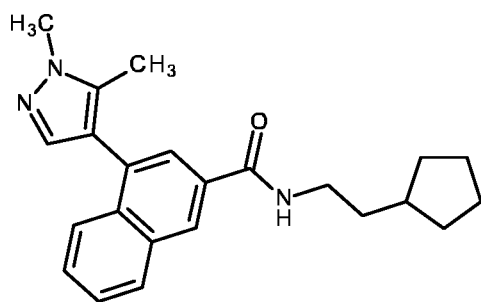
The following compounds are thus specifically described in Tables A-1 to A-23 with the substituents for Formula (I-A)

- 10 **Table A-1:** This table provides 36 compounds (A-1.01) to (A-1.36) of formula (I-A) wherein R², R⁴, R⁵, and R⁶ are H, B¹, B² and B³ are CH, and Z¹ and substituents are as defined in Table A. For example, compound (A-1.01) has the following structure:



Compound (A-1.01)

Table A-2: This table provides 36 compounds (A-2.01) to (A-2.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 , B^2 and B^3 are CH, and Z^1 and substituents are as defined in Table A. For example, compound (A-2.08) has the following structure:



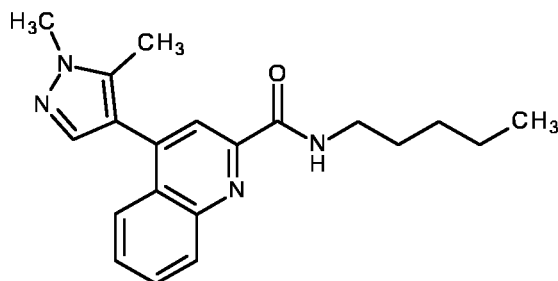
5

Compound (A-2.08)

Table A-3: This table provides 36 compounds (A-3.01) to (A-3.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is Cl, B^1 , B^2 and B^3 are CH, and Z^1 and substituents are as defined in Table A.

Table A-4: This table provides 36 compounds (A-4.01) to (A-4.36) of formula (I-A) wherein R^2 , R^4 , R^5 , and R^6 are H, B^1 , and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

10 **Table A-5:** This table provides 36 compounds (A-5.01) to (A-5.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 , and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A. For example, compound (A-5.35) has the following structure:



Compound (A-5.35)

15 **Table A-6:** This table provides 36 compounds (A-6.01) to (A-6.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is Cl, B^1 , and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-7: This table provides 36 compounds (A-7.01) to (A-7.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is Cl, B^1 , and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-8: This table provides 36 compounds (A-8.01) to (A-8.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 is CH, B^2 is C-Cl, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-9: This table provides 36 compounds (A-9.01) to (A-9.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 is CH, B^2 is C-Br, B^3 is N, and Z^1 and substituents are as defined in Table A.

- 5 Table A-10: This table provides 36 compounds (A-10.01) to (A-10.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 is CH, B^2 is C-CN, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-11: This table provides 36 compounds (A-11.01) to (A-11.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is Cl, B^1 is CH, B^2 is C-Cl, B^3 is N, and Z^1 and substituents are as defined in Table A.

- 10 Table A-12: This table provides 36 compounds (A-12.01) to (A-12.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is Cl, B^1 is CH, B^2 is C-Br, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-13: This table provides 36 compounds (A-13.01) to (A-13.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is Cl, B^1 is CH, B^2 is C-CN, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-14: This table provides 36 compounds (A-14.01) to (A-14.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 is CH, B^2 is C- CH_3 , B^3 is N, and Z^1 and substituents are as defined in Table A.

- 15 Table A-15: This table provides 36 compounds (A-15.01) to (A-15.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 is C- CH_3 , B^2 is C-Cl, B^3 is N, and Z^1 and substituents are as defined in Table A.

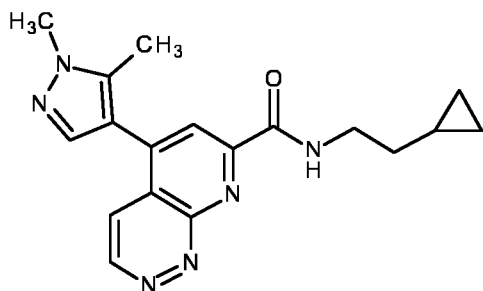
Table A-16: This table provides 36 compounds (A-16.01) to (A-16.36) of formula (I-A) wherein R^2 , R^5 , and R^6 are H, R^4 is CH_3 , B^1 and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

- 20 Table A-17: This table provides 36 compounds (A-17.01) to (A-17.36) of formula (I-A) wherein R^5 and R^6 are H, R^2 and R^4 are CH_3 , B^1 and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-18: This table provides 36 compounds (A-18.01) to (A-18.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^1 is CH, B^2 and B^3 are N, and Z^1 and substituents are as defined in Table A.

Table A-19: This table provides 36 compounds (A-19.01) to (A-19.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^2 is CH, B^1 and B^3 are N, and Z^1 and substituents are as defined in Table A.

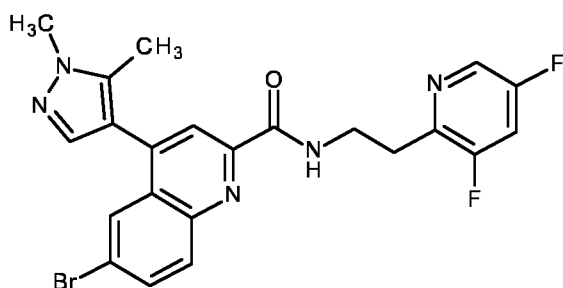
- 25 Table A-20: This table provides 36 compounds (A-20.01) to (A-20.36) of formula (I-A) wherein R^4 , R^5 , and R^6 are H, R^2 is CH_3 , B^2 , B^1 and B^3 are N, and Z^1 and substituents are as defined in Table A. For example, compound (A-20.09) has the following structure:



Compound (A-20.09)

Table A-21: This table provides 36 compounds (A-21.01) to (A-21.36) of formula (I-A) wherein R^4 and R^5 , are H, R^6 is C-Cl, R^2 is CH_3 , B^1 and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

Table A-22: This table provides 36 compounds (A-22.01) to (A-22.36) of formula (I-A) wherein R^4 and R^5 , are H, R^6 is C-Br, R^2 is CH_3 , B^1 and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A. For example, compound (A-22.04) has the following structure:



Compound (A-22.04)

Table A-23: This table provides 36 compounds (A-23.01) to (A-23.36) of formula (I-A) wherein R^4 and R^5 , are H, R^6 is C-CN, R^2 is CH_3 , B^1 and B^2 are CH, B^3 is N, and Z^1 and substituents are as defined in Table A.

10 EXAMPLES

The Examples which follow serve to illustrate the invention and are not meant in any way to limit 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 a person skilled in the art using the experimental procedures outlined in the Examples, using lower application rates if necessary, for example 60 ppm, 20 ppm or 2 ppm.

- 15 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).

- 20 Throughout this description, temperatures are given in degrees Celsius and "m.p." means melting point. LC/MS means Liquid Chromatography Mass Spectroscopy and the description of the apparatus, and the methods is as follows.

¹H NMR and ¹⁹F NMR measurements were recorded on a Bruker 400MHz spectrometer, chemical shifts are given in ppm relevant to a TMS (¹H) and CFCI₃ (¹⁹F) standard. Spectra measured in deuterated solvents as indicated. Either one of the LC-MS methods below was used to characterize the compounds. The characteristic LC-MS values obtained for each compound were the retention time ("Rt", recorded in minutes) and the measured molecular ion (M+H)⁺ or (M-H)⁻.

LC-MS Methods

LC-MS Method A: Spectra were recorded on a Mass Spectrometer from Waters Corporation (SQD, SQDII or QDA Single quadrupole mass spectrometer) equipped with an electrospray source (Polarity: positive and negative ions), Capillary: 0.8-3.00 kV, Cone: 5-30 V, Source Temperature: 120-150°C, Desolvation Temperature: 350-600°C, Cone Gas Flow: 50-150 l/h, Desolvation Gas Flow: 650-1000 l/h, Mass range: 100 to 900 Da and an Acquity UPLC from Waters Corporation: Binary pump, heated column compartment, diode-array detector and ELSD. Column: Waters UPLC HSS T3, 1.8 µm, 30 x 2.1 mm, Temp: 60°C, DAD Wavelength range (nm): 210 to 400, Runtime: 1.5 min; Solvents: A = water + 5% MeOH + 0.05 % HCOOH, B= Acetonitrile + 0.05 % HCOOH; Flow (ml/min) 0.85, Gradient: 10% B isocratic for 0.2 min, then 10-100% B in 1.0 min, 100% B isocratic for 0.2min, 100-10% B in 0.05min, 10% B isocratic for 0.05 min.

LC-MS Method B: Spectra were recorded on a ACQUITY Mass Spectrometer from Waters Corporations (SQD or SQDII Single quadrupole mass spectrometer) equipped with an electrospray source (Polarity: positive or negative ions, Capillary: 3.0 kV, Cone: 30V, Extractor: 3.00 V, Source Temperature: 150°C, Desolvation Temperature: 400°C, Cone Gas Flow: 60 L/hr, Desolvation Gas Flow: 700 L/hr, Mass range: 140 to 800 Da) and an ACQUITY UPLC from Waters Corporations with solvent degasser, binary pump, heated column compartment and diode-array detector. Column: Waters UPLC HSS T3, 1.8 µm, 30 x 2.1 mm, Temp: 60°C, DAD Wavelength range (nm): 210 to 400, Solvent Gradient: A = Water/Methanol 9:1 + 0.1% formic acid, B= Acetonitrile + 0.1% formic acid, gradient: 0-100% B in 2.5 min; Flow (ml/min) 0.75.

LC-MS Method C: Spectra were recorded on a Mass Spectrometer from Waters (SQD2 or QDA Single quadrupole mass spectrometer) equipped with an electrospray source (Polarity: Positive and Negative Polarity Switch), Capillary: 0.8-3.00 kV, Cone range: 25 Source Temperature: 120-150°C, Desolvation Temperature: 500-600°C, Cone Gas Flow: 50 L/h, Desolvation Gas Flow: 1000 L/h, Mass range: 110 to 850 Da) and an Acquity UPLC from Waters: Quaternary solvent manager, heated column compartment, diode-array detector. Column: Acquity UPLC HSS T3 C18, 1.8 µm, 30 x 2.1 mm, Temp: 40°C, DAD Wavelength range (nm): 200 to 400, Solvent Gradient: A = water + 5% Acetonitrile + 0.1 % HCOOH, B= Acetonitrile + 0.05 % HCOOH: gradient: 0 min 10% B; 0.-0.2 min 10-50% B; 0.2-0.6 min 50-100% B; 0.6-1.3 min 100% B; 1.3-1.4 min 100-10% B; 1.4-1.6 min 10% B; Flow (mL/min) 0.6.

LC-MS Method D: Spectra were recorded on a Mass Spectrometer from Agilent Technologies (6410 Triple Quadrupole mass spectrometer) equipped with an electrospray source (Polarity: positive or negative ions, MS2 Scan, Capillary: 4.00 kV, Fragmentor: 100 V, Desolvation Temperature: 350°C, Gas Flow: 11 L/min, Nebulizer Gas: 45 psi, Mass range: 110 to 1000 Da) and a 1200 Series HPLC from Agilent: quaternary pump, heated

column compartment and VWD detector. Column: KINETEX EVO C18, 2.6 μ m, 50 x 4.6 mm, Temp: 40°C, Detector VWD Wavelength: 254 nm, Solvent Gradient: A = water + 5% Acetonitrile + 0.1 % HCOOH, B= Acetonitrile + 0.1 % HCOOH: gradient: 0 min 10% B, 90%A; 0.9-1.8 min 100% B; 1.8-2.2 min 100-10% B; 2.2-2.5 min 10%B; Flow (mL/min) 1.8.

- 5 LC-MS Method E: Spectra were recorded on a ACQUITY Mass Spectrometer from Waters Corporations (SQD or SQDII Single quadrupole mass spectrometer) equipped with an electrospray source (Polarity: positive or negative ions, Capillary: 3.0 kV, Cone: 30V, Extractor: 3.00 V, Source Temperature: 150°C, Desolvation Temperature: 400°C, Cone Gas Flow: 60 L/hr, Desolvation Gas Flow: 700 L/hr, Mass range: 140 to 800 Da) and an ACQUITY UPLC from Waters Corporations with solvent degasser, binary pump, heated column
- 10 compartment and diode-array detector. Column: Waters UPLC HSS T3, 1.8 μ m, 30 x 2.1 mm, Temp: 60°C, DAD Wavelength range (nm): 210 to 400, Solvent Gradient: A = Water/Methanol 9:1 + 0.1% formic acid, B= Acetonitrile + 0.1% formic acid, gradient: 0-100% B in 3.0 min; Flow (ml/min) 0.75.

Formulation Examples

<u>Wettable powders</u>		a)	b)	c)
15	active ingredients	25 %	50 %	75 %
	sodium lignosulfonate	5 %	5 %	-
	sodium lauryl sulfate	3 %	-	5 %
	sodium diisobutylphenylsulfonate	-	6 %	10 %
	phenol polyethylene glycol ether (7-8 mol of ethylene oxide)	-	2 %	-
20	highly dispersed silicic acid	5 %	10 %	10 %
	Kaolin	62 %	27 %	-

The combination 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.

<u>Powders for dry seed treatment</u>		a)	b)	c)
25	active ingredients	25 %	50 %	75 %
	light mineral oil	5 %	5 %	5 %
	highly dispersed silicic acid	5 %	5 %	-
	Kaolin	65 %	40 %	-
	Talcum	-	-	20 %

- 30 The combination 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 ingredients	10 %
	octylphenol polyethylene glycol ether (4-5 mol of ethylene oxide)	3 %
35	calcium dodecylbenzene sulfonate	3 %
	castor oil polyglycol ether (35 mol of ethylene oxide)	4 %

Cyclohexanone	30 %
xylene mixture	50 %

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

5	<u>Dusts</u>	a)	b)	c)
	Active ingredients	5 %	6 %	4 %
	Talcum	95 %	-	-
	Kaolin	-	94 %	-
	mineral filler	-	-	96 %

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

Extruder granules

	Active ingredients	15 %
	sodium lignosulfonate	2 %
15	carboxymethylcellulose	1 %
	Kaolin	82 %

The combination 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

20	Active ingredients	8%
	polyethylene glycol (mol. wt. 200)	3 %
	Kaolin	89 %

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

25	<u>Suspension concentrate</u>	
	active ingredients	40 %
	propylene glycol	10 %
	nonylphenol polyethylene glycol ether (15 mol of ethylene oxide)	6 %
	Sodium lignosulfonate	10 %
30	carboxymethylcellulose	1 %
	silicone oil (in the form of a 75 % emulsion in water)	1 %
	Water	32 %

The finely ground combination 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 ingredients	40 %
5	propylene glycol	5 %
	copolymer butanol PO/EO	2 %
	Tristyrenephenol 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 %
10	Silicone oil (in the form of a 75 % emulsion in water)	0.2 %
	Water	45.3 %

The finely ground combination 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 the combination 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. 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. The resulting formulation is applied to seeds as an aqueous suspension in an apparatus suitable for that purpose.

Formulation types include 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 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), a soluble granule (SG) or any technically feasible formulation in combination with agriculturally acceptable adjuvants.

Abbreviations

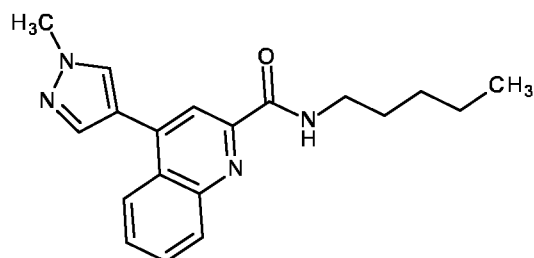
	CDCl ₃	deuterated chloroform
	CO	Carbonmonoxide
35	DABCO	1,4-diazabicyclo[2.2.2]octane, also known as triethylenediamine or TEDA

	DCC	dicyclohexyl carbodiimide		
	DIPEA	Diisopropylethylamine (N,N-Diisopropylethylamine)		
	DMA	dimethylacetamide		
	DMF	dimethylformamide		
5	DMSO	dimethyl sulfoxide		
	DMSO-d6	deuterated Dimethyl sulfoxide		
	EDC	1-ethyl-3-(3-dimethylaminopropyl)carbodiimide		
	Et3N	triethylamine		
	EtOAc	ethylacetate		
10	HATU	1-[bis(dimethylamino)methylene]-1H-1,2,3-triazolo[4,5-b]pyridinium phosphate	3-oxide	hexafluoro-
	HCl	hydrochloric acid		
	hr/hrs	hour/hours		
	LC-MS	Liquid Chromatography Mass Spectrometry (LC-MS or LCMS)		
15	ppm	parts per million		
	rh	relative humidity		
	rt	room temperature		
	Rt	retention time		
	ssp.	subspecies		
20	TBME	methyl tert-butyl ether or tert-butyl methyl ether		

Preparation Examples

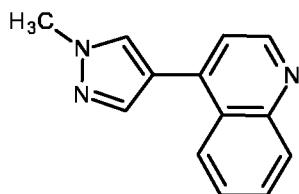
The compounds of formula (I) according to the invention may be prepared using the synthetic techniques described both above and below.

25 **Example P1:** Synthesis of 4-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide (Compound P-3, table P)



(Compound P-3, Table P)

Step A: Preparation of 4-(1-methylpyrazol-4-yl)quinoline

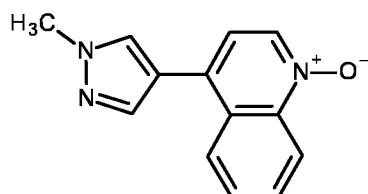


A 250 mL flask was charged with 4-bromoquinoline (2.50 g, 12.0 mmol, [CAS 3964-04-3]), THF (36 mL), water (6 mL), cesium carbonate (15.7g, 48.1 mmol) and (1-methylpyrazol-4-yl)boronic acid (2.12 g, 16.8 mmol) at rt and under an argon atmosphere. The resulting reaction mixture was purged with argon again before the addition of Pd(dppf)Cl₂ · CH₂Cl₂ (0.496 mg, 0.601 mmol). The reaction mixture was stirred for 2 hr 30 min at 95°C then additional Pd(dppf)Cl₂ · CH₂Cl₂ (0.496 mg, 0.601 mmol) and (1-methylpyrazol-4-yl)boronic acid (2.12 g, 16.8 mmol) were added, and the resulting reaction mixture stirred for an additional 2 hours at 95°C. The reaction mixture was cooled to rt and diluted with saturated aqueous NH₄Cl and EtOAc. The aqueous layer was separated, back-extracted with EtOAc, and the combined organic extracts washed with brine, dried over Na₂SO₄ and concentrated under reduced pressure. The crude product was purified by chromatography over silica gel to afford 4-(1-methylpyrazol-4-yl)quinoline.

LC-MS: 210 [M+H], Rt: 0.27-30 min (Method A)

¹H NMR (400 MHz, CDCl₃) δ ppm 4.05 - 4.10 (m, 3 H) 7.34 - 7.39 (m, 1 H) 7.55 - 7.62 (m, 1 H) 7.73 - 7.79 (m, 2 H) 7.83 - 7.88 (m, 1 H) 8.15 - 8.25 (m, 2 H) 8.85 - 8.97 (m, 1 H)

Step B: Preparation of 4-(1-methylpyrazol-4-yl)-1-oxido-quinolin-1-ium

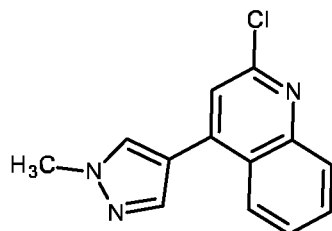


A 25 mL flask was charged with 4-(1-methylpyrazol-4-yl)quinoline (1.37 g, 6.55 mmol) and Dichloromethane (32 mL), and the resultant solution treated portionwise with 3-chlorobenzenecarboxoperoxoic acid (3.39 g, 19.6 mmol) at rt and under an argon atmosphere. The resulting reaction mixture was stirred 1 hr at rt and then quenched with saturated Na₂S₂O₃ solution. The resulting reaction mixture was stirred for 30 min after quenching and then diluted with DCM and saturated aqueous solution of NaHCO₃. The organic phase was separated and washed 2 times with saturated solution of NaHCO₃ and once with water followed by washing once with brine. A peroxide test showed still a very small trace of peroxide, therefore the dichloromethane solution was diluted with saturated Na₂S₂O₃ solution and stirred over the weekend at rt. The organic phase was separated and the aqueous phase back-extracted with dichloromethane. The combined organic layers were dried over Na₂SO₄ and concentrated under reduced pressure to afford pure 4-(1-methylpyrazol-4-yl)-1-oxido-quinolin-1-ium.

LC-MS: 226 [M+H], Rt: 0.52 min (Method A)

¹H NMR (400 MHz, CDCl₃) δ ppm 8.82 - 8.99 (m, 1 H) 8.58 (br s, 1 H) 8.20 (br d, J=8.0 Hz, 1 H) 7.65 - 7.85 (m, 4 H) 7.28 (s, 1 H) 4.03 - 4.11 (m, 3 H).

Step C: Preparation of 2-chloro-4-(1-methylpyrazol-4-yl)quinoline



5

A solution of 4-(1-methylpyrazol-4-yl)-1-oxido-quinolin-1-ium (1.05 g, 4.66 mmol) in phosphoryl chloride (9 mL) were mixed and the resulting black solution was stirred 45 min at 60°C. The phosphoryl chloride was removed by concentration *in vacuo* and the residue obtained diluted with EtOAc and water. The solution was neutralized by slow addition of a saturated aqueous solution of NaHCO₃. The EtOAc was removed and the aqueous phase back-extracted with EtOAc, and the combined organic phases were washed once with brine, dried over Na₂SO₄ and then concentrated under reduced pressure to afford 2-chloro-4-(1-methylpyrazol-4-yl)quinoline.

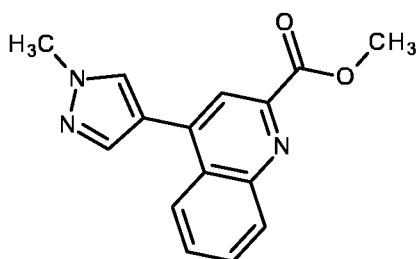
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LC-MS: 244 [M+H], Rt: 0.86 min (Method A)

¹H NMR (400 MHz, CDCl₃) δ ppm 8.18 (dd, J=8.4, 1.1 Hz, 1 H) 8.09 - 8.14 (m, 1 H) 7.86 (s, 1 H) 7.75 - 7.82 (m, 2 H) 7.60 (ddd, J=8.4, 7.0, 1.3 Hz, 1 H) 7.38 (s, 1 H) 4.08 (s, 3 H)

15

Step D: Preparation of methyl 4-(1-methylpyrazol-4-yl)quinoline-2-carboxylate



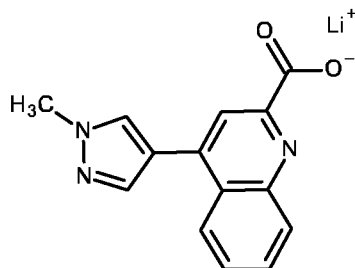
A solution of 2-chloro-4-(1-methylpyrazol-4-yl)quinoline (300 mg, 1.23 mmol) and triethylamine (0.347 mL, 2.46 mmol) in methanol (4.5 mL) was treated with Pd(dppf)Cl₂.CH₂Cl₂ (0.102 mg, 0.1231 mmol) and the reaction mixture was purged with a stream of argon for 5 min. In an autoclave, the reaction mixture was stirred overnight at 80°C under 10 bar of carbon monoxide (CO). The reaction mixture was cooled, purged with argon, evaporated and the concentrated under reduced pressure. The residue obtained was purified by chromatography over silica gel to afford methyl 4-(1-methylpyrazol-4-yl)quinoline-2-carboxylate.

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LC-MS: 268 [M+H], Rt: 0.75 min (Method A)

^1H NMR (400 MHz, CDCl_3) δ ppm 4.08 - 4.10 (m, 3 H) 4.11 - 4.14 (m, 3 H) 7.65 - 7.72 (m, 1 H) 7.79 - 7.87 (m, 2 H) 7.89 - 7.93 (m, 1 H) 8.16 - 8.21 (m, 1 H) 8.25 - 8.32 (m, 1 H) 8.35 - 8.41 (m, 1 H)

Step E : Preparation of lithium;4-(1-methylpyrazol-4-yl)quinoline-2-carboxylate



- 5 A solution of methyl 4-(1-methylpyrazol-4-yl)quinoline-2-carboxylate (226 mg, 0.845 mmol) in THF/ H_2O 3:1 (8mL) was treated with $\text{LiOH}\cdot\text{H}_2\text{O}$ (39.82 mg, 0.930 mmol) and the resulting reaction mixture was stirred at rt for 1 hour. Solvents were removed *in vacuo* to afford the title compound

LC-MS: 254 $[\text{M}+\text{H}]$, Rt: 0.49 min (free acid) (Method A)

- ^1H NMR (400 MHz, $\text{DMSO}-d_6$) δ ppm 3.99 (s, 3 H) 7.61 - 7.68 (m, 1 H) 7.76 - 7.83 (m, 1 H) 7.94 - 7.97 (m, 1 H) 7.99 - 8.04 (m, 1 H) 8.11 - 8.16 (m, 1 H) 8.26 - 8.32 (m, 1 H) 8.36 - 8.40 (m, 1 H)

Step F: Synthesis of 4-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide (Compound P-3, Table P)

Step F-Option A:

- A sample of 4-(1-methylpyrazol-4-yl)quinoline-2-carboxylic acid (114 mg, 0.450 mmol) dissolved in EtOAc (1 mL) was treated with pentan-1-amine (0.041 mg, 0.472 mmol), T3P (0.670 mL, 1.125 mmol) and diisopropylamine (0.236 mL, 1.350 mmol) under argon at rt. The resulting reaction mixture was stirred at rt for 30 min. and then diluted with water, saturated NaHCO_3 and EtOAc. The organic layer was separated and the aqueous phase back-extracted with EtOAc and the combined organic phases were washed once with brine, dried over Na_2SO_4 and concentrated under reduced pressure. The crude product was purified once by normal phase chromatography and once by reverse phase chromatography to afford 4-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide as a white solid.

LC-MS: 323 $[\text{M}+\text{H}]$, Rt: 1.04 min (Method A)

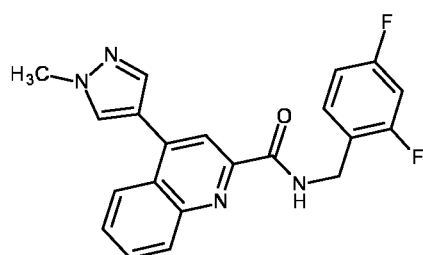
^1H NMR (400 MHz, CDCl_3) δ ppm 0.90 - 1.02 (m, 3 H) 1.38 - 1.51 (m, 4 H) 1.69 - 1.81 (m, 2 H) 3.52 - 3.63 (m, 2 H) 4.04 - 4.13 (m, 3 H) 7.60 - 7.69 (m, 1 H) 7.76 - 7.86 (m, 2 H) 7.89 - 7.96 (m, 1 H) 8.14 - 8.20 (m, 1 H) 8.26 - 8.39 (m, 3 H)

Step F - Option B:

To an Argon flushed autoclave was added $\text{Pd}(\text{dppp})\text{Cl}_2$ (0.063 g, 0.103 mmol) and afterwards was charged with a suspension of 2-chloro-4-(1-methylpyrazol-4-yl)quinoline (0.500 g, 2.05 mmol), pentan-1-amine (0.268 g, 3.08 mmol) and triethylamine (0.715 mL, 5.13 mmol) in THF (10 mL) and the reaction mixture reaction was

heated over night at 100°C under a CO (carbonmonoxide) pressure of 10bar. Additional Pd(dppp)Cl₂ (0.063 g, 0.103 mmol), pentan-1-amine (0.268 g 3.08 mmol), triethylamine (0.715 mL, 5.13 mmol) were added and the resulting reaction mixture was further heated for 2 days at 100°C under CO atmosphere (10bar). LCMS analysis indicated full conversion to the desired compound after this time. The reaction mixture was directly adsorbed on Isolute®, the solvent was removed *in vacuo* and the residue obtained was purified by chromatography over silica gel to afford 4-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide.

Example P2: Preparation of N-[(2,4-difluorophenyl)methyl]-4-(1-methylpyrazol-4-yl)quinoline-2-carboxamide (Compound P-1, table P)



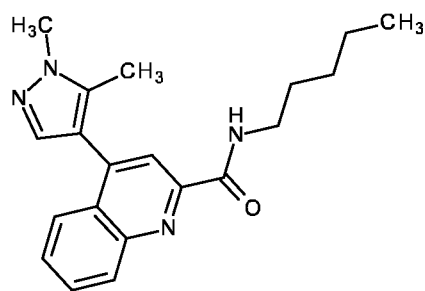
(Compound P-1, table P)

A 25 mL flask was charged with 4-(1-methylpyrazol-4-yl)quinoline-2-carboxylic acid (42 mg, 0.162 mmol) then was added EtOAc (0.65 mL) and 1 drop of DMF followed by slow addition of oxalyl chloride (0.035 mL, 0.405 mmol) at rt and under an argon atmosphere. After 30 min, the reaction mixture was concentrated under reduced pressure to give 4-(1-methylpyrazol-4-yl)quinoline-2-carbonyl chloride (0.044 g, 0.1619 mmol). To a mixture of the above 4-(1-methylpyrazol-4-yl)quinoline-2-carbonyl chloride (0.026 g, 0.09569 mmol) in CH₃CN (0.78 mL) under an argon atmosphere, were added (2,4-difluorophenyl)methanamine (0.013 g, 0.095 mmol) and potassium iodide (0.008 mg, 0.047 mmol). This reaction mixture was stirred for 1 hr at 60°C, and then cooled to rt, diluted with water and EtOAc followed by the addition of saturated aqueous solution of NaHCO₃. The organic layer was removed, and the aqueous phase was back-extracted with EtOAc. The combined organic layers were washed with brine, dried over Na₂SO₄ and concentrated under reduced pressure. The crude product was purified by chromatography over silica gel to afford N-[(2,4-difluorophenyl)methyl]-4-(1-methylpyrazol-4-yl)quinoline-2-carboxamide.

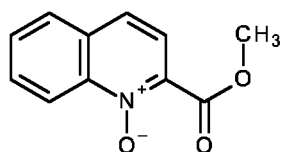
LC-MS: 379 [M+H], Rt: 1.01 min (Method A)

¹H NMR (400 MHz, CDCl₃) δ ppm 4.04 - 4.12 (m, 3 H) 4.74 - 4.83 (m, 2 H) 6.83 - 6.93 (m, 2 H) 7.45 - 7.53 (m, 1 H) 7.63 - 7.69 (m, 1 H) 7.77 - 7.83 (m, 2 H) 7.90 - 7.95 (m, 1 H) 8.14 - 8.23 (m, 1 H) 8.26 - 8.34 (m, 2 H) 8.64 - 8.86 (m, 1 H)

Example P3: Synthesis of 4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide (Compound P-2, Table P)

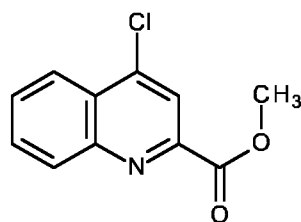


(Compound P-2, Table P)

Step A: Preparation of methyl 1-oxidoquinolin-1-ium-2-carboxylate

To a solution of methyl quinoline-2-carboxylate (CAS 19575-07-6) (0.670 g, 3.579 mmol, [CAS 19575-07-6]) in trifluoromethylbenzene (10 mL) at 0°C, was added 3-chlorobenzenecarboperoxoic acid (2.37 g, 8.947 mmol, 65 mass%) at 0°C. The reaction mixture was stirred at rt for 12 hs. The reaction mixture was quenched with 2N aq. NaOH solution and water, and extracted with EtOAc. Combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated under reduced pressure to afford methyl 1-oxidoquinolin-1-ium-2-carboxylate.

LC-MS: 204 [M+H], Rt: 0.46 min (Method B)

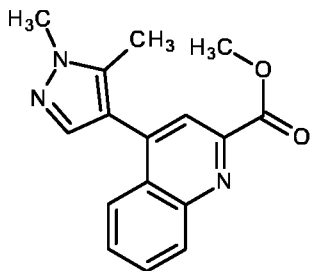
Step B: Preparation of methyl 4-chloroquinoline-2-carboxylate

A sample of methyl-1-oxidoquinolin-1-ium-2-carboxylate (900 mg, 3.100 mmol) was dissolved in phosphorus(V) oxychloride (18 mL). The resulting reaction mixture was heated to 80°C and stirred at this temperature for 3 hs. The reaction mixture was cooled to rt and was added dropwise over 20 min under stirring to water at rt, and then quenched with an ice cooled solution of saturated NaHCO₃. The reaction mixture was extracted with EtOAc and the combined organic layers dried over Na₂SO₄, and concentrated under reduced pressure. The crude product was purified by CombiFlash®, using 10-20% EtOAc in cyclohexane to afford methyl 4-chloroquinoline-2-carboxylate.

LC-MS: 222 [M+H], Rt: 1.07 min (Method C)

¹H NMR (400 MHz, CDCl₃-d) δ ppm 8.33 - 8.38 (m, 1 H) 8.28 - 8.32 (m, 2 H) 8.07 - 8.11 (m, 1 H) 7.97 - 8.02 (m, 1 H) 7.84 - 7.91 (m, 1 H) 7.76 - 7.76 (m, 1 H) 7.75 - 7.81 (m, 1 H) 7.56 - 7.63 (m, 1 H) 7.40 - 7.48 (m, 1 H) 4.11 (s, 3 H)

Step C : Preparation of methyl 4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxylate



5

A solution of methyl 4-chloroquinoline-2-carboxylate (0.197 mg, 0.445 mmol) and 1,5-dimethyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pyrazole (100 mg, 0.4052 mmol) in 2-methyltetrahydrofuran (1.6 mL) was treated with potassium phosphate (0.263 g, 1.216 mmol) and the resulting reaction mixture was degassed with nitrogen. A sample of mesylate[(di(1-adamantyl)-n-butylphosphine)-2-(2'-amino-1,1'-biphenyl)]palladium(II), [(Di(1-adamantyl)-butylphosphine)-2-(2'-amino-1,1'-biphenyl)]palladium(II) methanesulfonate (cataCXium® A Pd G3) (0.031 g, 0.0405 mmol, [1651823-59-4]) was added (brown suspension) and the reaction mixture was stirred at 80°C for 1 hr. The reaction mixture was poured into water and then extracted with EtOAc (3 x 20 mL). The combined organic layers were washed with brine, dried over Na₂SO₄, and concentrated under reduced pressure. The crude product was purified by combi flash chromatography over silica gel to afford methyl 4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxylate.

15

LC-MS: 282 [M+H], Rt: 0.98 min (Method C)

¹H NMR (400 MHz, CDCl₃-d) δ ppm 8.27 (d, J=8.68 Hz, 1 H) 7.96 (s, 1 H) 7.85 - 7.95 (m, 1 H) 7.66 - 7.76 (m, 1 H) 7.57 (s, 2H) 7.50 - 7.55 (m, 1 H) 7.20 (s, 1 H) 3.86 (s, 3 H) 3.65 - 3.71 (m, 3 H) 2.33 (s, 3 H)

Step D: Synthesis of 4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide (compound P-2, Table P)

A MW vial was charged with methyl 4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxylate (70.0 mg, 0.174 mmol) and pentan-1-amine (0.020 mL, 0.174 mmol). The reaction mixture was then subjected to Microwave at 100°C for 1 hour. After the completion of the reaction, the reaction mixture was concentrated under reduced pressure to give crude product. The crude product was absorbed on celite and purified using RP chromatography eluting with 50-65 % water in CH₃CN to afford 4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide.

LC-MS (Agilent): 337 [M+H], Rt: 1.61 min (Method D)

25

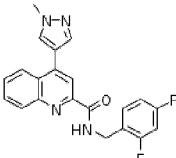
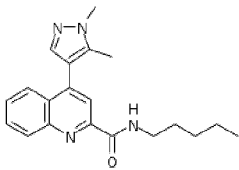
¹H NMR (400 MHz, CDCl₃-d) δ ppm 8.29 - 8.37 (m, 1 H) 8.12 - 8.19 (m, 2 H) 7.99 - 8.06 (m, 1 H) 7.75 - 7.82 (m, 1 H) 7.64 - 7.68 (m, 1 H) 7.55 - 7.63 (m, 1 H) 3.90 - 3.99 (m, 3 H) 3.55 (q, J=6.77 Hz, 2 H) 2.30 (s, 3 H) 1.73 (quin, J=7.24 Hz, 3 H) 1.35 - 1.51 (m, 5 H) 0.94 (t, J=7.03 Hz, 3 H)

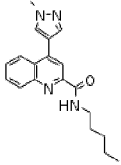
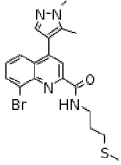
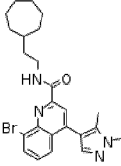
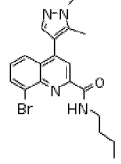
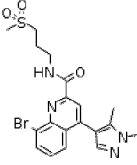
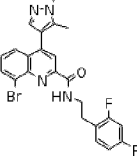
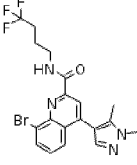
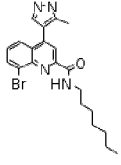
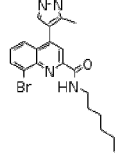
General Synthetic procedure for Library Synthesis:

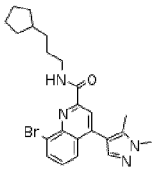
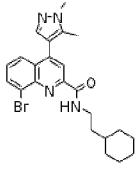
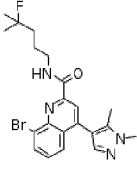
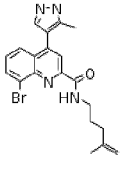
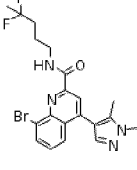
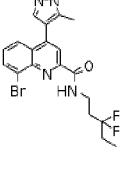
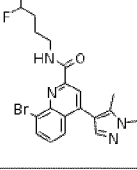
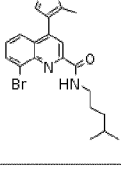
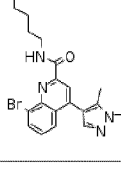
Samples of 4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxylic acid (prepared as described in example P-1, *vide supra*), 8-bromo-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxylic acid (prepared analogously to the example described in example P-1), and 4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxylic acid carboxylic acid (CAS [2866323-20-6]), (2mmol / 0.04mmol per planned reaction) were dissolved in 10mL DMA (dimethylacetamide) a 20mL Braun Glass bottle. After slight stirring, 200μL of each scaffold are added to each reaction well of a 1.5mL Deep well plate (DWP). One DWP per Scaffold was used. DIPEA (N,N-Diisopropylethylamine, Hünig's base) (6eq., 0.24mmol, 40μL) was added to each reaction well of each DWP with a multipipette. Each amine building block (6eq., 0.024mmol) was weighed into a 4mL glass tube and dissolved with 0.9mL DMA. 0.3mL were dispensed into each corresponding reaction well of each DWP (2eq., 0.08mmol, 3 times per building block) with a Tecan Robot. In a 100mL flask HATU was weighed (5.88mmol in total, 0.08mmol per planned reaction, 4.517g) and dissolved in 73.5mL DMA. 0.5mL were dispensed into each reaction well of each DWP. DWPs were sealed and heated at 60°C for 8 hr in an oven under vigorous shaking. Reaction monitoring was performed by aliquoting 20μL of each reaction mixture in a DWP, followed by dilution in acetonitrile (800μL). Analysis by UPLC-MS revealed a general excellent formation of desired products. The reaction mixtures were mixed with MeOH (200μL), transferred in a Nunc 96 Deep-Well Plate and purified on a reverse phase preparative HPLC. 50 μL of the collected fractions were diluted with 100μL of acetonitrile and analyzed by UPLC. The fractions solvent was removed from the samples using a Genevac evaporator. After a pooling and a reformatting step on a Tecan robot to have the final products in a final destination vessels, a last quality control of the products was performed before being concentrated by evaporation (aliquoting of 5μL and dilution in 100μL of acetonitrile). Expected masses were confirmed by UPLC-MS (method B). Compounds that passed the QC were sent to biological assay.

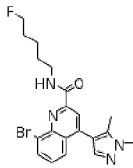
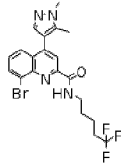
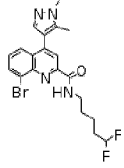
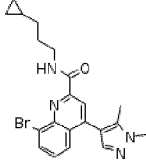
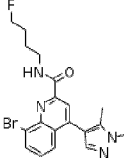
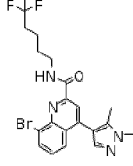
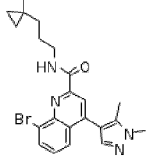
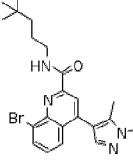
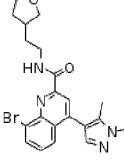
Further examples of synthesized compounds of formula (I) are shown in Table P.

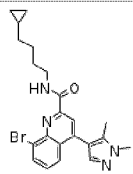
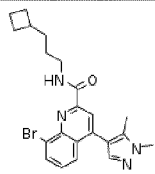
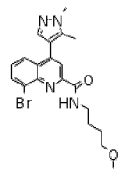
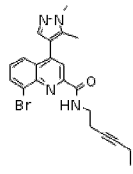
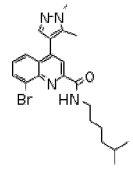
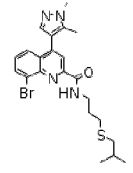
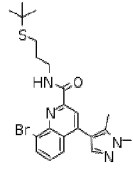
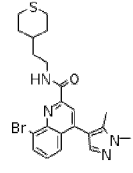
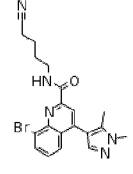
Table P: Synthesized compounds and Spectral and Physical Chemical Data.

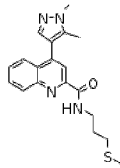
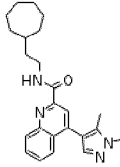
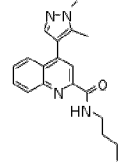
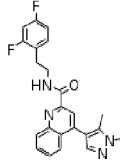
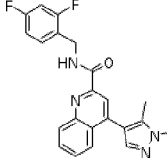
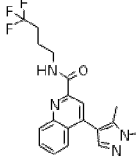
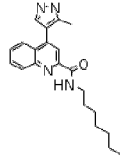
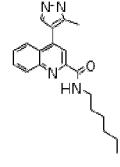
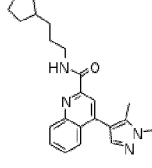
Entry	IUPAC name	Structure	RT (min)	[M+H] (measured)	Method
P-1	N-[(2,4-difluorophenyl)methyl]-4-(1-methylpyrazol-4-yl)quinoline-2-carboxamide		1.02	379	A
P-2	4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		3.28	337	D

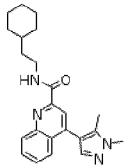
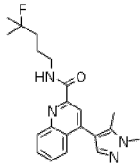
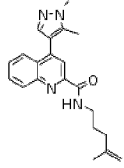
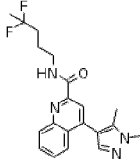
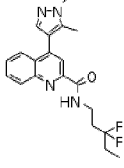
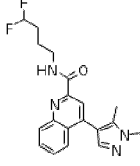
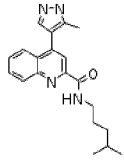
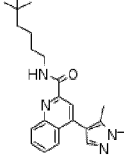
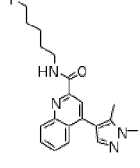
P-3	4-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.05	373	A
P-4	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(3-methylsulfanypropyl)quinoline-2-carboxamide		1.64	433.39	B
P-5	8-bromo-N-(2-cycloheptylethyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.23	469.48	B
P-6	8-bromo-N-butyl-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.77	401.46	B
P-7	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(3-methylsulfonylpropyl)quinoline-2-carboxamide		1.19	465.39	B
P-8	8-bromo-N-[2-(2,4-difluorophenyl)ethyl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.82	485.41	B
P-9	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(4,4,4-trifluorobutyl)quinoline-2-carboxamide		1.69	455.41	B
P-10	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-heptyl-quinoline-2-carboxamide		2.12	443.48	B
P-11	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-hexyl-quinoline-2-carboxamide		2.01	429.48	B

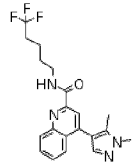
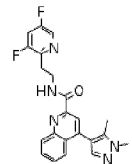
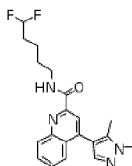
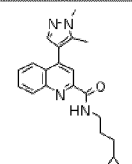
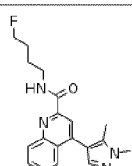
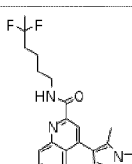
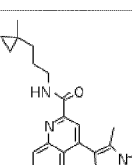
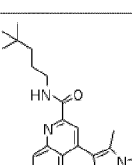
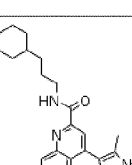
P-12	8-bromo-N-(3-cyclopentylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.14	455.47	B
P-13	8-bromo-N-(2-cyclohexylethyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.14	455.48	B
P-14	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(4-fluoro-4-methyl-pentyl)quinoline-2-carboxamide		1.74	447.46	B
P-15	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(4-methylpent-4-enyl)quinoline-2-carboxamide		1.87	427.46	B
P-16	8-bromo-N-(4,4-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.66	451.44	B
P-17	8-bromo-N-(3,3-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.71	451.43	B
P-18	8-bromo-N-(4,4-difluorobutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.58	437.41	B
P-19	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-isoethyl-quinoline-2-carboxamide		1.99	429.45	B
P-20	8-bromo-N-(5,5-dimethylhexyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.18	457.47	B

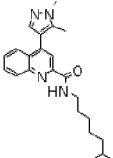
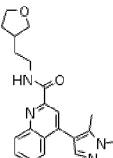
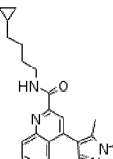
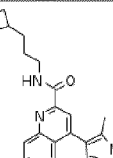
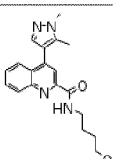
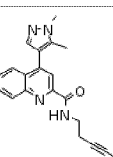
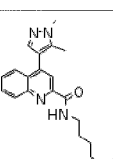
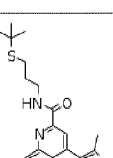
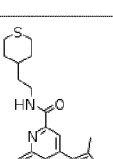
P-21	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(5-fluoropentyl)quinoline-2-carboxamide		1.77	434	C
P-22	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.76	469.4	B
P-23	8-bromo-N-(5,5-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.66	451.43	B
P-24	8-bromo-N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.88	427.43	B
P-25	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(4-fluorobutyl)quinoline-2-carboxamide		1.56	419.42	B
P-26	8-bromo-N-(5,5-difluorohexyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.75	465.45	B
P-27	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-[3-(1-methylcyclopropyl)propyl]quinoline-2-carboxamide		1.98	441.44	B
P-28	8-bromo-N-(4,4-dimethylpentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.07	443.46	B
P-29	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(2-tetrahydrofuran-3-ylethyl)quinoline-2-carboxamide		1.47	443.43	B

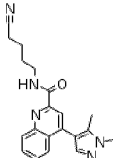
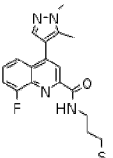
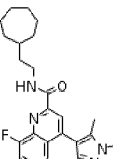
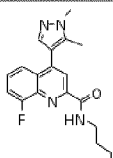
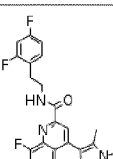
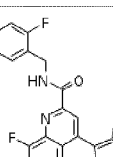
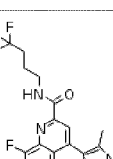
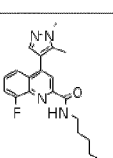
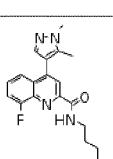
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P-31	8-bromo-N-(3-cyclobutylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.05	441.44	B
P-32	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(4-methoxybutyl)quinoline-2-carboxamide		1.55	431.43	B
P-33	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-hex-3-ynylquinoline-2-carboxamide		1.75	425.43	B
P-34	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(5-methylhexyl)quinoline-2-carboxamide		2.1	443.46	B
P-35	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(3-isobutylsulfanylpropyl)quinoline-2-carboxamide		1.98	475.44	B
P-36	8-bromo-N-(3-tert-butylsulfanylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.93	475.44	B
P-37	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(2-tetrahydrothiopyran-4-ylethyl)quinoline-2-carboxamide		1.84	473.42	B
P-38	8-bromo-N-(4-cyanobutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.41	426.41	B

P-39	4-(1,5-dimethylpyrazol-4-yl)-N-(3-methylsulfanypropyl)quinoline-2-carboxamide		1.42	355.5	B
P-40	N-(2-cycloheptylethyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.02	391.6	B
P-41	N-butyl-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.54	323.5	B
P-42	N-[2-(2,4-difluorophenyl)ethyl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.65	407.51	B
P-43	N-[(2,4-difluorophenyl)methyl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.6	393.5	B
P-44	4-(1,5-dimethylpyrazol-4-yl)-N-(4,4,4-trifluorobutyl)quinoline-2-carboxamide		1.49	377.49	B
P-45	4-(1,5-dimethylpyrazol-4-yl)-N-heptyl-quinoline-2-carboxamide		1.92	365.57	B
P-46	4-(1,5-dimethylpyrazol-4-yl)-N-hexyl-quinoline-2-carboxamide		1.8	351.55	B
P-47	N-(3-cyclopentylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.94	377.57	B

P-48	N-(2-cyclohexylethyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.93	377.56	B
P-49	4-(1,5-dimethylpyrazol-4-yl)-N-(4-fluoro-4-methyl-pentyl)quinoline-2-carboxamide		1.54	369.54	B
P-50	4-(1,5-dimethylpyrazol-4-yl)-N-(4-methylpent-4-enyl)quinoline-2-carboxamide		1.66	349.54	B
P-51	N-(4,4-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.47	373.52	B
P-52	N-(3,3-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.53	373.52	B
P-53	N-(4,4-difluorobutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.38	359.5	B
P-54	4-(1,5-dimethylpyrazol-4-yl)-N-isohexyl-quinoline-2-carboxamide		1.78	351.56	B
P-55	N-(5,5-dimethylhexyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.98	379.57	B
P-56	4-(1,5-dimethylpyrazol-4-yl)-N-(5-fluoropentyl)quinoline-2-carboxamide		1.45	355.53	B

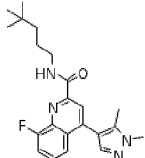
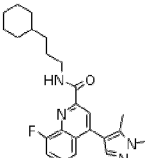
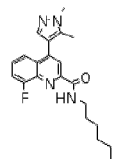
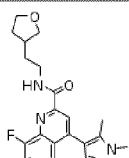
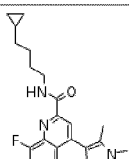
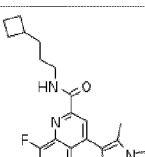
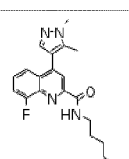
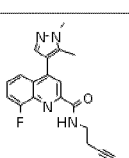
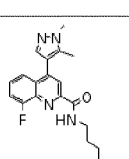
P-57	4-(1,5-dimethylpyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.57	391.53	B
P-58	N-[2-(3,5-difluoro-2-pyridyl)ethyl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.41	408.51	B
P-59	N-(5,5-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.47	373.51	B
P-60	N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.67	349.54	B
P-61	4-(1,5-dimethylpyrazol-4-yl)-N-(4-fluorobutyl)quinoline-2-carboxamide		1.35	341.51	B
P-62	N-(5,5-difluorohexyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.56	387.55	B
P-63	4-(1,5-dimethylpyrazol-4-yl)-N-[3-(1-methylcyclopropyl)propyl]quinoline-2-carboxamide		1.78	363.55	B
P-64	N-(4,4-dimethylpentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.86	365.56	B
P-65	N-(3-cyclohexylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.04	391.6	B

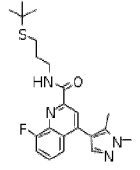
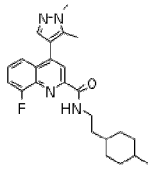
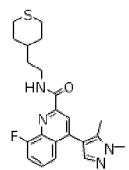
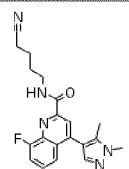
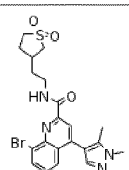
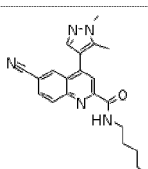
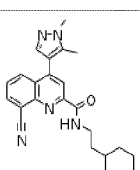
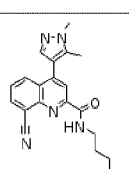
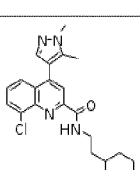
P-66	4-(1,5-dimethylpyrazol-4-yl)-N-(6-methylheptyl)quinoline-2-carboxamide		2.01	379.58	B
P-67	4-(1,5-dimethylpyrazol-4-yl)-N-(2-tetrahydrofuran-3-ylethyl)quinoline-2-carboxamide		1.26	365.53	B
P-68	N-(4-cyclopropylbutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.79	363.56	B
P-69	N-(3-cyclobutylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.84	363.55	B
P-70	4-(1,5-dimethylpyrazol-4-yl)-N-(4-methoxybutyl)quinoline-2-carboxamide		1.33	353.54	B
P-71	4-(1,5-dimethylpyrazol-4-yl)-N-hex-3-ynylquinoline-2-carboxamide		1.55	347.52	B
P-72	4-(1,5-dimethylpyrazol-4-yl)-N-(5-methylhexyl)quinoline-2-carboxamide		1.9	365.57	B
P-73	N-(3-tert-butylsulfanylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.73	397.55	B
P-74	4-(1,5-dimethylpyrazol-4-yl)-N-(2-tetrahydrothiopyran-4-ylethyl)quinoline-2-carboxamide		1.62	395.54	B

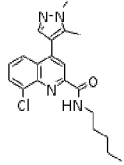
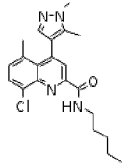
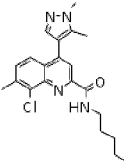
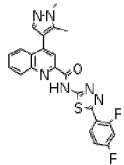
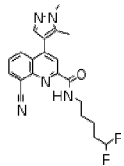
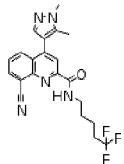
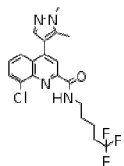
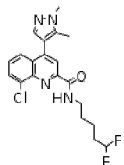
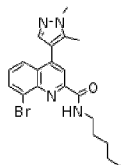
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P-76	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(3-methylsulfanypropyl)quinoline-2-carboxamide		1.43	373.48	B
P-77	N-(2-cycloheptylethyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		2.02	409.58	B
P-78	N-butyl-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.55	341.51	B
P-79	N-[2-(2,4-difluorophenyl)ethyl]-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.65	425.51	B
P-80	N-[(2,4-difluorophenyl)methyl]-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.6	411.49	B
P-81	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(4,4,4-trifluorobutyl)quinoline-2-carboxamide		1.5	395.5	B
P-82	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-heptyl-quinoline-2-carboxamide		1.92	383.55	B
P-83	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-hexyl-quinoline-2-carboxamide		1.8	369.54	B

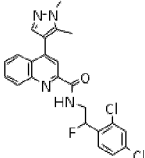
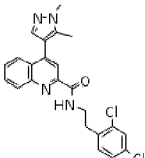
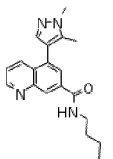
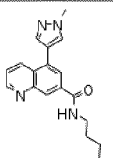
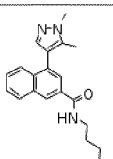
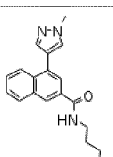
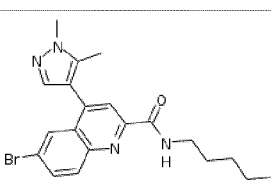
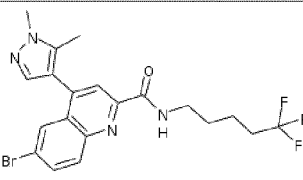
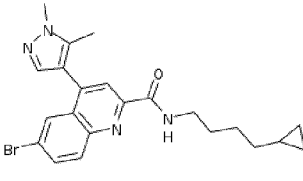
P-84	N-(3-cyclopentylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.94	395.57	B
P-85	N-(2-cyclohexylethyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.93	395.57	B
P-86	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(4-fluoro-4-methyl-pentyl)quinoline-2-carboxamide		1.54	387.55	B
P-87	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-hex-4-ynyl-quinoline-2-carboxamide		1.5	365.52	B
P-88	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(4-methylpent-4-enyl)quinoline-2-carboxamide		1.68	367.53	B
P-89	N-(4,4-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.48	391.52	B
P-90	N-(3,3-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.54	391.52	B
P-91	N-(4,4-difluorobutyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.39	377.49	B
P-92	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-isohexyl-quinoline-2-carboxamide		1.78	369.54	B

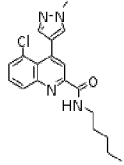
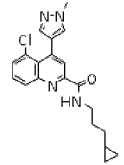
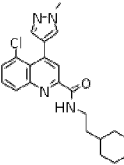
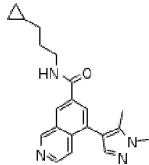
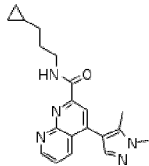
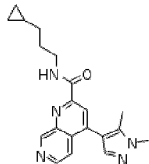
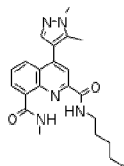
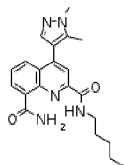
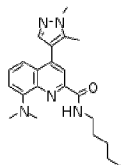
P-93	N-(5,5-dimethylhexyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.98	397.58	B
P-94	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(5-fluoropentyl)quinoline-2-carboxamide		1.10	373.3	C
P-95	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.58	409.51	B
P-96	N-[2-(3,5-difluoro-2-pyridyl)ethyl]-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.42	426.49	B
P-97	N-(5,5-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.48	391.53	B
P-98	N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.68	367.53	B
P-99	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(4-fluorobutyl)quinoline-2-carboxamide		1.36	359.51	B
P-100	N-(5,5-difluorohexyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.57	405.54	B
P-101	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-[3-(1-methylcyclopropyl)propyl]quinoline-2-carboxamide		1.78	381.56	B

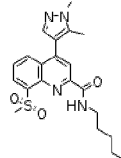
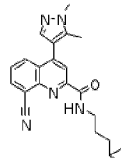
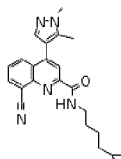
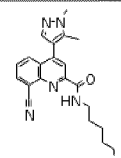
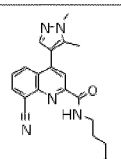
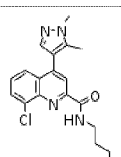
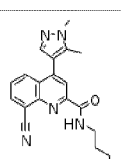
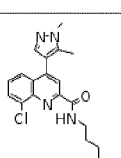
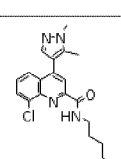
P-102	N-(4,4-dimethylpentyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.86	383.57	B
P-103	N-(3-cyclohexylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		2.04	409.6	B
P-104	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(6-methylheptyl)quinoline-2-carboxamide		2.01	397.61	B
P-105	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(2-tetrahydrofuran-3-ylethyl)quinoline-2-carboxamide		1.28	383.54	B
P-106	N-(4-cyclopropylbutyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.79	381.56	B
P-107	N-(3-cyclobutylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.84	381.56	B
P-108	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(4-methoxybutyl)quinoline-2-carboxamide		1.34	371.54	B
P-109	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-hex-3-ynyl-quinoline-2-carboxamide		1.57	365.53	B
P-110	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(5-methylhexyl)quinoline-2-carboxamide		1.9	383.57	B

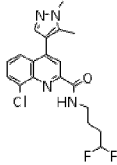
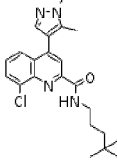
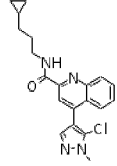
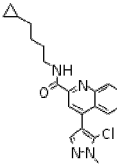
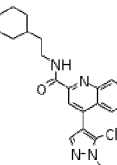
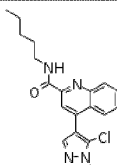
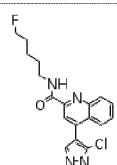
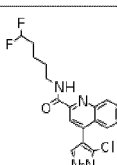
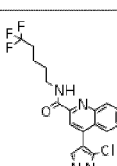
P-111	N-(3-tert-butylsulfanylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.73	415.56	B
P-112	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-[2-(4-methylcyclohexyl)ethyl]quinoline-2-carboxamide		2.04	409.61	B
P-113	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-(2-tetrahydrothiopyran-4-ylethyl)quinoline-2-carboxamide		1.63	413.55	B
P-114	N-(4-cyanobutyl)-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-quinoline-2-carboxamide		1.23	366.53	B
P-115	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-[2-(1,1-dioxothiolan-3-yl)ethyl]quinoline-2-carboxamide				
P-116	6-cyano-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide				
P-117	8-cyano-N-(2-cyclohexylethyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.8	402	E
P-118	8-cyano-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.14	362.3	C
P-119	8-chloro-N-(2-cyclohexylethyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.13	411	E

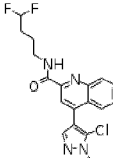
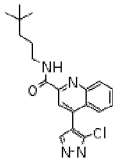
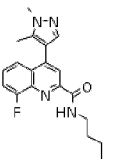
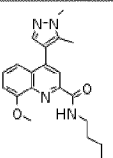
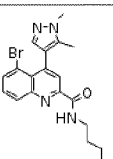
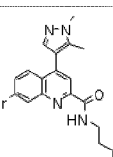
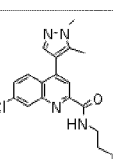
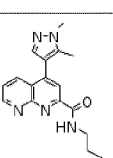
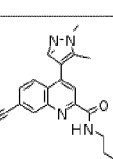
P-120	8-chloro-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.88	371	E
P-121	8-chloro-4-(1,5-dimethylpyrazol-4-yl)-5-methyl-N-pentyl-quinoline-2-carboxamide		1.89	385	E
P-122	8-chloro-4-(1,5-dimethylpyrazol-4-yl)-7-methyl-N-pentyl-quinoline-2-carboxamide		1.94	385	E
P-123	N-[5-(2,4-difluorophenyl)-1,3,4-thiadiazol-2-yl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.28	463.1	C
P-124	8-cyano-N-(5,5-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.39	398	E
P-125	8-cyano-4-(1,5-dimethylpyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.49	416	E
P-126	8-chloro-4-(1,5-dimethylpyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.75	425	E
P-127	8-chloro-N-(5,5-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.65	425	E
P-128	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.29	415	C

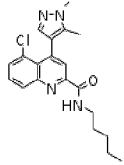
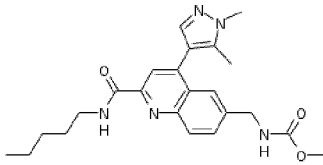
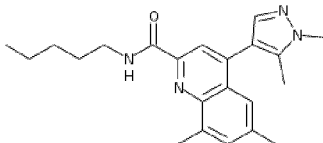
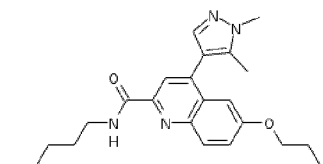
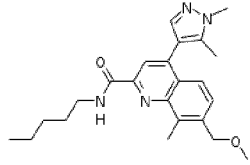
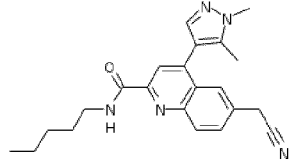
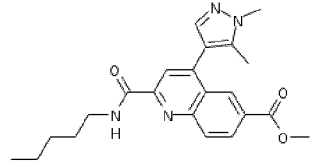
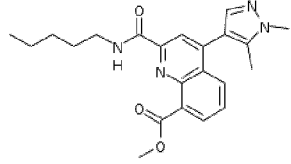
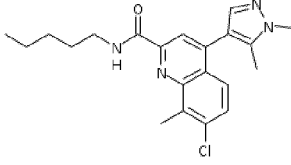
P-129	N-[2-(2,4-dichlorophenyl)-2-fluoro-ethyl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.27	457.1	C
P-130	N-[2-(2,4-dichlorophenyl)ethyl]-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.28	439.1	C
P-131	5-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-7-carboxamide		1.02	337.3	C
P-132	5-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-7-carboxamide		1.13	323.2	C
P-133	4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-naphthalene-2-carboxamide		1.12	336.3	C
P-134	4-(1-methylpyrazol-4-yl)-N-pentyl-naphthalene-2-carboxamide		1.13	322.2	C
P-135	6-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.20	415-417	A
P-136	6-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.16	469-471	A
P-137	6-bromo-N-(4-cyclopropylbutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.27	441-443	A

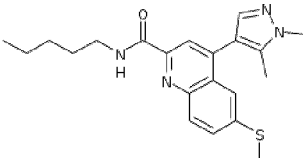
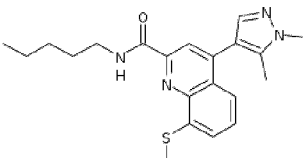
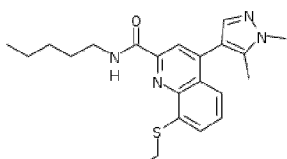
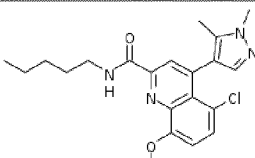
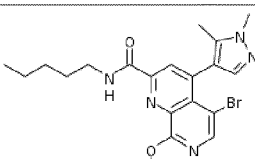
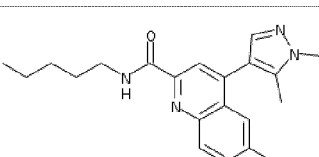
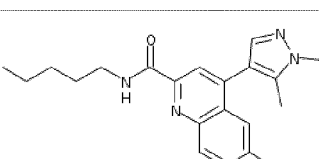
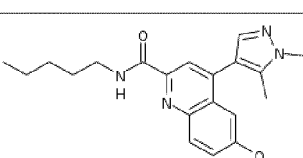
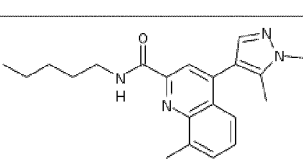
P-138	5-chloro-4-(1-methylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.21	357.2	C
P-139	5-chloro-N-(3-cyclopropylpropyl)-4-(1-methylpyrazol-4-yl)quinoline-2-carboxamide		1.18	369.2	C
P-140	5-chloro-N-(2-cyclohexylethyl)-4-(1-methylpyrazol-4-yl)quinoline-2-carboxamide		1.28	397.3	C
P-141	N-(3-cyclopropylpropyl)-5-(1,5-dimethylpyrazol-4-yl)isoquinoline-7-carboxamide		1.01	349.3	C
P-142	N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-1,8-naphthyridine-2-carboxamide		1.23	350	E
P-143	N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)-1,7-naphthyridine-2-carboxamide		1.12	350.3	C
P-144	4-(1,5-dimethylpyrazol-4-yl)-N8-methyl-N2-pentyl-quinoline-2,8-dicarboxamide		1.31	394	E
P-145	4-(1,5-dimethylpyrazol-4-yl)-N2-pentyl-quinoline-2,8-dicarboxamide		1.2	380	E
P-146	8-(dimethylamino)-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		0.81	380	E

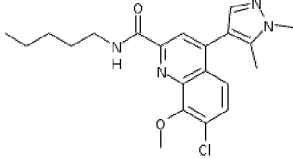
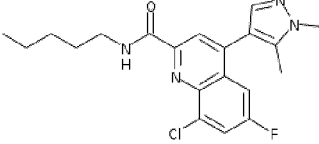
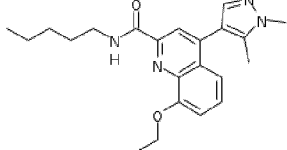
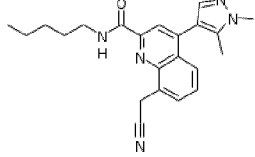
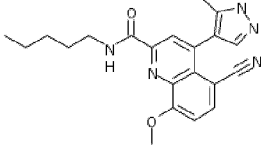
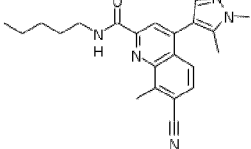
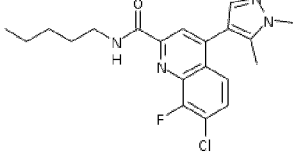
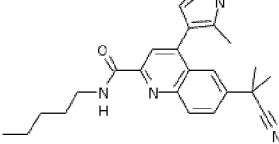
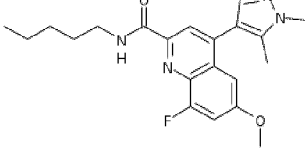
P-147	4-(1,5-dimethylpyrazol-4-yl)-8-methylsulfonyl-N-pentyl-quinoline-2-carboxamide		0.95	415	E
P-148	8-cyano-N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.56	374	E
P-149	8-cyano-N-(4-cyclopropylbutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.67	388	E
P-150	8-cyano-4-(1,5-dimethylpyrazol-4-yl)-N-(5-fluoropentyl)quinoline-2-carboxamide		1.37	380	E
P-151	8-cyano-N-(4,4-difluorobutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.31	384	E
P-152	8-chloro-N-(3-cyclopropylpropyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.87	383	E
P-153	8-cyano-N-(4,4-dimethylpentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.74	390	E
P-154	8-chloro-N-(4-cyclopropylbutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.99	397	E
P-155	8-chloro-4-(1,5-dimethylpyrazol-4-yl)-N-(5-fluoropentyl)quinoline-2-carboxamide		1.64	389	E

P-156	8-chloro-N-(4,4-difluorobutyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		1.56	393	E
P-157	8-chloro-N-(4,4-dimethylpentyl)-4-(1,5-dimethylpyrazol-4-yl)quinoline-2-carboxamide		2.06	399	E
P-158	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(3-cyclopropylpropyl)quinoline-2-carboxamide		1.77	369	E
P-159	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(4-cyclopropylbutyl)quinoline-2-carboxamide		1.88	383	E
P-160	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(2-cyclohexylethyl)quinoline-2-carboxamide		2.02	397	E
P-161	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.77	357	E
P-162	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(5-fluoropentyl)quinoline-2-carboxamide		1.56	375	E
P-163	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(5,5-difluoropentyl)quinoline-2-carboxamide		1.57	393	E
P-164	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.67	411	E

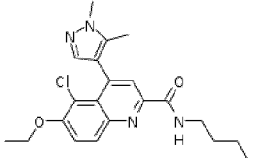
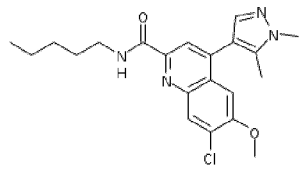
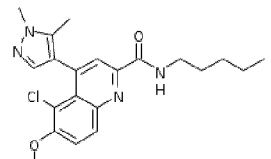
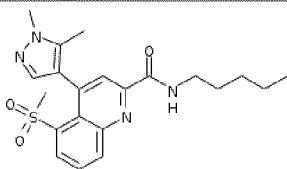
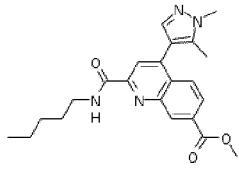
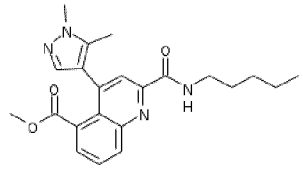
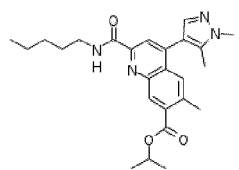
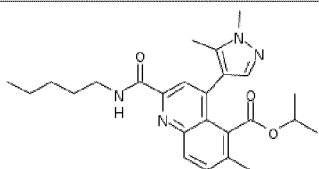
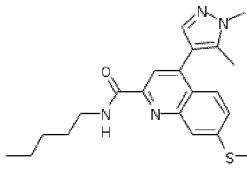
P-165	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(4,4-difluorobutyl)quinoline-2-carboxamide		1.48	379	E
P-166	4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(4,4-dimethylpentyl)quinoline-2-carboxamide		1.96	385	E
P-167	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-pentyl-quinoline-2-carboxamide		1.67	355	E
P-168	4-(1,5-dimethylpyrazol-4-yl)-8-methoxy-N-pentyl-quinoline-2-carboxamide		1.02	367	A
P-169	5-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.22	415-417	A
P-170	7-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.15	415-417	A
P-171	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.17	371	A
P-172	4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-1,8-naphthyridine-2-carboxamide		0.85	338	A
P-173	7-cyano-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.05	362	A

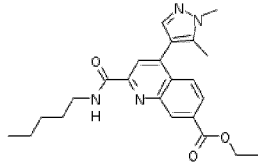
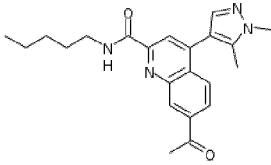
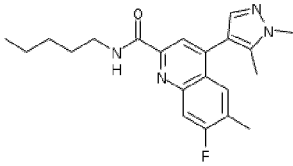
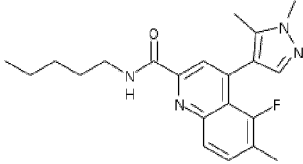
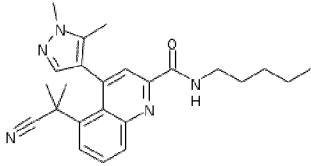
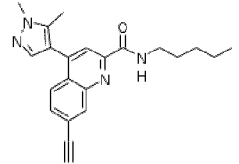
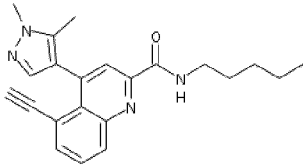
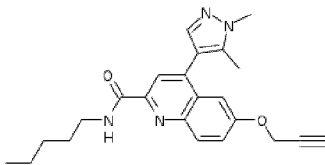
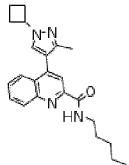
P-174	5-chloro-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.10	371	A
P-175	methyl N-[[4-(1,5-dimethylpyrazol-4-yl)-2-(pentylcarbamoyl)-6-quinolyl]methyl]carbamate		1.47	424	E
P-176	4-(1,5-dimethylpyrazol-4-yl)-6,8-dimethyl-N-pentyl-quinoline-2-carboxamide		1.93	365	E
P-177	4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-6-propoxy-quinoline-2-carboxamide		1.93	395	E
P-178	4-(1,5-dimethylpyrazol-4-yl)-7-(methoxymethyl)-8-methyl-N-pentyl-quinoline-2-carboxamide		1.78	395	E
P-179	6-(cyanomethyl)-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.53	376	E
P-180	methyl 4-(1,5-dimethylpyrazol-4-yl)-2-(pentylcarbamoyl)quinoline-6-carboxylate		1.7	395	E
P-181	methyl 4-(1,5-dimethylpyrazol-4-yl)-2-(pentylcarbamoyl)quinoline-8-carboxylate		1.59	395	E
P-182	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-8-methyl-N-pentyl-quinoline-2-carboxamide		2	385	E

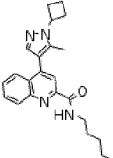
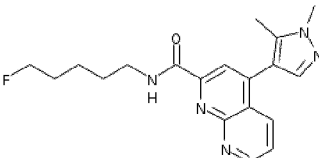
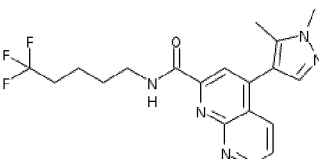
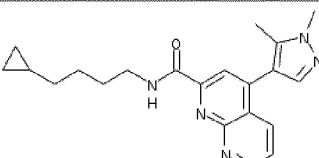
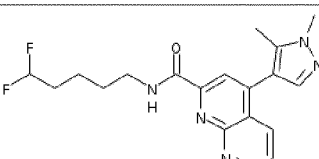
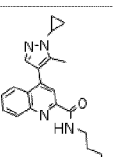
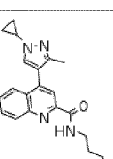
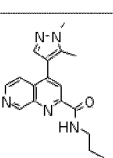
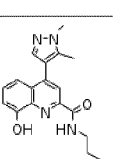
P-183	4-(1,5-dimethylpyrazol-4-yl)-6-methylsulfanyl-N-pentyl-quinoline-2-carboxamide		1.79	383	E
P-184	4-(1,5-dimethylpyrazol-4-yl)-8-methylsulfanyl-N-pentyl-quinoline-2-carboxamide		1.78	383	E
P-185	4-(1,5-dimethylpyrazol-4-yl)-8-ethylsulfanyl-N-pentyl-quinoline-2-carboxamide		1.88	397	E
P-186	5-chloro-4-(1,5-dimethylpyrazol-4-yl)-8-methoxy-N-pentyl-quinoline-2-carboxamide		1.57	401	E
P-187	5-bromo-4-(1,5-dimethylpyrazol-4-yl)-8-methoxy-N-pentyl-1,7-naphthyridine-2-carboxamide		1.63	446	E
P-188	6-chloro-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.82	371	E
P-189	4-(1,5-dimethylpyrazol-4-yl)-6-fluoro-N-pentyl-quinoline-2-carboxamide		1.7	355	E
P-190	4-(1,5-dimethylpyrazol-4-yl)-6-methoxy-N-pentyl-quinoline-2-carboxamide		1.68	367	E
P-191	4-(1,5-dimethylpyrazol-4-yl)-8-ethyl-N-pentyl-quinoline-2-carboxamide		1.93	365	E

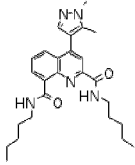
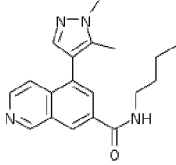
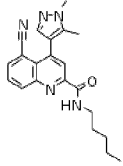
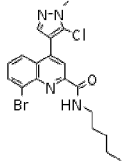
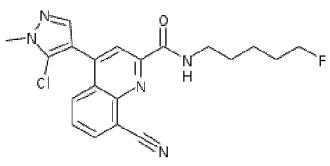
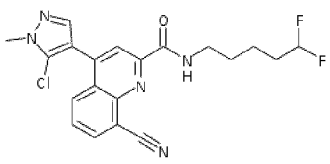
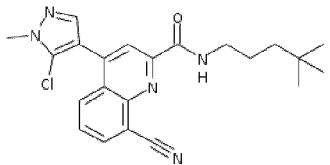
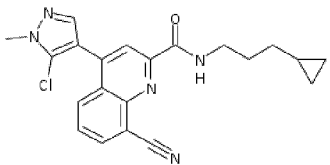
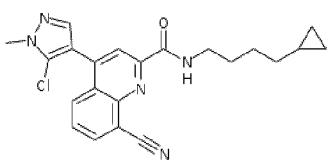
P-192	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-8-methoxy-N-pentyl-quinoline-2-carboxamide		1.8	401	E
P-193	8-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-fluoro-N-pentyl-quinoline-2-carboxamide		1.89	389	E
P-194	4-(1,5-dimethylpyrazol-4-yl)-8-ethoxy-N-pentyl-quinoline-2-carboxamide		1.64	381	E
P-195	8-(cyanomethyl)-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.54	376	E
P-196	5-cyano-4-(1,5-dimethylpyrazol-4-yl)-8-methoxy-N-pentyl-quinoline-2-carboxamide		1.39	392	E
P-197	7-cyano-4-(1,5-dimethylpyrazol-4-yl)-8-methyl-N-pentyl-quinoline-2-carboxamide		1.72	376	E
P-198	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-N-pentyl-quinoline-2-carboxamide		1.85	389	E
P-199	6-(1-cyano-1-methyl-ethyl)-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.7	404	E
P-200	4-(1,5-dimethylpyrazol-4-yl)-8-fluoro-6-methoxy-N-pentyl-quinoline-2-carboxamide		1.72	385	E

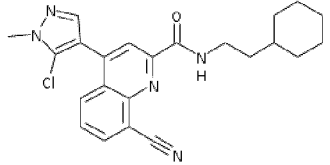
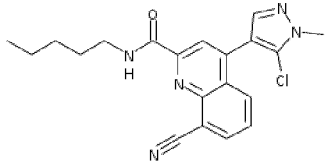
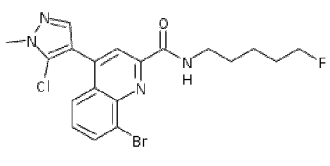
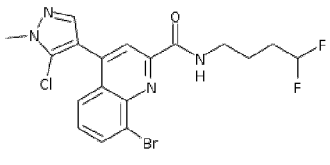
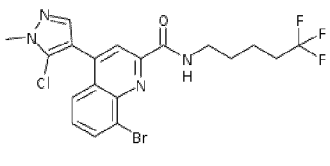
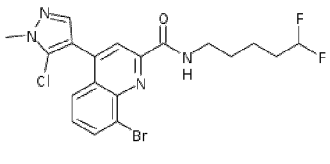
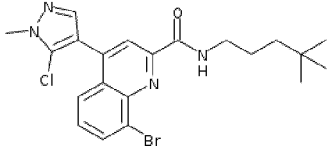
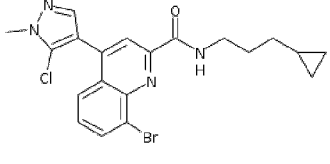
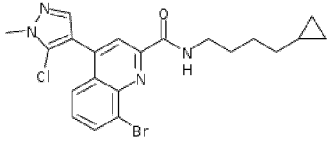
P-201	4-(1,5-dimethylpyrazol-4-yl)-N8,6-dimethyl-N2-pentyl-quinoline-2,8-dicarboxamide		1.39	408	E
P-202	6-chloro-4-(1,5-dimethylpyrazol-4-yl)-5-methoxy-N-pentyl-1,8-naphthyridine-2-carboxamide		1.46	402	E
P-203	4-(1,5-dimethylpyrazol-4-yl)-7-fluoro-N-pentyl-quinoline-2-carboxamide		1.64	355	E
P-204	4-(1,5-dimethylpyrazol-4-yl)-5-fluoro-N-pentyl-quinoline-2-carboxamide		1.72	355	E
P-205	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-methyl-N-pentyl-quinoline-2-carboxamide		1.97	385	E
P-206	5-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-methyl-N-pentyl-quinoline-2-carboxamide		1.81	385	E
P-207	6-chloro-4-(1,5-dimethylpyrazol-4-yl)-5-methyl-N-pentyl-quinoline-2-carboxamide		1.88	385	E
P-208	6-chloro-4-(1,5-dimethylpyrazol-4-yl)-7-methyl-N-pentyl-quinoline-2-carboxamide		1.94	385	E
P-209	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-ethoxy-N-pentyl-quinoline-2-carboxamide		1.97	415	E

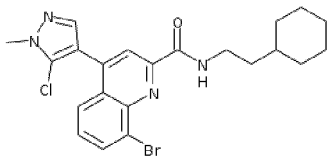
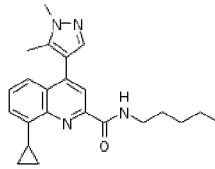
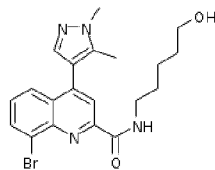
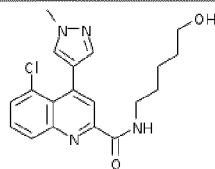
P-210	5-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-ethoxy-N-pentyl-quinoline-2-carboxamide		1.75	415	E
P-211	7-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-methoxy-N-pentyl-quinoline-2-carboxamide		1.84	401	E
P-212	5-chloro-4-(1,5-dimethylpyrazol-4-yl)-6-methoxy-N-pentyl-quinoline-2-carboxamide		1.63	401	E
P-213	4-(1,5-dimethylpyrazol-4-yl)-5-methylsulfonyl-N-pentyl-quinoline-2-carboxamide		1.38	415	E
P-214	methyl 4-(1,5-dimethylpyrazol-4-yl)-2-(pentylcarbamoyl)quinoline-7-carboxylate		1.69	395	E
P-215	methyl 4-(1,5-dimethylpyrazol-4-yl)-2-(pentylcarbamoyl)quinoline-5-carboxylate		1.56	395	E
P-216	isopropyl 4-(1,5-dimethylpyrazol-4-yl)-6-methyl-2-(pentylcarbamoyl)quinoline-7-carboxylate		1.97	437	E
P-217	isopropyl 4-(1,5-dimethylpyrazol-4-yl)-6-methyl-2-(pentylcarbamoyl)quinoline-5-carboxylate		1.83	437	E
P-218	4-(1,5-dimethylpyrazol-4-yl)-7-methylsulfonyl-N-pentyl-quinoline-2-carboxamide		1.79	383	E

P-219	ethyl 4-(1,5-dimethylpyrazol-4-yl)-2-(pentylcarbamoyl)quinoline-7-carboxylate		1.81	409	E
P-220	7-acetyl-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.5	379	E
P-221	4-(1,5-dimethylpyrazol-4-yl)-7-fluoro-6-methyl-N-pentyl-quinoline-2-carboxamide		1.74	369	E
P-222	4-(1,5-dimethylpyrazol-4-yl)-5-fluoro-6-methyl-N-pentyl-quinoline-2-carboxamide		1.83	369	E
P-223	5-(1-cyano-1-methyl-ethyl)-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.7	404	E
P-224	4-(1,5-dimethylpyrazol-4-yl)-7-ethynyl-N-pentyl-quinoline-2-carboxamide		1.74	361	E
P-225	4-(1,5-dimethylpyrazol-4-yl)-5-ethynyl-N-pentyl-quinoline-2-carboxamide		1.67	361	E
P-226	4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-6-prop-2-ynoxy-quinoline-2-carboxamide		1.69	391	E
P-227	4-(1-cyclobutyl-3-methyl-pyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.29	377.3	C

P-228	4-(1-cyclobutyl-5-methyl-pyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.31	377.3	C
P-229	4-(1,5-dimethylpyrazol-4-yl)-N-(5-fluoropentyl)-1,8-naphthyridine-2-carboxamide		1.06	356	E
P-230	4-(1,5-dimethylpyrazol-4-yl)-N-(5,5,5-trifluoropentyl)-1,8-naphthyridine-2-carboxamide		1.2	392	E
P-231	N-(4-cyclopropylbutyl)-4-(1,5-dimethylpyrazol-4-yl)-1,8-naphthyridine-2-carboxamide		1.36	364	E
P-232	N-(5,5-difluoropentyl)-4-(1,5-dimethylpyrazol-4-yl)-1,8-naphthyridine-2-carboxamide		1.09	374	E
P-233	4-(1-cyclopropyl-5-methyl-pyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		2.96	363.3	E
P-234	4-(1-cyclopropyl-3-methyl-pyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.24	363.3	C
P-235	4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-1,7-naphthyridine-2-carboxamide		1.08	338.2	C
P-236	4-(1,5-dimethylpyrazol-4-yl)-8-hydroxy-N-pentyl-quinoline-2-carboxamide		1.00	353	A

P-237	4-(1,5-dimethylpyrazol-4-yl)-N2,N8-dipentyl-quinoline-2,8-dicarboxamide		1.09	450	A
P-238	5-(1,5-dimethylpyrazol-4-yl)-N-pentyl-isoquinoline-7-carboxamide		1.27	337.3	C
P-239	5-cyano-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		0.98	362	A
P-240	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.30	435-437	A
P-241	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-(5-fluoropentyl)quinoline-2-carboxamide		1.54	400	E
P-242	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-(5,5-difluoropentyl)quinoline-2-carboxamide		1.55	418	E
P-243	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-(4,4-dimethylpentyl)quinoline-2-carboxamide		1.93	410	E
P-244	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-(3-cyclopropylpropyl)quinoline-2-carboxamide		1.74	394	E
P-245	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-(4-cyclopropylbutyl)quinoline-2-carboxamide		1.86	408	E

P-246	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-(2-cyclohexylethyl)quinoline-2-carboxamide		2	422	E
P-247	4-(5-chloro-1-methyl-pyrazol-4-yl)-8-cyano-N-pentylquinoline-2-carboxamide		1.74	382	E
P-248	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(5-fluoropentyl)quinoline-2-carboxamide		1.82	453	E
P-249	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(4,4-difluorobutyl)quinoline-2-carboxamide		1.73	457	E
P-250	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(5,5,5-trifluoropentyl)quinoline-2-carboxamide		1.92	489	E
P-251	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(5,5-difluoropentyl)quinoline-2-carboxamide		1.82	471	E
P-252	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(4,4-dimethylpentyl)quinoline-2-carboxamide		2.24	463	E
P-253	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(3-cyclopropylpropyl)quinoline-2-carboxamide		2.06	447	E
P-254	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(4-cyclopropylbutyl)quinoline-2-carboxamide		2.16	461	E

P-255	8-bromo-4-(5-chloro-1-methyl-pyrazol-4-yl)-N-(2-cyclohexylethyl)quinoline-2-carboxamide		2.31	475	E
P-256	8-cyclopropyl-4-(1,5-dimethylpyrazol-4-yl)-N-pentyl-quinoline-2-carboxamide		1.20	377	A
P-257	8-bromo-4-(1,5-dimethylpyrazol-4-yl)-N-(5-hydroxypentyl)quinoline-2-carboxamide		1.03	431.1	C
P-258	5-chloro-N-(5-hydroxypentyl)-4-(1-methylpyrazol-4-yl)quinoline-2-carboxamide		1.00	373.2	C

Biological Examples

Example B1: *Alternaria solani* / tomato / leaf disc (early blight)

- 5 Tomato leaf disks cv. Baby are placed on agar in multiwell plates (24-well format) and sprayed with the formulated test compound diluted in water. The leaf disks are inoculated with a spore suspension of the fungus 2 days after application. The inoculated leaf disks are incubated at 23°C / 21°C (day/night) and 80% rh under a light regime of 12/12 h (light/dark) in a climate cabinet and the activity of a compound is assessed as percent disease control compared to untreated when an appropriate level of disease damage appears on untreated
- 10 leaf disks (5 – 7 days after application).

The following compounds gave at least 80% control of *Alternaria solani* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

- P-2, P-9, P-11, P-14, P-16, P-18, P-21, P-22, P-23, P-24, P-25, P-26, P-29, P-30, P-38, P-41, P-44, P-46, P-47, P-48, P-49, P-50, P-51, P-52, P-53, P-54, P-56, P-57, P-59, P-60, P-62, P-63, P-64, P-67, P-68, P-69, P-70, P-71, P-74, P-75, P-77, P-81, P-83, P-85, P-86, P-89, P-91, P-92, P-93, P-94, P-95, P-97, P-98, P-99, P-100, P-102, P-105, P-106, P-107, P-110, P-113, P-116, P-117, P-118, P-120, P-122, P-124, P-125, P-127, P-128, P-131, P-133, P-141, P-142, P-144, P-145, P-146, P-148, P-149, P-150, P-151, P-152, P-155, P-156, P-158, P-159, P-161, P-162, P-163, P-164, P-165, P-166, P-167, P-168, P-170, P-172, P-178, P-181, P-184, P-185, P-189, P-194, P-197, P-198, P-203, P-204, P-218, P-229, P-230, P-231, P-232, P-235, P-236, P-237, P-240, P-241, P-242, P-244, P-245, P-247, P-248, P-250, and P-256
- 15
- 20

Example B2: *Botryotinia fuckeliana* (*Botrytis cinerea*) / liquid culture (Gray mould)

Conidia of the fungus from cryogenic storage are directly mixed into nutrient broth (Vogels 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 determined photometrically 3 – 4 days after application.

The following compounds gave at least 80% control of *Botryotinia fuckeliana* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-6, P-9, P-11, P-13, P-14, P-16, P-17, P-18, P-19, P-21, P-22, P-23, P-24, P-25, P-26, P-29, P-30, P-31, P-32, P-34, P-37, P-38, P-40, P-46, P-48, P-54, P-56, P-57, P-59, P-60, P-62, P-64, P-65, P-68, P-69, P-72, P-78, P-83, P-85, P-91, P-92, P-94, P-95, P-97, P-98, P-100, P-102, P-106, P-107, P-110, P-113, P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-146, P-148, P-149, P-150, P-151, P-152, P-155, P-156, P-158, P-161, P-162, P-164, P-166, P-167, P-168, P-176, P-178, P-181, P-184, P-185, P-191, P-193, P-194, P-195, P-197, P-214, P-219, P-223, P-236, P-237, P-240, P-241, P-242, P-244, P-245, P-246, P-247, P-248, P-249, P-250, P-251, P-253, P-254, and P-256

Example B3: *Glomerella lagenarium* (*Colletotrichum lagenarium*) / liquid culture (Anthracnose)

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 – 4 days after application.

The following compounds gave at least 80% control of *Glomerella lagenarium* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-3, P-6, P-9, P-10, P-11, P-12, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-20, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-30, P-31, P-32, P-33, P-34, P-37, P-40, P-41, P-43, P-44, P-45, P-46, P-47, P-48, P-49, P-50, P-51, P-52, P-53, P-54, P-55, P-56, P-57, P-59, P-60, P-61, P-62, P-63, P-64, P-68, P-69, P-70, P-71, P-72, P-73, P-74, P-77, P-78, P-81, P-82, P-83, P-84, P-85, P-86, P-87, P-88, P-89, P-90, P-91, P-92, P-93, P-94, P-95, P-97, P-98, P-99, P-100, P-101, P-102, P-106, P-107, P-108, P-109, P-110, P-113, P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-128, P-148, P-149, P-150, P-152, P-158, P-159, P-161, P-162, P-163, P-164, P-167, P-168, P-171, P-173, P-176, P-178, P-181, P-182, P-184, P-185, P-189, P-191, P-193, P-194, P-195, P-197, P-198, P-203, P-204, P-214, P-218, P-219, P-223, P-224, P-231, P-236, P-237, P-240, P-241, P-242, P-244, P-245, P-246, P-247, P-248, P-250, P-251, P-253, and P-254

Example B4: *Blumeria graminis* f. sp. *tritici* (*Erysiphe graminis* f. sp. *tritici*) / wheat / leaf disc preventative (Powdery mildew on wheat)

Wheat leaf segments cv. Kanzler are placed on agar in a multiwell plate (24-well format) and sprayed with the formulated test compound diluted in water. The leaf disks are inoculated by shaking powdery mildew infected plants above the test plates 1 day after application. The inoculated leaf disks are incubated at 20°C and 60%

rh under a light regime of 24 h darkness followed by 12 h light / 12 h darkness in a climate chamber and the activity of a compound is assessed as percent disease control compared to untreated when an appropriate level of disease damage appears on untreated check leaf segments (6 – 8 days after application).

The following compounds gave at least 80% control of *Blumeria graminis* f. sp. *tritici* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-6, P-9, P-18, P-21, P-22, P-23, P-24, P-25, P-26, P-29, P-32, P-38, P-44, P-56, P-57, P-59, P-78, P-81, P-91, P-92, P-94, P-95, P-97, P-98, P-99, P-100, P-118, P-120, P-124, P-125, P-127, P-128, P-142, P-144, P-146, P-148, P-149, P-150, P-151, P-152, P-155, P-156, P-158, P-161, P-162, P-163, P-164, P-165, P-167, P-173, P-178, P-181, P-230, P-232, P-240, P-241, P-242, P-244, P-245, P-247, P-248, P-249, P-250, and P-251

Example B5: *Fusarium culmorum* / liquid culture (Head blight)

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 determined photometrically 3 – 4 days after application.

The following compounds gave at least 80% control of *Fusarium culmorum* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-3, P-4, P-6, P-9, P-11, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-29, P-30, P-31, P-32, P-37, P-38, P-41, P-46, P-48, P-49, P-50, P-52, P-54, P-56, P-57, P-59, P-60, P-63, P-64, P-68, P-69, P-74, P-78, P-81, P-83, P-85, P-86, P-88, P-89, P-90, P-91, P-92, P-94, P-95, P-97, P-98, P-99, P-100, P-101, P-102, P-106, P-107, P-113, P-116, P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-146, P-148, P-149, P-150, P-151, P-152, P-155, P-156, P-158, P-161, P-162, P-163, P-164, P-165, P-167, P-168, P-170, P-171, P-173, P-174, P-176, P-178, P-181, P-182, P-184, P-185, P-189, P-191, P-193, P-194, P-195, P-197, P-198, P-200, P-203, P-204, P-214, P-218, P-219, P-221, P-223, P-224, P-235, P-236, P-237, P-240, P-241, P-242, P-244, P-245, P-247, P-248, P-249, P-250, P-251, P-253, and P-256

Example B6: *Fusarium culmorum* / wheat / spikelet preventative (Head blight)

Wheat spikelets cv. Monsun are placed on agar in multiwell plates (24-well format) and sprayed with the formulated test compound diluted in water. The spikelets are inoculated with a spore suspension of the fungus 1 day after application. The inoculated spikelets are incubated at 20°C and 60% rh under a light regime of 72 h semi darkness followed by 12 h light / 12 h darkness in a climate chamber and the activity of a compound is assessed as percent disease control compared to untreated when an appropriate level of disease damage appears on untreated check spikelets (6 – 8 days after application).

The following compounds gave at least 80% control of *Fusarium culmorum* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-6, P-17, P-18, P-21, P-22, P-23, P-25, P-26, P-29, P-56, P-78, P-83, P-94, P-95, P-97, P-99, P-106, P-118, P-120, P-122, P-124, P-125, P-128, P-148, P-149, P-150, P-161, P-162, P-163, P-167, P-168, P-178, P-181, P-184, P-185, P-193, P-194, P-195, P-197, P-242, P-244, P-247, P-248, and P-251

Example B7: *Gibberella zeae* (*Fusarium graminearum*) / wheat / spikelet preventative (Head blight)

- 5 Wheat spikelets cv. Monsun are placed on agar in multiwell plates (24-well format) and sprayed with the formulated test compound diluted in water. One day after application, the spikelets are inoculated with a spore suspension of the fungus. The inoculated test leaf disks are incubated at 20°C and 60% rh under a light regime of 72 h semi darkness followed by 12 h light / 12 h darkness in a climate chamber, the activity of a compound is assessed as percent disease control compared to untreated when an appropriate level of disease damage appears on untreated check spikelets (6 – 8 days after application).

The following compounds gave at least 80% control of *Gibberella zeae* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-6, P-18, P-21, P-22, P-23, P-25, P-38, P-46, P-56, P-59, P-60, P-83, P-94, P-95, P-97, P-117, P-118, P-120, P-124, P-125, P-128, P-149, P-150, P-161, P-162, P-167, P-168, P-178, P-181, P-193, and P-194

- 15 **Example B8: *Phaeosphaeria nodorum* (*Septoria nodorum*) / wheat / leaf disc preventative (Glume blotch)**

- Wheat leaf segments cv. Kanzler are placed on agar in a multiwell plate (24-well format) and sprayed with the formulated test compound diluted in water. The leaf disks are inoculated with a spore suspension of the fungus 2 days after application. The inoculated test leaf disks are incubated at 20°C and 75% rh under a light regime of 12 h light / 12 h darkness in a climate cabinet and 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 (5 – 7 days after application).

The following compounds gave at least 80% control of *Phaeosphaeria nodorum* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

- 25 P-2, P-6, P-9, P-12, P-13, P-14, P-16, P-17, P-18, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-29, P-30, P-31, P-32, P-34, P-38, P-40, P-41, P-42, P-43, P-44, P-46, P-47, P-48, P-49, P-50, P-51, P-52, P-53, P-54, P-55, P-56, P-57, P-59, P-60, P-61, P-62, P-63, P-64, P-67, P-68, P-69, P-71, P-75, P-77, P-78, P-79, P-80, P-81, P-82, P-83, P-85, P-86, P-89, P-90, P-91, P-92, P-93, P-94, P-95, P-97, P-98, P-99, P-100, P-101, P-102, P-103, P-105, P-106, P-107, P-109, P-110, P-114, P-116, P-117, P-118, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-133, P-135, P-142, P-144, P-145, P-148, P-149, P-150, P-151, P-152, P-153, P-155, P-156, P-158, P-159, P-160, P-161, P-162, P-163, P-164, P-165, P-167, P-168, P-170, P-171, P-172, P-173, P-174, P-176, P-178, P-181, P-184, P-185, P-187, P-189, P-193, P-194, P-195, P-197, P-198, P-203, P-204, P-218, P-219, P-223, P-229, P-230, P-231, P-232, P-235, P-236, P-237, P-240, P-241, P-242, P-244, P-245, P-247, P-248, P-249, P-250, P-251, P-253, P-254, and P-256

Example B9: *Monographella nivalis* (*Microdochium nivale*) / liquid culture (foot rot cereals)

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 determined photometrically 4 – 5 days after application.

- 5 The following compounds gave at least 80% control of *Monographella nivalis* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-3, P-6, P-9, P-11, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-30, P-31, P-34, P-37, P-40, P-45, P-46, P-47, P-48, P-49, P-50, P-51, P-52, P-54, P-55, P-56, P-57, P-59, P-60, P-62, P-63, P-64, P-65, P-68, P-69, P-71, P-72, P-74, P-77, P-83, P-84, P-85, P-86, P-88, P-89, P-90, 10 P-92, P-93, P-94, P-95, P-97, P-98, P-100, P-101, P-102, P-106, P-107, P-110, P-112, P-113, P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-133, P-142, P-146, P-148, P-149, P-150, P-152, P-155, P-156, P-158, P-159, P-160, P-161, P-162, P-163, P-164, P-165, P-166, P-167, P-168, P-170, P-172, P-173, P-176, P-178, P-181, P-182, P-184, P-185, P-186, P-189, P-191, P-193, P-194, P-195, P-197, P-198, P-203, P-204, P-214, P-218, P-219, P-223, P-224, P-231, P-235, P-236, P-240, P-241, P-242, P-244, P-245, 15 P-246, P-247, P-248, P-250, P-253, P-254, and P-256

Example B10: *Mycosphaerella arachidis* (*Cercospora arachidicola*) / liquid culture (early leaf spot)

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 20 determined photometrically 4 – 5 days after application.

The following compounds gave at least 80% control of *Mycosphaerella arachidis* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-1, P-2, P-4, P-6, P-7, P-9, P-11, P-12, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-28, P-29, P-30, P-31, P-32, P-34, P-37, P-38, P-39, P-40, P-41, P-44, P-45, P-46, P-47, 25 P-48, P-49, P-50, P-51, P-52, P-53, P-54, P-55, P-56, P-57, P-59, P-60, P-61, P-62, P-63, P-64, P-68, P-69, P-71, P-72, P-74, P-77, P-78, P-81, P-83, P-84, P-85, P-86, P-88, P-89, P-90, P-91, P-92, P-93, P-94, P-95, P-97, P-98, P-99, P-100, P-101, P-102, P-104, P-106, P-107, P-109, P-110, P-113, P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-131, P-133, P-142, P-144, P-145, P-146, P-148, P-149, P-150, P-151, P-152, P-155, P-156, P-157, P-158, P-159, P-160, P-161, P-162, P-163, P-164, P-165, P-166, 30 P-167, P-168, P-170, P-171, P-172, P-173, P-176, P-178, P-181, P-182, P-184, P-185, P-189, P-191, P-192, P-193, P-194, P-195, P-197, P-198, P-203, P-204, P-214, P-218, P-219, P-223, P-224, P-230, P-231, P-235, P-236, P-237, P-238, P-240, P-241, P-242, P-244, P-245, P-246, P-247, P-248, P-249, P-250, P-251, P-253, P-254, and P-256

Example B11: *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 inoculated with a spore suspension of the fungus. Plates are stored in darkness at 19°C and 75% rh. The formulated test compound diluted in water is applied 1 day after inoculation. The leaf segments are incubated at 19°C and 75% rh under a light regime of 12 h light / 12 h darkness in a climate cabinet and 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 segments (6 – 8 days after application).

The following compounds gave at least 80% control of *Puccinia recondita f. sp. tritici* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-15, P-44, P-52, P-53, P-56, P-60, P-89, P-94, P-95, P-98, P-99, P-118, P-142, P-148, P-151, P-167, P-172, P-173, P-206, P-242, P-247, and P-254

Example B12: *Puccinia recondita f. sp. tritici* / wheat / leaf disc preventative (Brown rust)

Wheat leaf segments cv. Kanzler are placed on agar in multiwell plates (24-well format) and sprayed with the formulated test compound diluted in water. The leaf disks are inoculated with a spore suspension of the fungus 1 day after application. The inoculated leaf segments are incubated at 19°C and 75% rh under a light regime of 12 h light / 12 h darkness in a climate cabinet and 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 segments (7 – 9 days after application).

The following compounds gave at least 80% control of *Puccinia recondita f. sp. tritici* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-21, P-23, P-24, P-38, P-46, P-52, P-55, P-56, P-61, P-68, P-89, P-94, P-95, P-97, P-98, P-107, P-118, P-120, P-124, P-127, P-128, P-142, P-148, P-149, P-150, P-155, P-161, P-164, P-165, P-167, P-168, P-172, P-173, P-181, P-194, and P-206

Example B13: *Magnaporthe grisea (Pyricularia oryzae)* / liquid culture (Rice Blast)

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 determined photometrically 3 – 4 days after application.

The following compounds gave at least 80% control of *Magnaporthe grisea* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-146, P-148, P-149, P-150, P-151, P-152, P-155, P-156, P-158, P-161, P-162, P-163, P-164, P-165, P-167, P-171, P-173, P-174, P-175, P-176, P-178, P-179, P-181, P-182, P-183, P-184, P-185, P-189, P-191, P-192, P-193, P-194, P-195, P-197, P-198, P-200, P-203, P-204, P-205, P-214, P-216, P-218, P-219, P-221, P-222, P-223, P-224, P-226, P-235, P-236, P-237, P-239, P-240, P-241, P-242, P-244, P-245, P-246, P-247, P-248, P-249, P-250, P-251, P-253, P-254, P-255, P-256

Example B14: *Magnaporthe grisea* (*Pyricularia oryzae*) / rice / leaf disc preventative (Rice Blast)

Rice leaf segments cv. Ballila are placed on agar in a multiwell plate (24-well format) and sprayed with the formulated test compound diluted in water. The leaf segments are inoculated with a spore suspension of the fungus 2 days after application. The inoculated leaf segments are incubated at 22°C and 80% rh under a light regime of 24 h darkness followed by 12 h light / 12 h darkness in a climate cabinet and 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 segments (5 – 7 days after application).

The following compounds gave at least 80% control of *Magnaporthe grisea* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-21, P-22, P-23, P-29, P-53, P-78, P-94

Example B15: *Pyrenophora teres* / barley / leaf disc preventative (Net blotch)

Barley leaf segments cv. Hasso are placed on agar in a multiwell plate (24-well format) and sprayed with the formulated test compound diluted in water. The leaf segments are inoculated with a spore suspension of the fungus 2 days after application. The inoculated leaf segments are incubated at 20°C and 65% rh under a light regime of 12 h light / 12 h darkness in a climate cabinet and the activity of a compound is assessed as disease control compared to untreated when an appropriate level of disease damage appears in untreated check leaf segments (5 – 7 days after application).

The following compounds gave at least 80% control of *Pyrenophora teres* at 200 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-3, P-6, P-9, P-10, P-11, P-12, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-29, P-30, P-31, P-32, P-33, P-35, P-38, P-40, P-41, P-42, P-43, P-44, P-46, P-47, P-48, P-49, P-50, P-51, P-52, P-53, P-54, P-55, P-56, P-57, P-59, P-60, P-61, P-62, P-63, P-64, P-67, P-68, P-69, P-71, P-75, P-77, P-78, P-79, P-81, P-83, P-85, P-86, P-87, P-88, P-89, P-90, P-91, P-92, P-93, P-94, P-95, P-96, P-97, P-98, P-99, P-100, P-101, P-102, P-103, P-105, P-106, P-107, P-108, P-109, P-110, P-112, P-114, P-116, P-117, P-118, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-129, P-131, P-133, P-142, P-144, P-145, P-146, P-147, P-148, P-149, P-150, P-151, P-152, P-153, P-155, P-156, P-158, P-159, P-160, P-161, P-162, P-163, P-164, P-165, P-166, P-167, P-168, P-169, P-170, P-171, P-172, P-173, P-174, P-176, P-178, P-179, P-181, P-184, P-185, P-186, P-187, P-189, P-191, P-193, P-194, P-195, P-196, P-197, P-198, P-203, P-204, P-214, P-218, P-219, P-220, P-221, P-223, P-224, P-229, P-230, P-231, P-232, P-235, P-237, P-239, P-240, P-241, P-242, P-244, P-245, P-247, P-248, P-249, P-250, P-251, P-253, P-254, and P-256

Example B16: *Thanatephorus cucumeris* (*Rhizoctonia solani*) / liquid culture (foot rot, damping-off)

Mycelia fragments of a newly grown liquid culture of the fungus are directly mixed into nutrient broth (PDB potato dextrose broth). After placing a (DMSO) solution of the test compounds into a microtiter plate (96-well format), the nutrient broth containing the fungal material is added. The test plates are incubated at 24°C and the inhibition of growth is determined photometrically 3 – 4 days after application.

The following compounds gave at least 80% control of *Thanatephorus cucumeris* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-21, P-22, P-23, P-24, P-26, P-46, P-47, P-48, P-54, P-55, P-56, P-57, P-59, P-60, P-62, P-64, P-68, P-69, P-71, P-72, P-74, P-94, P-95, P-97, P-98, P-100, P-106, P-109, P-118, P-120, P-122, P-124, P-125, P-127, P-128, P-148, P-149, P-150, P-152, P-155, P-161, P-162, P-164, P-168, P-178, P-181, P-184, P-185, P-194, P-214, P-219, P-236, P-240, P-241, P-242, P-244, P-245, P-247, and P-256

Example B17: *Sclerotinia sclerotiorum* / liquid culture (cottony rot)

Mycelia fragments of a newly grown liquid culture of the fungus 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 material is added. The test plates are incubated at 24°C and the inhibition of growth is determined photometrically 3 – 4 days after application.

The following compounds gave at least 80% control of *Sclerotinia sclerotiorum* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-18, P-21, P-22, P-23, P-25, P-94, P-118, P-120, P-122, P-124, P-125, P-127, P-128, P-129, P-148, P-149, P-150, P-155, P-156, P-168, P-181, P-184, P-194, P-241, P-242, P-244, and P-247

Example B18: *Mycosphaerella graminicola* (*Septoria tritici*) / liquid culture (Septoria blotch)

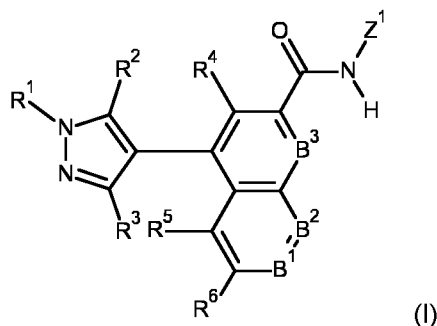
Conidia of the fungus from cryogenic storage are directly mixed into nutrient broth (PDB potato dextrose broth). After placing a (DMSO) solution of test compound into a microtiter plate (96-well format), the nutrient broth containing the fungal spores is added. The test plates are incubated at 24°C and the inhibition of growth is determined photometrically 4 – 5 days after application.

The following compounds gave at least 80% control of *Mycosphaerella graminicola* at 20 ppm when compared to untreated control under the same conditions, which showed extensive disease development:

P-2, P-3, P-4, P-5, P-6, P-9, P-10, P-11, P-12, P-13, P-14, P-15, P-16, P-17, P-18, P-19, P-21, P-22, P-23, P-24, P-25, P-26, P-27, P-28, P-29, P-30, P-31, P-32, P-34, P-36, P-37, P-38, P-39, P-40, P-41, P-42, P-43, P-44, P-45, P-46, P-47, P-48, P-49, P-50, P-51, P-52, P-53, P-54, P-55, P-56, P-57, P-58, P-59, P-60, P-61, P-62, P-63, P-64, P-65, P-67, P-68, P-69, P-70, P-71, P-72, P-73, P-74, P-76, P-77, P-78, P-80, P-81, P-82, P-83, P-84, P-85, P-86, P-88, P-89, P-90, P-91, P-92, P-93, P-94, P-95, P-97, P-98, P-99, P-100, P-101, P-102, P-103, P-105, P-106, P-107, P-108, P-109, P-110, P-111, P-112, P-113, P-116, P-117, P-118, P-119, P-120, P-121, P-122, P-124, P-125, P-127, P-128, P-131, P-133, P-134, P-141, P-142, P-144, P-145, P-146, P-148, P-149, P-150, P-151, P-152, P-153, P-155, P-156, P-157, P-158, P-159, P-160, P-161, P-162, P-163, P-164, P-165, P-166, P-167, P-168, P-169, P-170, P-171, P-172, P-173, P-174, P-176, P-178, P-179, P-181, P-182, P-184, P-185, P-186, P-189, P-190, P-191, P-192, P-193, P-194, P-195, P-197, P-198, P-200, P-203, P-204, P-214, P-216, P-218, P-219, P-221, P-223, P-224, P-225, P-226, P-229, P-230, P-231, P-232, P-233, P-234, P-235, P-236, P-237, P-238, P-240, P-241, P-242, P-244, P-245, P-246, P-247, P-248, P-249, P-250, P-251, P-252, P-253, P-254, P-255, and P-256

CLAIMS

1. A compound of formula (I):



wherein

- 5 B¹ is selected from CR⁷, or N;
 B² is selected from CR⁸, or N;
 B³ is selected from CR⁹, or N;
 R¹ is selected from hydrogen, C₁-C₄-alkyl, C₂-C₄-alkenyl, C₂-C₄-alkynyl, or C₃-C₆-cycloalkyl
 R² is selected from hydrogen, halogen, C₁-C₄-alkyl, C₂-C₄-alkenyl, C₂-C₄-alkynyl, C₁-C₄-haloalkyl, C₃-
 10 C₆cycloalkyl, C₁-C₄-alkylcarbonyl, N-C₁-C₄alkoxy-C-C₁-C₄-alkyl-carbonimidoyl, N-hydroxy-C-C₁-
 C₄alkyl-carbonimidoyl, or C₁-C₄-alkoxycarbonyl;
 R³ is selected from hydrogen, halogen, C₁-C₄-haloalkyl, or C₁-C₄-alkyl;
 R⁴ is selected from hydrogen, halogen, C₁-C₄-haloalkyl, C₃-C₆-cycloalkyl, or C₁-C₄-alkyl;
 R⁵, R⁶, R⁷, R⁸ and R⁹ are independently selected from hydrogen, halogen, hydroxy, amino, cyano, C₁-
 15 C₄ alkyl, C₁-C₄ haloalkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy, C₂-C₄alkenyloxy, C₂-C₄ alkynyloxy, C₁-C₄
 alkylsulfanyl, C₁-C₄ alkylsulfinyl, C₁-C₄ alkylsulfonyl, C₁-C₄ alkoxy-C₁-C₄ alkyl, C₁-C₄ alkoxycarbonyl, C₁-
 C₄ alkylcarbonyl, carbamoyl, C₁-C₄ alkylaminocarbonyl, di(C₁-C₄)alkylaminocarbonyl, cyano-C₁-
 C₄alkyl, N-C₁-C₄alkoxy-C-C₁-C₄alkyl-carbonimidoyl, N-hydroxy-C-C₁-C₄ alkyl-carbonimidoyl, C₁-C₄
 20 alkylamino, C₁-C₄ dialkylamino, trifluoromethylsulfonyloxy, carboxy, phenyl, a 5- to 6-membered
 saturated, partially saturated or aromatic heterocycle, or C₃-C₆-cycloalkyl; wherein any of said 4-, 5- or
 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms
 selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl,
 and 5- to 6-membered saturated, partially saturated or aromatic heterocycle are unsubstituted or
 substituted with 1, 2, or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano,
 25 C₁-C₄ alkyl and C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1,
 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄
 alkoxy; and

Z^1 is selected from C_1 - C_6 alkyl, wherein said C_1 - C_6 alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen C_1 - C_4 alkyl, C_2 - C_4 alkenyl, C_2 - C_4 alkynyl, C_1 - C_4 haloalkyl, C_1 - C_4 alkoxy, C_1 - C_4 haloalkoxy, C_2 - C_4 alkenyloxy, C_2 - C_4 alkynyloxy, C_1 - C_4 alkylsulfanyl, C_1 - C_4 alkylsulfinyl, C_1 - C_4 alkylsulfonyl, C_1 - C_4 alkoxy- C_1 - C_4 alkyl, C_1 - C_4 alkoxycarbonyl, C_1 - C_4 alkylcarbonyl, N- C_1 - C_4 alkoxy-C- C_1 - C_4 alkyl-carbonimidoyl, N-hydroxy-C- C_1 - C_4 alkyl-carbonimidoyl, hydroxy, trifluoromethylsulfonyloxy, cyano, carboxy, phenyl, a 5- to 6-membered saturated, partially saturated or aromatic heterocycle, or C_3 - C_6 -cycloalkyl; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and said 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C_1 - C_4 haloalkyl, cyano, C_1 - C_4 alkyl, or C_1 - C_4 alkoxy; and wherein said C_3 - C_6 -cycloalkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C_1 - C_4 haloalkyl, cyano, C_1 - C_4 alkyl, or C_1 - C_4 alkoxy;

or an agrochemically acceptable salt, stereoisomer or N-oxide thereof.

2. The compound of formula (I) according to claim 1, wherein R^1 is methyl and R^3 is hydrogen.
3. The compound of formula (I) according to claim 1 or claim 2, wherein R^2 is hydrogen, chlorine, or methyl.
4. The compound of formula (I) according to any of claims 1 to 3, wherein R^4 is hydrogen.
5. The compound of formula (I) according to any of claims 1 to 4, wherein B^1 is CR^7 , B^2 is CR^8 and B^3 is N.
6. The compound of formula (I) according to any of claims 1 to 5, wherein R^7 and R^8 are independently selected from hydrogen, halogen, cyano, hydroxy, C_1 - C_4 alkyl, C_1 - C_4 haloalkyl, C_1 - C_4 alkoxy, C_1 - C_4 haloalkoxy, or C_3 - C_6 -cycloalkyl, and wherein said C_3 - C_6 -cycloalkyl is unsubstituted or substituted with 1 substituent selected from halogen, cyano, or C_1 - C_4 alkyl.
7. The compound of formula (I) according to claim 6, wherein R^7 and R^8 are independently selected from hydrogen, chlorine, bromine, fluorine, methyl, ethyl, isopropyl, trifluoromethyl, difluoromethyl, difluoromethoxy, 2,2,2-trifluoroethoxy, 2,2-difluoroethoxy, methoxy, ethoxy, methoxymethoxy, 2-methoxyethoxy, methoxycarbonyl, hydroxy, cyano, cyclopropyl, cyanocyclopropyl, or methylcyclopropyl.
8. The compound of formula (I) according to any of claims 1 to 7, wherein R^5 is hydrogen, fluorine, chlorine, bromine, methyl, or cyano.

9. The compound of formula (I) according to any of claims 1 to 8, wherein R⁶ is hydrogen, chlorine, bromine, fluorine, methyl, cyano, or cyclopropyl.
10. The compound of formula (I) according to any of claims 1 to 9, wherein Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1, 2 or 3 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy carbonyl, C₁-C₄ alkyl carbonyl, phenyl, 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy.
11. The compound of formula (I) according to claim 10, wherein Z¹ is C₁-C₆ alkyl, wherein said C₁-C₆ alkyl is unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, C₁-C₄ alkyl, C₁-C₄ haloalkoxy, C₁-C₄ alkoxy carbonyl, C₁-C₄ alkyl carbonyl, phenyl, or 5- to 6-membered saturated, partially saturated or aromatic heterocycle; wherein any of said 4-, 5- or 6-membered saturated, partially saturated or aromatic heterocycle contains 1, 2 or 3 heteroatoms selected from O, S or N, with the proviso that no more than one is O or S; wherein any of said phenyl and 5- to 6-membered saturated, partially saturated or aromatic heterocycle, are unsubstituted or substituted with 1 or 2 substituents independently selected from halogen, C₁-C₄ haloalkyl, cyano, C₁-C₄ alkyl, or C₁-C₄ alkoxy; and wherein said C₃-C₆-cycloalkyl is unsubstituted or substituted with 1 substituent selected from halogen, C₁- cyano, or C₁-C₄ alkyl.
12. An agrochemical composition comprising a fungicidally effective amount of a compound of formula (I) as defined in any one of claims 1 to 11.
13. The agrochemical composition according to claim 12, further comprising at least one additional active ingredient and/or an agrochemically-acceptable diluent or carrier.
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) as defined in any one of claims 1 to 11, or a composition comprising the compound of formula (I), is applied to the plants, to parts thereof or the locus thereof.
15. Use of a compound according to any one of claims 1 to 11 as a fungicide.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2023/081142

A. CLASSIFICATION OF SUBJECT MATTER		
INV. C07D401/04 A01N43/56 C07D401/14 C07D405/14 C07D409/14 C07D487/04		
ADD. According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) C07D A01N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data, CHEM ABS Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2016/038173 A1 (SYNGENTA PARTICIPATIONS AG [CH]) 17 March 2016 (2016-03-17) claims; examples -----	1-15
A	WO 2005/002552 A2 (ASTEX TECHNOLOGY LTD [GB]; BERDINI VALERIO [GB] ET AL.) 13 January 2005 (2005-01-13) claims; examples -----	1-15
A	WO 98/57931 A2 (SEPRACOR INC [US]; KUMARAVEL GNANASAMBANDAM [US] ET AL.) 23 December 1998 (1998-12-23) claims; examples ----- --/--	1-15
☒ 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 11 January 2024		Date of mailing of the international search report 26/01/2024
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Bedel, Christian

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International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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