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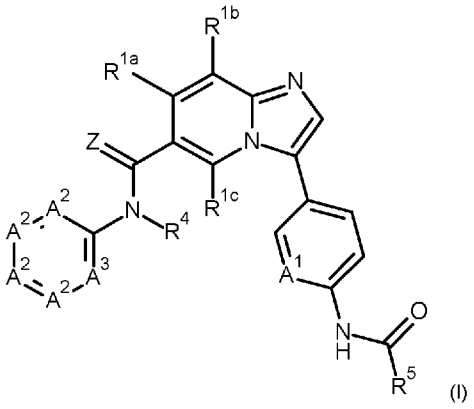
(54) Title: IMIDAZO[1,2-A]PYRIDINE DERIVATIVES



(I)

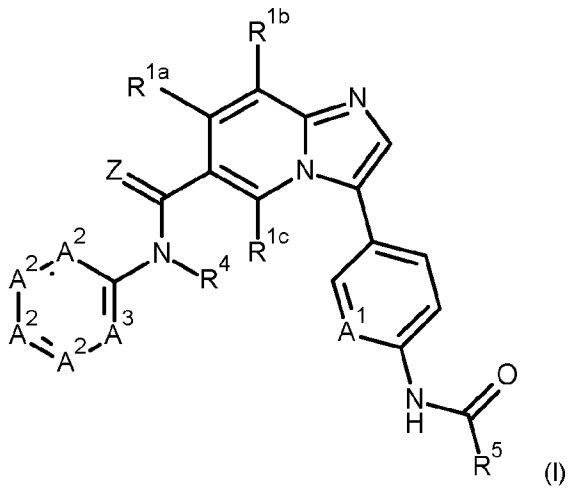
(57) Abstract: The current invention relates to compounds of the formula (I) wherein the substituents are as defined in claim 1, to processes and methods for preparing compounds of formula (I), to agrochemical compositions comprising compounds of formula (I) as defined in claim 1, to preparation of these compositions and to the use of the compounds or compositions in agriculture or horticulture for combating, preventing or controlling infestation of plants, harvested food crops, seeds or non-living materials by phytopathogenic microorganisms, in particular fungi.

Imidazo[1,2-a]pyridine derivatives

The present invention relates to microbiocidal imidazo[1,2-a]pyridine derivatives, e.g. as active ingredients, which have microbiocidal activity, in particular fungicidal activity, more particularly activity against oomycetes. The invention also relates to preparation of these imidazo[1,2-a]pyridine derivatives, to intermediates useful in the preparation of these imidazo[1,2-a]pyridine derivatives, to the preparation of these intermediates, to agrochemical compositions which comprise at least one of the imidazo[1,2-a]pyridine derivatives, to preparation of these compositions and to the use of the imidazo[1,2-a]pyridine derivatives or compositions in agriculture or horticulture for combating, controlling or preventing infestation of plants, harvested food crops, seeds or non-living materials by phytopathogenic microorganisms, in particular fungi, more particularly oomycetes.

It has now surprisingly been found that certain novel imidazo[1,2-a]pyridine derivatives have favourable fungicidal properties, in particular against oomycetes.

Therefore, in a first aspect, the present invention provides compounds of formula (I)



(I)

wherein Z is O or S, and preferably Z is O;

A^1 is CH or N, and preferably N;

R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkylsulfanyl. C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxy, amino, and -NHC(O)C_{1-6}alkyl;

A^2 are independently CR^2 or N, with the proviso that no more than three A^2 are N, preferably no more than two A^2 are N, preferably no more than one A^2 is N, and more preferably the four A^2 are CR^2;

R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-}

$_{6}$alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN;

A^3 is CR^3 or N;

R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN;
wherein R^3 taken together with the adjacent R^2 optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 5-membered heterocycle or a 6-membered heterocycle;

R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, and CN, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl and diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN;
wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle; and

R^5 is selected from C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxyC_{1-6}alkyl, C_{1-6}alkylamino, diC_{1-6}alkylamino, C_{1-6}alkoxyamino, and C_{1-6}alkylC_{1-6}alkoxyamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxyC_{1-6}alkyl, C_{1-6}alkylamino, diC_{1-6}alkylamino, C_{1-6}alkoxyamino, and C_{1-6}alkylC_{1-6}alkoxyamino groups is optionally substituted with one to three substituents independently selected from halogen and CN;

or a salt or N-oxide thereof.

In a second aspect the present invention provides an agrochemical composition comprising a compound of formula (I), and more particularly an agrochemical composition comprising a fungicidally effective

amount of a compound of formula (I). Said composition can further comprise at least one compound selected among an additional active ingredient, an appropriate formulation inert, a carrier, an adjuvant, and any mixtures thereof.

Compounds of formula (I) may be used to control phytopathogenic microorganisms. Thus, in order to control a phytopathogen a compound of formula (I), or a composition comprising a compound of formula (I) according to the invention, may be applied directly to the phytopathogen, to the locus of a phytopathogen, in particular to a plant susceptible to attack by phytopathogens, or to a propagation material of a plant.

Thus, in a third aspect the present invention provides the use of a compound of formula (I), or a composition comprising a compound of formula (I), as described herein to combat, prevent or control a phytopathogen.

In a fourth aspect the present invention provides a method of combating, preventing or controlling phytopathogens, comprising applying a compound of formula (I), or a composition comprising a compound of formula (I), as described herein to said phytopathogen, to the locus of said phytopathogen, in particular to a plant susceptible to attack by a phytopathogen, or to a propagation material of a plant. According to this fourth aspect of the invention, the method may exclude methods for the treatment of the human or animal body by surgery or therapy.

Compounds of formula (I) are particularly effective in combating, preventing or controlling phytopathogenic fungi, in particular oomycetes. Thus, in a fifth aspect the present invention provides the use of a compound of formula (I), or a composition comprising a compound of formula (I), as described herein to control phytopathogenic fungi, in particular oomycetes.

In a sixth aspect the present invention provides a method of combating, preventing or controlling phytopathogenic disease, such as phytopathogenic fungi, comprising applying a compound of formula (I), or a composition comprising a compound of formula (I), as described herein to said phytopathogenic fungi, or to the locus of said phytopathogenic fungi, in particular to a plant susceptible to attack by phytopathogenic fungi, in particular oomycetes, or to a propagation material of a plant. According to this sixth aspect of the invention, the method may exclude methods for the treatment of the human or animal body by surgery or therapy.

Where a group is indicated as being substituted, e.g. alkyl, this includes those groups that are part of other groups, e.g. the alkyl in alkylthio.

Definitions:

- The term "halogen" or “halo” refers to fluorine (fluoro or F), chlorine (chloro or Cl), bromine (bromo or Br) or iodine (iodo or I), preferably fluorine, chlorine or bromine.

- The term “amino” refers to a -NH_2 group.

- The term "Alkyl" as used herein- in isolation or as part of a chemical group – represents straight-chain or branched hydrocarbons, preferably with 1 to 6 carbon atoms, for example methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, s-butyl, t-butyl, pentyl, 1- methylbutyl, 2-methylbutyl, 3-methylbutyl, 1,2-dimethylpropyl, 1,1 -dimethylpropyl, 2,2- dimethylpropyl, 1 -ethylpropyl, hexyl, 1 -methylpentyl, 2-methylpentyl, 3-methylpentyl, 4- methylpentyl, 1,2-dimethylpropyl, 1,3-dimethylbutyl, 1,4-dimethylbutyl, 2,3-dimethylbutyl, 1,1- dimethylbutyl, 2,2-dimethylbutyl, 3,3-dimethylbutyl, 1,1,2-trimethylpropyl, 1,2,2-trimethylpropyl, 1- ethylbutyl and 2-ethylbutyl. Alkyl groups with 1 to 4 carbon atoms are preferred, for example methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, s-butyl or t-butyl.

- The term "Alkenyl" - in isolation or as part of a chemical group - represents straight-chain or branched hydrocarbons, preferably with 2 to 6 carbon atoms and at least one double bond, for example vinyl, 2-propenyl, 2-butenyl, 3-butenyl, 1- methyl-2-propenyl, 2-methyl-2-propenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 1-methyl-2-butenyl, 2- methyl-2-butenyl, 3-methyl-2-butenyl, 1-methyl-3-butenyl, 2-methyl-3-butenyl, 3-methyl-3-butenyl, 1,1 - dimethyl-2-propenyl, 1,2-dimethyl-2-propenyl, 1 -ethyl-2-propenyl, 2-hexenyl, 3-hexenyl, 4- hexenyl, 5-hexenyl, 1 -methyl-2-pentenyl, 2-methyl-2-pentenyl, 3-methyl-2-pentenyl, 4-methyl-2- pentenyl, 3-methyl-3-pentenyl, 4-methyl-3-pentenyl, 1 -methyl-4-pentenyl, 2-methyl-4-pentenyl, 3- methyl-4-pentenyl, 4-methyl-4-pentenyl, 1, 1 -dimethyl-2-butenyl, 1,1-dimethyl-3-butenyl, 1,2- dimethyl-2-butenyl, l,2-dimethyl-3-butenyl, 1,3-dimethyl-2-butenyl, 2,2-dimethyl-3-butenyl, 2,3- dimethyl-2-butenyl, 2,3-dimethyl-3-butenyl, 1 -ethyl-2-butenyl, 1-ethyl-3-butenyl, 2-ethyl-2-butenyl, 2-ethyl-3-butenyl, 1, 1,2-trimethyl-2-propenyl, 1 -ethyl- 1 -methyl-2-propenyl und 1-ethyl-2-methyl-2-propenyl. Alkenyl groups with 2 to 4 carbon atoms are preferred, for example 2-propenyl, 2-butenyl or 1-methyl-2-propenyl.

- The term "Alkynyl" - in isolation or as part of a chemical group - represents straight-chain or branched hydrocarbons, preferably with 2 to 6 carbon atoms and at least one triple bond, for example 2-propynyl, 2-butynyl, 3-butynyl, 1-methyl-2- propynyl, 2-pentynyl, 3-pentynyl, 4-pentynyl, 1-methyl-3-butynyl, 2-methyl-3-butynyl, 1-methyl-2- butynyl, 1,1 -dimethyl-2-propynyl, 1 -ethyl-2-propynyl, 2-hexynyl, 3-hexynyl, 4-hexynyl, 5-hexynyl, 1- methyl-2-pentynyl, 1-methyl-3-pentynyl, 1 -methyl-4-pentynyl, 2-methyl-3-pentynyl, 2-methyl-4- pentynyl, 3 -methyl-4-pentynyl, 4-methyl-2-pentynyl, 1,1 -dimethyl-3 -butynyl, 1,2-dimethyl-3 –butynyl, 2,2- dimethyl-3-butynyl, 1-ethyl-3-butynyl, 2-ethyl-3-butynyl, 1-ethyl-1-methyl-2-propynyl and 2,5-hexadiynyl. Alkynyls with 2 to 4 carbon atoms are preferred, for example ethynyl, 2- propynyl or 2-butynyl-2-propenyl.

- The term "haloalkyl" refers to an alkyl radical as generally defined above substituted by one or more of the same or different halogen atoms, for examples fluoromethyl, fluoroethyl, difluoromethyl, trifluoromethyl, or 2,2,2-trifluoroethyl.

- The term cyanoalkyl” refers to an alkyl radical as generally defined above substituted by one or more cyano groups.

- The term "cycloalkyl" - in isolation or as part of a chemical group - represents saturated or partially unsaturated mono-, bi- or tricyclic hydrocarbons, preferably with 3 to 10 carbon atoms, for example cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, bicyclo[2.2.1]heptyl, bicyclo[2.2.2]octyl or adamantyl. Cycloalkyls with 3, 4, 5, 6 or 7 carbon atoms are preferred, for example cyclopropyl or cyclobutyl.

- The term "halocycloalkyl" refers to a cycloalkyl ring as defined above substituted by one or more of the same or different halogen atoms.

- The term cyanocycloalkyl" refers to a cycloalkyl radical as generally defined above substituted by one or more cyano groups.

- The term "alkoxy" refers to a radical of the formula $-OR_a$ wherein R_a is an alkyl radical as generally defined above. Examples of alkoxy include, but are not limited to methoxy, ethoxy, propoxy, iso-propoxy, and tert-butoxy. The term "alkoxyalkyl" refers to an alkyl radical (as mentioned above) substituted with said alkoxy group. Examples are methoxymethyl, methoxyethyl, ethoxymethyl and propoxymethyl.

- The term "alkylsulfanyl" refers to a radical of the formula $-SR_a$ wherein R_a is an alkyl radical as generally defined above.

- The term "alkylsulfinyl" refers to a radical of the formula $-S(O)R_a$ wherein R_a is an alkyl radical as generally defined above.

- The term "alkylsulfonyl" refers to a radical of the formula $-S(O)_2R_a$ wherein R_a is an alkyl radical as generally defined above.

- The term "alkylcarbonyl" refers to a radical of the formula $R_aC(O)-$ wherein R_a is an alkyl radical as generally defined above.

- the term "alkoxycarbonyl" refers to a radical of the formula $R_aOC(O)-$, wherein R_a is an alkyl radical as generally defined above.

- The term "alkylamino" refers to a radical of the formula R_aNH- wherein R_a is an alkyl radical as generally defined above.

- The term "cycloalkylamino" refers to a radical of the formula R_aNH- wherein R_a is a cycloalkyl radical as generally defined above.

- The term "alkoxyamino" refers to a radical of the formula R_aNH-, wherein R_a is an alkoxy radical as generally defined above.

- The term "alkylaminocarbonyl" refers to a radical of the formula $R_aNHC(O)$- wherein R_a is an alkyl radical as generally defined above.

- Hydroxyl or hydroxy stands for a –OH group.

The term "combating", "preventing" or "controlling", and its inflections, within the context of the present invention, mean reducing any undesired effect, such as pathogenic and more particularly phytopathogenic, especially fungi such as oomycetes, infestation or attack of, and pathogenic damage to a plant or to a plant derived product to such a level that an improvement is demonstrated.

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

An effective amount is readily determined by the skilled person in the art, by the use of 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 pathogen to be controlled & its lifecycle; the particular compound applied; the type of application; and other relevant circumstances.

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 C_{1-4}alkanecarboxylic 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 C_{1-4}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 an N-oxide, in covalently hydrated form, or in salt form, e.g., an agronomically usable or agrochemically acceptable 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 salt formation.

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

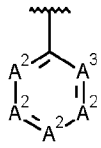
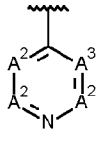
In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy.
In a particular embodiment, R^{1a}, R^{1b} and R^{1c} can be independently selected from hydrogen and C_{1-6}alkyl. In another particular embodiment, R^{1a} and R^{1c} can be hydrogen; and R^{1b} can be selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkoxy, amino, and NHC(O)C_{1-6}alkyl.

In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; preferably R^2 are independently selected from hydrogen, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxy-C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxy-C_{1-6}alkoxy groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; and more preferably R^2 are independently selected from hydrogen, halogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and CN.

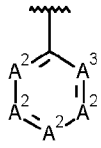
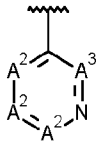
In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN. More preferably, R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen, hydroxy, and CN.

In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein four A^2 are CR^2 and A^3 is N.

In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein

 is  , and preferably the three A^2 are CR^2 and A^3 is CR^3.

In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein

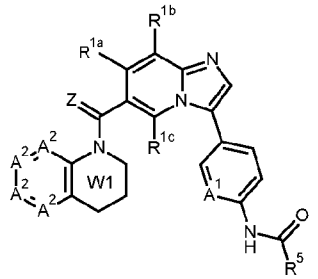
 is  , and preferably the three A^2 are CR^2 and A^3 is CR^3.

In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein four A^2 are CR^2 and A^3 is CR^3.

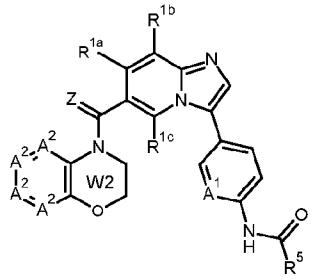
In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents independently selected from halogen and CN; and preferably R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen and CN; and

wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle.

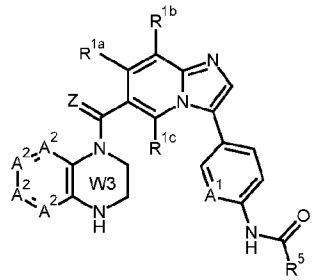
In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein A^3 is CR^3 and wherein R^3 and R^4 taken together form a ring, preferably a 5-8-membered heterocycle, preferably a 6-membered heterocycle, and more preferably one of the rings W1, W2 or W3 as described in the compounds of the formula (I) below:



(I-W1)

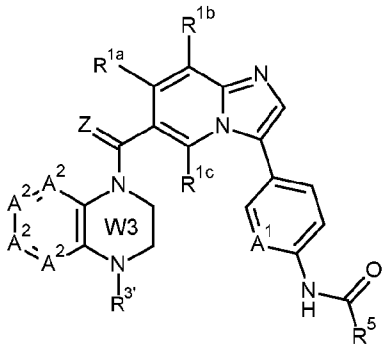


(I-W2)



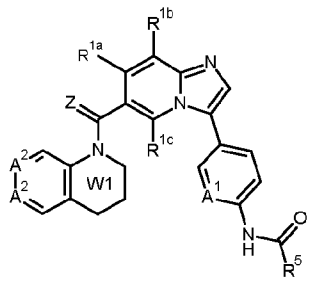
(I-W3)

The carbon and/or the nitrogen atoms forming said ring (W1, W2 or W3) can be substituted, especially by a $R^{3'}$ group, wherein $R^{3'}$ is selected from hydrogen, C_{1-6}alkyl, C_{3-6}cycloalkyl, hydroxy, C_{1-6}alkoxy, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one to three substituents independently selected from halogen and CN. More preferably, $R^{3'}$ is selected from hydrogen, C_{1-6}alkyl, hydroxy, C_{1-6}alkoxy, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen and CN. For example, the compounds of the formula (I-W3) can be as follows:

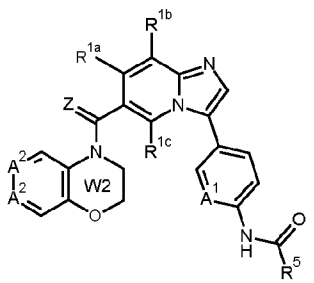


(I-W3)

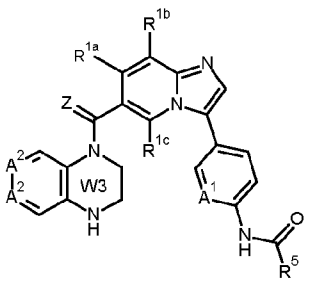
In a preferred embodiment, the compounds of the formula (I-W1), (I-W2) and (I-W3) can be as described below:



(I-W1)



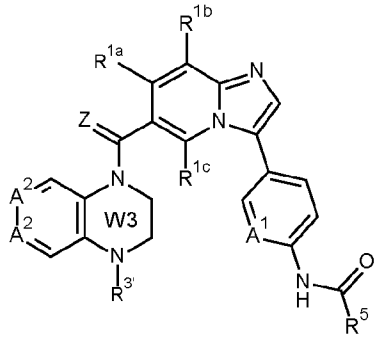
(I-W2)



(I-W3)

The carbon and/or the nitrogen atoms forming said ring (W1, W2 or W3) can be substituted, especially by a $R^{3'}$ group, wherein $R^{3'}$ is selected from hydrogen, C_{1-6}alkyl, hydroxy, C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, and C_{3-6}cycloalkyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, and C_{3-6}cycloalkyl

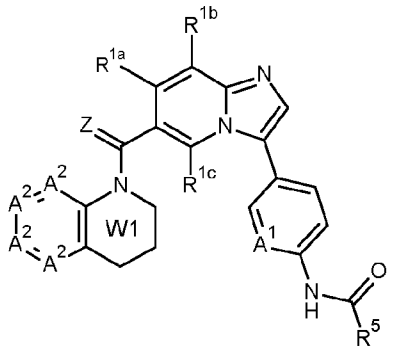
groups is optionally substituted with one to three substituents independently selected from halogen and CN. More preferably, $R^{3'}$ is selected from hydrogen, C_{1-6}alkyl, hydroxy, C_{1-6}alkoxy, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl C_{1-6}alkoxy, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen and CN. For example, the compounds of the formula (I-W3) can be as follows:



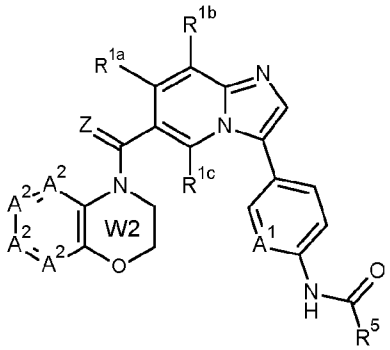
(I-W3)

In a further embodiment, there is provided a compound of formula (I) according to the present invention, wherein R^5 is selected from C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, and C_{1-6}alkoxyC_{1-6}alkyl, wherein each of said groups is optionally substituted with one to three substituents independently selected from halogen and CN.

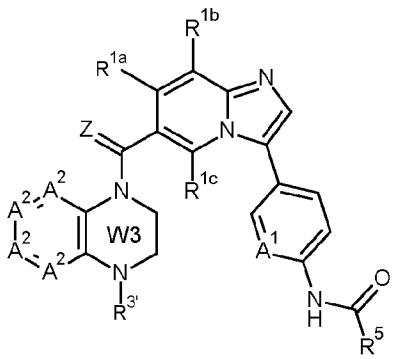
In a particular embodiment, there is provided a compound of formula (I-W1, I-W2, or I-W3) according to the present invention



(I-W1)

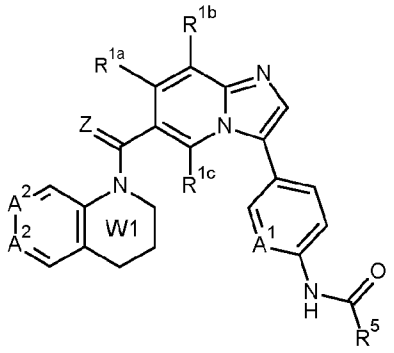


(I-W2)

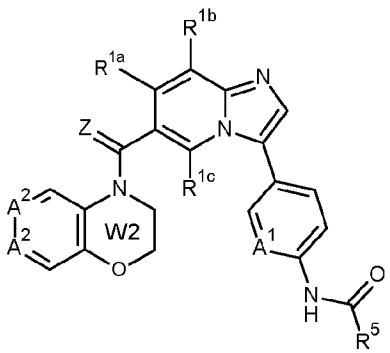


(I-W3),

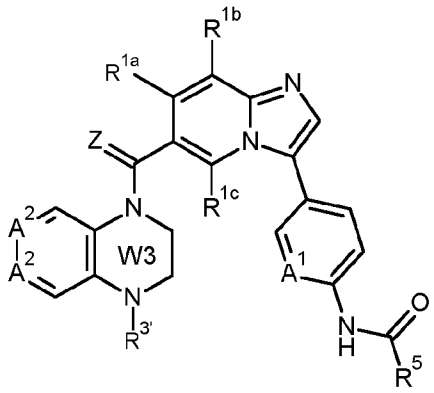
and more preferably



(I-W1)



(I-W2)



(I-W3),

wherein

Z is O;

A^1 is N;

R^{1a} and R^{1c} are hydrogen; and R^{1b} is selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkoxy, amino, and NHC(O)C_{1-6}alkyl;

the two A^2 are CR^2; with R^2 being independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkoxycarbonyl and C_{1-6}alkylsulfonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkoxycarbonyl and C_{1-6}alkylsulfonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; preferably R^2 being independently selected from hydrogen, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl and C_{1-6}alkoxy-C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl and C_{1-6}alkoxy-C_{1-6}alkoxy groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen, hydroxy, and CN; and preferably R^2 being independently selected from hydrogen, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, and C_{1-6}alkoxy-C_{1-6}alkyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, and C_{1-6}alkoxy-C_{1-6}alkyl groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen, hydroxy, and CN;

$R^{3'}$ is selected from hydrogen, C_{1-6}alkyl, and C_{3-6}cycloalkyl, wherein each of the C_{1-6}alkyl and C_{3-6}cycloalkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN; and

R^5 is selected from C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxyC_{1-6} alkyl, C_{1-6}alkylamino, diC_{1-6}alkylamino, and C_{1-6}alkylC_{1-6}alkoxyamino, wherein each of said groups is optionally substituted with one to three substituents independently selected from halogen and CN; and preferably R^5 is selected from C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, and C_{1-6}alkoxyC_{1-6}alkyl, wherein each of said groups is optionally substituted with one to three substituents independently selected from halogen and CN.

In a further embodiment, the compound according to the present invention is selected from:
methyl N-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(7-fluoro-2,3-dihydro-1,4-benzoxazine-4-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-5-carboxylate;
methyl N-[5-[6-(3-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(8-fluoro-7-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate
methyl N-[5-[6-[(2-chloro-5-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-3-carboxylate;
methyl N-[5-[6-[(3-fluoro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(2-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5-chloroindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(7-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-chloro-8-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5,7-difluoroindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-bromo-5-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(2-chloro-4-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;

methyl N-[5-[6-(5,6-difluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(2-fluoro-4-methyl-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(7-methylsulfonyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-fluoro-3-hydroxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(6-chloropyridazin-3-yl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6,7-difluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5-fluoro-6-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[4-(2-methoxyethyl)-3,4-dihydro-2H-quinoline-1-carbonyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(4-fluoro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(3-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-4-carboxylate;
methyl N-[5-[6-[6-(difluoromethoxy)-3,4-dihydro-2H-quinoline-1-carbonyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
ethyl 6-fluoro-1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-3-carboxylate;
methyl N-[5-[6-(7-methyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(6-fluoro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(2,3-dichlorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[methyl-(5-methyl-2-pyridyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5,7-dimethoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-1,6-naphthyridine-5-carboxylate;

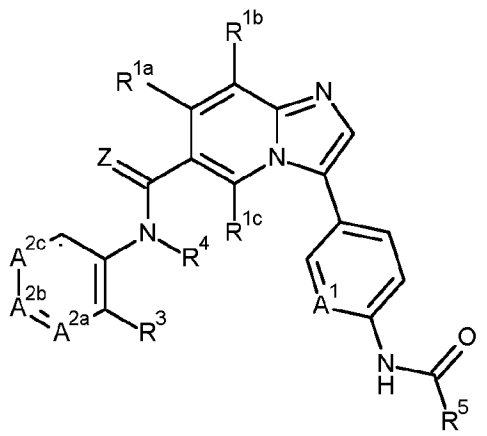
methyl N-[5-[6-(3-hydroxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[methyl-(4-methylpyrimidin-2-yl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-7-carboxylate;
methyl 2-[[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-methyl-amino]benzoate;
methyl N-[5-[6-[(5-chloro-2-methyl-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-chloro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[methyl-(2,3,4-trifluorophenyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(8-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(4-cyclopropyl-6-fluoro-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-methoxyindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(4-chloro-2-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(2,5-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-methylsulfonyl-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(7-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6,7-dimethoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[5-(difluoromethoxy)-3,4-dihydro-2H-quinoline-1-carbonyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl 2-[ethyl-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]amino]benzoate;
methyl N-[5-[6-[(2-methoxyphenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(5-chloro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-fluoro-5-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(7-fluoro-6-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(6-fluoro-7-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-(5-fluoroindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;

methyl N-[5-[6-(6-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(4-fluoro-2,6-diiodo-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(5-chloro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(5-cyanopyrazin-2-yl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(4-methoxy-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[5-[6-[(5-fluoro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate;
methyl N-[4-[6-[(5-chloro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate;
methyl N-[4-[6-[(2,6-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate;
methyl N-[4-[6-[methyl-(2-methyl-3-pyridyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate;
methyl N-[4-[6-[(2,5-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate;
methyl N-[4-[6-[(2-isopropylphenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate;
methyl N-[4-[6-[methyl(o-tolyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate;
methyl N-[4-[6-[(2,4-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate; and
methyl N-[4-[6-[(2,4-dichlorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate.

The method according to the present invention has advantageous properties for protecting plants against pathogenic, such as phytopathogenic, especially fungi such as oomycetes, attack or infestation, which result in a disease and damage to the plant; particularly in instance of plants, the present invention can control, limit or prevent pathogenic damage on plant, parts of plant, plant propagation material and/or plant grown.

The compounds in Tables 1.1 to 1.27, in Tables 2.1 to 2.45, Tables 3.1 to 3.55 and in Tables 4.1 to 4.24 below illustrate the compounds of the invention.

Table 1.1 provides compounds of formula (Ia)



(Ia)

wherein Z is O;
R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is methoxy and R^5 is methyl; and
the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1 below.

Each of Tables 1.2 to 1.27 (which follow Table Z.1) discloses individual compounds of the formula (Ia) in which Z, R^{1a}, R^{1b}, R^{1c}, R^3 and R^5 are specifically defined in Tables 1.2 to 1.27, which refer to Table Z.1 wherein R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are specifically defined.

Table Z.1

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.1	CH_3	CH	CH	CH	CH
E1.2	CH_3	C-CH_3	CH	CH	CH
E1.3	CH_3	C-CH_2CH_3	CH	CH	CH
E1.4	CH_3	C-F	CH	CH	CH
E1.5	CH_3	C-Cl	CH	CH	CH
E1.6	CH_3	C-Br	CH	CH	CH
E1.7	CH_3	C-CN	CH	CH	CH
E1.8	CH_3	C-OCH_3	CH	CH	CH
E1.9	CH_3	C-OCH_2CH_3	CH	CH	CH
E1.10	CH_3	C-$OCH_2CH_2OCH_3$	CH	CH	CH
E1.11	CH_3	C-OH	CH	CH	CH
E1.12	CH_3	CH	N	CH	CH
E1.13	CH_3	C-CH_3	N	CH	CH
E1.14	CH_3	C-CH_2CH_3	N	CH	CH
E1.15	CH_3	C-F	N	CH	CH
E1.16	CH_3	C-Cl	N	CH	CH
E1.17	CH_3	C-Br	N	CH	CH
E1.18	CH_3	C-CN	N	CH	CH
E1.19	CH_3	C-OCH_3	N	CH	CH
E1.20	CH_3	C-OCH_2CH_3	N	CH	CH
E1.21	CH_3	C-$OCH_2CH_2OCH_3$	N	CH	CH
E1.22	CH_3	C-OH	N	CH	CH
E1.23	CH_3	CH	CH	N	CH
E1.24	CH_3	C-CH_3	CH	N	CH
E1.25	CH_3	C-CH_2CH_3	CH	N	CH
E1.26	CH_3	C-F	CH	N	CH
E1.27	CH_3	C-Cl	CH	N	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.28	CH_3	C-Br	CH	N	CH
E1.29	CH_3	C-CN	CH	N	CH
E1.30	CH_3	C-OCH_3	CH	N	CH
E1.31	CH_3	C-OCH_2CH_3	CH	N	CH
E1.32	CH_3	C-$OCH_2CH_2OCH_3$	CH	N	CH
E1.33	CH_3	C-OH	CH	N	CH
E1.34	CH_3	CH	C-F	CH	CH
E1.35	CH_3	C-CH_3	C-F	CH	CH
E1.36	CH_3	C-CH_2CH_3	C-F	CH	CH
E1.37	CH_3	C-F	C-F	CH	CH
E1.38	CH_3	C-Cl	C-F	CH	CH
E1.39	CH_3	C-Br	C-F	CH	CH
E1.40	CH_3	C-CN	C-F	CH	CH
E1.41	CH_3	C-OCH_3	C-F	CH	CH
E1.42	CH_3	C-OCH_2CH_3	C-F	CH	CH
E1.43	CH_3	C-$OCH_2CH_2OCH_3$	C-F	CH	CH
E1.44	CH_3	C-OH	C-F	CH	CH
E1.45	CH_3	CH	C-Cl	CH	CH
E1.46	CH_3	C-CH_3	C-Cl	CH	CH
E1.47	CH_3	C-CH_2CH_3	C-Cl	CH	CH
E1.48	CH_3	C-F	C-Cl	CH	CH
E1.49	CH_3	C-Cl	C-Cl	CH	CH
E1.50	CH_3	C-Br	C-Cl	CH	CH
E1.51	CH_3	C-CN	C-Cl	CH	CH
E1.52	CH_3	C-OCH_3	C-Cl	CH	CH
E1.53	CH_3	C-OCH_2CH_3	C-Cl	CH	CH
E1.54	CH_3	C-$OCH_2CH_2OCH_3$	C-Cl	CH	CH
E1.55	CH_3	C-OH	C-Cl	CH	CH
E1.56	CH_3	CH	C-CH_3	CH	CH
E1.57	CH_3	C-CH_3	C-CH_3	CH	CH
E1.58	CH_3	C-CH_2CH_3	C-CH_3	CH	CH
E1.59	CH_3	C-F	C-CH_3	CH	CH
E1.60	CH_3	C-Cl	C-CH_3	CH	CH
E1.61	CH_3	C-Br	C-CH_3	CH	CH
E1.62	CH_3	C-CN	C-CH_3	CH	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.63	CH_3	C-OCH_3	C-CH_3	CH	CH
E1.64	CH_3	C-OCH_2CH_3	C-CH_3	CH	CH
E1.65	CH_3	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	CH
E1.66	CH_3	C-OH	C-CH_3	CH	CH
E1.67	CH_3	CH	C-CH_2CH_3	CH	CH
E1.68	CH_3	C-CH_3	C-CH_2CH_3	CH	CH
E1.69	CH_3	C-CH_2CH_3	C-CH_2CH_3	CH	CH
E1.70	CH_3	C-F	C-CH_2CH_3	CH	CH
E1.71	CH_3	C-Cl	C-CH_2CH_3	CH	CH
E1.72	CH_3	C-Br	C-CH_2CH_3	CH	CH
E1.73	CH_3	C-CN	C-CH_2CH_3	CH	CH
E1.74	CH_3	C-OCH_3	C-CH_2CH_3	CH	CH
E1.75	CH_3	C-OCH_2CH_3	C-CH_2CH_3	CH	CH
E1.76	CH_3	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH
E1.77	CH_3	C-OH	C-CH_2CH_3	CH	CH
E1.78	CH_3	CH	C-CN	CH	CH
E1.79	CH_3	C-CH_3	C-CN	CH	CH
E1.80	CH_3	C-CH_2CH_3	C-CN	CH	CH
E1.81	CH_3	C-F	C-CN	CH	CH
E1.82	CH_3	C-Cl	C-CN	CH	CH
E1.83	CH_3	C-Br	C-CN	CH	CH
E1.84	CH_3	C-CN	C-CN	CH	CH
E1.85	CH_3	C-OCH_3	C-CN	CH	CH
E1.86	CH_3	C-OCH_2CH_3	C-CN	CH	CH
E1.87	CH_3	C-$OCH_2CH_2OCH_3$	C-CN	CH	CH
E1.88	CH_3	C-OH	C-CN	CH	CH
E1.89	CH_3	CH	CH	CH	N
E1.90	CH_3	C-CH_3	CH	CH	N
E1.91	CH_3	C-CH_2CH_3	CH	CH	N
E1.92	CH_3	C-F	CH	CH	N
E1.93	CH_3	C-Cl	CH	CH	N
E1.94	CH_3	C-Br	CH	CH	N
E1.95	CH_3	C-CN	CH	CH	N
E1.96	CH_3	C-OCH_3	CH	CH	N
E1.97	CH_3	C-OCH_2CH_3	CH	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.98	CH_3	C-$OCH_2CH_2OCH_3$	CH	CH	N
E1.99	CH_3	C-OH	CH	CH	N
E1.100	CH_3	CH	N	CH	N
E1.101	CH_3	C-CH_3	N	CH	N
E1.102	CH_3	C-CH_2CH_3	N	CH	N
E1.103	CH_3	C-F	N	CH	N
E1.104	CH_3	C-Cl	N	CH	N
E1.105	CH_3	C-Br	N	CH	N
E1.106	CH_3	C-CN	N	CH	N
E1.107	CH_3	C-OCH_3	N	CH	N
E1.108	CH_3	C-OCH_2CH_3	N	CH	N
E1.109	CH_3	C-$OCH_2CH_2OCH_3$	N	CH	N
E1.110	CH_3	C-OH	N	CH	N
E1.111	CH_3	CH	CH	N	N
E1.112	CH_3	C-CH_3	CH	N	N
E1.113	CH_3	C-CH_2CH_3	CH	N	N
E1.114	CH_3	C-F	CH	N	N
E1.115	CH_3	C-Cl	CH	N	N
E1.116	CH_3	C-Br	CH	N	N
E1.117	CH_3	C-CN	CH	N	N
E1.118	CH_3	C-OCH_3	CH	N	N
E1.119	CH_3	C-OCH_2CH_3	CH	N	N
E1.120	CH_3	C-$OCH_2CH_2OCH_3$	CH	N	N
E1.121	CH_3	C-OH	CH	N	N
E1.122	CH_3	CH	C-F	CH	N
E1.123	CH_3	C-CH_3	C-F	CH	N
E1.124	CH_3	C-CH_2CH_3	C-F	CH	N
E1.125	CH_3	C-F	C-F	CH	N
E1.126	CH_3	C-Cl	C-F	CH	N
E1.127	CH_3	C-Br	C-F	CH	N
E1.128	CH_3	C-CN	C-F	CH	N
E1.129	CH_3	C-OCH_3	C-F	CH	N
E1.130	CH_3	C-OCH_2CH_3	C-F	CH	N
E1.131	CH_3	C-$OCH_2CH_2OCH_3$	C-F	CH	N
E1.132	CH_3	C-OH	C-F	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.133	CH_3	CH	C-Cl	CH	N
E1.134	CH_3	C-CH_3	C-Cl	CH	N
E1.135	CH_3	C-CH_2CH_3	C-Cl	CH	N
E1.136	CH_3	C-F	C-Cl	CH	N
E1.137	CH_3	C-Cl	C-Cl	CH	N
E1.138	CH_3	C-Br	C-Cl	CH	N
E1.139	CH_3	C-CN	C-Cl	CH	N
E1.140	CH_3	C-OCH_3	C-Cl	CH	N
E1.141	CH_3	C-OCH_2CH_3	C-Cl	CH	N
E1.142	CH_3	C-$OCH_2CH_2OCH_3$	C-Cl	CH	N
E1.143	CH_3	C-OH	C-Cl	CH	N
E1.144	CH_3	CH	C-CH_3	CH	N
E1.145	CH_3	C-CH_3	C-CH_3	CH	N
E1.146	CH_3	C-CH_2CH_3	C-CH_3	CH	N
E1.147	CH_3	C-F	C-CH_3	CH	N
E1.148	CH_3	C-Cl	C-CH_3	CH	N
E1.149	CH_3	C-Br	C-CH_3	CH	N
E1.150	CH_3	C-CN	C-CH_3	CH	N
E1.151	CH_3	C-OCH_3	C-CH_3	CH	N
E1.152	CH_3	C-OCH_2CH_3	C-CH_3	CH	N
E1.153	CH_3	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	N
E1.154	CH_3	C-OH	C-CH_3	CH	N
E1.155	CH_3	CH	C-CH_2CH_3	CH	N
E1.156	CH_3	C-CH_3	C-CH_2CH_3	CH	N
E1.157	CH_3	C-CH_2CH_3	C-CH_2CH_3	CH	N
E1.158	CH_3	C-F	C-CH_2CH_3	CH	N
E1.159	CH_3	C-Cl	C-CH_2CH_3	CH	N
E1.160	CH_3	C-Br	C-CH_2CH_3	CH	N
E1.161	CH_3	C-CN	C-CH_2CH_3	CH	N
E1.162	CH_3	C-OCH_3	C-CH_2CH_3	CH	N
E1.163	CH_3	C-OCH_2CH_3	C-CH_2CH_3	CH	N
E1.164	CH_3	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	N
E1.165	CH_3	C-OH	C-CH_2CH_3	CH	N
E1.166	CH_3	CH	C-CN	CH	N
E1.167	CH_3	C-CH_3	C-CN	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.168	CH_3	C-CH_2CH_3	C-CN	CH	N
E1.169	CH_3	C-F	C-CN	CH	N
E1.170	CH_3	C-Cl	C-CN	CH	N
E1.171	CH_3	C-Br	C-CN	CH	N
E1.172	CH_3	C-CN	C-CN	CH	N
E1.173	CH_3	C-OCH_3	C-CN	CH	N
E1.174	CH_3	C-OCH_2CH_3	C-CN	CH	N
E1.175	CH_3	C-$OCH_2CH_2OCH_3$	C-CN	CH	N
E1.176	CH_3	C-OH	C-CN	CH	N
E1.177	CH_2CH_3	CH	CH	CH	CH
E1.178	CH_2CH_3	C-CH_3	CH	CH	CH
E1.179	CH_2CH_3	C-CH_2CH_3	CH	CH	CH
E1.180	CH_2CH_3	C-F	CH	CH	CH
E1.181	CH_2CH_3	C-Cl	CH	CH	CH
E1.182	CH_2CH_3	C-Br	CH	CH	CH
E1.183	CH_2CH_3	C-CN	CH	CH	CH
E1.184	CH_2CH_3	C-OCH_3	CH	CH	CH
E1.185	CH_2CH_3	C-OCH_2CH_3	CH	CH	CH
E1.186	CH_2CH_3	C-$OCH_2CH_2OCH_3$	CH	CH	CH
E1.187	CH_2CH_3	C-OH	CH	CH	CH
E1.188	CH_2CH_3	CH	N	CH	CH
E1.189	CH_2CH_3	C-CH_3	N	CH	CH
E1.190	CH_2CH_3	C-CH_2CH_3	N	CH	CH
E1.191	CH_2CH_3	C-F	N	CH	CH
E1.192	CH_2CH_3	C-Cl	N	CH	CH
E1.193	CH_2CH_3	C-Br	N	CH	CH
E1.194	CH_2CH_3	C-CN	N	CH	CH
E1.195	CH_2CH_3	C-OCH_3	N	CH	CH
E1.196	CH_2CH_3	C-OCH_2CH_3	N	CH	CH
E1.197	CH_2CH_3	C-$OCH_2CH_2OCH_3$	N	CH	CH
E1.198	CH_2CH_3	C-OH	N	CH	CH
E1.199	CH_2CH_3	CH	CH	N	CH
E1.200	CH_2CH_3	C-CH_3	CH	N	CH
E1.201	CH_2CH_3	C-CH_2CH_3	CH	N	CH
E1.202	CH_2CH_3	C-F	CH	N	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.203	CH_2CH_3	C-Cl	CH	N	CH
E1.204	CH_2CH_3	C-Br	CH	N	CH
E1.205	CH_2CH_3	C-CN	CH	N	CH
E1.206	CH_2CH_3	C-OCH_3	CH	N	CH
E1.207	CH_2CH_3	C-OCH_2CH_3	CH	N	CH
E1.208	CH_2CH_3	C-$OCH_2CH_2OCH_3$	CH	N	CH
E1.209	CH_2CH_3	C-OH	CH	N	CH
E1.210	CH_2CH_3	CH	C-F	CH	CH
E1.211	CH_2CH_3	C-CH_3	C-F	CH	CH
E1.212	CH_2CH_3	C-CH_2CH_3	C-F	CH	CH
E1.213	CH_2CH_3	C-F	C-F	CH	CH
E1.214	CH_2CH_3	C-Cl	C-F	CH	CH
E1.215	CH_2CH_3	C-Br	C-F	CH	CH
E1.216	CH_2CH_3	C-CN	C-F	CH	CH
E1.217	CH_2CH_3	C-OCH_3	C-F	CH	CH
E1.218	CH_2CH_3	C-OCH_2CH_3	C-F	CH	CH
E1.219	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-F	CH	CH
E1.220	CH_2CH_3	C-OH	C-F	CH	CH
E1.221	CH_2CH_3	CH	C-Cl	CH	CH
E1.222	CH_2CH_3	C-CH_3	C-Cl	CH	CH
E1.223	CH_2CH_3	C-CH_2CH_3	C-Cl	CH	CH
E1.224	CH_2CH_3	C-F	C-Cl	CH	CH
E1.225	CH_2CH_3	C-Cl	C-Cl	CH	CH
E1.226	CH_2CH_3	C-Br	C-Cl	CH	CH
E1.227	CH_2CH_3	C-CN	C-Cl	CH	CH
E1.228	CH_2CH_3	C-OCH_3	C-Cl	CH	CH
E1.229	CH_2CH_3	C-OCH_2CH_3	C-Cl	CH	CH
E1.230	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-Cl	CH	CH
E1.231	CH_2CH_3	C-OH	C-Cl	CH	CH
E1.232	CH_2CH_3	CH	C-CH_3	CH	CH
E1.233	CH_2CH_3	C-CH_3	C-CH_3	CH	CH
E1.234	CH_2CH_3	C-CH_2CH_3	C-CH_3	CH	CH
E1.235	CH_2CH_3	C-F	C-CH_3	CH	CH
E1.236	CH_2CH_3	C-Cl	C-CH_3	CH	CH
E1.237	CH_2CH_3	C-Br	C-CH_3	CH	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.238	CH_2CH_3	C-CN	C-CH_3	CH	CH
E1.239	CH_2CH_3	C-OCH_3	C-CH_3	CH	CH
E1.240	CH_2CH_3	C-OCH_2CH_3	C-CH_3	CH	CH
E1.241	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	CH
E1.242	CH_2CH_3	C-OH	C-CH_3	CH	CH
E1.243	CH_2CH_3	CH	C-CH_2CH_3	CH	CH
E1.244	CH_2CH_3	C-CH_3	C-CH_2CH_3	CH	CH
E1.245	CH_2CH_3	C-CH_2CH_3	C-CH_2CH_3	CH	CH
E1.246	CH_2CH_3	C-F	C-CH_2CH_3	CH	CH
E1.247	CH_2CH_3	C-Cl	C-CH_2CH_3	CH	CH
E1.248	CH_2CH_3	C-Br	C-CH_2CH_3	CH	CH
E1.249	CH_2CH_3	C-CN	C-CH_2CH_3	CH	CH
E1.250	CH_2CH_3	C-OCH_3	C-CH_2CH_3	CH	CH
E1.251	CH_2CH_3	C-OCH_2CH_3	C-CH_2CH_3	CH	CH
E1.252	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH
E1.253	CH_2CH_3	C-OH	C-CH_2CH_3	CH	CH
E1.254	CH_2CH_3	CH	C-CN	CH	CH
E1.255	CH_2CH_3	C-CH_3	C-CN	CH	CH
E1.256	CH_2CH_3	C-CH_2CH_3	C-CN	CH	CH
E1.257	CH_2CH_3	C-F	C-CN	CH	CH
E1.258	CH_2CH_3	C-Cl	C-CN	CH	CH
E1.259	CH_2CH_3	C-Br	C-CN	CH	CH
E1.260	CH_2CH_3	C-CN	C-CN	CH	CH
E1.261	CH_2CH_3	C-OCH_3	C-CN	CH	CH
E1.262	CH_2CH_3	C-OCH_2CH_3	C-CN	CH	CH
E1.263	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-CN	CH	CH
E1.264	CH_2CH_3	C-OH	C-CN	CH	CH
E1.265	CH_2CH_3	CH	CH	CH	N
E1.266	CH_2CH_3	C-CH_3	CH	CH	N
E1.267	CH_2CH_3	C-CH_2CH_3	CH	CH	N
E1.268	CH_2CH_3	C-F	CH	CH	N
E1.269	CH_2CH_3	C-Cl	CH	CH	N
E1.270	CH_2CH_3	C-Br	CH	CH	N
E1.271	CH_2CH_3	C-CN	CH	CH	N
E1.272	CH_2CH_3	C-OCH_3	CH	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.273	CH_2CH_3	C-OCH_2CH_3	CH	CH	N
E1.274	CH_2CH_3	C-$OCH_2CH_2OCH_3$	CH	CH	N
E1.275	CH_2CH_3	C-OH	CH	CH	N
E1.276	CH_2CH_3	CH	N	CH	N
E1.277	CH_2CH_3	C-CH_3	N	CH	N
E1.278	CH_2CH_3	C-CH_2CH_3	N	CH	N
E1.279	CH_2CH_3	C-F	N	CH	N
E1.280	CH_2CH_3	C-Cl	N	CH	N
E1.281	CH_2CH_3	C-Br	N	CH	N
E1.282	CH_2CH_3	C-CN	N	CH	N
E1.283	CH_2CH_3	C-OCH_3	N	CH	N
E1.284	CH_2CH_3	C-OCH_2CH_3	N	CH	N
E1.285	CH_2CH_3	C-$OCH_2CH_2OCH_3$	N	CH	N
E1.286	CH_2CH_3	C-OH	N	CH	N
E1.287	CH_2CH_3	CH	CH	N	N
E1.288	CH_2CH_3	C-CH_3	CH	N	N
E1.289	CH_2CH_3	C-CH_2CH_3	CH	N	N
E1.290	CH_2CH_3	C-F	CH	N	N
E1.291	CH_2CH_3	C-Cl	CH	N	N
E1.292	CH_2CH_3	C-Br	CH	N	N
E1.293	CH_2CH_3	C-CN	CH	N	N
E1.294	CH_2CH_3	C-OCH_3	CH	N	N
E1.295	CH_2CH_3	C-OCH_2CH_3	CH	N	N
E1.296	CH_2CH_3	C-$OCH_2CH_2OCH_3$	CH	N	N
E1.297	CH_2CH_3	C-OH	CH	N	N
E1.298	CH_2CH_3	CH	C-F	CH	N
E1.299	CH_2CH_3	C-CH_3	C-F	CH	N
E1.300	CH_2CH_3	C-CH_2CH_3	C-F	CH	N
E1.301	CH_2CH_3	C-F	C-F	CH	N
E1.302	CH_2CH_3	C-Cl	C-F	CH	N
E1.303	CH_2CH_3	C-Br	C-F	CH	N
E1.304	CH_2CH_3	C-CN	C-F	CH	N
E1.305	CH_2CH_3	C-OCH_3	C-F	CH	N
E1.306	CH_2CH_3	C-OCH_2CH_3	C-F	CH	N
E1.307	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-F	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.308	CH_2CH_3	C-OH	C-F	CH	N
E1.309	CH_2CH_3	CH	C-Cl	CH	N
E1.310	CH_2CH_3	C-CH_3	C-Cl	CH	N
E1.311	CH_2CH_3	C-CH_2CH_3	C-Cl	CH	N
E1.312	CH_2CH_3	C-F	C-Cl	CH	N
E1.313	CH_2CH_3	C-Cl	C-Cl	CH	N
E1.314	CH_2CH_3	C-Br	C-Cl	CH	N
E1.315	CH_2CH_3	C-CN	C-Cl	CH	N
E1.316	CH_2CH_3	C-OCH_3	C-Cl	CH	N
E1.317	CH_2CH_3	C-OCH_2CH_3	C-Cl	CH	N
E1.318	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-Cl	CH	N
E1.319	CH_2CH_3	C-OH	C-Cl	CH	N
E1.320	CH_2CH_3	CH	C-CH_3	CH	N
E1.321	CH_2CH_3	C-CH_3	C-CH_3	CH	N
E1.322	CH_2CH_3	C-CH_2CH_3	C-CH_3	CH	N
E1.323	CH_2CH_3	C-F	C-CH_3	CH	N
E1.324	CH_2CH_3	C-Cl	C-CH_3	CH	N
E1.325	CH_2CH_3	C-Br	C-CH_3	CH	N
E1.326	CH_2CH_3	C-CN	C-CH_3	CH	N
E1.327	CH_2CH_3	C-OCH_3	C-CH_3	CH	N
E1.328	CH_2CH_3	C-OCH_2CH_3	C-CH_3	CH	N
E1.329	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	N
E1.330	CH_2CH_3	C-OH	C-CH_3	CH	N
E1.331	CH_2CH_3	CH	C-CH_2CH_3	CH	N
E1.332	CH_2CH_3	C-CH_3	C-CH_2CH_3	CH	N
E1.333	CH_2CH_3	C-CH_2CH_3	C-CH_2CH_3	CH	N
E1.334	CH_2CH_3	C-F	C-CH_2CH_3	CH	N
E1.335	CH_2CH_3	C-Cl	C-CH_2CH_3	CH	N
E1.336	CH_2CH_3	C-Br	C-CH_2CH_3	CH	N
E1.337	CH_2CH_3	C-CN	C-CH_2CH_3	CH	N
E1.338	CH_2CH_3	C-OCH_3	C-CH_2CH_3	CH	N
E1.339	CH_2CH_3	C-OCH_2CH_3	C-CH_2CH_3	CH	N
E1.340	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	N
E1.341	CH_2CH_3	C-OH	C-CH_2CH_3	CH	N
E1.342	CH_2CH_3	CH	C-CN	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.343	CH_2CH_3	C-CH_3	C-CN	CH	N
E1.344	CH_2CH_3	C-CH_2CH_3	C-CN	CH	N
E1.345	CH_2CH_3	C-F	C-CN	CH	N
E1.346	CH_2CH_3	C-Cl	C-CN	CH	N
E1.347	CH_2CH_3	C-Br	C-CN	CH	N
E1.348	CH_2CH_3	C-CN	C-CN	CH	N
E1.349	CH_2CH_3	C-OCH_3	C-CN	CH	N
E1.350	CH_2CH_3	C-OCH_2CH_3	C-CN	CH	N
E1.351	CH_2CH_3	C-$OCH_2CH_2OCH_3$	C-CN	CH	N
E1.352	CH_2CH_3	C-OH	C-CN	CH	N
E1.353	CH_2OCH_3	CH	CH	CH	CH
E1.354	CH_2OCH_3	C-CH_3	CH	CH	CH
E1.355	CH_2OCH_3	C-CH_2CH_3	CH	CH	CH
E1.356	CH_2OCH_3	C-F	CH	CH	CH
E1.357	CH_2OCH_3	C-Cl	CH	CH	CH
E1.358	CH_2OCH_3	C-Br	CH	CH	CH
E1.359	CH_2OCH_3	C-CN	CH	CH	CH
E1.360	CH_2OCH_3	C-OCH_3	CH	CH	CH
E1.361	CH_2OCH_3	C-OCH_2CH_3	CH	CH	CH
E1.362	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	CH	CH	CH
E1.363	CH_2OCH_3	C-OH	CH	CH	CH
E1.364	CH_2OCH_3	CH	N	CH	CH
E1.365	CH_2OCH_3	C-CH_3	N	CH	CH
E1.366	CH_2OCH_3	C-CH_2CH_3	N	CH	CH
E1.367	CH_2OCH_3	C-F	N	CH	CH
E1.368	CH_2OCH_3	C-Cl	N	CH	CH
E1.369	CH_2OCH_3	C-Br	N	CH	CH
E1.370	CH_2OCH_3	C-CN	N	CH	CH
E1.371	CH_2OCH_3	C-OCH_3	N	CH	CH
E1.372	CH_2OCH_3	C-OCH_2CH_3	N	CH	CH
E1.373	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	N	CH	CH
E1.374	CH_2OCH_3	C-OH	N	CH	CH
E1.375	CH_2OCH_3	CH	CH	N	CH
E1.376	CH_2OCH_3	C-CH_3	CH	N	CH
E1.377	CH_2OCH_3	C-CH_2CH_3	CH	N	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.378	CH_2OCH_3	C-F	CH	N	CH
E1.379	CH_2OCH_3	C-Cl	CH	N	CH
E1.380	CH_2OCH_3	C-Br	CH	N	CH
E1.381	CH_2OCH_3	C-CN	CH	N	CH
E1.382	CH_2OCH_3	$C\text{-}OCH_3$	CH	N	CH
E1.383	CH_2OCH_3	$C\text{-}OCH_2CH_3$	CH	N	CH
E1.384	CH_2OCH_3	$C\text{-}OCH_2CH_2OCH_3$	CH	N	CH
E1.385	CH_2OCH_3	C-OH	CH	N	CH
E1.386	CH_2OCH_3	CH	C-F	CH	CH
E1.387	CH_2OCH_3	$C\text{-}CH_3$	C-F	CH	CH
E1.388	CH_2OCH_3	$C\text{-}CH_2CH_3$	C-F	CH	CH
E1.389	CH_2OCH_3	C-F	C-F	CH	CH
E1.390	CH_2OCH_3	C-Cl	C-F	CH	CH
E1.391	CH_2OCH_3	C-Br	C-F	CH	CH
E1.392	CH_2OCH_3	C-CN	C-F	CH	CH
E1.393	CH_2OCH_3	$C\text{-}OCH_3$	C-F	CH	CH
E1.394	CH_2OCH_3	$C\text{-}OCH_2CH_3$	C-F	CH	CH
E1.395	CH_2OCH_3	$C\text{-}OCH_2CH_2OCH_3$	C-F	CH	CH
E1.396	CH_2OCH_3	C-OH	C-F	CH	CH
E1.397	CH_2OCH_3	CH	C-F	CH	CH
E1.398	CH_2OCH_3	$C\text{-}CH_3$	C-Cl	CH	CH
E1.399	CH_2OCH_3	$C\text{-}CH_2CH_3$	C-Cl	CH	CH
E1.400	CH_2OCH_3	C-F	C-Cl	CH	CH
E1.401	CH_2OCH_3	C-Cl	C-Cl	CH	CH
E1.402	CH_2OCH_3	C-Br	C-Cl	CH	CH
E1.403	CH_2OCH_3	C-CN	C-Cl	CH	CH
E1.404	CH_2OCH_3	$C\text{-}OCH_3$	C-Cl	CH	CH
E1.405	CH_2OCH_3	$C\text{-}OCH_2CH_3$	C-Cl	CH	CH
E1.406	CH_2OCH_3	$C\text{-}OCH_2CH_2OCH_3$	C-Cl	CH	CH
E1.407	CH_2OCH_3	C-OH	C-Cl	CH	CH
E1.408	CH_2OCH_3	CH	C-Cl	CH	CH
E1.409	CH_2OCH_3	$C\text{-}CH_3$	$C\text{-}CH_3$	CH	CH
E1.410	CH_2OCH_3	$C\text{-}CH_2CH_3$	$C\text{-}CH_3$	CH	CH
E1.411	CH_2OCH_3	C-F	$C\text{-}CH_3$	CH	CH
E1.412	CH_2OCH_3	C-Cl	$C\text{-}CH_3$	CH	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.413	CH_2OCH_3	C-Br	C-CH_3	CH	CH
E1.414	CH_2OCH_3	C-CN	C-CH_3	CH	CH
E1.415	CH_2OCH_3	C-OCH_3	C-CH_3	CH	CH
E1.416	CH_2OCH_3	C-OCH_2CH_3	C-CH_3	CH	CH
E1.417	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	CH
E1.418	CH_2OCH_3	C-OH	C-CH_3	CH	CH
E1.419	CH_2OCH_3	CH	C-CH_3	CH	CH
E1.420	CH_2OCH_3	C-CH_3	C-CH_2CH_3	CH	CH
E1.421	CH_2OCH_3	C-CH_2CH_3	C-CH_2CH_3	CH	CH
E1.422	CH_2OCH_3	C-F	C-CH_2CH_3	CH	CH
E1.423	CH_2OCH_3	C-Cl	C-CH_2CH_3	CH	CH
E1.424	CH_2OCH_3	C-Br	C-CH_2CH_3	CH	CH
E1.425	CH_2OCH_3	C-CN	C-CH_2CH_3	CH	CH
E1.426	CH_2OCH_3	C-OCH_3	C-CH_2CH_3	CH	CH
E1.427	CH_2OCH_3	C-OCH_2CH_3	C-CH_2CH_3	CH	CH
E1.428	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH
E1.429	CH_2OCH_3	C-OH	C-CH_2CH_3	CH	CH
E1.430	CH_2OCH_3	CH	C-CH_2CH_3	CH	CH
E1.431	CH_2OCH_3	C-CH_3	C-CN	CH	CH
E1.432	CH_2OCH_3	C-CH_2CH_3	C-CN	CH	CH
E1.433	CH_2OCH_3	C-F	C-CN	CH	CH
E1.434	CH_2OCH_3	C-Cl	C-CN	CH	CH
E1.435	CH_2OCH_3	C-Br	C-CN	CH	CH
E1.436	CH_2OCH_3	C-CN	C-CN	CH	CH
E1.437	CH_2OCH_3	C-OCH_3	C-CN	CH	CH
E1.438	CH_2OCH_3	C-OCH_2CH_3	C-CN	CH	CH
E1.439	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-CN	CH	CH
E1.440	CH_2OCH_3	C-OH	C-CN	CH	CH
E1.441	CH_2OCH_3	CH	CH	CH	N
E1.442	CH_2OCH_3	C-CH_3	CH	CH	N
E1.443	CH_2OCH_3	C-CH_2CH_3	CH	CH	N
E1.444	CH_2OCH_3	C-F	CH	CH	N
E1.445	CH_2OCH_3	C-Cl	CH	CH	N
E1.446	CH_2OCH_3	C-Br	CH	CH	N
E1.447	CH_2OCH_3	C-CN	CH	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.448	CH_2OCH_3	C-OCH_3	CH	CH	N
E1.449	CH_2OCH_3	C-OCH_2CH_3	CH	CH	N
E1.450	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	CH	CH	N
E1.451	CH_2OCH_3	C-OH	CH	CH	N
E1.452	CH_2OCH_3	CH	N	CH	N
E1.453	CH_2OCH_3	C-CH_3	N	CH	N
E1.454	CH_2OCH_3	C-CH_2CH_3	N	CH	N
E1.455	CH_2OCH_3	C-F	N	CH	N
E1.456	CH_2OCH_3	C-Cl	N	CH	N
E1.457	CH_2OCH_3	C-Br	N	CH	N
E1.458	CH_2OCH_3	C-CN	N	CH	N
E1.459	CH_2OCH_3	C-OCH_3	N	CH	N
E1.460	CH_2OCH_3	C-OCH_2CH_3	N	CH	N
E1.461	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	N	CH	N
E1.462	CH_2OCH_3	C-OH	N	CH	N
E1.463	CH_2OCH_3	CH	CH	N	N
E1.464	CH_2OCH_3	C-CH_3	CH	N	N
E1.465	CH_2OCH_3	C-CH_2CH_3	CH	N	N
E1.466	CH_2OCH_3	C-F	CH	N	N
E1.467	CH_2OCH_3	C-Cl	CH	N	N
E1.468	CH_2OCH_3	C-Br	CH	N	N
E1.469	CH_2OCH_3	C-CN	CH	N	N
E1.470	CH_2OCH_3	C-OCH_3	CH	N	N
E1.471	CH_2OCH_3	C-OCH_2CH_3	CH	N	N
E1.472	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	CH	N	N
E1.473	CH_2OCH_3	C-OH	CH	N	N
E1.474	CH_2OCH_3	CH	C-F	CH	N
E1.475	CH_2OCH_3	C-CH_3	C-F	CH	N
E1.476	CH_2OCH_3	C-CH_2CH_3	C-F	CH	N
E1.477	CH_2OCH_3	C-F	C-F	CH	N
E1.478	CH_2OCH_3	C-Cl	C-F	CH	N
E1.479	CH_2OCH_3	C-Br	C-F	CH	N
E1.480	CH_2OCH_3	C-CN	C-F	CH	N
E1.481	CH_2OCH_3	C-OCH_3	C-F	CH	N
E1.482	CH_2OCH_3	C-OCH_2CH_3	C-F	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.483	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-F	CH	N
E1.484	CH_2OCH_3	C-OH	C-F	CH	N
E1.485	CH_2OCH_3	CH	C-Cl	CH	N
E1.486	CH_2OCH_3	C-CH_3	C-Cl	CH	N
E1.487	CH_2OCH_3	C-CH_2CH_3	C-Cl	CH	N
E1.488	CH_2OCH_3	C-F	C-Cl	CH	N
E1.489	CH_2OCH_3	C-Cl	C-Cl	CH	N
E1.490	CH_2OCH_3	C-Br	C-Cl	CH	N
E1.491	CH_2OCH_3	C-CN	C-Cl	CH	N
E1.492	CH_2OCH_3	C-OCH_3	C-Cl	CH	N
E1.493	CH_2OCH_3	C-OCH_2CH_3	C-Cl	CH	N
E1.494	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-Cl	CH	N
E1.495	CH_2OCH_3	C-OH	C-Cl	CH	N
E1.496	CH_2OCH_3	CH	C-CH_3	CH	N
E1.497	CH_2OCH_3	C-CH_3	C-CH_3	CH	N
E1.498	CH_2OCH_3	C-CH_2CH_3	C-CH_3	CH	N
E1.499	CH_2OCH_3	C-F	C-CH_3	CH	N
E1.500	CH_2OCH_3	C-Cl	C-CH_3	CH	N
E1.501	CH_2OCH_3	C-Br	C-CH_3	CH	N
E1.502	CH_2OCH_3	C-CN	C-CH_3	CH	N
E1.503	CH_2OCH_3	C-OCH_3	C-CH_3	CH	N
E1.504	CH_2OCH_3	C-OCH_2CH_3	C-CH_3	CH	N
E1.505	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	N
E1.506	CH_2OCH_3	C-OH	C-CH_3	CH	N
E1.507	CH_2OCH_3	CH	C-CH_2CH_3	CH	N
E1.508	CH_2OCH_3	C-CH_3	C-CH_2CH_3	CH	N
E1.509	CH_2OCH_3	C-CH_2CH_3	C-CH_2CH_3	CH	N
E1.510	CH_2OCH_3	C-F	C-CH_2CH_3	CH	N
E1.511	CH_2OCH_3	C-Cl	C-CH_2CH_3	CH	N
E1.512	CH_2OCH_3	C-Br	C-CH_2CH_3	CH	N
E1.513	CH_2OCH_3	C-CN	C-CH_2CH_3	CH	N
E1.514	CH_2OCH_3	C-OCH_3	C-CH_2CH_3	CH	N
E1.515	CH_2OCH_3	C-OCH_2CH_3	C-CH_2CH_3	CH	N
E1.516	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	N
E1.517	CH_2OCH_3	C-OH	C-CH_2CH_3	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.518	CH_2OCH_3	CH	C-CN	CH	N
E1.519	CH_2OCH_3	C-CH_3	C-CN	CH	N
E1.520	CH_2OCH_3	C-CH_2CH_3	C-CN	CH	N
E1.521	CH_2OCH_3	C-F	C-CN	CH	N
E1.522	CH_2OCH_3	C-Cl	C-CN	CH	N
E1.523	CH_2OCH_3	C-Br	C-CN	CH	N
E1.524	CH_2OCH_3	C-CN	C-CN	CH	N
E1.525	CH_2OCH_3	C-OCH_3	C-CN	CH	N
E1.526	CH_2OCH_3	C-OCH_2CH_3	C-CN	CH	N
E1.527	CH_2OCH_3	C-$OCH_2CH_2OCH_3$	C-CN	CH	N
E1.528	CH_2OCH_3	C-OH	C-CN	CH	N
E1.529	$CH_2CH_2OCH_3$	CH	CH	CH	CH
E1.530	$CH_2CH_2OCH_3$	C-CH_3	CH	CH	CH
E1.531	$CH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH	CH
E1.532	$CH_2CH_2OCH_3$	C-F	CH	CH	CH
E1.533	$CH_2CH_2OCH_3$	C-Cl	CH	CH	CH
E1.534	$CH_2CH_2OCH_3$	C-Br	CH	CH	CH
E1.535	$CH_2CH_2OCH_3$	C-CN	CH	CH	CH
E1.536	$CH_2CH_2OCH_3$	C-OCH_3	CH	CH	CH
E1.537	$CH_2CH_2OCH_3$	C-OCH_2CH_3	CH	CH	CH
E1.538	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	CH	CH	CH
E1.539	$CH_2CH_2OCH_3$	C-OH	CH	CH	CH
E1.540	$CH_2CH_2OCH_3$	CH	N	CH	CH
E1.541	$CH_2CH_2OCH_3$	C-CH_3	N	CH	CH
E1.542	$CH_2CH_2OCH_3$	C-CH_2CH_3	N	CH	CH
E1.543	$CH_2CH_2OCH_3$	C-F	N	CH	CH
E1.544	$CH_2CH_2OCH_3$	C-Cl	N	CH	CH
E1.545	$CH_2CH_2OCH_3$	C-Br	N	CH	CH
E1.546	$CH_2CH_2OCH_3$	C-CN	N	CH	CH
E1.547	$CH_2CH_2OCH_3$	C-OCH_3	N	CH	CH
E1.548	$CH_2CH_2OCH_3$	C-OCH_2CH_3	N	CH	CH
E1.549	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	N	CH	CH
E1.550	$CH_2CH_2OCH_3$	C-OH	N	CH	CH
E1.551	$CH_2CH_2OCH_3$	CH	CH	N	CH
E1.552	$CH_2CH_2OCH_3$	C-CH_3	CH	N	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.553	$CH_2CH_2OCH_3$	C-CH_2CH_3	CH	N	CH
E1.554	$CH_2CH_2OCH_3$	C-F	CH	N	CH
E1.555	$CH_2CH_2OCH_3$	C-Cl	CH	N	CH
E1.556	$CH_2CH_2OCH_3$	C-Br	CH	N	CH
E1.557	$CH_2CH_2OCH_3$	C-CN	CH	N	CH
E1.558	$CH_2CH_2OCH_3$	C-OCH_3	CH	N	CH
E1.559	$CH_2CH_2OCH_3$	C-OCH_2CH_3	CH	N	CH
E1.560	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	CH	N	CH
E1.561	$CH_2CH_2OCH_3$	C-OH	CH	N	CH
E1.562	$CH_2CH_2OCH_3$	CH	C-F	CH	CH
E1.563	$CH_2CH_2OCH_3$	C-CH_3	C-F	CH	CH
E1.564	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-F	CH	CH
E1.565	$CH_2CH_2OCH_3$	C-F	C-F	CH	CH
E1.566	$CH_2CH_2OCH_3$	C-Cl	C-F	CH	CH
E1.567	$CH_2CH_2OCH_3$	C-Br	C-F	CH	CH
E1.568	$CH_2CH_2OCH_3$	C-CN	C-F	CH	CH
E1.569	$CH_2CH_2OCH_3$	C-OCH_3	C-F	CH	CH
E1.570	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-F	CH	CH
E1.571	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-F	CH	CH
E1.572	$CH_2CH_2OCH_3$	C-OH	C-F	CH	CH
E1.573	$CH_2CH_2OCH_3$	CH	C-Cl	CH	CH
E1.574	$CH_2CH_2OCH_3$	C-CH_3	C-Cl	CH	CH
E1.575	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-Cl	CH	CH
E1.576	$CH_2CH_2OCH_3$	C-F	C-Cl	CH	CH
E1.577	$CH_2CH_2OCH_3$	C-Cl	C-Cl	CH	CH
E1.578	$CH_2CH_2OCH_3$	C-Br	C-Cl	CH	CH
E1.579	$CH_2CH_2OCH_3$	C-CN	C-Cl	CH	CH
E1.580	$CH_2CH_2OCH_3$	C-OCH_3	C-Cl	CH	CH
E1.581	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-Cl	CH	CH
E1.582	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-Cl	CH	CH
E1.583	$CH_2CH_2OCH_3$	C-OH	C-Cl	CH	CH
E1.584	$CH_2CH_2OCH_3$	CH	C-CH_3	CH	CH
E1.585	$CH_2CH_2OCH_3$	C-CH_3	C-CH_3	CH	CH
E1.586	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-CH_3	CH	CH
E1.587	$CH_2CH_2OCH_3$	C-F	C-CH_3	CH	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.588	$CH_2CH_2OCH_3$	C-Cl	C-CH_3	CH	CH
E1.589	$CH_2CH_2OCH_3$	C-Br	C-CH_3	CH	CH
E1.590	$CH_2CH_2OCH_3$	C-CN	C-CH_3	CH	CH
E1.591	$CH_2CH_2OCH_3$	C-OCH_3	C-CH_3	CH	CH
E1.592	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-CH_3	CH	CH
E1.593	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	CH
E1.594	$CH_2CH_2OCH_3$	C-OH	C-CH_3	CH	CH
E1.595	$CH_2CH_2OCH_3$	CH	C-CH_2CH_3	CH	CH
E1.596	$CH_2CH_2OCH_3$	C-CH_3	C-CH_2CH_3	CH	CH
E1.597	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-CH_2CH_3	CH	CH
E1.598	$CH_2CH_2OCH_3$	C-F	C-CH_2CH_3	CH	CH
E1.599	$CH_2CH_2OCH_3$	C-Cl	C-CH_2CH_3	CH	CH
E1.600	$CH_2CH_2OCH_3$	C-Br	C-CH_2CH_3	CH	CH
E1.601	$CH_2CH_2OCH_3$	C-CN	C-CH_2CH_3	CH	CH
E1.602	$CH_2CH_2OCH_3$	C-OCH_3	C-CH_2CH_3	CH	CH
E1.603	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-CH_2CH_3	CH	CH
E1.604	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH
E1.605	$CH_2CH_2OCH_3$	C-OH	C-CH_2CH_3	CH	CH
E1.606	$CH_2CH_2OCH_3$	CH	C-CN	CH	CH
E1.607	$CH_2CH_2OCH_3$	C-CH_3	C-CN	CH	CH
E1.608	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-CN	CH	CH
E1.609	$CH_2CH_2OCH_3$	C-F	C-CN	CH	CH
E1.610	$CH_2CH_2OCH_3$	C-Cl	C-CN	CH	CH
E1.611	$CH_2CH_2OCH_3$	C-Br	C-CN	CH	CH
E1.612	$CH_2CH_2OCH_3$	C-CN	C-CN	CH	CH
E1.613	$CH_2CH_2OCH_3$	C-OCH_3	C-CN	CH	CH
E1.614	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-CN	CH	CH
E1.615	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-CN	CH	CH
E1.616	$CH_2CH_2OCH_3$	C-OH	C-CN	CH	CH
E1.617	$CH_2CH_2OCH_3$	CH	CH	CH	N
E1.618	$CH_2CH_2OCH_3$	C-CH_3	CH	CH	N
E1.619	$CH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH	N
E1.620	$CH_2CH_2OCH_3$	C-F	CH	CH	N
E1.621	$CH_2CH_2OCH_3$	C-Cl	CH	CH	N
E1.622	$CH_2CH_2OCH_3$	C-Br	CH	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.623	$CH_2CH_2OCH_3$	C-CN	CH	CH	N
E1.624	$CH_2CH_2OCH_3$	C-OCH_3	CH	CH	N
E1.625	$CH_2CH_2OCH_3$	C-OCH_2CH_3	CH	CH	N
E1.626	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	CH	CH	N
E1.627	$CH_2CH_2OCH_3$	C-OH	CH	CH	N
E1.628	$CH_2CH_2OCH_3$	CH	N	CH	N
E1.629	$CH_2CH_2OCH_3$	C-CH_3	N	CH	N
E1.630	$CH_2CH_2OCH_3$	C-CH_2CH_3	N	CH	N
E1.631	$CH_2CH_2OCH_3$	C-F	N	CH	N
E1.632	$CH_2CH_2OCH_3$	C-Cl	N	CH	N
E1.633	$CH_2CH_2OCH_3$	C-Br	N	CH	N
E1.634	$CH_2CH_2OCH_3$	C-CN	N	CH	N
E1.635	$CH_2CH_2OCH_3$	C-OCH_3	N	CH	N
E1.636	$CH_2CH_2OCH_3$	C-OCH_2CH_3	N	CH	N
E1.637	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	N	CH	N
E1.638	$CH_2CH_2OCH_3$	C-OH	N	CH	N
E1.639	$CH_2CH_2OCH_3$	CH	CH	N	N
E1.640	$CH_2CH_2OCH_3$	C-CH_3	CH	N	N
E1.641	$CH_2CH_2OCH_3$	C-CH_2CH_3	CH	N	N
E1.642	$CH_2CH_2OCH_3$	C-F	CH	N	N
E1.643	$CH_2CH_2OCH_3$	C-Cl	CH	N	N
E1.644	$CH_2CH_2OCH_3$	C-Br	CH	N	N
E1.645	$CH_2CH_2OCH_3$	C-CN	CH	N	N
E1.646	$CH_2CH_2OCH_3$	C-OCH_3	CH	N	N
E1.647	$CH_2CH_2OCH_3$	C-OCH_2CH_3	CH	N	N
E1.648	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	CH	N	N
E1.649	$CH_2CH_2OCH_3$	C-OH	CH	N	N
E1.650	$CH_2CH_2OCH_3$	CH	C-F	CH	N
E1.651	$CH_2CH_2OCH_3$	C-CH_3	C-F	CH	N
E1.652	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-F	CH	N
E1.653	$CH_2CH_2OCH_3$	C-F	C-F	CH	N
E1.654	$CH_2CH_2OCH_3$	C-Cl	C-F	CH	N
E1.655	$CH_2CH_2OCH_3$	C-Br	C-F	CH	N
E1.656	$CH_2CH_2OCH_3$	C-CN	C-F	CH	N
E1.657	$CH_2CH_2OCH_3$	C-OCH_3	C-F	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.658	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-F	CH	N
E1.659	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-F	CH	N
E1.660	$CH_2CH_2OCH_3$	C-OH	C-F	CH	N
E1.661	$CH_2CH_2OCH_3$	CH	C-Cl	CH	N
E1.662	$CH_2CH_2OCH_3$	C-CH_3	C-Cl	CH	N
E1.663	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-Cl	CH	N
E1.664	$CH_2CH_2OCH_3$	C-F	C-Cl	CH	N
E1.665	$CH_2CH_2OCH_3$	C-Cl	C-Cl	CH	N
E1.666	$CH_2CH_2OCH_3$	C-Br	C-Cl	CH	N
E1.667	$CH_2CH_2OCH_3$	C-CN	C-Cl	CH	N
E1.668	$CH_2CH_2OCH_3$	C-OCH_3	C-Cl	CH	N
E1.669	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-Cl	CH	N
E1.670	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-Cl	CH	N
E1.671	$CH_2CH_2OCH_3$	C-OH	C-Cl	CH	N
E1.672	$CH_2CH_2OCH_3$	CH	C-CH_3	CH	N
E1.673	$CH_2CH_2OCH_3$	C-CH_3	C-CH_3	CH	N
E1.674	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-CH_3	CH	N
E1.675	$CH_2CH_2OCH_3$	C-F	C-CH_3	CH	N
E1.676	$CH_2CH_2OCH_3$	C-Cl	C-CH_3	CH	N
E1.677	$CH_2CH_2OCH_3$	C-Br	C-CH_3	CH	N
E1.678	$CH_2CH_2OCH_3$	C-CN	C-CH_3	CH	N
E1.679	$CH_2CH_2OCH_3$	C-OCH_3	C-CH_3	CH	N
E1.680	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-CH_3	CH	N
E1.681	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	N
E1.682	$CH_2CH_2OCH_3$	C-OH	C-CH_3	CH	N
E1.683	$CH_2CH_2OCH_3$	CH	C-CH_2CH_3	CH	N
E1.684	$CH_2CH_2OCH_3$	C-CH_3	C-CH_2CH_3	CH	N
E1.685	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-CH_2CH_3	CH	N
E1.686	$CH_2CH_2OCH_3$	C-F	C-CH_2CH_3	CH	N
E1.687	$CH_2CH_2OCH_3$	C-Cl	C-CH_2CH_3	CH	N
E1.688	$CH_2CH_2OCH_3$	C-Br	C-CH_2CH_3	CH	N
E1.689	$CH_2CH_2OCH_3$	C-CN	C-CH_2CH_3	CH	N
E1.690	$CH_2CH_2OCH_3$	C-OCH_3	C-CH_2CH_3	CH	N
E1.691	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-CH_2CH_3	CH	N
E1.692	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.693	$CH_2CH_2OCH_3$	C-OH	C-CH_2CH_3	CH	N
E1.694	$CH_2CH_2OCH_3$	CH	C-CN	CH	N
E1.695	$CH_2CH_2OCH_3$	C-CH_3	C-CN	CH	N
E1.696	$CH_2CH_2OCH_3$	C-CH_2CH_3	C-CN	CH	N
E1.697	$CH_2CH_2OCH_3$	C-F	C-CN	CH	N
E1.698	$CH_2CH_2OCH_3$	C-Cl	C-CN	CH	N
E1.699	$CH_2CH_2OCH_3$	C-Br	C-CN	CH	N
E1.700	$CH_2CH_2OCH_3$	C-CN	C-CN	CH	N
E1.701	$CH_2CH_2OCH_3$	C-OCH_3	C-CN	CH	N
E1.702	$CH_2CH_2OCH_3$	C-OCH_2CH_3	C-CN	CH	N
E1.703	$CH_2CH_2OCH_3$	C-$OCH_2CH_2OCH_3$	C-CN	CH	N
E1.704	$CH_2CH_2OCH_3$	C-OH	C-CN	CH	N
E1.705	CH_2CN	CH	CH	CH	CH
E1.706	CH_2CN	C-CH_3	CH	CH	CH
E1.707	CH_2CN	C-CH_2CH_3	CH	CH	CH
E1.708	CH_2CN	C-F	CH	CH	CH
E1.709	CH_2CN	C-Cl	CH	CH	CH
E1.710	CH_2CN	C-Br	CH	CH	CH
E1.711	CH_2CN	C-CN	CH	CH	CH
E1.712	CH_2CN	C-OCH_3	CH	CH	CH
E1.713	CH_2CN	C-OCH_2CH_3	CH	CH	CH
E1.714	CH_2CN	C-$OCH_2CH_2OCH_3$	CH	CH	CH
E1.715	CH_2CN	C-OH	CH	CH	CH
E1.716	CH_2CN	CH	N	CH	CH
E1.717	CH_2CN	C-CH_3	N	CH	CH
E1.718	CH_2CN	C-CH_2CH_3	N	CH	CH
E1.719	CH_2CN	C-F	N	CH	CH
E1.720	CH_2CN	C-Cl	N	CH	CH
E1.721	CH_2CN	C-Br	N	CH	CH
E1.722	CH_2CN	C-CN	N	CH	CH
E1.723	CH_2CN	C-OCH_3	N	CH	CH
E1.724	CH_2CN	C-OCH_2CH_3	N	CH	CH
E1.725	CH_2CN	C-$OCH_2CH_2OCH_3$	N	CH	CH
E1.726	CH_2CN	C-OH	N	CH	CH
E1.727	CH_2CN	CH	CH	N	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.728	CH_2CN	C-CH_3	CH	N	CH
E1.729	CH_2CN	C-CH_2CH_3	CH	N	CH
E1.730	CH_2CN	C-F	CH	N	CH
E1.731	CH_2CN	C-Cl	CH	N	CH
E1.732	CH_2CN	C-Br	CH	N	CH
E1.733	CH_2CN	C-CN	CH	N	CH
E1.734	CH_2CN	C-OCH_3	CH	N	CH
E1.735	CH_2CN	C-OCH_2CH_3	CH	N	CH
E1.736	CH_2CN	C-$OCH_2CH_2OCH_3$	CH	N	CH
E1.737	CH_2CN	C-OH	CH	N	CH
E1.738	CH_2CN	CH	C-F	CH	CH
E1.739	CH_2CN	C-CH_3	C-F	CH	CH
E1.740	CH_2CN	C-CH_2CH_3	C-F	CH	CH
E1.741	CH_2CN	C-F	C-F	CH	CH
E1.742	CH_2CN	C-Cl	C-F	CH	CH
E1.743	CH_2CN	C-Br	C-F	CH	CH
E1.744	CH_2CN	C-CN	C-F	CH	CH
E1.745	CH_2CN	C-OCH_3	C-F	CH	CH
E1.746	CH_2CN	C-OCH_2CH_3	C-F	CH	CH
E1.747	CH_2CN	C-$OCH_2CH_2OCH_3$	C-F	CH	CH
E1.748	CH_2CN	C-OH	C-F	CH	CH
E1.749	CH_2CN	CH	C-Cl	CH	CH
E1.750	CH_2CN	C-CH_3	C-Cl	CH	CH
E1.751	CH_2CN	C-CH_2CH_3	C-Cl	CH	CH
E1.752	CH_2CN	C-F	C-Cl	CH	CH
E1.753	CH_2CN	C-Cl	C-Cl	CH	CH
E1.754	CH_2CN	C-Br	C-Cl	CH	CH
E1.755	CH_2CN	C-CN	C-Cl	CH	CH
E1.756	CH_2CN	C-OCH_3	C-Cl	CH	CH
E1.757	CH_2CN	C-OCH_2CH_3	C-Cl	CH	CH
E1.758	CH_2CN	C-$OCH_2CH_2OCH_3$	C-Cl	CH	CH
E1.759	CH_2CN	C-OH	C-Cl	CH	CH
E1.760	CH_2CN	CH	C-CH_3	CH	CH
E1.761	CH_2CN	C-CH_3	C-CH_3	CH	CH
E1.762	CH_2CN	C-CH_2CH_3	C-CH_3	CH	CH

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.763	CH_2CN	C-F	$C\text{-}CH_3$	CH	CH
E1.764	CH_2CN	C-Cl	$C\text{-}CH_3$	CH	CH
E1.765	CH_2CN	C-Br	$C\text{-}CH_3$	CH	CH
E1.766	CH_2CN	C-CN	$C\text{-}CH_3$	CH	CH
E1.767	CH_2CN	$C\text{-}OCH_3$	$C\text{-}CH_3$	CH	CH
E1.768	CH_2CN	$C\text{-}OCH_2CH_3$	$C\text{-}CH_3$	CH	CH
E1.769	CH_2CN	$C\text{-}OCH_2CH_2OCH_3$	$C\text{-}CH_3$	CH	CH
E1.770	CH_2CN	C-OH	$C\text{-}CH_3$	CH	CH
E1.771	CH_2CN	CH	$C\text{-}CH_2CH_3$	CH	CH
E1.772	CH_2CN	$C\text{-}CH_3$	$C\text{-}CH_2CH_3$	CH	CH
E1.773	CH_2CN	$C\text{-}CH_2CH_3$	$C\text{-}CH_2CH_3$	CH	CH
E1.774	CH_2CN	C-F	$C\text{-}CH_2CH_3$	CH	CH
E1.775	CH_2CN	C-Cl	$C\text{-}CH_2CH_3$	CH	CH
E1.776	CH_2CN	C-Br	$C\text{-}CH_2CH_3$	CH	CH
E1.777	CH_2CN	C-CN	$C\text{-}CH_2CH_3$	CH	CH
E1.778	CH_2CN	$C\text{-}OCH_3$	$C\text{-}CH_2CH_3$	CH	CH
E1.779	CH_2CN	$C\text{-}OCH_2CH_3$	$C\text{-}CH_2CH_3$	CH	CH
E1.780	CH_2CN	$C\text{-}OCH_2CH_2OCH_3$	$C\text{-}CH_2CH_3$	CH	CH
E1.781	CH_2CN	C-OH	$C\text{-}CH_2CH_3$	CH	CH
E1.782	CH_2CN	CH	C-CN	CH	CH
E1.783	CH_2CN	$C\text{-}CH_3$	C-CN	CH	CH
E1.784	CH_2CN	$C\text{-}CH_2CH_3$	C-CN	CH	CH
E1.785	CH_2CN	C-F	C-CN	CH	CH
E1.786	CH_2CN	C-Cl	C-CN	CH	CH
E1.787	CH_2CN	C-Br	C-CN	CH	CH
E1.788	CH_2CN	C-CN	C-CN	CH	CH
E1.789	CH_2CN	$C\text{-}OCH_3$	C-CN	CH	CH
E1.790	CH_2CN	$C\text{-}OCH_2CH_3$	C-CN	CH	CH
E1.791	CH_2CN	$C\text{-}OCH_2CH_2OCH_3$	C-CN	CH	CH
E1.792	CH_2CN	C-OH	C-CN	CH	CH
E1.793	CH_2CN	CH	CH	CH	N
E1.794	CH_2CN	$C\text{-}CH_3$	CH	CH	N
E1.795	CH_2CN	$C\text{-}CH_2CH_3$	CH	CH	N
E1.796	CH_2CN	C-F	CH	CH	N
E1.797	CH_2CN	C-Cl	CH	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.798	CH_2CN	C-Br	CH	CH	N
E1.799	CH_2CN	C-CN	CH	CH	N
E1.800	CH_2CN	C-OCH_3	CH	CH	N
E1.801	CH_2CN	C-OCH_2CH_3	CH	CH	N
E1.802	CH_2CN	C-$OCH_2CH_2OCH_3$	CH	CH	N
E1.803	CH_2CN	C-OH	CH	CH	N
E1.804	CH_2CN	CH	N	CH	N
E1.805	CH_2CN	C-CH_3	N	CH	N
E1.806	CH_2CN	C-CH_2CH_3	N	CH	N
E1.807	CH_2CN	C-F	N	CH	N
E1.808	CH_2CN	C-Cl	N	CH	N
E1.809	CH_2CN	C-Br	N	CH	N
E1.810	CH_2CN	C-CN	N	CH	N
E1.811	CH_2CN	C-OCH_3	N	CH	N
E1.812	CH_2CN	C-OCH_2CH_3	N	CH	N
E1.813	CH_2CN	C-$OCH_2CH_2OCH_3$	N	CH	N
E1.814	CH_2CN	C-OH	N	CH	N
E1.815	CH_2CN	CH	CH	N	N
E1.816	CH_2CN	C-CH_3	CH	N	N
E1.817	CH_2CN	C-CH_2CH_3	CH	N	N
E1.818	CH_2CN	C-F	CH	N	N
E1.819	CH_2CN	C-Cl	CH	N	N
E1.820	CH_2CN	C-Br	CH	N	N
E1.821	CH_2CN	C-CN	CH	N	N
E1.822	CH_2CN	C-OCH_3	CH	N	N
E1.823	CH_2CN	C-OCH_2CH_3	CH	N	N
E1.824	CH_2CN	C-$OCH_2CH_2OCH_3$	CH	N	N
E1.825	CH_2CN	C-OH	CH	N	N
E1.826	CH_2CN	CH	C-F	CH	N
E1.827	CH_2CN	C-CH_3	C-F	CH	N
E1.828	CH_2CN	C-CH_2CH_3	C-F	CH	N
E1.829	CH_2CN	C-F	C-F	CH	N
E1.830	CH_2CN	C-Cl	C-F	CH	N
E1.831	CH_2CN	C-Br	C-F	CH	N
E1.832	CH_2CN	C-CN	C-F	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.833	CH_2CN	C-OCH_3	C-F	CH	N
E1.834	CH_2CN	C-OCH_2CH_3	C-F	CH	N
E1.835	CH_2CN	C-$OCH_2CH_2OCH_3$	C-F	CH	N
E1.836	CH_2CN	C-OH	C-F	CH	N
E1.837	CH_2CN	CH	C-Cl	CH	N
E1.838	CH_2CN	C-CH_3	C-Cl	CH	N
E1.839	CH_2CN	C-CH_2CH_3	C-Cl	CH	N
E1.840	CH_2CN	C-F	C-Cl	CH	N
E1.841	CH_2CN	C-Cl	C-Cl	CH	N
E1.842	CH_2CN	C-Br	C-Cl	CH	N
E1.843	CH_2CN	C-CN	C-Cl	CH	N
E1.844	CH_2CN	C-OCH_3	C-Cl	CH	N
E1.845	CH_2CN	C-OCH_2CH_3	C-Cl	CH	N
E1.846	CH_2CN	C-$OCH_2CH_2OCH_3$	C-Cl	CH	N
E1.847	CH_2CN	C-OH	C-Cl	CH	N
E1.848	CH_2CN	CH	C-CH_3	CH	N
E1.849	CH_2CN	C-CH_3	C-CH_3	CH	N
E1.850	CH_2CN	C-CH_2CH_3	C-CH_3	CH	N
E1.851	CH_2CN	C-F	C-CH_3	CH	N
E1.852	CH_2CN	C-Cl	C-CH_3	CH	N
E1.853	CH_2CN	C-Br	C-CH_3	CH	N
E1.854	CH_2CN	C-CN	C-CH_3	CH	N
E1.855	CH_2CN	C-OCH_3	C-CH_3	CH	N
E1.856	CH_2CN	C-OCH_2CH_3	C-CH_3	CH	N
E1.857	CH_2CN	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	N
E1.858	CH_2CN	C-OH	C-CH_3	CH	N
E1.859	CH_2CN	CH	C-CH_2CH_3	CH	N
E1.860	CH_2CN	C-CH_3	C-CH_2CH_3	CH	N
E1.861	CH_2CN	C-CH_2CH_3	C-CH_2CH_3	CH	N
E1.862	CH_2CN	C-F	C-CH_2CH_3	CH	N
E1.863	CH_2CN	C-Cl	C-CH_2CH_3	CH	N
E1.864	CH_2CN	C-Br	C-CH_2CH_3	CH	N
E1.865	CH_2CN	C-CN	C-CH_2CH_3	CH	N
E1.866	CH_2CN	C-OCH_3	C-CH_2CH_3	CH	N
E1.867	CH_2CN	C-OCH_2CH_3	C-CH_2CH_3	CH	N

Compound	R^4	A^{2c}	A^{2b}	A^{2a}	A^1
E1.868	CH_2CN	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	N
E1.869	CH_2CN	C-OH	C-CH_2CH_3	CH	N
E1.870	CH_2CN	CH	C-CN	CH	N
E1.871	CH_2CN	C-CH_3	C-CN	CH	N
E1.872	CH_2CN	C-CH_2CH_3	C-CN	CH	N
E1.873	CH_2CN	C-F	C-CN	CH	N
E1.874	CH_2CN	C-Cl	C-CN	CH	N
E1.875	CH_2CN	C-Br	C-CN	CH	N
E1.876	CH_2CN	C-CN	C-CN	CH	N
E1.877	CH_2CN	C-OCH_3	C-CN	CH	N
E1.878	CH_2CN	C-OCH_2CH_3	C-CN	CH	N
E1.879	CH_2CN	C-$OCH_2CH_2OCH_3$	C-CN	CH	N
E1.880	CH_2CN	C-OH	C-CN	CH	N

Table 1.2: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is methoxy and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.3: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is methoxy and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.4: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is methoxy and R^5 is methyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.5: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is methoxy and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.6: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is methoxy and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.7: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is methoxy and R^5 is methyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.8: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is methoxy and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.9: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is methoxy and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.10: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is fluoro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.11: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is fluoro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.12: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is fluoro and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.13: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is fluoro and R^5 is methyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.14: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is fluoro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.15: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is fluoro and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.16: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is fluoro and R^5 is methyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.17: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is fluoro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.18: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is fluoro and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.19: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is chloro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.20: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is chloro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.21: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H, R^3 is chloro and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.22: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is chloro and R^5 is methyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.23: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is chloro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.24: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H, R^3 is chloro and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

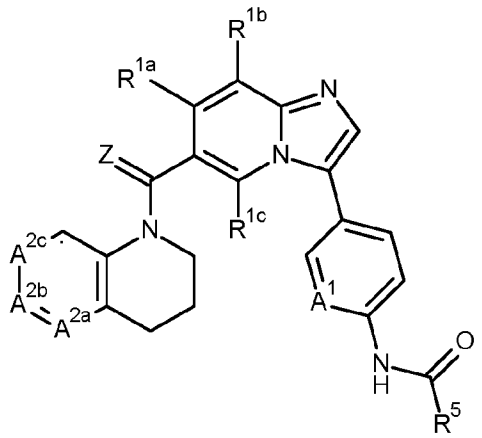
Table 1.25: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is chloro and R^5 is methyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.26: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is chloro and R^5 is methoxy and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

Table 1.27: This table discloses specific compounds of formula (Ia) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H, R^3 is chloro and R^5 is cyclopropyl and wherein the values of R^4, A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.1.

The compounds in Tables 2.1 to 2.45 below illustrate the compounds of the invention.

Table 2.1 provides compounds of formula (Ib)



(Ib)

wherein Z is O; and wherein A^3 and R^4 taken together form the depicted ring;

R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methyl; and

the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2 below.

Each of Tables 2.1 to 2.45 (which follow Table Z.2) discloses individual compounds of the formula (Ib), formula (Ic), formula (Id), formula (Ie), and formula (If)in which R^{1a}, R^{1b}, R^{1c}, and R^5 are specifically defined in Tables 2.1 to 2.45, which refer to Table Z.2 wherein A^{2c}, A^{2b}, A^{2a} and A^1 are specifically defined.

Table Z.2

Compound	A^{2c}	A^{2b}	A^{2a}	A^{1}
E2.1	CH	CH	CH	CH
E2.2	C-CH_3	CH	CH	CH
E2.3	C-CH_2CH_3	CH	CH	CH
E2.4	C-F	CH	CH	CH
E2.5	C-Cl	CH	CH	CH
E2.6	C-Br	CH	CH	CH
E2.7	C-CN	CH	CH	CH
E2.8	C-OCH_3	CH	CH	CH
E2.9	C-OCH_2CH_3	CH	CH	CH
E2.10	C-$OCH_2CH_2OCH_3$	CH	CH	CH
E2.11	C-OH	CH	CH	CH
E2.12	CH	N	CH	CH
E2.13	C-CH_3	N	CH	CH
E2.14	C-CH_2CH_3	N	CH	CH
E2.15	C-F	N	CH	CH
E2.16	C-Cl	N	CH	CH
E2.17	C-Br	N	CH	CH
E2.18	C-CN	N	CH	CH
E2.19	C-OCH_3	N	CH	CH
E2.20	C-OCH_2CH_3	N	CH	CH
E2.21	C-$OCH_2CH_2OCH_3$	N	CH	CH
E2.22	C-OH	N	CH	CH
E2.23	CH	CH	N	CH
E2.24	C-CH_3	CH	N	CH
E2.25	C-CH_2CH_3	CH	N	CH
E2.26	C-F	CH	N	CH
E2.27	C-Cl	CH	N	CH
E2.28	C-Br	CH	N	CH
E2.29	C-CN	CH	N	CH
E2.30	C-OCH_3	CH	N	CH
E2.31	C-OCH_2CH_3	CH	N	CH
E2.32	C-$OCH_2CH_2OCH_3$	CH	N	CH
E2.33	C-OH	CH	N	CH
E2.34	CH	C-F	CH	CH

Compound	A^{2c}	A^{2b}	A^{2a}	A^{1}
E2.35	C-CH_3	C-F	CH	CH
E2.36	C-CH_2CH_3	C-F	CH	CH
E2.37	C-F	C-F	CH	CH
E2.38	C-Cl	C-F	CH	CH
E2.39	C-Br	C-F	CH	CH
E2.40	C-CN	C-F	CH	CH
E2.41	C-OCH_3	C-F	CH	CH
E2.42	C-OCH_2CH_3	C-F	CH	CH
E2.43	C-$OCH_2CH_2OCH_3$	C-F	CH	CH
E2.44	C-OH	C-F	CH	CH
E2.45	CH	C-Cl	CH	CH
E2.46	C-CH_3	C-Cl	CH	CH
E2.47	C-CH_2CH_3	C-Cl	CH	CH
E2.48	C-F	C-Cl	CH	CH
E2.49	C-Cl	C-Cl	CH	CH
E2.50	C-Br	C-Cl	CH	CH
E2.51	C-CN	C-Cl	CH	CH
E2.52	C-OCH_3	C-Cl	CH	CH
E2.53	C-OCH_2CH_3	C-Cl	CH	CH
E2.54	C-$OCH_2CH_2OCH_3$	C-Cl	CH	CH
E2.55	C-OH	C-Cl	CH	CH
E2.56	CH	C-CH_3	CH	CH
E2.57	C-CH_3	C-CH_3	CH	CH
E2.58	C-CH_2CH_3	C-CH_3	CH	CH
E2.59	C-F	C-CH_3	CH	CH
E2.60	C-Cl	C-CH_3	CH	CH
E2.61	C-Br	C-CH_3	CH	CH
E2.62	C-CN	C-CH_3	CH	CH
E2.63	C-OCH_3	C-CH_3	CH	CH
E2.64	C-OCH_2CH_3	C-CH_3	CH	CH
E2.65	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	CH
E2.66	C-OH	C-CH_3	CH	CH
E2.67	CH	C-CH_2CH_3	CH	CH
E2.68	C-CH_3	C-CH_2CH_3	CH	CH
E2.69	C-CH_2CH_3	C-CH_2CH_3	CH	CH

Compound	A^{2c}	A^{2b}	A^{2a}	A^{1}
E2.70	C-F	C-CH_2CH_3	CH	CH
E2.71	C-Cl	C-CH_2CH_3	CH	CH
E2.72	C-Br	C-CH_2CH_3	CH	CH
E2.73	C-CN	C-CH_2CH_3	CH	CH
E2.74	C-OCH_3	C-CH_2CH_3	CH	CH
E2.75	C-OCH_2CH_3	C-CH_2CH_3	CH	CH
E2.76	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	CH
E2.77	C-OH	C-CH_2CH_3	CH	CH
E2.78	CH	C-CN	CH	CH
E2.79	C-CH_3	C-CN	CH	CH
E2.80	C-CH_2CH_3	C-CN	CH	CH
E2.81	C-F	C-CN	CH	CH
E2.82	C-Cl	C-CN	CH	CH
E2.83	C-Br	C-CN	CH	CH
E2.84	C-CN	C-CN	CH	CH
E2.85	C-OCH_3	C-CN	CH	CH
E2.86	C-OCH_2CH_3	C-CN	CH	CH
E2.87	C-$OCH_2CH_2OCH_3$	C-CN	CH	CH
E2.88	C-OH	C-CN	CH	CH
E2.89	CH	CH	CH	N
E2.90	C-CH_3	CH	CH	N
E2.91	C-CH_2CH_3	CH	CH	N
E2.92	C-F	CH	CH	N
E2.93	C-Cl	CH	CH	N
E2.94	C-Br	CH	CH	N
E2.95	C-CN	CH	CH	N
E2.96	C-OCH_3	CH	CH	N
E2.97	C-OCH_2CH_3	CH	CH	N
E2.98	C-$OCH_2CH_2OCH_3$	CH	CH	N
E2.99	C-OH	CH	CH	N
E2.100	CH	N	CH	N
E2.101	C-CH_3	N	CH	N
E2.102	C-CH_2CH_3	N	CH	N
E2.103	C-F	N	CH	N
E2.104	C-Cl	N	CH	N

Compound	A^{2c}	A^{2b}	A^{2a}	A^{1}
E2.105	C-Br	N	CH	N
E2.106	C-CN	N	CH	N
E2.107	C-OCH_3	N	CH	N
E2.108	C-OCH_2CH_3	N	CH	N
E2.109	C-$OCH_2CH_2OCH_3$	N	CH	N
E2.110	C-OH	N	CH	N
E2.111	CH	CH	N	N
E2.112	C-CH_3	CH	N	N
E2.113	C-CH_2CH_3	CH	N	N
E2.114	C-F	CH	N	N
E2.115	C-Cl	CH	N	N
E2.116	C-Br	CH	N	N
E2.117	C-CN	CH	N	N
E2.118	C-OCH_3	CH	N	N
E2.119	C-OCH_2CH_3	CH	N	N
E2.120	C-$OCH_2CH_2OCH_3$	CH	N	N
E2.121	C-OH	CH	N	N
E2.122	CH	C-F	CH	N
E2.123	C-CH_3	C-F	CH	N
E2.124	C-CH_2CH_3	C-F	CH	N
E2.125	C-F	C-F	CH	N
E2.126	C-Cl	C-F	CH	N
E2.127	C-Br	C-F	CH	N
E2.128	C-CN	C-F	CH	N
E2.129	C-OCH_3	C-F	CH	N
E2.130	C-OCH_2CH_3	C-F	CH	N
E2.131	C-$OCH_2CH_2OCH_3$	C-F	CH	N
E2.132	C-OH	C-F	CH	N
E2.133	CH	C-Cl	CH	N
E2.134	C-CH_3	C-Cl	CH	N
E2.135	C-CH_2CH_3	C-Cl	CH	N
E2.136	C-F	C-Cl	CH	N
E2.137	C-Cl	C-Cl	CH	N
E2.138	C-Br	C-Cl	CH	N
E2.139	C-CN	C-Cl	CH	N

Compound	A^{2c}	A^{2b}	A^{2a}	A^{1}
E2.140	C-OCH_3	C-Cl	CH	N
E2.141	C-OCH_2CH_3	C-Cl	CH	N
E2.142	C-$OCH_2CH_2OCH_3$	C-Cl	CH	N
E2.143	C-OH	C-Cl	CH	N
E2.144	CH	C-CH_3	CH	N
E2.145	C-CH_3	C-CH_3	CH	N
E2.146	C-CH_2CH_3	C-CH_3	CH	N
E2.147	C-F	C-CH_3	CH	N
E2.148	C-Cl	C-CH_3	CH	N
E2.149	C-Br	C-CH_3	CH	N
E2.150	C-CN	C-CH_3	CH	N
E2.151	C-OCH_3	C-CH_3	CH	N
E2.152	C-OCH_2CH_3	C-CH_3	CH	N
E2.153	C-$OCH_2CH_2OCH_3$	C-CH_3	CH	N
E2.154	C-OH	C-CH_3	CH	N
E2.155	CH	C-CH_2CH_3	CH	N
E2.156	C-CH_3	C-CH_2CH_3	CH	N
E2.157	C-CH_2CH_3	C-CH_2CH_3	CH	N
E2.158	C-F	C-CH_2CH_3	CH	N
E2.159	C-Cl	C-CH_2CH_3	CH	N
E2.160	C-Br	C-CH_2CH_3	CH	N
E2.161	C-CN	C-CH_2CH_3	CH	N
E2.162	C-OCH_3	C-CH_2CH_3	CH	N
E2.163	C-OCH_2CH_3	C-CH_2CH_3	CH	N
E2.164	C-$OCH_2CH_2OCH_3$	C-CH_2CH_3	CH	N
E2.165	C-OH	C-CH_2CH_3	CH	N
E2.166	CH	C-CN	CH	N
E2.167	C-CH_3	C-CN	CH	N
E2.168	C-CH_2CH_3	C-CN	CH	N
E2.169	C-F	C-CN	CH	N
E2.170	C-Cl	C-CN	CH	N
E2.171	C-Br	C-CN	CH	N
E2.172	C-CN	C-CN	CH	N
E2.173	C-OCH_3	C-CN	CH	N
E2.174	C-OCH_2CH_3	C-CN	CH	N

Compound	A^{2c}	A^{2b}	A^{2a}	A^1
E2.175	C-$OCH_2CH_2OCH_3$	C-CN	CH	N
E2.176	C-OH	C-CN	CH	N

Table 2.2: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.3: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.4: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.5: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

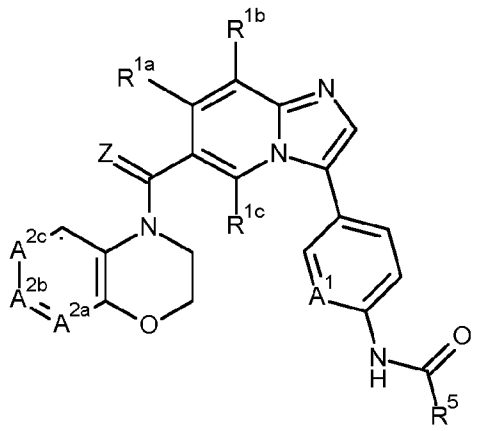
Table 2.6: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.7: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.8: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.9: This table discloses specific compounds of formula (Ib) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.10 provides compounds of formula (Ic)



(Ic)

wherein Z is O; and wherein A^3 and R^4 taken together form the depicted ring;
wherein R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methyl; and
the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2 above.

Table 2.11: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.12: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.13: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.14: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

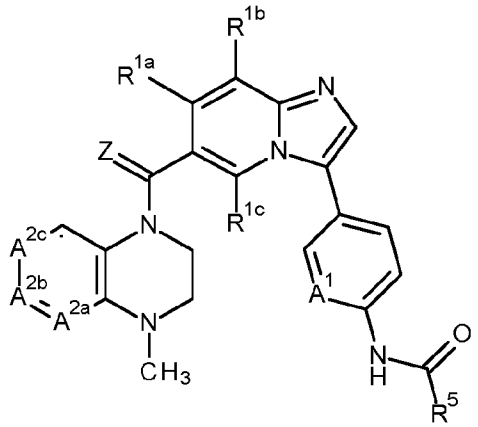
Table 2.15: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.16: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.17: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.18: This table discloses specific compounds of formula (Ic) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.19 provides compounds of formula (Id)



(Id)

wherein Z is O; and wherein A^3 and R^4 taken together form the depicted ring

R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methyl; and

the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2 above.

Table 2.20: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.21: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.22: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.23: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

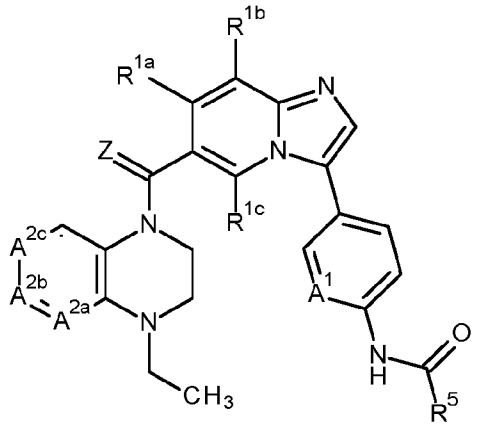
Table 2.24: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.25: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.26: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.27: This table discloses specific compounds of formula (Id) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.28 provides compounds of formula (Ie)



(Ie)

wherein Z is O; and wherein A^3 and R^4 taken together form the depicted ring

R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methyl; and

the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2 above.

Table 2.29: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.30: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.31: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.32: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

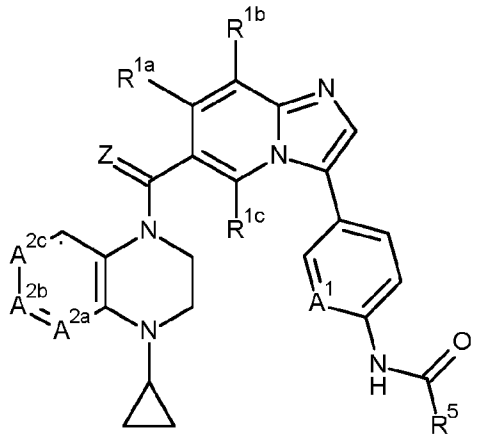
Table 2.33: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.34: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.35: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.36: This table discloses specific compounds of formula (Ie) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.37 provides compounds of formula (If)



(If)

wherein Z is O; and wherein A^3 and R^4 taken together form the depicted ring

R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methyl; and

the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2 above.

Table 2.38: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.39: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is H, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.40: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.41: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.42: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is methyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

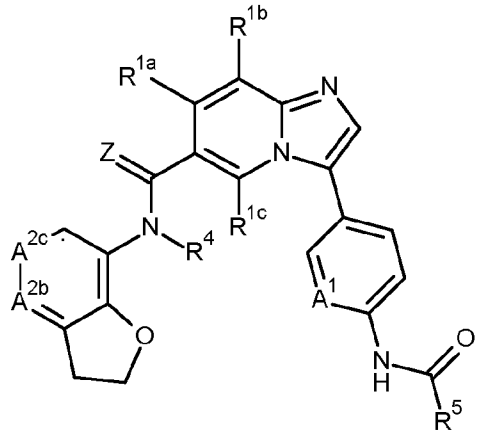
Table 2.43: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.44: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is methoxy, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

Table 2.45: This table discloses specific compounds of formula (If) wherein Z is O, R^{1a} is H, R^{1b} is methoxymethyl, R^{1c} is H and R^5 is cyclopropyl, and wherein the values of A^{2c}, A^{2b}, A^{2a} and A^1 are as defined in Table Z.2.

The compounds in Tables 3.1 to 3.55 below illustrate the compounds of the invention.

Table 3.1: This table discloses specific compounds of formula (Ig)



(Ig)

wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CH, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3 below.

Table Z.3: Substituent definitions of R^{1b}, A^1, A^{2b} and R^5:

Compound	A^1	A^{2b}	R^5	R^{1b}
E3.1	CH	CH	CH_3	H

E3.2	CH	CH	OCH_3	H
E3.3	CH	CH	cyclopropyl	H
E3.4	CH	CH	CH_2OCH_3	H
E3.5	CH	N	CH_3	H
E3.6	CH	N	OCH_3	H
E3.7	CH	N	cyclopropyl	H
E3.8	CH	N	CH_2OCH_3	H
E3.9	CH	CF	CH_3	H
E3.10	CH	CF	OCH_3	H
E3.11	CH	CF	cyclopropyl	H
E3.12	CH	CF	CH_2OCH_3	H
E3.13	CH	CCl	CH_3	H
E3.14	CH	CCl	OCH_3	H
E3.15	CH	CCl	cyclopropyl	H
E3.16	CH	CCl	CH_2OCH_3	H
E3.17	CH	CCH_3	CH_3	H
E3.18	CH	CCH_3	OCH_3	H
E3.19	CH	CCH_3	cyclopropyl	H
E3.20	CH	CCH_3	CH_2OCH_3	H
E3.21	CH	CCH_2CH_3	CH_3	H
E3.22	CH	CCH_2CH_3	OCH_3	H
E3.23	CH	CCH_2CH_3	cyclopropyl	H
E3.24	CH	CCH_2CH_3	CH_2OCH_3	H
E3.25	CH	CCN	CH_3	H
E3.26	CH	CCN	OCH_3	H
E3.27	CH	CCN	cyclopropyl	H
E3.28	CH	CCN	CH_2OCH_3	H
E3.29	CH	$CC(O)OCH_3$	CH_3	H
E3.30	CH	$CC(O)OCH_3$	OCH_3	H
E3.31	CH	$CC(O)OCH_3$	cyclopropyl	H
E3.32	CH	$CC(O)OCH_3$	CH_2OCH_3	H
E3.33	N	CH	CH_3	H
E3.34	N	CH	OCH_3	H
E3.35	N	CH	cyclopropyl	H
E3.36	N	CH	CH_2OCH_3	H
E3.37	N	N	CH_3	H

E3.38	N	N	OCH_3	H
E3.39	N	N	cyclopropyl	H
E3.40	N	N	CH_2OCH_3	H
E3.41	N	CF	CH_3	H
E3.42	N	CF	OCH_3	H
E3.43	N	CF	cyclopropyl	H
E3.44	N	CF	CH_2OCH_3	H
E3.45	N	CCl	CH_3	H
E3.46	N	CCl	OCH_3	H
E3.47	N	CCl	cyclopropyl	H
E3.48	N	CCl	CH_2OCH_3	H
E3.49	N	CCH_3	CH_3	H
E3.50	N	CCH_3	OCH_3	H
E3.51	N	CCH_3	cyclopropyl	H
E3.52	N	CCH_3	CH_2OCH_3	H
E3.53	N	CCH_2CH_3	CH_3	H
E3.54	N	CCH_2CH_3	OCH_3	H
E3.55	N	CCH_2CH_3	cyclopropyl	H
E3.56	N	CCH_2CH_3	CH_2OCH_3	H
E3.57	N	CCN	CH_3	H
E3.58	N	CCN	OCH_3	H
E3.59	N	CCN	cyclopropyl	H
E3.60	N	CCN	CH_2OCH_3	H
E3.61	N	$CC(O)OCH_3$	CH_3	H
E3.62	N	$CC(O)OCH_3$	OCH_3	H
E3.63	N	$CC(O)OCH_3$	cyclopropyl	H
E3.64	N	$CC(O)OCH_3$	CH_2OCH_3	H
E3.65	CH	CH	CH_3	CH_3
E3.66	CH	CH	OCH_3	CH_3
E3.67	CH	CH	cyclopropyl	CH_3
E3.68	CH	CH	CH_2OCH_3	CH_3
E3.69	CH	N	CH_3	CH_3
E3.70	CH	N	OCH_3	CH_3
E3.71	CH	N	cyclopropyl	CH_3
E3.72	CH	N	CH_2OCH_3	CH_3
E3.73	CH	CF	CH_3	CH_3

E3.74	CH	CF	OCH_3	CH_3
E3.75	CH	CF	cyclopropyl	CH_3
E3.76	CH	CF	CH_2OCH_3	CH_3
E3.77	CH	CCl	CH_3	CH_3
E3.78	CH	CCl	OCH_3	CH_3
E3.79	CH	CCl	cyclopropyl	CH_3
E3.80	CH	CCl	CH_2OCH_3	CH_3
E3.81	CH	CCH_3	CH_3	CH_3
E3.82	CH	CCH_3	OCH_3	CH_3
E3.83	CH	CCH_3	cyclopropyl	CH_3
E3.84	CH	CCH_3	CH_2OCH_3	CH_3
E3.85	CH	CCH_2CH_3	CH_3	CH_3
E3.86	CH	CCH_2CH_3	OCH_3	CH_3
E3.87	CH	CCH_2CH_3	cyclopropyl	CH_3
E3.88	CH	CCH_2CH_3	CH_2OCH_3	CH_3
E3.89	CH	CCN	CH_3	CH_3
E3.90	CH	CCN	OCH_3	CH_3
E3.91	CH	CCN	cyclopropyl	CH_3
E3.92	CH	CCN	CH_2OCH_3	CH_3
E3.93	CH	$CC(O)OCH_3$	CH_3	CH_3
E3.94	CH	$CC(O)OCH_3$	OCH_3	CH_3
E3.95	CH	$CC(O)OCH_3$	cyclopropyl	CH_3
E3.96	CH	$CC(O)OCH_3$	CH_2OCH_3	CH_3
E3.97	N	CH	CH_3	CH_3
E3.98	N	CH	OCH_3	CH_3
E3.99	N	CH	cyclopropyl	CH_3
E3.100	N	CH	CH_2OCH_3	CH_3
E3.101	N	N	CH_3	CH_3
E3.102	N	N	OCH_3	CH_3
E3.103	N	N	cyclopropyl	CH_3
E3.104	N	N	CH_2OCH_3	CH_3
E3.105	N	CF	CH_3	CH_3
E3.106	N	CF	OCH_3	CH_3
E3.107	N	CF	cyclopropyl	CH_3
E3.108	N	CF	CH_2OCH_3	CH_3
E3.109	N	CCl	CH_3	CH_3

E3.110	N	CCl	OCH_3	CH_3
E3.111	N	CCl	cyclopropyl	CH_3
E3.112	N	CCl	CH_2OCH_3	CH_3
E3.113	N	CCH_3	CH_3	CH_3
E3.114	N	CCH_3	OCH_3	CH_3
E3.115	N	CCH_3	cyclopropyl	CH_3
E3.116	N	CCH_3	CH_2OCH_3	CH_3
E3.117	N	CCH_2CH_3	CH_3	CH_3
E3.118	N	CCH_2CH_3	OCH_3	CH_3
E3.119	N	CCH_2CH_3	cyclopropyl	CH_3
E3.120	N	CCH_2CH_3	CH_2OCH_3	CH_3
E3.121	N	CCN	CH_3	CH_3
E3.122	N	CCN	OCH_3	CH_3
E3.123	N	CCN	cyclopropyl	CH_3
E3.124	N	CCN	CH_2OCH_3	CH_3
E3.125	N	$CC(O)OCH_3$	CH_3	CH_3
E3.126	N	$CC(O)OCH_3$	OCH_3	CH_3
E3.127	N	$CC(O)OCH_3$	cyclopropyl	CH_3
E3.128	N	$CC(O)OCH_3$	CH_2OCH_3	CH_3
E3.129	CH	CH	CH_3	CH_2OCH_3
E3.130	CH	CH	OCH_3	CH_2OCH_3
E3.131	CH	CH	cyclopropyl	CH_2OCH_3
E3.132	CH	CH	CH_2OCH_3	CH_2OCH_3
E3.133	CH	N	CH_3	CH_2OCH_3
E3.134	CH	N	OCH_3	CH_2OCH_3
E3.135	CH	N	cyclopropyl	CH_2OCH_3
E3.136	CH	N	CH_2OCH_3	CH_2OCH_3
E3.137	CH	CF	CH_3	CH_2OCH_3
E3.138	CH	CF	OCH_3	CH_2OCH_3
E3.139	CH	CF	cyclopropyl	CH_2OCH_3
E3.140	CH	CF	CH_2OCH_3	CH_2OCH_3
E3.141	CH	CCl	CH_3	CH_2OCH_3
E3.142	CH	CCl	OCH_3	CH_2OCH_3
E3.143	CH	CCl	cyclopropyl	CH_2OCH_3
E3.144	CH	CCl	CH_2OCH_3	CH_2OCH_3
E3.145	CH	CCH_3	CH_3	CH_2OCH_3

E3.146	CH	CCH_3	OCH_3	CH_2OCH_3
E3.147	CH	CCH_3	cyclopropyl	CH_2OCH_3
E3.148	CH	CCH_3	CH_2OCH_3	CH_2OCH_3
E3.149	CH	CCH_2CH_3	CH_3	CH_2OCH_3
E3.150	CH	CCH_2CH_3	OCH_3	CH_2OCH_3
E3.151	CH	CCH_2CH_3	cyclopropyl	CH_2OCH_3
E3.152	CH	CCH_2CH_3	CH_2OCH_3	CH_2OCH_3
E3.153	CH	CCN	CH_3	CH_2OCH_3
E3.154	CH	CCN	OCH_3	CH_2OCH_3
E3.155	CH	CCN	cyclopropyl	CH_2OCH_3
E3.156	CH	CCN	CH_2OCH_3	CH_2OCH_3
E3.157	CH	$CC(O)OCH_3$	CH_3	CH_2OCH_3
E3.158	CH	$CC(O)OCH_3$	OCH_3	CH_2OCH_3
E3.159	CH	$CC(O)OCH_3$	cyclopropyl	CH_2OCH_3
E3.160	CH	$CC(O)OCH_3$	CH_2OCH_3	CH_2OCH_3
E3.161	N	CH	CH_3	CH_2OCH_3
E3.162	N	CH	OCH_3	CH_2OCH_3
E3.163	N	CH	cyclopropyl	CH_2OCH_3
E3.164	N	CH	CH_2OCH_3	CH_2OCH_3
E3.165	N	N	CH_3	CH_2OCH_3
E3.166	N	N	OCH_3	CH_2OCH_3
E3.167	N	N	cyclopropyl	CH_2OCH_3
E3.168	N	N	CH_2OCH_3	CH_2OCH_3
E3.169	N	CF	CH_3	CH_2OCH_3
E3.170	N	CF	OCH_3	CH_2OCH_3
E3.171	N	CF	cyclopropyl	CH_2OCH_3
E3.172	N	CF	CH_2OCH_3	CH_2OCH_3
E3.173	N	CCl	CH_3	CH_2OCH_3
E3.174	N	CCl	OCH_3	CH_2OCH_3
E3.175	N	CCl	cyclopropyl	CH_2OCH_3
E3.176	N	CCl	CH_2OCH_3	CH_2OCH_3
E3.177	N	CCH_3	CH_3	CH_2OCH_3
E3.178	N	CCH_3	OCH_3	CH_2OCH_3
E3.179	N	CCH_3	cyclopropyl	CH_2OCH_3
E3.180	N	CCH_3	CH_2OCH_3	CH_2OCH_3
E3.181	N	CCH_2CH_3	CH_3	CH_2OCH_3

E3.182	N	CCH_2CH_3	OCH_3	CH_2OCH_3
E3.183	N	CCH_2CH_3	cyclopropyl	CH_2OCH_3
E3.184	N	CCH_2CH_3	CH_2OCH_3	CH_2OCH_3
E3.185	N	CCN	CH_3	CH_2OCH_3
E3.186	N	CCN	OCH_3	CH_2OCH_3
E3.187	N	CCN	cyclopropyl	CH_2OCH_3
E3.188	N	CCN	CH_2OCH_3	CH_2OCH_3
E3.189	N	$CC(O)OCH_3$	CH_3	CH_2OCH_3
E3.190	N	$CC(O)OCH_3$	OCH_3	CH_2OCH_3
E3.191	N	$CC(O)OCH_3$	cyclopropyl	CH_2OCH_3
E3.192	N	$CC(O)OCH_3$	CH_2OCH_3	CH_2OCH_3

Table 3.2: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CH, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.3: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CH, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.4: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CH, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.5: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CH, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.6: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_3, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.7: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_3, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.8: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_3, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.9: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_3, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.10: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_3, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.11: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_2CH_3, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.12: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_2CH_3, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.13: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_2CH_3, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.14: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_2CH_3, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.15: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCH_2CH_3, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.16: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CF, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.17: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CF, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.18: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CF, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.19: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CF, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.20: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CF, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.21: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCl, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.22: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCl, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.23: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCl, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.24: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCl, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.25: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCl, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.26: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CBr, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.27: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CBr, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.28: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CBr, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.29: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CBr, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.30: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CBr, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.31: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCN, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.32: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCN, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.33: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCN, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.34: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCN, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.35: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is CCN, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.36: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_3$, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.37: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_3$, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.38: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_3$, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.39 provides 192 compounds E-39.001 to E-39.192 of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_3$, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.40: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_3$, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.41: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_3$, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.42: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_3$, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.43: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_3$, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.44: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_3$, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.45: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_3$, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.46: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_2OCH_3$, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.47: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_2OCH_3$, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.48: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_2OCH_3$, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.49: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_2OCH_3$, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.50: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is $COCH_2CH_2OCH_3$, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.51: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is COH, R^4 is CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.52: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is COH, R^4 is CH_2CH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

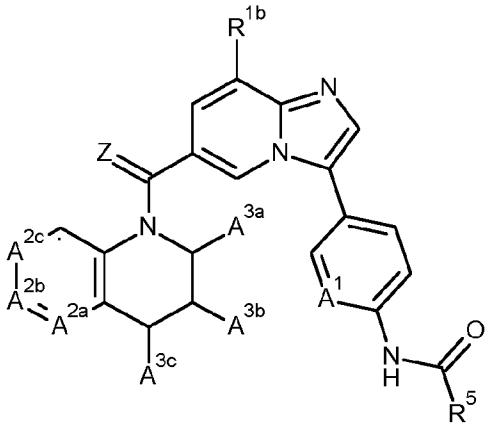
Table 3.53: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is COH, R^4 is CH_2OCH_3 and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.54: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is COH, R^4 is $CH_2CH_2OCH_3$ and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

Table 3.55: This table discloses specific compounds of formula (Ig) wherein Z is O, R^{1a} is H, R^{1c} is H, A^{2c} is COH, R^4 is CH_2CN and R^{1b}, A^1, A^{2b}, R^5 are as defined in Table Z.3.

The compounds in Tables 4.1 to 4.24 below illustrate the compounds of the invention.

Table 4.1 provides compounds of formula (Ih)



(Ih):

wherein Z is O; A^3 and R^4 taken together form the depicted ring; and

R^{1b} is H, R^5 is CH_3, A^1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4 below.

Table Z.4: Substituent definitions of A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b} and A^{3c}:

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.1	CH	CH	CH	H	H	H
E4.2	CH	CH	CH	H	H	CH_3
E4.3	CH	CH	CH	H	H	$C(O)OCH_3$
E4.4	CH	CH	CH	H	OH	H
E4.5	CH	CH	CH	H	$C(O)OCH_3$	H
E4.6	CH	CH	CH	H	OCH_3	H
E4.7	CH	CH	CH	H	CH_3	H
E4.8	CH	CH	CH	CH_3	H	H
E4.9	CH	CH	$COCH_3$	H	H	H
E4.10	CH	CH	$COCH_3$	H	H	CH_3
E4.11	CH	CH	$COCH_3$	H	H	$C(O)OCH_3$
E4.12	CH	CH	$COCH_3$	H	OH	H
E4.13	CH	CH	$COCH_3$	H	$C(O)OCH_3$	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.14	CH	CH	$COCH_3$	H	OCH_3	H
E4.15	CH	CH	$COCH_3$	H	CH_3	H
E4.16	CH	CH	$COCH_3$	CH_3	H	H
E4.17	CH	CH	CCH_3	H	H	H
E4.18	CH	CH	CCH_3	H	H	CH_3
E4.19	CH	CH	CCH_3	H	H	$C(O)OCH_3$
E4.20	CH	CH	CCH_3	H	OH	H
E4.21	CH	CH	CCH_3	H	$C(O)OCH_3$	H
E4.22	CH	CH	CCH_3	H	OCH_3	H
E4.23	CH	CH	CCH_3	H	CH_3	H
E4.24	CH	CH	CCH_3	CH_3	H	H
E4.25	CH	CH	CF	H	H	H
E4.26	CH	CH	CF	H	H	CH_3
E4.27	CH	CH	CF	H	H	$C(O)OCH_3$
E4.28	CH	CH	CF	H	OH	H
E4.29	CH	CH	CF	H	$C(O)OCH_3$	H
E4.30	CH	CH	CF	H	OCH_3	H
E4.31	CH	CH	CF	H	CH_3	H
E4.32	CH	CH	CF	CH_3	H	H
E4.33	CH	CH	CN	H	H	H
E4.34	CH	CH	CN	H	H	CH_3
E4.35	CH	CH	CN	H	H	$C(O)OCH_3$
E4.36	CH	CH	CN	H	OH	H
E4.37	CH	CH	CN	H	$C(O)OCH_3$	H
E4.38	CH	CH	CN	H	OCH_3	H
E4.39	CH	CH	CN	H	CH_3	H
E4.40	CH	CH	CN	CH_3	H	H
E4.41	CH	CH	$CC(O)OCH_3$	H	H	H
E4.42	CH	CH	$CC(O)OCH_3$	H	H	CH_3

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.43	CH	CH	$CC(O)OCH_3$	H	H	$C(O)OCH_3$
E4.44	CH	CH	$CC(O)OCH_3$	H	OH	H
E4.45	CH	CH	$CC(O)OCH_3$	H	$C(O)OCH_3$	H
E4.46	CH	CH	$CC(O)OCH_3$	H	OCH_3	H
E4.47	CH	CH	$CC(O)OCH_3$	H	CH_3	H
E4.48	CH	CH	$CC(O)OCH_3$	CH_3	H	H
E4.49	CH	CF	CH	H	H	H
E4.50	CH	CF	CH	H	H	CH_3
E4.51	CH	CF	CH	H	H	$C(O)OCH_3$
E4.52	CH	CF	CH	H	OH	H
E4.53	CH	CF	CH	H	OCH_3	H
E4.54	CH	CF	CH	H	CH_3	H
E4.55	CH	CF	CH	CH_3	H	H
E4.56	CH	CF	$COCH_3$	H	H	H
E4.57	CH	CF	$COCH_3$	H	H	CH_3
E4.58	CH	CF	$COCH_3$	H	H	$C(O)OCH_3$
E4.59	CH	CF	$COCH_3$	H	OH	H
E4.60	CH	CF	$COCH_3$	H	$C(O)OCH_3$	H
E4.61	CH	CF	$COCH_3$	H	OCH_3	H
E4.62	CH	CF	$COCH_3$	H	CH_3	H
E4.63	CH	CF	$COCH_3$	CH_3	H	H
E4.64	CH	CF	CCH_3	H	H	H
E4.65	CH	CF	CCH_3	H	H	CH_3
E4.66	CH	CF	CCH_3	H	H	$C(O)OCH_3$
E4.67	CH	CF	CCH_3	H	OH	H
E4.68	CH	CF	CCH_3	H	$C(O)OCH_3$	H
E4.69	CH	CF	CCH_3	H	OCH_3	H
E4.70	CH	CF	CCH_3	H	CH_3	H
E4.71	CH	CF	CCH_3	CH_3	H	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.72	CH	CF	CF	H	H	H
E4.73	CH	CF	CF	H	H	CH_3
E4.74	CH	CF	CF	H	H	$C(O)OCH_3$
E4.75	CH	CF	CF	H	OH	H
E4.76	CH	CF	CF	H	$C(O)OCH_3$	H
E4.77	CH	CF	CF	H	OCH_3	H
E4.78	CH	CF	CF	H	CH_3	H
E4.79	CH	CF	CF	CH_3	H	H
E4.80	CH	CF	CN	H	H	H
E4.81	CH	CF	CN	H	H	CH_3
E4.82	CH	CF	CN	H	H	$C(O)OCH_3$
E4.83	CH	CF	CN	H	OH	H
E4.84	CH	CF	CN	H	$C(O)OCH_3$	H
E4.85	CH	CF	CN	H	OCH_3	H
E4.86	CH	CF	CN	H	CH_3	H
E4.87	CH	CF	CN	CH_3	H	H
E4.88	CH	CCl	CH	H	H	H
E4.89	CH	CCl	CH	H	H	CH_3
E4.90	CH	CCl	CH	H	H	$C(O)OCH_3$
E4.91	CH	CCl	CH	H	OH	H
E4.92	CH	CCl	CH	H	$C(O)OCH_3$	H
E4.93	CH	CCl	CH	H	OCH_3	H
E4.94	CH	CCl	CH	H	CH_3	H
E4.95	CH	CCl	CH	CH_3	H	H
E4.96	CH	CCl	$COCH_3$	H	H	H
E4.97	CH	CCl	$COCH_3$	H	H	CH_3
E4.98	CH	CCl	$COCH_3$	H	H	$C(O)OCH_3$
E4.99	CH	CCl	$COCH_3$	H	OH	H
E4.100	CH	CCl	$COCH_3$	H	$C(O)OCH_3$	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.101	CH	CCl	$COCH_3$	H	CH_3	H
E4.102	CH	CCl	$COCH_3$	CH_3	H	H
E4.103	CH	CCl	CCH_3	H	H	H
E4.104	CH	CCl	CCH_3	H	H	CH_3
E4.105	CH	CCl	CCH_3	H	H	$C(O)OCH_3$
E4.106	CH	CCl	CCH_3	H	OH	H
E4.107	CH	CCl	CCH_3	H	$C(O)OCH_3$	H
E4.108	CH	CCl	CCH_3	H	OCH_3	H
E4.109	CH	CCl	CCH_3	H	CH_3	H
E4.110	CH	CCl	CCH_3	CH_3	H	H
E4.111	CH	CCl	CF	H	H	H
E4.112	CH	CCl	CF	H	H	CH_3
E4.113	CH	CCl	CF	H	H	$C(O)OCH_3$
E4.114	CH	CCl	CF	H	OH	H
E4.115	CH	CCl	CF	H	$C(O)OCH_3$	H
E4.116	CH	CCl	CF	H	OCH_3	H
E4.117	CH	CCl	CF	H	CH_3	H
E4.118	CH	CCl	CF	CH_3	H	H
E4.119	CH	CCl	CN	H	H	H
E4.120	CH	CCl	CN	H	H	CH_3
E4.121	CH	CCl	CN	H	H	$C(O)OCH_3$
E4.122	CH	CCl	CN	H	OH	H
E4.123	CH	CCl	CN	H	$C(O)OCH_3$	H
E4.124	CH	CCl	CN	H	OCH_3	H
E4.125	CH	CCl	CN	H	CH_3	H
E4.126	CH	CCl	CN	CH_3	H	H
E4.127	CH	CBr	CH	H	H	H
E4.128	CH	CBr	CH	H	H	CH_3
E4.129	CH	CBr	CH	H	H	$C(O)OCH_3$

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.130	CH	CBr	CH	H	OH	H
E4.131	CH	CBr	CH	H	$C(O)OCH_3$	H
E4.132	CH	CBr	CH	H	OCH_3	H
E4.133	CH	CBr	CH	H	CH_3	H
E4.134	CH	CBr	CH	CH_3	H	H
E4.135	CH	CBr	$COCH_3$	H	H	H
E4.136	CH	CBr	$COCH_3$	H	H	CH_3
E4.137	CH	CBr	$COCH_3$	H	H	$C(O)OCH_3$
E4.138	CH	CBr	$COCH_3$	H	OH	H
E4.139	CH	CBr	$COCH_3$	H	$C(O)OCH_3$	H
E4.140	CH	CBr	$COCH_3$	H	OCH_3	H
E4.141	CH	CBr	$COCH_3$	H	CH_3	H
E4.142	CH	CBr	$COCH_3$	CH_3	H	H
E4.143	CH	CBr	CCH_3	H	H	H
E4.144	CH	CBr	CCH_3	H	H	CH_3
E4.145	CH	CBr	CCH_3	H	H	$C(O)OCH_3$
E4.146	CH	CBr	CCH_3	H	OH	H
E4.147	CH	CBr	CCH_3	H	$C(O)OCH_3$	H
E4.148	CH	CBr	CCH_3	H	OCH_3	H
E4.149	CH	CBr	CCH_3	H	CH_3	H
E4.150	CH	CBr	CCH_3	CH_3	H	H
E4.151	CH	CCH_3	CH	H	H	H
E4.152	CH	CCH_3	CH	H	H	CH_3
E4.153	CH	CCH_3	CH	H	H	$C(O)OCH_3$
E4.154	CH	CCH_3	CH	H	OH	H
E4.155	CH	CCH_3	CH	H	$C(O)OCH_3$	H
E4.156	CH	CCH_3	CH	H	OCH_3	H
E4.157	CH	CCH_3	CH	H	CH_3	H
E4.158	CH	CCH_3	CH	CH_3	H	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.159	CH	CCH_3	$COCH_3$	H	H	H
E4.160	CH	CCH_3	$COCH_3$	H	H	CH_3
E4.161	CH	CCH_3	$COCH_3$	H	H	$C(O)OCH_3$
E4.162	CH	CCH_3	$COCH_3$	H	OH	H
E4.163	CH	CCH_3	$COCH_3$	H	$C(O)OCH_3$	H
E4.164	CH	CCH_3	$COCH_3$	H	OCH_3	H
E4.165	CH	CCH_3	$COCH_3$	H	CH_3	H
E4.166	CH	CCH_3	$COCH_3$	CH_3	H	H
E4.167	CH	CCH_3	CCH_3	H	H	H
E4.168	CH	CCH_3	CCH_3	H	H	CH_3
E4.169	CH	CCH_3	CCH_3	H	H	$C(O)OCH_3$
E4.170	CH	CCH_3	CCH_3	H	OH	H
E4.171	CH	CCH_3	CCH_3	H	$C(O)OCH_3$	H
E4.172	CH	CCH_3	CCH_3	H	OCH_3	H
E4.173	CH	CCH_3	CCH_3	H	CH_3	H
E4.174	CH	CCH_3	CCH_3	CH_3	H	H
E4.175	CH	CCH_3	CF	H	H	H
E4.176	CH	CCH_3	CF	H	H	CH_3
E4.177	CH	CCH_3	CF	H	H	$C(O)OCH_3$
E4.178	CH	CCH_3	CF	H	OH	H
E4.179	CH	CCH_3	CF	H	$C(O)OCH_3$	H
E4.180	CH	CCH_3	CF	H	OCH_3	H
E4.181	CH	CCH_3	CF	H	CH_3	H
E4.182	CH	CCH_3	CF	CH_3	H	H
E4.183	CH	CCH_3	CN	H	H	H
E4.184	CH	CCH_3	CN	H	H	CH_3
E4.185	CH	CCH_3	CN	H	H	$C(O)OCH_3$
E4.186	CH	CCH_3	CN	H	OH	H
E4.187	CH	CCH_3	CN	H	$C(O)OCH_3$	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.188	CH	CCH_3	CN	H	OCH_3	H
E4.189	CH	CCH_3	CN	H	CH_3	H
E4.190	CH	CCH_3	CN	CH_3	H	H
E4.191	CH	CN	CH	H	H	H
E4.192	CH	CN	CH	H	H	CH_3
E4.193	CH	CN	CH	H	H	$C(O)OCH_3$
E4.194	CH	CN	CH	H	OH	H
E4.195	CH	CN	CH	H	$C(O)OCH_3$	H
E4.196	CH	CN	CH	H	OCH_3	H
E4.197	CH	CN	CH	H	CH_3	H
E4.198	CH	CN	CH	CH_3	H	H
E4.199	CH	CN	$COCH_3$	H	H	H
E4.200	CH	CN	$COCH_3$	H	H	CH_3
E4.201	CH	CN	$COCH_3$	H	H	$C(O)OCH_3$
E4.202	CH	CN	$COCH_3$	H	OH	H
E4.203	CH	CN	$COCH_3$	H	$C(O)OCH_3$	H
E4.204	CH	CN	$COCH_3$	H	OCH_3	H
E4.205	CH	CN	$COCH_3$	H	CH_3	H
E4.206	CH	CN	$COCH_3$	CH_3	H	H
E4.207	CH	CN	CCH_3	H	H	H
E4.208	CH	CN	CCH_3	H	H	CH_3
E4.209	CH	CN	CCH_3	H	H	$C(O)OCH_3$
E4.210	CH	CN	CCH_3	H	OH	H
E4.211	CH	CN	CCH_3	H	$C(O)OCH_3$	H
E4.212	CH	CN	CCH_3	H	OCH_3	H
E4.213	CH	CN	CCH_3	H	CH_3	H
E4.214	CH	CN	CCH_3	CH_3	H	H
E4.215	CH	CN	CF	H	H	H
E4.216	CH	CN	CF	H	H	CH_3

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.217	CH	CN	CF	H	H	$C(O)OCH_3$
E4.218	CH	CN	CF	H	OH	H
E4.219	CH	CN	CF	H	$C(O)OCH_3$	H
E4.220	CH	CN	CF	H	OCH_3	H
E4.221	CH	CN	CF	H	CH_3	H
E4.222	CH	CN	CF	CH_3	H	H
E4.223	CH	$COCHF_2$	CH	H	H	H
E4.224	CH	$COCHF_2$	CH	H	H	CH_3
E4.225	CH	$COCHF_2$	CH	H	OCH_3	H
E4.226	CH	$COCHF_2$	CH	H	CH_3	H
E4.227	CH	$COCH_3$	CH	H	H	H
E4.228	CH	$COCH_3$	CH	H	H	CH_3
E4.229	CH	$COCH_3$	CH	H	H	$C(O)OCH_3$
E4.230	CH	$COCH_3$	CH	H	OH	H
E4.231	CH	$COCH_3$	CH	H	$C(O)OCH_3$	H
E4.232	CH	$COCH_3$	CH	H	OCH_3	H
E4.233	CH	$COCH_3$	CH	H	CH_3	H
E4.234	CH	$COCH_3$	CH	CH_3	H	H
E4.235	CH	$COCH_3$	$COCH_3$	H	H	H
E4.236	CH	$COCH_3$	$COCH_3$	H	H	CH_3
E4.237	CH	$COCH_3$	$COCH_3$	H	H	$C(O)OCH_3$
E4.238	CH	$COCH_3$	$COCH_3$	H	OH	H
E4.239	CH	$COCH_3$	$COCH_3$	H	$C(O)OCH_3$	H
E4.240	CH	$COCH_3$	$COCH_3$	H	OCH_3	H
E4.241	CH	$COCH_3$	$COCH_3$	H	CH_3	H
E4.242	CH	$COCH_3$	$COCH_3$	CH_3	H	H
E4.243	CH	$COCH_3$	CCH_3	H	H	H
E4.244	CH	$COCH_3$	CCH_3	H	H	CH_3
E4.245	CH	$COCH_3$	CCH_3	H	H	$C(O)OCH_3$

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.246	CH	$COCH_3$	CCH_3	H	OH	H
E4.247	CH	$COCH_3$	CCH_3	H	$C(O)OCH_3$	H
E4.248	CH	$COCH_3$	CCH_3	H	OCH_3	H
E4.249	CH	$COCH_3$	CCH_3	H	CH_3	H
E4.250	CH	$COCH_3$	CCH_3	CH_3	H	H
E4.251	CH	$COCH_3$	CF	H	H	H
E4.252	CH	$COCH_3$	CF	H	H	CH_3
E4.253	CH	$COCH_3$	CF	H	H	$C(O)OCH_3$
E4.254	CH	$COCH_3$	CF	H	OH	H
E4.255	CH	$COCH_3$	CF	H	$C(O)OCH_3$	H
E4.256	CH	$COCH_3$	CF	H	OCH_3	H
E4.257	CH	$COCH_3$	CF	H	CH_3	H
E4.258	CH	$COCH_3$	CF	CH_3	H	H
E4.259	CH	$COCH_3$	CN	H	H	H
E4.260	CH	$COCH_3$	CN	H	H	CH_3
E4.261	CH	$COCH_3$	CN	H	H	$C(O)OCH_3$
E4.262	CH	$COCH_3$	CN	H	OH	H
E4.263	CH	$COCH_3$	CN	H	$C(O)OCH_3$	H
E4.264	CH	$COCH_3$	CN	H	OCH_3	H
E4.265	CH	$COCH_3$	CN	H	CH_3	H
E4.266	CH	$COCH_3$	CN	CH_3	H	H
E4.267	$COCH_3$	CH	CH	H	H	H
E4.268	$COCH_3$	CH	CH	H	H	CH_3
E4.269	$COCH_3$	CH	CH	H	H	$C(O)OCH_3$
E4.270	$COCH_3$	CH	CH	H	OH	H
E4.271	$COCH_3$	CH	CH	H	$C(O)OCH_3$	H
E4.272	$COCH_3$	CH	CH	H	OCH_3	H
E4.273	$COCH_3$	CH	CH	H	CH_3	H
E4.274	$COCH_3$	CH	CH	CH_3	H	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.275	$COCH_3$	CH	$COCH_3$	H	H	H
E4.276	$COCH_3$	CH	$COCH_3$	H	H	CH_3
E4.277	$COCH_3$	CH	$COCH_3$	H	H	$C(O)OCH_3$
E4.278	$COCH_3$	CH	$COCH_3$	H	OH	H
E4.279	$COCH_3$	CH	$COCH_3$	H	$C(O)OCH_3$	H
E4.280	$COCH_3$	CH	$COCH_3$	H	OCH_3	H
E4.281	$COCH_3$	CH	$COCH_3$	H	CH_3	H
E4.282	$COCH_3$	CH	$COCH_3$	CH_3	H	H
E4.283	$COCH_3$	CH	CCH_3	H	H	H
E4.284	$COCH_3$	CH	CCH_3	H	OH	H
E4.285	$COCH_3$	CH	CCH_3	H	$C(O)OCH_3$	H
E4.286	$COCH_3$	CH	CCH_3	H	OCH_3	H
E4.287	$COCH_3$	CH	CCH_3	H	CH_3	H
E4.288	$COCH_3$	CH	CCH_3	CH_3	H	H
E4.289	$COCH_3$	CH	CF	H	H	H
E4.290	$COCH_3$	CH	CF	H	H	CH_3
E4.291	$COCH_3$	CH	CF	H	H	$C(O)OCH_3$
E4.292	$COCH_3$	CH	CF	H	OH	H
E4.293	$COCH_3$	CH	CF	H	$C(O)OCH_3$	H
E4.294	$COCH_3$	CH	CF	H	OCH_3	H
E4.295	$COCH_3$	CH	CF	H	CH_3	H
E4.296	$COCH_3$	CH	CF	CH_3	H	H
E4.297	$COCH_3$	CH	CN	H	H	H
E4.298	$COCH_3$	CH	CN	H	H	CH_3
E4.299	$COCH_3$	CH	CN	H	H	$C(O)OCH_3$
E4.300	$COCH_3$	CH	CN	H	OH	H
E4.301	$COCH_3$	CH	CN	H	$C(O)OCH_3$	H
E4.302	$COCH_3$	CH	CN	H	OCH_3	H
E4.303	$COCH_3$	CH	CN	H	CH_3	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.304	$COCH_3$	CH	CN	CH_3	H	H
E4.305	$COCH_3$	CF	CH	H	H	H
E4.306	$COCH_3$	CF	CH	H	H	CH_3
E4.307	$COCH_3$	CF	CH	H	H	$C(O)OCH_3$
E4.308	$COCH_3$	CF	CH	H	OH	H
E4.309	$COCH_3$	CF	CH	H	$C(O)OCH_3$	H
E4.310	$COCH_3$	CF	CH	H	OCH_3	H
E4.311	$COCH_3$	CF	CH	H	CH_3	H
E4.312	$COCH_3$	CF	CH	CH_3	H	H
E4.313	$COCH_3$	CCl	CH	H	H	H
E4.314	$COCH_3$	CCl	CH	H	H	CH_3
E4.315	$COCH_3$	CCl	CH	H	H	$C(O)OCH_3$
E4.316	$COCH_3$	CCl	CH	H	OH	H
E4.317	$COCH_3$	CCl	CH	H	$C(O)OCH_3$	H
E4.318	$COCH_3$	CCl	CH	H	OCH_3	H
E4.319	$COCH_3$	CCl	CH	H	CH_3	H
E4.320	$COCH_3$	CCl	CH	CH_3	H	H
E4.321	$COCH_3$	CBr	CH	H	H	H
E4.322	$COCH_3$	CBr	CH	H	H	CH_3
E4.323	$COCH_3$	CBr	CH	H	H	$C(O)OCH_3$
E4.324	$COCH_3$	CBr	CH	H	OH	H
E4.325	$COCH_3$	CBr	CH	H	$C(O)OCH_3$	H
E4.326	$COCH_3$	CBr	CH	H	OCH_3	H
E4.327	$COCH_3$	CBr	CH	H	CH_3	H
E4.328	$COCH_3$	CBr	CH	CH_3	H	H
E4.329	$COCH_3$	CCH_3	CH	H	H	H
E4.330	$COCH_3$	CCH_3	CH	H	H	CH_3
E4.331	$COCH_3$	CCH_3	CH	H	H	$C(O)OCH_3$
E4.332	$COCH_3$	CCH_3	CH	H	OH	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.333	$COCH_3$	CCH_3	CH	H	$C(O)OCH_3$	H
E4.334	$COCH_3$	CCH_3	CH	H	OCH_3	H
E4.335	$COCH_3$	CCH_3	CH	H	CH_3	H
E4.336	$COCH_3$	CCH_3	CH	CH_3	H	H
E4.337	$COCH_3$	CN	CH	H	H	H
E4.338	$COCH_3$	CN	CH	H	H	CH_3
E4.339	$COCH_3$	CN	CH	H	H	$C(O)OCH_3$
E4.340	$COCH_3$	CN	CH	H	OH	H
E4.341	$COCH_3$	CN	CH	H	OCH_3	H
E4.342	$COCH_3$	CN	CH	H	CH_3	H
E4.343	$COCH_3$	CN	CH	CH_3	H	H
E4.344	$COCH_3$	$COCH_3$	CH	H	H	H
E4.345	$COCH_3$	$COCH_3$	CH	H	H	CH_3
E4.346	$COCH_3$	$COCH_3$	CH	H	H	$C(O)OCH_3$
E4.347	$COCH_3$	$COCH_3$	CH	H	OH	H
E4.348	$COCH_3$	$COCH_3$	CH	H	$C(O)OCH_3$	H
E4.349	$COCH_3$	$COCH_3$	CH	H	OCH_3	H
E4.350	$COCH_3$	$COCH_3$	CH	H	CH_3	H
E4.351	$COCH_3$	$COCH_3$	CH	CH_3	H	H
E4.352	CF	CH	CH	H	H	H
E4.353	CF	CH	CH	H	H	CH_3
E4.354	CF	CH	CH	H	H	$C(O)OCH_3$
E4.355	CF	CH	CH	H	OH	H
E4.356	CF	CH	CH	H	$C(O)OCH_3$	H
E4.357	CF	CH	CH	H	OCH_3	H
E4.358	CF	CH	CH	H	CH_3	H
E4.359	CF	CH	CH	CH_3	H	H
E4.360	CF	CH	$COCH_3$	H	H	H
E4.361	CF	CH	$COCH_3$	H	H	CH_3

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.362	CF	CH	$COCH_3$	H	H	$C(O)OCH_3$
E4.363	CF	CH	$COCH_3$	H	OH	H
E4.364	CF	CH	$COCH_3$	H	$C(O)OCH_3$	H
E4.365	CF	CH	$COCH_3$	H	OCH_3	H
E4.366	CF	CH	$COCH_3$	H	CH_3	H
E4.367	CF	CH	$COCH_3$	CH_3	H	H
E4.368	CF	CH	CCH_3	H	H	H
E4.369	CF	CH	CCH_3	H	H	CH_3
E4.370	CF	CH	CCH_3	H	H	$C(O)OCH_3$
E4.371	CF	CH	CCH_3	H	OH	H
E4.372	CF	CH	CCH_3	H	$C(O)OCH_3$	H
E4.373	CF	CH	CCH_3	H	OCH_3	H
E4.374	CF	CH	CCH_3	H	CH_3	H
E4.375	CF	CH	CCH_3	CH_3	H	H
E4.376	CF	CH	CF	H	H	H
E4.377	CF	CH	CF	H	H	CH_3
E4.378	CF	CH	CF	H	H	$C(O)OCH_3$
E4.379	CF	CH	CF	H	OH	H
E4.380	CF	CH	CF	H	$C(O)OCH_3$	H
E4.381	CF	CH	CF	H	OCH_3	H
E4.382	CF	CH	CF	H	CH_3	H
E4.383	CF	CH	CF	CH_3	H	H
E4.384	CF	CH	CN	H	H	H
E4.385	CF	CH	CN	H	H	CH_3
E4.386	CF	CH	CN	H	H	$C(O)OCH_3$
E4.387	CF	CH	CN	H	OH	H
E4.388	CF	CH	CN	H	$C(O)OCH_3$	H
E4.389	CF	CH	CN	H	OCH_3	H
E4.390	CF	CH	CN	H	CH_3	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.391	CF	CH	CN	CH_3	H	H
E4.392	CF	CH	$CC(O)OCH_3$	H	H	H
E4.393	CF	CH	$CC(O)OCH_3$	H	H	CH_3
E4.394	CF	CH	$CC(O)OCH_3$	H	H	$C(O)OCH_3$
E4.395	CF	CH	$CC(O)OCH_3$	H	OH	H
E4.396	CF	CH	$CC(O)OCH_3$	H	$C(O)OCH_3$	H
E4.397	CF	CH	$CC(O)OCH_3$	H	OCH_3	H
E4.398	CF	CH	$CC(O)OCH_3$	H	CH_3	H
E4.399	CF	CH	$CC(O)OCH_3$	CH_3	H	H
E4.400	CF	CF	CH	H	H	H
E4.401	CF	CF	CH	H	H	CH_3
E4.402	CF	CF	CH	H	H	$C(O)OCH_3$
E4.403	CF	CF	CH	H	OH	H
E4.404	CF	CF	CH	H	$C(O)OCH_3$	H
E4.405	CF	CF	CH	H	OCH_3	H
E4.406	CF	CF	CH	H	CH_3	H
E4.407	CF	CF	CH	CH_3	H	H
E4.408	CF	CCl	CH	H	H	H
E4.409	CF	CCl	CH	H	H	CH_3
E4.410	CF	CCl	CH	H	H	$C(O)OCH_3$
E4.411	CF	CCl	CH	H	OH	H
E4.412	CF	CCl	CH	H	$C(O)OCH_3$	H
E4.413	CF	CCl	CH	H	OCH_3	H
E4.414	CF	CCl	CH	H	CH_3	H
E4.415	CF	CCl	CH	CH_3	H	H
E4.416	CF	CBr	CH	H	H	H
E4.417	CF	CBr	CH	H	H	CH_3
E4.418	CF	CBr	CH	H	H	$C(O)OCH_3$
E4.419	CF	CBr	CH	H	OH	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.420	CF	CBr	CH	H	$C(O)OCH_3$	H
E4.421	CF	CBr	CH	H	OCH_3	H
E4.422	CF	CBr	CH	H	CH_3	H
E4.423	CF	CBr	CH	CH_3	H	H
E4.424	CF	CCH_3	CH	H	H	H
E4.425	CF	CCH_3	CH	H	H	CH_3
E4.426	CF	CCH_3	CH	H	H	$C(O)OCH_3$
E4.427	CF	CCH_3	CH	H	OH	H
E4.428	CF	CCH_3	CH	H	$C(O)OCH_3$	H
E4.429	CF	CCH_3	CH	H	OCH_3	H
E4.430	CF	CCH_3	CH	H	CH_3	H
E4.431	CF	CCH_3	CH	CH_3	H	H
E4.432	CF	$COCH_3$	CH	H	H	H
E4.433	CF	$COCH_3$	CH	H	H	CH_3
E4.434	CF	$COCH_3$	CH	H	H	$C(O)OCH_3$
E4.435	CF	$COCH_3$	CH	H	OH	H
E4.436	CF	$COCH_3$	CH	H	$C(O)OCH_3$	H
E4.437	CF	$COCH_3$	CH	H	OCH_3	H
E4.438	CF	$COCH_3$	CH	H	CH_3	H
E4.439	CF	$COCH_3$	CH	CH_3	H	H
E4.440	CCH_3	CH	CH	H	H	H
E4.441	CCH_3	CH	CH	H	H	CH_3
E4.442	CCH_3	CH	CH	H	H	$C(O)OCH_3$
E4.443	CCH_3	CH	CH	H	OH	H
E4.444	CCH_3	CH	CH	H	$C(O)OCH_3$	H
E4.445	CCH_3	CH	CH	H	OCH_3	H
E4.446	CCH_3	CH	CH	H	CH_3	H
E4.447	CCH_3	CH	CH	CH_3	H	H
E4.448	CCH_3	CH	$COCH_3$	H	H	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.449	CCH_3	CH	$COCH_3$	H	H	CH_3
E4.450	CCH_3	CH	$COCH_3$	H	H	$C(O)OCH_3$
E4.451	CCH_3	CH	$COCH_3$	H	OH	H
E4.452	CCH_3	CH	$COCH_3$	H	$C(O)OCH_3$	H
E4.453	CCH_3	CH	$COCH_3$	H	OCH_3	H
E4.454	CCH_3	CH	$COCH_3$	H	CH_3	H
E4.455	CCH_3	CH	$COCH_3$	CH_3	H	H
E4.456	CCH_3	CH	CCH_3	H	H	H
E4.457	CCH_3	CH	CCH_3	H	H	CH_3
E4.458	CCH_3	CH	CCH_3	H	H	$C(O)OCH_3$
E4.459	CCH_3	CH	CCH_3	H	OH	H
E4.460	CCH_3	CH	CCH_3	H	$C(O)OCH_3$	H
E4.461	CCH_3	CH	CCH_3	H	OCH_3	H
E4.462	CCH_3	CH	CCH_3	H	CH_3	H
E4.463	CCH_3	CH	CCH_3	CH_3	H	H
E4.464	CCH_3	CH	CF	H	H	H
E4.465	CCH_3	CH	CF	H	H	CH_3
E4.466	CCH_3	CH	CF	H	H	$C(O)OCH_3$
E4.467	CCH_3	CH	CF	H	OH	H
E4.468	CCH_3	CH	CF	H	$C(O)OCH_3$	H
E4.469	CCH_3	CH	CF	H	OCH_3	H
E4.470	CCH_3	CH	CF	H	CH_3	H
E4.471	CCH_3	CH	CF	CH_3	H	H
E4.472	CCH_3	CH	CN	H	H	H
E4.473	CCH_3	CH	CN	H	H	CH_3
E4.474	CCH_3	CH	CN	H	H	$C(O)OCH_3$
E4.475	CCH_3	CH	CN	H	OH	H
E4.476	CCH_3	CH	CN	H	$C(O)OCH_3$	H
E4.477	CCH_3	CH	CN	H	OCH_3	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.478	CCH_3	CH	CN	H	CH_3	H
E4.479	CCH_3	CH	CN	CH_3	H	H
E4.480	CCH_3	CH	$CC(O)OCH_3$	H	H	H
E4.481	CCH_3	CH	$CC(O)OCH_3$	H	H	CH_3
E4.482	CCH_3	CH	$CC(O)OCH_3$	H	H	$C(O)OCH_3$
E4.483	CCH_3	CH	$CC(O)OCH_3$	H	OH	H
E4.484	CCH_3	CH	$CC(O)OCH_3$	H	$C(O)OCH_3$	H
E4.485	CCH_3	CH	$CC(O)OCH_3$	H	OCH_3	H
E4.486	CCH_3	CH	$CC(O)OCH_3$	H	CH_3	H
E4.487	CCH_3	CH	$CC(O)OCH_3$	CH_3	H	H
E4.488	CCH_3	CF	CH	H	H	H
E4.489	CCH_3	CF	CH	H	H	CH_3
E4.490	CCH_3	CF	CH	H	H	$C(O)OCH_3$
E4.491	CCH_3	CF	CH	H	OH	H
E4.492	CCH_3	CF	CH	H	$C(O)OCH_3$	H
E4.493	CCH_3	CF	CH	H	OCH_3	H
E4.494	CCH_3	CF	CH	H	CH_3	H
E4.495	CCH_3	CF	CH	CH_3	H	H
E4.496	CCH_3	CCl	CH	H	H	H
E4.497	CCH_3	CCl	CH	H	H	CH_3
E4.498	CCH_3	CCl	CH	H	H	$C(O)OCH_3$
E4.499	CCH_3	CCl	CH	H	OH	H
E4.500	CCH_3	CCl	CH	H	$C(O)OCH_3$	H
E4.501	CCH_3	CCl	CH	H	OCH_3	H
E4.502	CCH_3	CCl	CH	H	CH_3	H
E4.503	CCH_3	CCl	CH	CH_3	H	H
E4.504	CCH_3	CBr	CH	H	H	H
E4.505	CCH_3	CBr	CH	H	H	CH_3
E4.506	CCH_3	CBr	CH	H	H	$C(O)OCH_3$

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.507	CCH_3	CBr	CH	H	OH	H
E4.508	CCH_3	CBr	CH	H	$C(O)OCH_3$	H
E4.509	CCH_3	CBr	CH	H	OCH_3	H
E4.510	CCH_3	CBr	CH	H	CH_3	H
E4.511	CCH_3	CBr	CH	CH_3	H	H
E4.512	CCH_3	CCH_3	CH	H	H	H
E4.513	CCH_3	CCH_3	CH	H	H	CH_3
E4.514	CCH_3	CCH_3	CH	H	H	$C(O)OCH_3$
E4.515	CCH_3	CCH_3	CH	H	OH	H
E4.516	CCH_3	CCH_3	CH	H	$C(O)OCH_3$	H
E4.517	CCH_3	CCH_3	CH	H	OCH_3	H
E4.518	CCH_3	CCH_3	CH	H	CH_3	H
E4.519	CCH_3	CCH_3	CH	CH_3	H	H
E4.520	CCH_3	CN	CH	H	H	H
E4.521	CCH_3	CN	CH	H	H	CH_3
E4.522	CCH_3	CN	CH	H	H	$C(O)OCH_3$
E4.523	CCH_3	CN	CH	H	OH	H
E4.524	CCH_3	CN	CH	H	$C(O)OCH_3$	H
E4.525	CCH_3	CN	CH	H	OCH_3	H
E4.526	CCH_3	CN	CH	H	CH_3	H
E4.527	CCH_3	CN	CH	CH_3	H	H
E4.528	CCH_3	$COCH_3$	CH	H	H	H
E4.529	CCH_3	$COCH_3$	CH	H	H	CH_3
E4.530	CCH_3	$COCH_3$	CH	H	H	$C(O)OCH_3$
E4.531	CCH_3	$COCH_3$	CH	H	OH	H
E4.532	CCH_3	$COCH_3$	CH	H	$C(O)OCH_3$	H
E4.533	CCH_3	$COCH_3$	CH	H	OCH_3	H
E4.534	CCH_3	$COCH_3$	CH	H	CH_3	H
E4.535	CCH_3	$COCH_3$	CH	CH_3	H	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.536	$CC(O)OCH_3$	CH	CH	H	H	H
E4.537	$CC(O)OCH_3$	CH	CH	H	H	CH_3
E4.538	$CC(O)OCH_3$	CH	CH	H	H	$C(O)OCH_3$
E4.539	$CC(O)OCH_3$	CH	CH	H	OH	H
E4.540	$CC(O)OCH_3$	CH	CH	H	$C(O)OCH_3$	H
E4.541	$CC(O)OCH_3$	CH	CH	H	OCH_3	H
E4.542	$CC(O)OCH_3$	CH	CH	H	CH_3	H
E4.543	$CC(O)OCH_3$	CH	CH	CH_3	H	H
E4.544	$CC(O)OCH_3$	CH	$COCH_3$	H	H	H
E4.545	$CC(O)OCH_3$	CH	$COCH_3$	H	H	CH_3
E4.546	$CC(O)OCH_3$	CH	$COCH_3$	H	H	$C(O)OCH_3$
E4.547	$CC(O)OCH_3$	CH	$COCH_3$	H	OH	H
E4.548	$CC(O)OCH_3$	CH	$COCH_3$	H	$C(O)OCH_3$	H
E4.549	$CC(O)OCH_3$	CH	$COCH_3$	H	OCH_3	H
E4.550	$CC(O)OCH_3$	CH	$COCH_3$	H	CH_3	H
E4.551	$CC(O)OCH_3$	CH	$COCH_3$	CH_3	H	H
E4.552	$CC(O)OCH_3$	CH	CCH_3	H	H	H
E4.553	$CC(O)OCH_3$	CH	CCH_3	H	H	CH_3
E4.554	$CC(O)OCH_3$	CH	CCH_3	H	H	$C(O)OCH_3$
E4.555	$CC(O)OCH_3$	CH	CCH_3	H	OH	H
E4.556	$CC(O)OCH_3$	CH	CCH_3	H	$C(O)OCH_3$	H
E4.557	$CC(O)OCH_3$	CH	CCH_3	H	OCH_3	H
E4.558	$CC(O)OCH_3$	CH	CCH_3	H	CH_3	H
E4.559	$CC(O)OCH_3$	CH	CCH_3	CH_3	H	H
E4.560	$CC(O)OCH_3$	CH	CF	H	H	H
E4.561	$CC(O)OCH_3$	CH	CF	H	H	CH_3
E4.562	$CC(O)OCH_3$	CH	CF	H	H	$C(O)OCH_3$
E4.563	$CC(O)OCH_3$	CH	CF	H	OH	H
E4.564	$CC(O)OCH_3$	CH	CF	H	$C(O)OCH_3$	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.565	$CC(O)OCH_3$	CH	CF	H	OCH_3	H
E4.566	$CC(O)OCH_3$	CH	CF	H	CH_3	H
E4.567	$CC(O)OCH_3$	CH	CF	CH_3	H	H
E4.568	$CC(O)OCH_3$	CH	CN	H	H	H
E4.569	$CC(O)OCH_3$	CH	CN	H	H	CH_3
E4.570	$CC(O)OCH_3$	CH	CN	H	H	$C(O)OCH_3$
E4.571	$CC(O)OCH_3$	CH	CN	H	OH	H
E4.572	$CC(O)OCH_3$	CH	CN	H	$C(O)OCH_3$	H
E4.573	$CC(O)OCH_3$	CH	CN	H	OCH_3	H
E4.574	$CC(O)OCH_3$	CH	CN	H	CH_3	H
E4.575	$CC(O)OCH_3$	CH	CN	CH_3	H	H
E4.576	$CC(O)OCH_3$	CF	CH	H	H	H
E4.577	$CC(O)OCH_3$	CF	CH	H	H	CH_3
E4.578	$CC(O)OCH_3$	CF	CH	H	H	$C(O)OCH_3$
E4.579	$CC(O)OCH_3$	CF	CH	H	OH	H
E4.580	$CC(O)OCH_3$	CF	CH	H	$C(O)OCH_3$	H
E4.581	$CC(O)OCH_3$	CF	CH	H	OCH_3	H
E4.582	$CC(O)OCH_3$	CF	CH	H	CH_3	H
E4.583	$CC(O)OCH_3$	CF	CH	CH_3	H	H
E4.584	$CC(O)OCH_3$	CCl	CH	H	H	H
E4.585	$CC(O)OCH_3$	CCl	CH	H	H	CH_3
E4.586	$CC(O)OCH_3$	CCl	CH	H	H	$C(O)OCH_3$
E4.587	$CC(O)OCH_3$	CCl	CH	H	OH	H
E4.588	$CC(O)OCH_3$	CCl	CH	H	$C(O)OCH_3$	H
E4.589	$CC(O)OCH_3$	CCl	CH	H	OCH_3	H
E4.590	$CC(O)OCH_3$	CCl	CH	H	CH_3	H
E4.591	$CC(O)OCH_3$	CCl	CH	CH_3	H	H
E4.592	$CC(O)OCH_3$	CCH_3	CH	H	H	H
E4.593	$CC(O)OCH_3$	CCH_3	CH	H	H	CH_3

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.594	$CC(O)OCH_3$	CCH_3	CH	H	H	$C(O)OCH_3$
E4.595	$CC(O)OCH_3$	CCH_3	CH	H	OH	H
E4.596	$CC(O)OCH_3$	CCH_3	CH	H	$C(O)OCH_3$	H
E4.597	$CC(O)OCH_3$	CCH_3	CH	H	OCH_3	H
E4.598	$CC(O)OCH_3$	CCH_3	CH	H	CH_3	H
E4.599	$CC(O)OCH_3$	CCH_3	CH	CH_3	H	H
E4.600	$CC(O)OCH_3$	CN	CH	H	H	H
E4.601	$CC(O)OCH_3$	CN	CH	H	H	CH_3
E4.602	$CC(O)OCH_3$	CN	CH	H	H	$C(O)OCH_3$
E4.603	$CC(O)OCH_3$	CN	CH	H	OH	H
E4.604	$CC(O)OCH_3$	CN	CH	H	$C(O)OCH_3$	H
E4.605	$CC(O)OCH_3$	CN	CH	H	OCH_3	H
E4.606	$CC(O)OCH_3$	CN	CH	H	CH_3	H
E4.607	$CC(O)OCH_3$	CN	CH	CH_3	H	H
E4.608	CN	CH	CH	H	H	H
E4.609	CN	CH	CH	H	H	CH_3
E4.610	CN	CH	CH	H	H	$C(O)OCH_3$
E4.611	CN	CH	CH	H	OH	H
E4.612	CN	CH	CH	H	$C(O)OCH_3$	H
E4.613	CN	CH	CH	H	OCH_3	H
E4.614	CN	CH	CH	H	CH_3	H
E4.615	CN	CH	CH	CH_3	H	H
E4.616	CN	CH	$COCH_3$	H	H	H
E4.617	CN	CH	$COCH_3$	H	H	CH_3
E4.618	CN	CH	$COCH_3$	H	H	$C(O)OCH_3$
E4.619	CN	CH	$COCH_3$	H	OH	H
E4.620	CN	CH	$COCH_3$	H	$C(O)OCH_3$	H
E4.621	CN	CH	$COCH_3$	H	OCH_3	H
E4.622	CN	CH	$COCH_3$	H	CH_3	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.623	CN	CH	$COCH_3$	CH_3	H	H
E4.624	CN	CH	CCH_3	H	H	H
E4.625	CN	CH	CCH_3	H	H	CH_3
E4.626	CN	CH	CCH_3	H	H	$C(O)OCH_3$
E4.627	CN	CH	CCH_3	H	OH	H
E4.628	CN	CH	CCH_3	H	$C(O)OCH_3$	H
E4.629	CN	CH	CCH_3	H	OCH_3	H
E4.630	CN	CH	CCH_3	H	CH_3	H
E4.631	CN	CH	CCH_3	CH_3	H	H
E4.632	CN	CH	CF	H	H	H
E4.633	CN	CH	CF	H	H	CH_3
E4.634	CN	CH	CF	H	H	$C(O)OCH_3$
E4.635	CN	CH	CF	H	OH	H
E4.636	CN	CH	CF	H	$C(O)OCH_3$	H
E4.637	CN	CH	CF	H	OCH_3	H
E4.638	CN	CH	CF	H	CH_3	H
E4.639	CN	CH	CF	CH_3	H	H
E4.640	CN	CH	CN	H	H	H
E4.641	CN	CH	CN	H	H	CH_3
E4.642	CN	CH	CN	H	H	$C(O)OCH_3$
E4.643	CN	CH	CN	H	OH	H
E4.644	CN	CH	CN	H	$C(O)OCH_3$	H
E4.645	CN	CH	CN	H	OCH_3	H
E4.646	CN	CH	CN	H	CH_3	H
E4.647	CN	CH	CN	CH_3	H	H
E4.648	CN	CH	$CC(O)OCH_3$	H	H	H
E4.649	CN	CH	$CC(O)OCH_3$	H	H	CH_3
E4.650	CN	CH	$CC(O)OCH_3$	H	H	$C(O)OCH_3$
E4.651	CN	CH	$CC(O)OCH_3$	H	OH	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.652	CN	CH	$CC(O)OCH_3$	H	$C(O)OCH_3$	H
E4.653	CN	CH	$CC(O)OCH_3$	H	OCH_3	H
E4.654	CN	CH	$CC(O)OCH_3$	H	CH_3	H
E4.655	CN	CH	$CC(O)OCH_3$	CH_3	H	H
E4.656	CN	CF	CH	H	H	H
E4.657	CN	CF	CH	H	H	CH_3
E4.658	CN	CF	CH	H	H	$C(O)OCH_3$
E4.659	CN	CF	CH	H	OH	H
E4.660	CN	CF	CH	H	$C(O)OCH_3$	H
E4.661	CN	CF	CH	H	OCH_3	H
E4.662	CN	CF	CH	H	CH_3	H
E4.663	CN	CF	CH	CH_3	H	H
E4.664	CN	CCl	CH	H	H	H
E4.665	CN	CCl	CH	H	H	CH_3
E4.666	CN	CCl	CH	H	H	$C(O)OCH_3$
E4.667	CN	CCl	CH	H	OH	H
E4.668	CN	CCl	CH	H	$C(O)OCH_3$	H
E4.669	CN	CCl	CH	H	OCH_3	H
E4.670	CN	CCl	CH	H	CH_3	H
E4.671	CN	CCl	CH	CH_3	H	H
E4.672	CN	CCH_3	CH	H	H	H
E4.673	CN	CCH_3	CH	H	H	CH_3
E4.674	CN	CCH_3	CH	H	H	$C(O)OCH_3$
E4.675	CN	CCH_3	CH	H	OH	H
E4.676	CN	CCH_3	CH	H	$C(O)OCH_3$	H
E4.677	CN	CCH_3	CH	H	OCH_3	H
E4.678	CN	CCH_3	CH	H	CH_3	H
E4.679	CN	CCH_3	CH	CH_3	H	H
E4.680	CN	$COCH_3$	CH	H	H	H

Compound	A^{2a}	A^{2b}	A^{2c}	A^{3a}	A^{3b}	A^{3c}
E4.681	CN	$COCH_3$	CH	H	H	CH_3
E4.682	CN	$COCH_3$	CH	H	H	$C(O)OCH_3$
E4.683	CN	$COCH_3$	CH	H	OH	H
E4.684	CN	$COCH_3$	CH	H	$C(O)OCH_3$	H
E4.685	CN	$COCH_3$	CH	H	OCH_3	H
E4.686	CN	$COCH_3$	CH	H	CH_3	H
E4.687	CN	$COCH_3$	CH	CH_3	H	H
E4.688	$COCHF_2$	CH	CH	H	H	H
E4.689	$COCHF_2$	CH	CH	H	H	CH_3
E4.690	$COCHF_2$	CH	CH	H	H	$C(O)OCH_3$
E4.691	$COCHF_2$	CH	CH	H	OCH_3	H
E4.692	$COCHF_2$	CH	CH	H	CH_3	H

Table 4.2: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is CH_3, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.3: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is methoxy, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.4: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is methoxy, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.5: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is cyclopropyl, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.6: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is cyclopropyl, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.7: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is CH_2OCH_3, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.8: This table discloses specific compounds of formula (Ih) wherein R^{1b} is H, R^5 is CH_2OCH_3, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.9: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is CH_3, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.10 This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is CH_3, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.11: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is methoxy, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.12: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is methoxy, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.13: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is cyclopropyl, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.14: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is cyclopropyl, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.15: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, , R^5 is CH_2OCH_3, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.16: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_3, R^5 is CH_2OCH_3, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.17: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is CH_3, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.18: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is CH_3, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.19: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is methoxy, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.20: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is methoxy, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.21: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is cyclopropyl, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.22: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is cyclopropyl, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Table 4.23: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is CH_2OCH_3, A_1 is CH and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

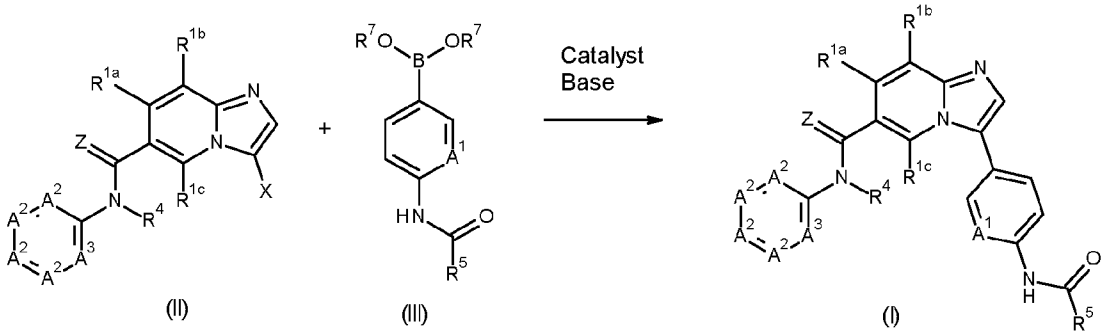
Table 4.24: This table discloses specific compounds of formula (Ih) wherein R^{1b} is CH_2OCH_3, R^5 is CH_2OCH_3, A_1 is N and A^{2a}, A^{2b}, A^{2c}, A^{3a}, A^{3b}, A^{3c} are as defined in Table Z.4.

Compounds according to the invention 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, improved physico-chemical properties, or increased biodegradability). Compounds according to the invention have particularly advantageous levels of biological activity for protecting plants against oomycetes such as *Phytophthora*, *Plasmopara* and *Pythium*.

Compounds of formula (I) wherein Z is O, can be made as shown in the following schemes 1 to 19, in which, unless otherwise stated, the definition of each variable is as defined in the present invention.

Compounds of formula (I) can be prepared via Suzuki cross coupling of compounds of formula (II), wherein X is chloro (Cl), bromo (Br) or iodo (I), and a compound of formula (III), wherein either R^7 is independently from each other hydrogen, C_{1-6}alkyl or wherein two R^7 together can form a C_{3-8}cycloalkyl, in the presence of a base, such as Cs_2CO_3, K_2CO_3 or NaO*t*Bu, and a suitable palladium catalyst, such as tetrakistriphenylphosphinepalladium, palladium dichloride, [1,1-

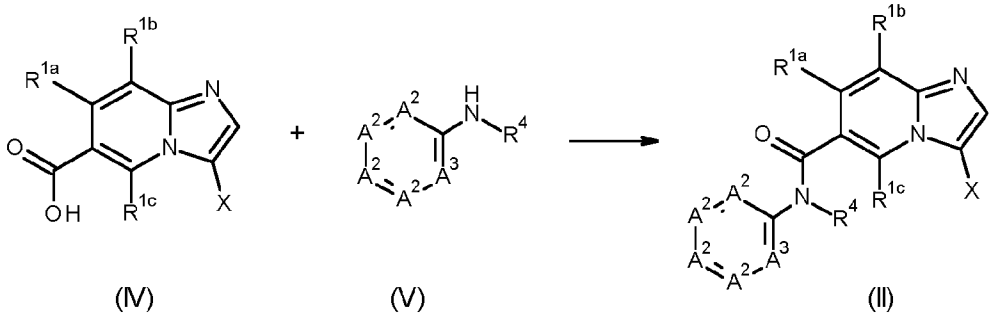
bis(diphenylphosphino)ferrocene]dichloropalladium(II), palladium acetate or bis(diphenylphosphine)palladium(II) chloride), in a suitable solvent, such as dimethylformamide, dioxane, tetrahydrofuran, ethanol or water. This transformation is depicted in Scheme 1.



(II) (III) (I)

Scheme 1

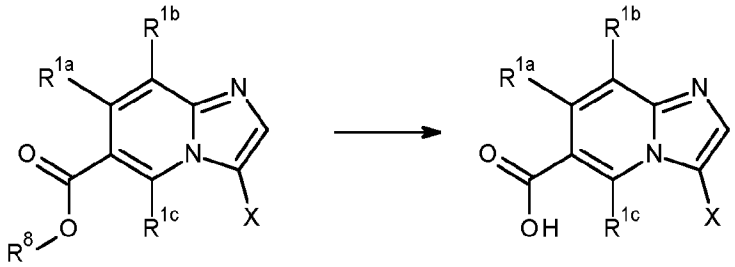
Compounds of formula (II), wherein X is Cl, Br or I, can be prepared by the reaction of a compound of formula (IV), wherein X is Cl, Br or I, with a compounds of formula (V) and a coupling agent, such as N,N'-dicyclohexylcarbodiimide, bis(2-oxo-3-oxazolidinyl)phosphinic chloride, 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, propylphosphonic anhydride or cyanuric chloride, and, optionally, a base such, as triethylamine, ethyldiisopropylamine or N-methylmorpholine in a suitable solvent such ethyl acetate, dimethylformamide, tetrahydrofuran or dichloromethane. Amines of formula (V) are commercially available or can be synthesized according to methods known to those skilled in the art. This transformation is depicted in Scheme 2.



(IV) (V) (II)

Scheme 2

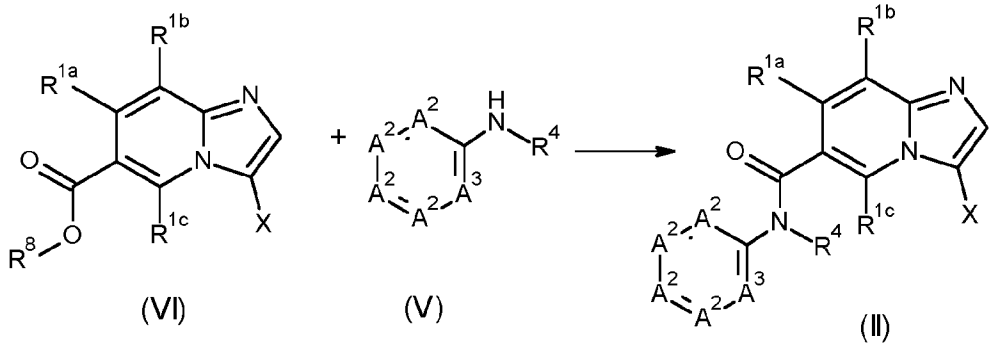
Compounds of formula (IV), wherein X is Cl, Br or I, are commercially available or, alternatively can be prepared by the saponification of compounds of formula (VI), wherein X is Cl, Br or I and R8 is a C_{1-6}alkyl, using a base, such as NaOH or LiOH, in a suitable solvent such as methanol, ethanol or water at temperature between room temperature and reflux. This transformation is depicted in Scheme 3.



(VI) (IV)

Scheme 3

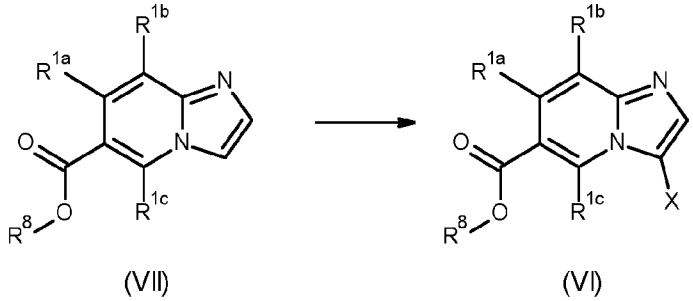
Alternatively, compounds of formula (II), wherein X is Cl, Br or I, can be prepared directly by the reaction of a compounds of formula (VI), wherein X is Cl, Br or I and R^8 is a C_{1-6}alkyl, and a compounds of formula (V) in the presence of trimethylaluminum or bis(trimethylaluminum)-1,4-diazabicyclo[2.2.2]octane adduct in a suitable solvent, such as tetrahydrofuran or toluene. These transformations have been described in the literature (see for examples: Weinreb, S. M. et al. *Tetrahedron Lett.* **1977**, *48*, 4171; Woodward, S. et al. in *Tetrahedron Letters* **2006**, *47*, 5767; Woodward S. et al. in *Org. Process Res. Dev.*, **2015**, *19*, 831). This transformation is depicted in scheme 4.



(VI) (V) (II)

Scheme 4

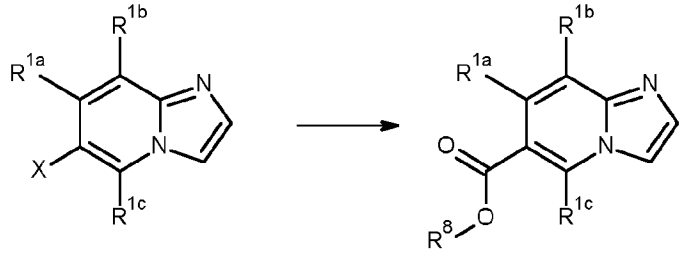
Compounds of formula (VI), wherein X is Cl, Br or I and R^8 is a C_{1-6}alkyl, are commercially available or, alternatively, can be prepared from the reaction of a compound of formula (VII), wherein R^8 is a C_{1-6}alkyl, and a halogenating agent, such as N-chlorosuccinimide, N-bromosuccinimide, N-iodosuccinimide or bromine in a suitable solvent, such as dichloromethane, chloroform, tetrahydrofuran or acetonitrile. This transformation is depicted in scheme 5.



(VII) (VI)

Scheme 5

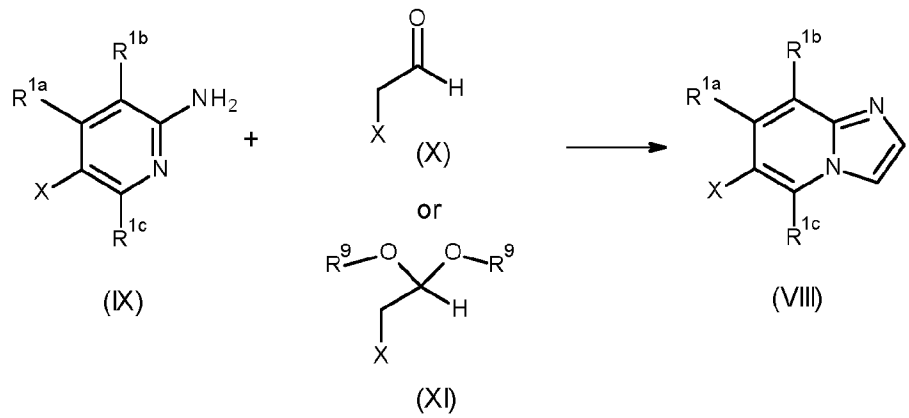
Compounds of formula (VII), wherein R^8 is a C_{1-6}alkyl, are commercially available or, alternatively, can be prepared by the reaction of a compound of formula (VIII), wherein X is Cl, Br or I, with carbon monoxide and an alcohol R^8OH, wherein R^8 is a C_{1-6}alkyl, in the presence of a catalyst, such as [1,1′-Bis-(diphenylphosphino)-ferrocen]-dichloro-palladium(II), and, optionally, a base such as triethylamine. This transformation is depicted in scheme 6.



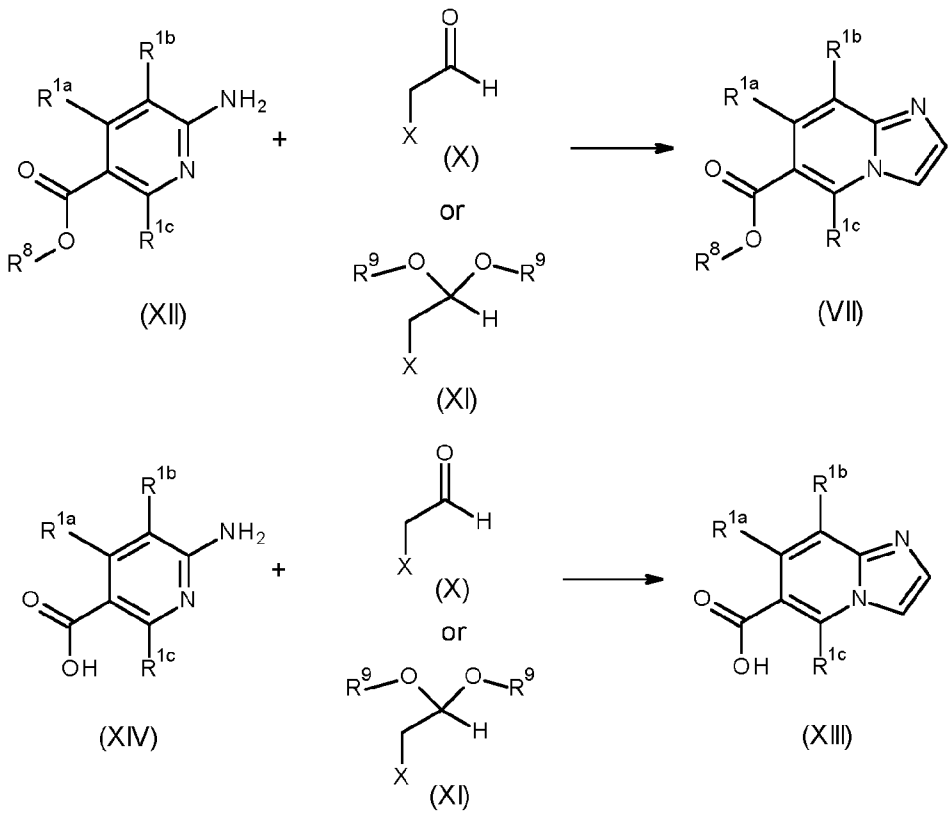
(VIII) (VII)

Scheme 6

Compounds of formula (VIII) are commercially available or, alternatively, can be prepared by the reaction of a compound of formula (IX), wherein X is Cl, Br or I, and a compound of formula (X), wherein X is Cl, Br or I, or its corresponding acetal of formula (XI), wherein X is Cl, Br or I and either R^9 is independently from each other C_{1-6}alkyl or wherein two R^9 together can form a C_{3-8}cycloalkyl, in a solvent, such as water, ethanol, acetone or acetonitrile. In some instance, the outcome of the reaction can be improved by using a base, such as sodium bicarbonate or potassium carbonate, or by using an acid, such as *p*-toluenesulfonic acid or hydrogen bromide. Additionally, this transformation can be utilized to prepare compounds of formula (VII), wherein R^8 is a C_{1-6}alkyl, from a compound of formula (XII), wherein R^8 is a C_{1-6}alkyl, and to prepare compounds of formula (XIII) from a compound of formula (XIV). These transformations are depicted in scheme 7



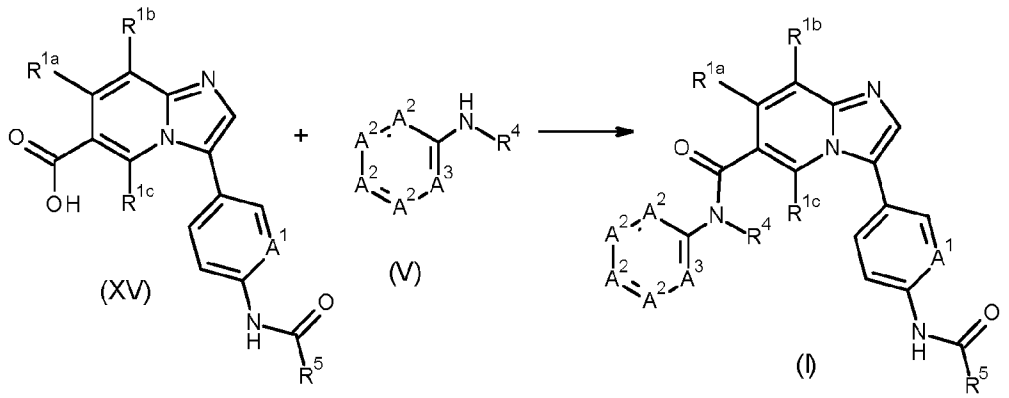
(IX) (X) or (XI) (VIII)



Scheme 7

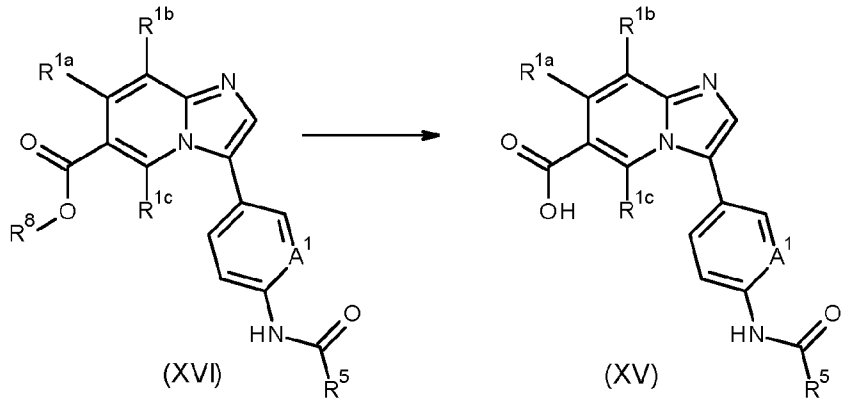
Compounds of formula (IX), wherein X is Cl, Br or I, compounds of formula (XII), wherein R^8 is a C_{1-6}alkyl, and compounds of formula (XIV) are prepared by known methods or are commercially available.

Alternatively, compounds of formula (I) can be prepared by the reaction of a compound of formula (XV), with a compounds of formula (V) and a coupling agent, such as N,N'-dicyclohexylcarbodiimide, bis(2-oxo-3-oxazolidinyl)phosphinic chloride, 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, propylphophonic anhydride or cyanuric chloride, and, optionally, a base such as triethylamine, ethyldiisopropylamine or N-methylmorpholine in a suitable solvent such ethyl acetate, dimethylformamide, tetrahydrofuran or dichloromethane. This transformation is depicted in Scheme 8.



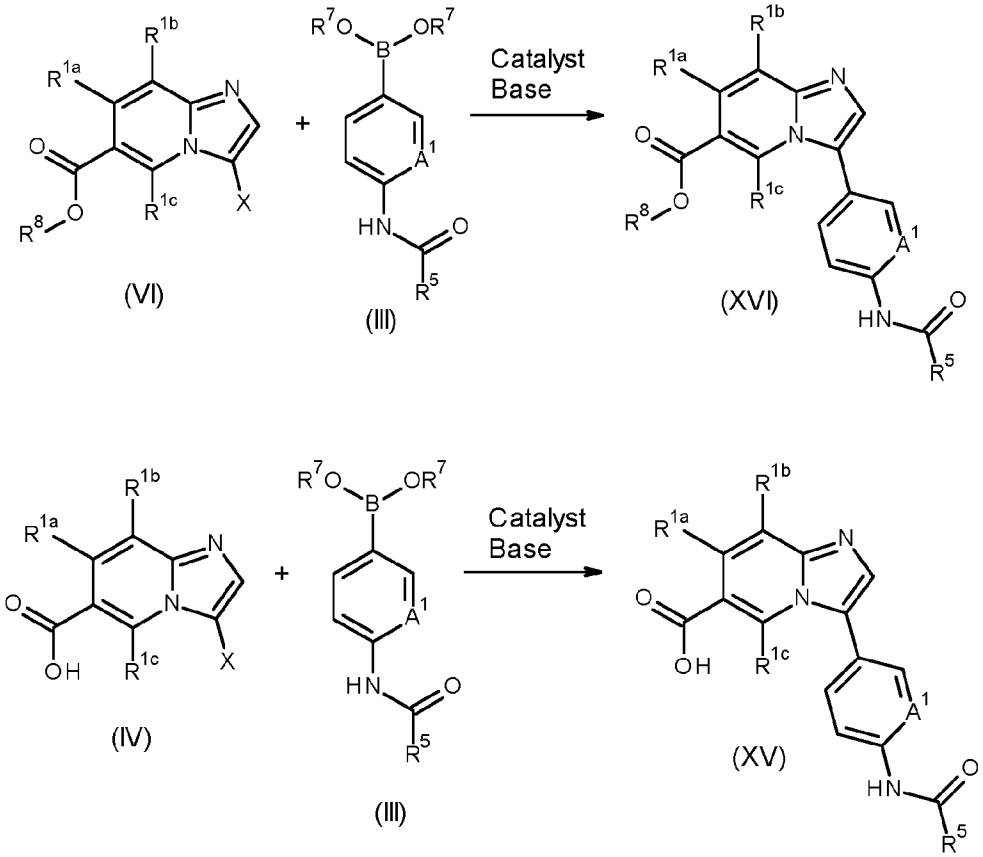
Scheme 8

Compound of formula (XV) can be prepared by the saponification of compounds of formula (XVI), wherein R^8 is a C_{1-6}alkyl, using a base such as NaOH or LiOH, in a suitable solvent such as methanol, ethanol or water at temperature between room temperature and reflux. This transformation is depicted in Scheme 9.



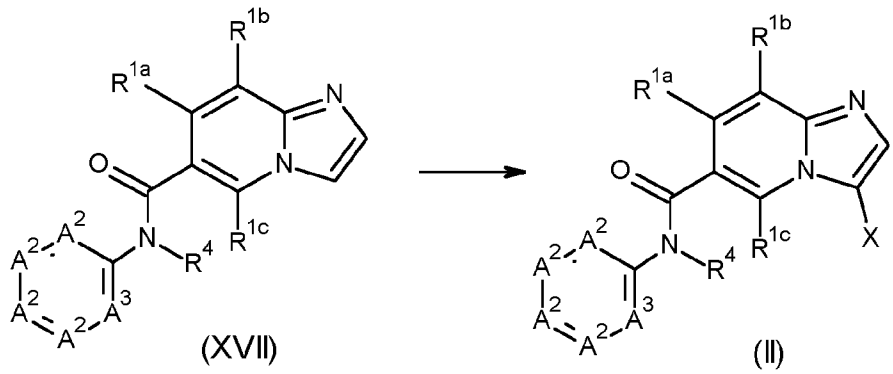
Scheme 9

Compounds of formula (XVI), wherein R^8 is a C_{1-6}alkyl, can be prepared via Suzuki cross coupling of compounds of formula (VI), wherein X is Cl, Br or I, and R^8 is a C_{1-6}alkyl, and a compound of formula (III), wherein either R^7 is independently from each other hydrogen, C_{1-6}alkyl or wherein two R^7 together can form a C_{3-8}cycloalkyl, in the presence of a base, such as Cs_2CO_3, K_2CO_3 or NaOtBu, and a suitable palladium catalyst, such as tetrakistriphenylphosphinepalladium, palladium dichloride, [1,1-bis(diphenylphosphino)ferrocene]dichloropalladium(II), palladium acetate or bis(diphenylphosphine)palladium(II) chloride), in a suitable solvent, such as dimethylformamide, dioxane, tetrahydrofuran, ethanol or water. Additionally, this transformation can be utilized to prepare a compound of formula (XV) from a compound of formula (IV). These transformations are depicted in Scheme 10.



Scheme 10

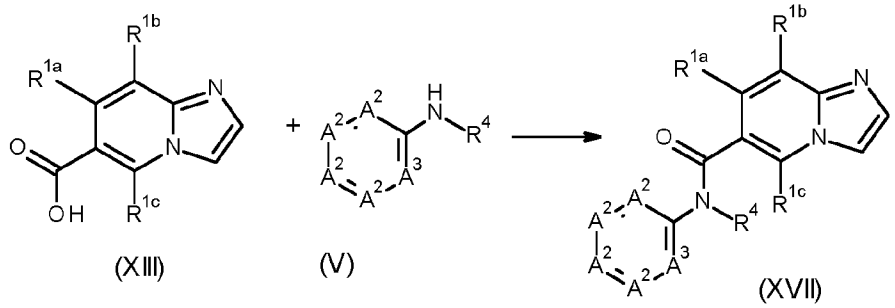
Alternatively, compounds of formula (II), wherein X is Cl, Br or I, can be prepared by the reaction of a compound of formula (XVII) and a halogenating agent, such as N-chlorosuccinimide, N-bromosuccinimide, N-iodosuccinimide or bromine in a suitable solvent, such as dichloromethane, chloroform, tetrahydrofuran or acetonitrile. This transformation is depicted in scheme 11.



Scheme 11

Compounds of formula (XVII) can be prepared by the reaction of a compound of formula (XIII), with a compounds of formula (V) and a coupling agent, such as N,N'-dicyclohexylcarbodiimide, bis(2-oxo-3-

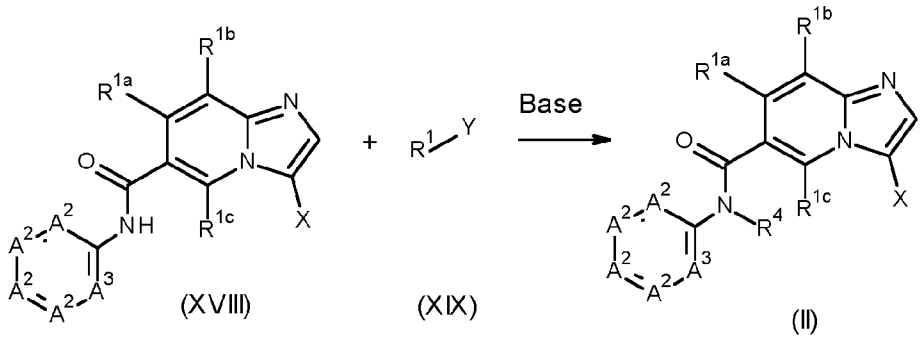
oxazolidinyl)phosphinic chloride, 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, propylphophonic anhydride or cyanuric chloride, and, optionally, a base such as triethylamine, ethyldiisopropylamine or N-methylmorpholine in a suitable solvent such ethyl acetate, dimethylformamide, tetrahydrofuran or dichloromethane. This transformation is depicted in Scheme 12.



(XIII) (V) (XVII)

Scheme 12

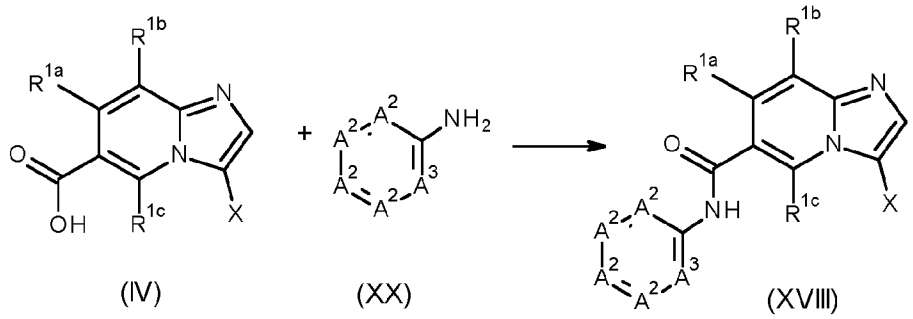
Alternatively, compounds of formula (II) can be prepared by the reaction of a compound of formula (XVIII), with a compound of formula (XIX), wherein Y is Cl, Br, I, OSO_2CF_3, $OSO_2C_6H_4CH_3$ or OSO_2CH_3, in the presence of a base, such as Cs_2CO_3, K_2CO_3 or NaOtBu. This transformation is depicted in scheme 13.



(XVIII) (XIX) (II)

Scheme 13

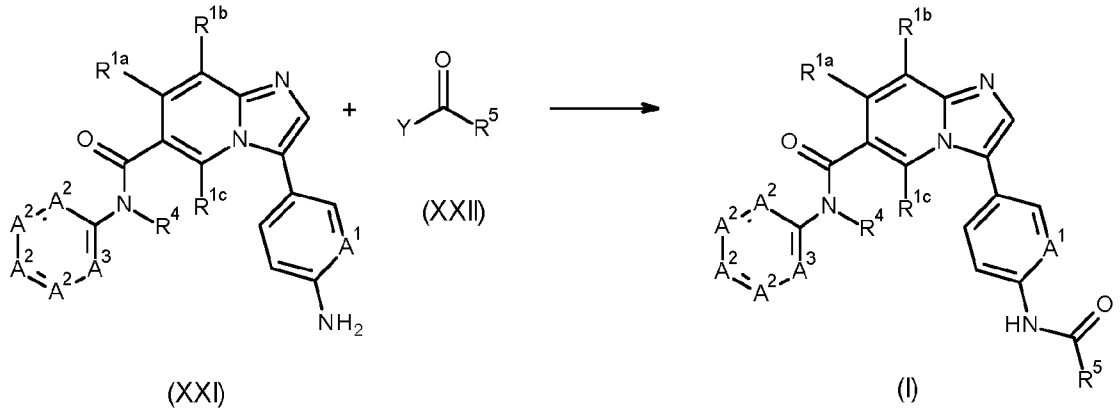
Compounds of formula (XVIII), wherein X is Cl, Br or I, can be prepared by the reaction of a compound of formula (IV), wherein X is Cl, Br or I, with a compounds of formula (XX) and a coupling agent, such as N,N'-dicyclohexylcarbodiimide, bis(2-oxo-3-oxazolidinyl)phosphinic chloride, 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, propylphosphonic anhydride or cyanuric chloride, and, optionally, a base such, as triethylamine, ethyldiisopropylamine or N-methylmorpholine in a suitable solvent such ethyl acetate, dimethylformamide, tetrahydrofuran or dichloromethane. This transformation is depicted in Scheme 14



(IV) (XX) (XVIII)

Scheme 14

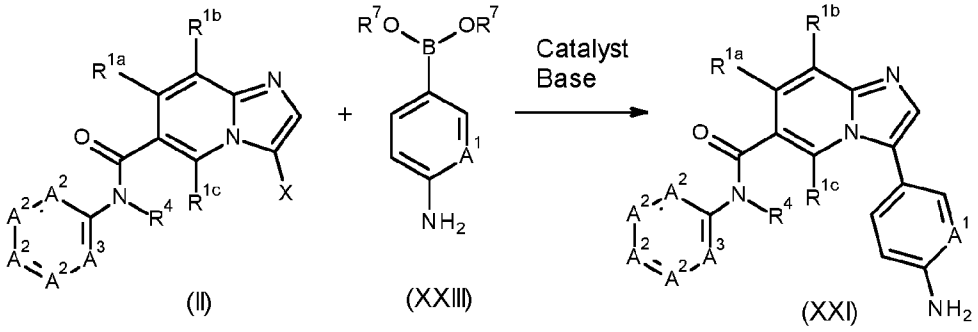
Alternatively, compounds of formula (I) can be prepared by the reaction of a compound of formula (XXI) with a compound of formula (XXII), wherein Y is OH, and a coupling agent, such as N,N'-dicyclohexylcarbodiimide, bis(2-oxo-3-oxazolidinyl)phosphinic chloride, 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, propylphosphonic anhydride or cyanuric chloride, and, optionally, a base such as triethylamine, ethyldiisopropylamine or N-methylmorpholine in a suitable solvent such ethyl acetate, dimethylformamide, tetrahydrofuran or dichloromethane. The transformation can also be accomplished by the reaction of a compound of formula (XXI) with a compound of formula (XXII), wherein Y is Cl, and, optionally, a base such as, triethylamine, ethyldiisopropylamine or pyridine in a suitable solvent such as ethyl acetate, pyridine or tetrahydrofuran. This transformation is depicted in Scheme 15.



(XXI) (XXII) (I)

Scheme 15

Compounds of formula (XXI) can be prepared via Suzuki cross coupling of compounds of formula (II), wherein X is Cl, Br or I, and a compound of formula (XXIII), wherein either R^7 is independently from each other hydrogen, C_{1-6}alkyl or wherein two R^7 together can form a C_{3-8}cycloalkyl, in the presence of a base, such as Cs_2CO_3, K_2CO_3 or NaOtBu, and a suitable palladium catalyst, such as tetrakistriphenylphosphinepalladium, palladium dichloride, [1,1-bis(diphenylphosphino)ferrocene]dichloropalladium(II), palladium acetate or bis(diphenylphosphine)palladium(II) chloride), in a suitable solvent, such as dimethylformamide, dioxane, tetrahydrofuran, ethanol or water. This transformation is depicted in Scheme 16.



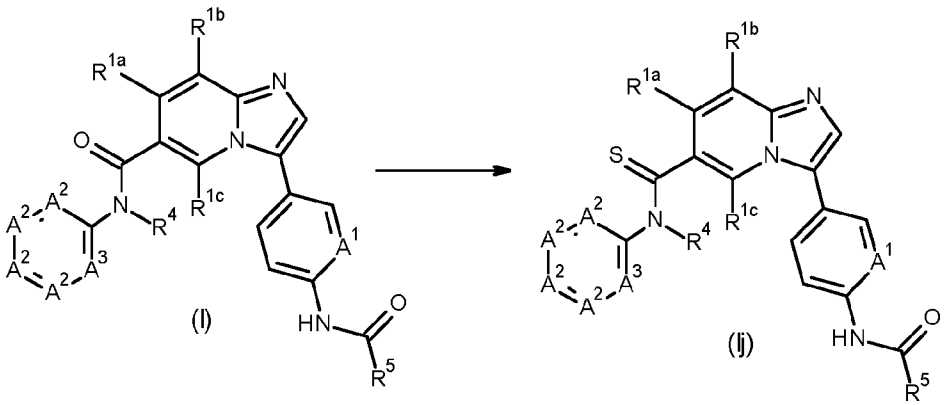
Scheme 16

Compounds of formula (V) and of formula (XX) are commercially available or can be prepared by known methods. See for example M. Milen, B. Nyulasi, T. Nagy, G. Simig, B. Volk, *Beilstein J. Org. Chem.* **2022**, *18*, 653; M. Imanishi, M. Sonoda, H. Miyazato, K.o Sugimoto, M. Akagawa, S. Tanimori, *ACS Omega* **2017**, *2*, 1875; J. X. Qiao, T. C. Wang, R. Ruel, C. Thibeault, A. L'Heureux, W. A. Schumacher, S. A. Spronk, S. Hiebert, G. Bouthillier, J. Lloyd, Z. Pi, D. M. Schnur, L. M. Abell, J. Hua, L. A. Price, E. Liu, Q. Wu, T. E. Steinbacher, J. S. Bostwick, M. Chang, J. Zheng, Q. Gao, B. Ma, P. A. McDonnell, C. S. Huang, R. Rehfuss, R. R. Wexler, P. Y. S. Lam *J. Med. Chem.* **2013**, *56*, 9275−9295; A. M. McKinney, K. R. Jackson, R. Nicholas Salvatore, E.-M. Savrides, M. J. Edattel, T. Gavin, *J. Heterocyclic Chem.* **2005**, *42*, 1031; S. Uçar, S. Eşsiz , A. Daştan, *Tetrahedron* **2017**, *73*, 1618-1632; F. Fache, *Synlett* **2004**, *15*, 2827–2829.

Compounds of formula (III) and of formula (XXIII), wherein either R^7 is independently from each other hydrogen, C_{1-6}alkyl or wherein two R^7 together can form a C_{3-8}cycloalkyl are prepared by known methods or are commercially available. See for example G. S. Basarab, J. I. Manchester, S. Bist, P. A. Boriack-Sjodin, B. Dangel, R. Illingworth†, B. A. Sherer, S. Sriram, M. Uria-Nickelsen, A. E. Eakin, *J. Med. Chem.* **2013**, *56*, 8712–8735; M. Gravel, K. A. Thompson, M. Zak, C. Bérubé, D. G. Hall, *J. Org. Chem.*, **2002**, *67*, 3-15; S. Kitamura, K. L. Hvorecny, J. Niu, B. D. Hammock, D. R. Madden, C. Morisseau, *J. Med. Chem.* **2016**, *59*, 4790−4799; J. Maity, D. Honcharenko, R. Strömberg, *Tetrahedron Letters* **2015**, *56*, 4780–4783.

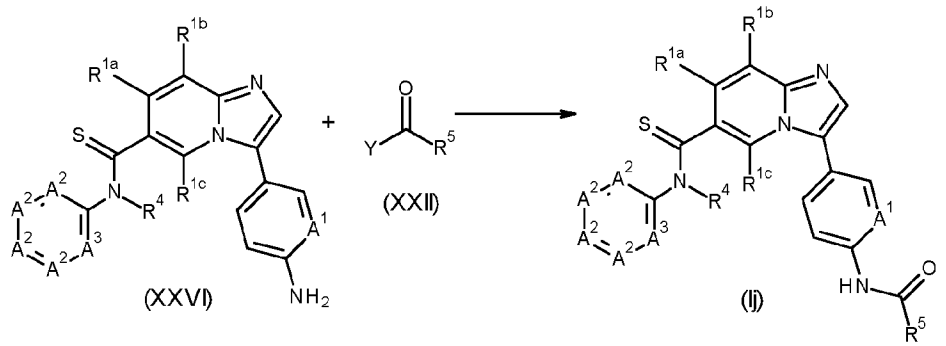
It is understood that a person skilled in the art would recognize that the amide coupling reactions described above between an acid, an amine and a coupling agent could also be performed using the corresponding acid chloride and amine. The transformation of an acid into its corresponding acid chloride is well known for the person skilled in the art.

Compounds of formula (Ij) can be prepared by the reaction of a compound of formula (I) wherein Z is O, with phosphorus pentasulfide or Lawesson's reagent (CAS: 19172-47-5) in a suitable solvent such as toluene, xylene or dichloromethane. This transformation is depicted in Scheme 17.



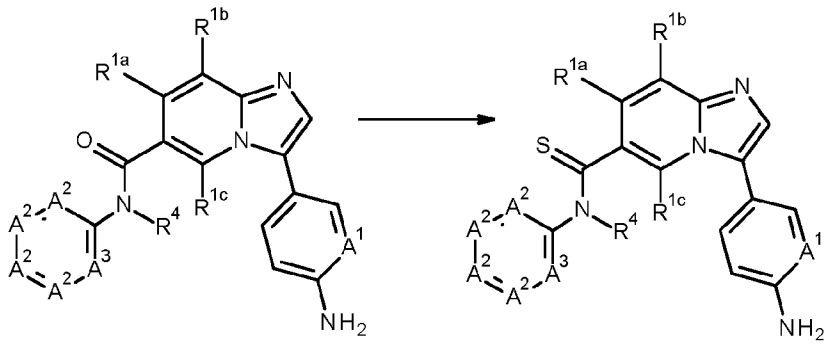
Scheme 17

Alternatively, compounds of formula (Ij), wherein Z is S, can be prepared by the reaction of a compound of formula (XXIV) with a compound of formula (XXII), wherein Y is OH, and a coupling agent, such as N,N'-dicyclohexylcarbodiimide, bis(2-oxo-3-oxazolidinyl)phosphinic chloride, 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, propylphosphonic anhydride or cyanuric chloride, and, optionally, a base such as triethylamine, ethyldiisopropylamine or N-methylmorpholine in a suitable solvent such ethyl acetate, dimethylformamide, tetrahydrofuran or dichloromethane. The transformation can also be accomplished by the reaction of a compound of formula (XXIV) with a compound of formula (XXII), wherein Y is Cl, and, optionally, a base such as, triethylamine, ethyldiisopropylamine or pyridine in a suitable solvent such as ethyl acetate, pyridine or tetrahydrofuran. These transformations are depicted in Scheme 18.



Scheme 18

Compounds of formula (XXIV) can be prepared by the reaction of a compound of formula (XXI), with phosphorus pentasulfide or Lawesson's reagent (CAS: 19172-47-5) in a suitable solvent such as toluene, xylene or dichloromethane. This transformation is depicted in Scheme 19.



(XXI) (XXVI)

Scheme 19

It is understood by the person skilled in the art that the amide coupling reactions described above between an acid, an amine and a coupling agent could also be performed using the corresponding acid chloride and amine. The transformation of an acid into its corresponding acid chloride is well known by the person skilled in the art.

It is also understood by the person skilled in the art that some of the reactions described above where the imidazole-ring nitrogen atom of the central ring is unsubstituted might work more efficiently if that imidazole nitrogen atom is masked with a protecting group, such as trimethylsilylethoxymethyl (SEM), tert-butoxycarbonyl (Boc) or 2-tetrahydropyranyl (THP). Protection reactions of imidazole ring with SEM, Boc or THP, along with the subsequent deprotection of those groups, are transformations well understood by the person skilled in the art. Information about those transformations can be found in literature including the Greene's Protective Groups in Organic Synthesis, Fourth Edition, Chapter 7.

When the term "compound/compounds according to the invention" is used, then this refers to compounds according to the present invention.

Alternatively, the compounds according to the present invention can be obtained by using standard synthesis techniques known to the person skilled in the art. Non-exhaustive examples include oxidation reactions, reduction reactions, hydrolysis reactions, coupling reactions, aromatic nucleophilic or electrophilic substitution reactions, nucleophilic substitution reactions, nucleophilic addition reactions, olefination reactions, oxime formation, alkylation and halogenation reactions.

A compound according to the present invention can be converted in a manner known per se into another compound according to the present invention by replacing one or more substituents of the starting compound according to the present invention in the customary manner by (an)other substituent(s) according to the invention.

Depending on the choice of the reaction conditions and starting materials which are suitable in each case, it is possible, for example, in one reaction step only to replace one substituent by another

substituent according to the invention, or a plurality of substituents can be replaced by other substituents according to the invention in the same reaction step.

Salts of the compounds according to the present invention can be prepared in a manner known per se. Thus, for example, acid addition salts of the compounds according to the present invention 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 the compounds according to the present invention can be converted in the customary manner into the free compounds, 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 the compounds according to the present invention can be converted in a manner known per se into other salts of the compounds according to the present invention, 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 according to the present invention, which have salt-forming properties can be obtained in free form or in the form of salts.

The compounds according to the present invention and, where appropriate, the tautomers thereof, in each case in free form or in salt form, can be present in the form of one of the stereoisomers which are possible or as a mixture of these, for example in the form of pure stereoisomers, such as antipodes and/or diastereomers, or as stereoisomer mixtures, such as enantiomer mixtures, for example racemates, diastereomer mixtures or racemate 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 stereoisomers and also to all stereoisomer mixtures which are possible and is to be understood in each case in this sense hereinabove and hereinbelow, even when stereochemical details are not mentioned specifically in each case.

Diastereomer mixtures or racemate mixtures of the compounds according to the present invention, 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.

Enantiomer mixtures, such as racemates, which can be obtained in a similar manner can be resolved into 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 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 stereoisomer 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.

N-oxides can be prepared by reacting a compound according to the present invention with a suitable oxidizing agent, for example the H2O2/urea adduct in the presence of an acid anhydride, e.g. trifluoroacetic anhydride. Such oxidations are known from the literature, for example from J. Med. Chem., 32 (12), 2561-73, 1989 or WO 00/15615.

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

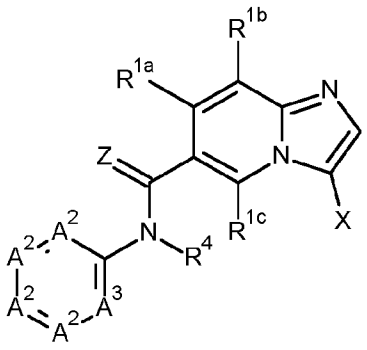
The compounds according to the present invention and, where appropriate, the tautomers thereof, in each case in free form or in salt form, can, if appropriate, also be obtained in the form of hydrates and/or include other solvents, for example those which may have been used for the crystallization of compounds which are present in solid form.

The following Examples illustrate, but do not limit, the invention.

The present invention also provides intermediates useful for the preparation of compounds according to the present invention.

The below intermediates form a further aspect of the invention.

A compound of formula (II)



(II)

wherein Z is O or S, and preferably Z is O;

R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkylsulfanyl. C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxy, amino, and -NHC(O)C_{1-6}alkyl; preferably R^{1a} and R^{1c} are hydrogen and R^{1b} is selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkylsulfonyl, and -NHC(O)C_{1-6}alkyl;

A^2 are independently CR^2 or N, with the proviso that no more than three A^2 are N, preferably no more than two A^2 are N, preferably no more than one A^2 is N, and more preferably the four A^2 are CR^2;

R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; preferably R^2 are independently selected from hydrogen, halogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and CN;

A^3 is CR^3 or N;

R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; and preferably R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen, hydroxy, and CN; and wherein R^3 taken together with the adjacent R^2 optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 5-membered heterocycle or a 6-membered heterocycle;

R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-}

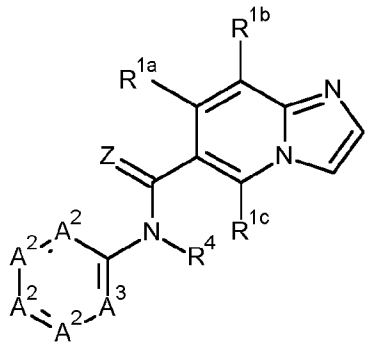
$_{6}$alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, and CN, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl and diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN; and preferably R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen and CN; and wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle;

and

X is Cl, Br or I;

or a salt or N-oxide thereof.

A compound of formula (XVII)



(XVII)

wherein Z is O or S, and preferably Z is O;

R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkylsulfanyl. C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxy, amino, and -NHC(O)C_{1-6}alkyl; preferably R1a and R^{1c} are hydrogen and R^{1b} is selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkylsulfonyl, and -NHC(O)C_{1-6}alkyl;

A^2 are independently CR^2 or N, with the proviso that no more than three A^2 are N, preferably no more than two A^2 are N, preferably no more than one A^2 is N, and more preferably the four A^2 are CR^2;

R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}-

$_{6}$alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; preferably R^2 are independently selected from hydrogen, halogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and CN;

A^3 is CR^3 or N;

R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; and preferably R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen, hydroxy, and CN; and wherein R^3 taken together with the adjacent R^2 optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 5-membered heterocycle or a 6-membered heterocycle; and

R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, and CN, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl and diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN; and preferably R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen and CN; and wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle;

or a salt or N-oxide thereof.

The compounds of formula (I) as defined in the present invention can be used in the agricultural sector and related fields of use e.g. as active ingredients for controlling plant pathogens or on non-living materials for 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 may be used for protecting numerous cultivated plants. The compounds of formula (I) as defined in the present invention can be used to inhibit or destroy the pathogens 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.

It is also possible to use compounds of formula (I) as defined in the present invention as fungicide. The term "fungicide" as used herein means a compound that controls, modifies, or prevents the growth of fungi. The term "fungicidally effective amount" 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 is also possible to use compounds of formula (I) as defined in the present invention as dressing agents for the treatment of plant propagation material, *e.g.*, seed, such as fruits, tubers or grains, or plant cuttings (for example rice), 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) as defined in the present invention before planting: seed, for example, can be dressed before being sown. The compounds of formula (I) as defined in the present invention 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) as defined in the present 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.

Compounds of formula (I) as defined in the present invention and fungicidal compositions containing them may be used to control plant diseases caused by a broad spectrum of fungal plant pathogens. They are effective in controlling a broad spectrum of plant diseases, such as foliar pathogens of ornamental, turf, vegetable, field, cereal, and fruit crops.

These fungi and fungal vectors of disease, as well as phytopathogenic bacteria and viruses, which may be controlled are for example:
Absidia corymbifera, Alternaria spp, Aphanomyces spp, Ascochyta spp, Aspergillus spp. including A. flavus, A. fumigatus, A. nidulans, A. niger, A. terrus, Aureobasidium spp. including A. pullulans, Blastomyces dermatitidis, Blumeria graminis, Bremia lactucae, Botryosphaeria spp. including B. dothidea, B. obtusa, Botrytis spp. inclusing B. cinerea, Candida spp. including C. albicans, C. glabrata, C. krusei, C. lusitaniae, C. parapsilosis, C. tropicalis, Cephaloascus fragrans, Ceratocystis spp,

Cercospora spp. including C. arachidicola, Cercosporidium personatum, Cladosporium spp, Claviceps purpurea,
Coccidioides immitis, Cochliobolus spp, Colletotrichum spp. including C. musae,
Cryptococcus neoformans, Diaporthe spp, Didymella spp, Drechslera spp, Elsinoe spp,
Epidermophyton spp, Erwinia amylovora, Erysiphe spp. including E. cichoracearum,
Eutypa lata, Fusarium spp. including F. culmorum, F. graminearum, F. langsethiae, F. moniliforme, F. oxysporum, F. proliferatum, F. subglutinans, F. solani, Gaeumannomyces graminis, Gibberella fujikuroi, Gloeodes pomigena, Gloeosporium musarum, Glomerella cingulate, Guignardia bidwellii, Gymnosporangium juniperi-virginianae, Helminthosporium spp, Hemileia spp, Histoplasma spp. including H. capsulatum, Laetisaria fuciformis, Leptographium lindbergi, Leveillula taurica, Lophodermium seditiosum, Microdochium nivale, 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 igniarus, 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, Pseudocercosporella herpotrichoides, Pseudomonas spp, Pseudoperonospora spp. including P. cubensis, P. humuli, Pseudopeziza tracheiphila, Puccinia Spp. including P. hordei, P. recondita, P. striiformis, P. triticina, Pyrenopeziza spp, Pyrenophora spp, Pyricularia spp. including P. oryzae, Pythium spp. including P. 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), Sporothorix 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.

In particular, compounds of formula (I) as defined in the present invention and fungicidal compositions containing them may be used to control plant diseases caused by a broad spectrum of fungal plant pathogens in the Basidiomycete, Ascomycete, Oomycete and/or Deuteromycete, Blasocladiomycete, Chrytidiomycete, Glomeromycete and/or Mucoromycete classes. More particularly, the compounds of formula (I) as defined in the present invention may be used to conrol oomycetes.

These pathogens may include:
Oomycetes, including Phytophthora diseases such as those caused by *Phytophthora capsici*, *Phytophthora infestans*, *Phytophthora sojae*, *Phytophthora fragariae*, *Phytophthora nicotianae*, *Phytophthora cinnamomi*, *Phytophthora citricola*, *Phytophthora citrophthora* and *Phytophthora erythroseptica*; Pythium diseases such as those caused by *Pythium aphanidermatum*, *Pythium*

arrhenomanes, Pythium graminicola, Pythium irregulare, Pythium sylvaticum and *Pythium ultimum*; diseases caused by Peronosporales such as *Peronospora destructor*, *Peronospora parasitica*, *Plasmopara viticola, Plasmopara halstedii, Pseudoperonospora cubensis*, *Albugo candida*, *Sclerophthora macrospora* and *Bremia lactucae*; and others such as *Aphanomyces cochlioides*, *Labyrinthula zosterae*, *Peronosclerospora sorghi* and *Sclerospora graminicola*.

Ascomycetes, including blotch, spot, blast or blight diseases and/or rots for example those caused by Pleosporales such as *Stemphylium solani*, *Stagonospora tainanensis*, *Spilocaea oleaginea*, *Setosphaeria turcica*, *Pyrenochaeta lycoperisici*, *Pleospora herbarum*, *Phoma destructiva*, *Phaeosphaeria herpotrichoides*, *Phaeocryptocus gaeumannii*, *Ophiosphaerella graminicola*, *Ophiobolus graminis*, *Leptosphaeria maculans*, *Hendersonia creberrima*, *Helminthosporium triticirepentis*, *Setosphaeria turcica*, *Drechslera glycines*, *Didymella bryoniae*, *Cycloconium oleagineum*, *Corynespora cassiicola*, *Cochliobolus sativus*, *Bipolaris cactivora*, *Venturia inaequalis*, *Pyrenophora teres*, *Pyrenophora tritici-repentis*, *Alternaria alternata*, *Alternaria brassicicola*, *Alternaria solani* and *Alternaria tomatophila*, Capnodiales such as *Septoria tritici*, *Septoria nodorum*, *Septoria glycines*, *Cercospora arachidicola*, *Cercospora sojina*, *Cercospora zeae-maydis*, *Cercosporella capsellae* and *Cercosporella herpotrichoides*, *Cladosporium carpophilum*, *Cladosporium effusum*, *Passalora fulva*, *Cladosporium oxysporum*, *Dothistroma septosporum*, *Isariopsis clavispora*, *Mycosphaerella fijiensis*, *Mycosphaerella graminicola*, *Mycovellosiella koepkeii, Phaeoisariopsis bataticola*, *Pseudocercospora vitis*, *Pseudocercosporella herpotrichoides*, *Ramularia beticola*, *Ramularia collo-cygni*, Magnaporthales such as *Gaeumannomyces graminis*, *Magnaporthe grisea*, *Pyricularia oryzae,* Diaporthales such as *Anisogramma anomala*, *Apiognomonia errabunda*, *Cytospora platani*, *Diaporthe phaseolorum*, *Discula destructiva*, *Gnomonia fructicola*, *Greeneria uvicola*, *Melanconium juglandinum*, *Phomopsis viticola*, *Sirococcus clavigignenti-juglandacearum*, *Tubakia dryina*, *Dicarpella* spp., *Valsa ceratosperma*, and others such as *Actinothyrium graminis*, *Ascochyta pisi*, *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus nidulans*, *Asperisporium caricae*, *Blumeriella jaapii*, *Candida* spp., *Capnodium ramosum*, *Cephaloascus* spp., *Cephalosporium gramineum*, *Ceratocystis paradoxa*, *Chaetomium* spp., *Hymenoscyphus pseudoalbidus*, *Coccidioides* spp., *Cylindrosporium padi*, *Diplocarpon malae*, *Drepanopeziza campestris*, *Elsinoe ampelina*, *Epicoccum nigrum*, *Epidermophyton* spp., *Eutypa lata*, *Geotrichum candidum*, *Gibellina cerealis*, *Gloeocercospora sorghi*, *Gloeodes pomigena*, *Gloeosporium perennans*; *Gloeotinia temulenta*, *Griphospaeria corticola*, *Kabatiella lini*, *Leptographium microsporum*, *Leptosphaerulinia crassiasca*, *Lophodermium seditiosum*, *Marssonina graminicola*, *Microdochium nivale*, *Monilinia fructicola*, *Monographella albescens*, *Monosporascus cannonballus*, *Naemacyclus* spp., *Ophiostoma novo-ulmi*, *Paracoccidioides brasiliensis*, *Penicillium expansum*, *Pestalotia rhododendri*, *Petriellidium* spp., *Pezicula* spp., *Phialophora gregata*, *Phyllachora pomigena*, *Phymatotrichum omnivora*, *Physalospora abdita*, *Plectosporium tabacinum*, *Polyscytalum pustulans*, *Pseudopeziza medicaginis*, *Pyrenopeziza brassicae*, *Ramulispora sorghi*, *Rhabdocline pseudotsugae*, *Rhynchosporium secalis*, *Sacrocladium oryzae*, *Scedosporium* spp., *Schizothyrium pomi*, *Sclerotinia sclerotiorum*, *Sclerotinia minor*; *Sclerotium* spp., *Typhula ishikariensis*, *Seimatosporium mariae*, *Lepteutypa cupressi*, *Septocyta ruborum*, *Sphaceloma perseae*, *Sporonema phacidioides*, *Stigmina palmivora*, *Tapesia yallundae*, *Taphrina bullata*, *Thielviopsis basicola*, *Trichoseptoria fructigena*, *Zygophiala jamaicensis*; powdery mildew diseases for example those caused by Erysiphales such as

Blumeria graminis, *Erysiphe polygoni*, *Uncinula necator*, *Sphaerotheca fuligena*, *Podosphaera leucotricha*, *Podospaera macularis Golovinomyces cichoracearum*, *Leveillula taurica*, *Microsphaera diffusa*, *Oidiopsis gossypii*, *Phyllactinia guttata* and *Oidium arachidis*; molds for example those caused by Botryosphaeriales such as *Dothiorella aromatica*, *Diplodia seriata*, *Guignardia bidwellii*, *Botrytis cinerea*, *Botryotinia allii*, *Botryotinia fabae*, *Fusicoccum amygdali*, *Lasiodiplodia theobromae*, *Macrophoma theicola*, *Macrophomina phaseolina*, *Phyllosticta cucurbitacearum*; anthracnoses for example those caused by Glommerelales such as *Colletotrichum gloeosporioides*, *Colletotrichum lagenarium*, *Colletotrichum gossypii*, *Glomerella cingulata*, and *Colletotrichum graminicola*; and wilts or blights for example those caused by Hypocreales such as *Acremonium strictum*, *Claviceps purpurea*, *Fusarium culmorum*, *Fusarium graminearum*, *Fusarium virguliforme*, *Fusarium oxysporum*, *Fusarium subglutinans*, *Fusarium oxysporum* f.sp. *cubense*, *Gerlachia nivale*, *Gibberella fujikuroi*, *Gibberella zeae*, *Gliocladium* spp., *Myrothecium verrucaria*, *Nectria ramulariae*, *Trichoderma viride*, *Trichothecium roseum*, and *Verticillium theobromae*.

Basidiomycetes, including smuts for example those caused by Ustilaginales such as *Ustilaginoidea virens*, *Ustilago nuda*, *Ustilago tritici*, *Ustilago zeae*, rusts for example those caused by Pucciniales such as *Cerotelium fici*, *Chrysomyxa arctostaphyli*, *Coleosporium ipomoeae*, *Hemileia vastatrix*, *Puccinia arachidis*, *Puccinia cacabata*, *Puccinia graminis*, *Puccinia recondita*, *Puccinia sorghi*, *Puccinia hordei*, *Puccinia striiformis* f.sp. Hordei, *Puccinia striiformis* f.sp. Secalis, *Pucciniastrum coryli*, or Uredinales such as *Cronartium ribicola*, *Gymnosporangium juniperi-viginianae*, *Melampsora medusae*, *Phakopsora pachyrhizi*, *Phragmidium mucronatum*, *Physopella ampelosidis*, *Tranzschelia discolor* and *Uromyces viciae-fabae*; and other rots and diseases such as those caused by *Cryptococcus* spp., *Exobasidium vexans*, *Marasmiellus inoderma*, *Mycena* spp., *Sphacelotheca reiliana*, *Typhula ishikariensis*, *Urocystis agropyri*, *Itersonilia perplexans*, *Corticium invisum*, *Laetisaria fuciformis*, *Waitea circinata*, *Rhizoctonia solani*, *Thanetephorus cucurmeris*, *Entyloma dahliae*, *Entylomella microspora*, *Neovossia moliniae* and *Tilletia caries*.

Blastocladiomycetes, such as *Physoderma maydis*.

Mucoromycetes, such as *Choanephora cucurbitarum*.; *Mucor* spp.; *Rhizopus arrhizus*.

As well as diseases caused by other species and genera closely related to those listed above.

In addition to their fungicidal activity, the compounds and compositions comprising compounds of formula (I) as defined in the present invention may also have activity against bacteria such as *Erwinia amylovora*, *Erwinia caratovora*, *Xanthomonas campestris, Pseudomonas syringae*, *Strptomyces scabies* and other related species as well as certain protozoa.

Within the scope of the 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 triticale 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 useful plants and / or target crops in accordance with the invention include conventional as well as genetically enhanced or engineered varieties such as, for example, insect resistant (e.g. Bt. and VIP varieties) as well as disease resistant, herbicide tolerant (e.g. glyphosate- and glufosinate-resistant maize varieties commercially available under the trade names RoundupReady® and LibertyLink®) and nematode tolerant varieties. By way of example, suitable genetically enhanced or engineered crop varieties include the Stoneville 5599BR cotton and Stoneville 4892BR cotton varieties.

The term "useful plants" and/or “target crops” is to be understood as including also 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" and/or “target crops” is to be understood as including those which naturally are or have been rendered resistant to harmful insects. This includes plants transformed by the use of recombinant DNA techniques, for example, to be capable of synthesising one or more selectively acting toxins, such as are known, for example, from toxin-producing bacteria. Examples of toxins which can be expressed include δ-endotoxins, vegetative insecticidal proteins (Vip), insecticidal proteins of bacteria colonising nematodes, and toxins produced by scorpions, arachnids, wasps and fungi. An example of a crop that has been modified to express the *Bacillus thuringiensis* toxin is the Bt maize KnockOut® (Syngenta Seeds). An example of a crop comprising more than one gene that codes for insecticidal resistance and thus expresses more than one toxin is VipCot® (Syngenta Seeds). Crops or seed material thereof can also be resistant to multiple types of pests (so-called stacked transgenic events when created by genetic modification). For example, a plant can have the ability to express an insecticidal protein while at the same time being herbicide tolerant, for example Herculex I® (Dow AgroSciences, Pioneer Hi-Bred International).

The term "useful plants" and/or "target crops" is to be understood as including also useful plants which have been so transformed by the use of recombinant DNA techniques that they are capable of synthesising antipathogenic substances having a selective action, such as, for example, the so-called "pathogenesis-related proteins" (PRPs, see e.g. EP-A-0 392 225). Examples of such antipathogenic substances and transgenic plants capable of synthesising such antipathogenic substances are known, for example, from EP-A-0 392 225, WO 95/33818, and EP-A-0 353 191. The methods of producing such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above.

Toxins that can be expressed by transgenic plants include, for example, insecticidal proteins from Bacillus cereus or Bacillus popilliae; or insecticidal proteins from Bacillus thuringiensis, such as δ-endotoxins, e.g. Cry1Ab, Cry1Ac, Cry1F, Cry1Fa2, Cry2Ab, Cry3A, Cry3Bb1 or Cry9C, or vegetative insecticidal proteins (Vip), e.g. Vip1, Vip2, Vip3 or Vip3A; or insecticidal proteins of bacteria colonising nematodes, for example Photorhabdus spp. or Xenorhabdus spp., such as Photorhabdus luminescens, Xenorhabdus nematophilus; toxins produced by animals, such as scorpion toxins, arachnid toxins, wasp toxins and other insect-specific neurotoxins; toxins produced by fungi, such as Streptomycetes 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 δ-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, WO 02/15701). Truncated toxins, for example a truncated Cry1Ab, are known. In the case of modified toxins, one or more amino acids of the naturally occurring toxin are replaced. In such amino acid replacements, preferably non-naturally present protease 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 WO03/018810).

More examples of such toxins or transgenic plants capable of synthesising such toxins are disclosed, for example, in EP-A-0 374 753, WO93/07278, WO95/34656, EP-A-0 427 529, EP-A-451 878 and WO03/052073.

The processes for the preparation of such transgenic plants are generally known to the person skilled in the art and are described, for example, in the publications mentioned above. Cryl-type

deoxyribonucleic acids and their preparation are known, for example, from WO 95/34656, EP-A-0 367 474, EP-A-0 401 979 and WO 90/13651.

The toxin contained in the transgenic plants imparts to the plants tolerance to harmful insects. 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 WO 03/018810.

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.

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

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

The term "plant propagation material" is understood to denote generative parts of the plant, such as seeds, which can be used for the multiplication of the latter, and vegetative material, such as cuttings or tubers, for example potatoes. There may 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 may be protected before transplantation by a total or partial treatment by immersion. Preferably "plant propagation material" is understood to denote seeds.

Pesticidal agents referred to herein using their common name are known, for example, from "The Pesticide Manual", 19th Ed., British Crop Protection Council 2021.

The compounds of formula (I) as defined in the present 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/or adjuvants, e.g. for agricultural use, can be solid or liquid and are substances useful in formulation technology, e.g. natural or regenerated mineral substances, solvents, dispersants, wetting agents, tackifiers, thickeners, binders or fertilizers. Such carriers are for example described in WO 97/33890.

Suspension concentrates are aqueous formulations in which finely divided solid particles of the active compound are suspended. Such formulations include anti-settling agents and dispersing agents and may further include a wetting agent to enhance activity as well an anti-foam and a crystal growth inhibitor. In use, these concentrates are diluted in water and normally applied as a spray to the area to be treated. The amount of active ingredient may range from 0.5% to 95% of the concentrate.

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

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

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

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

Microcapsules are typically droplets or granules of the active ingredient enclosed in an inert porous shell which allows escape of the enclosed material to the surroundings at controlled rates. Encapsulated

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

Other useful formulations for agrochemical applications include simple solutions of the active ingredient in a solvent in which it is completely soluble at the desired concentration, such as acetone, alkylated naphthalenes, xylene and other organic solvents. Pressurised sprayers, wherein the active ingredient is dispersed in finely-divided form as a result of vaporisation of a low boiling dispersant solvent carrier, may also be used.

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

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, diacetonalcohol, 1,2-dichloropropane, diethanolamine, p-diethylbenzene, diethylene glycol, diethylene glycol abietate, diethylene glycol butyl ether, diethylene glycol ethyl ether, diethylene glycol methyl ether, N,N-dimethyl formamide, dimethyl sulfoxide, 1,4-dioxane, dipropylene glycol, dipropylene glycol methyl ether, dipropylene glycol dibenzoate, diproxitol, alkyl pyrrolidinone, ethyl acetate, 2-ethyl hexanol, ethylene carbonate, 1,1,1-trichloroethane, 2-heptanone, alpha pinene, d-limonene, ethylene glycol, ethylene glycol butyl ether, ethylene glycol methyl ether, gamma-butyrolactone, glycerol, glycerol diacetate, glycerol monoacetate, glycerol triacetate, hexadecane, hexylene glycol, isoamyl acetate, isobornyl acetate, isooctane, isophorone, isopropyl benzene, isopropyl myristate, lactic acid, laurylamine, mesityl oxide, methoxy-propanol, methyl isoamyl ketone, methyl isobutyl ketone, methyl laurate, methyl octanoate, methyl oleate, methylene chloride, m-xylene, n-hexane, n-octylamine, octadecanoic acid, octyl amine acetate, oleic acid, oleylamine, o-xylene, phenol, polyethylene glycol (PEG400), propionic acid, propylene glycol, propylene glycol monomethyl ether, p-xylene, toluene, 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.

Suitable solid carriers include, for example, talc, titanium dioxide, pyrophyllite clay, silica, attapulgite clay, kieselguhr, chalk, diatomaxeous 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, normally comprise from 0.1% to 15% by weight of the formulation. They can be anionic, cationic, non-ionic or polymeric in character and can be employed as emulsifying agents, wetting agents, suspending agents or for other purposes. Typical surface active agents include salts of alkyl sulfates, such as diethanolammonium lauryl sulphate; alkylarylsulfonate salts, such as calcium dodecylbenzenesulfonate; alkylphenol-alkylene oxide addition products, such as nonylphenol-C.sub. 18 ethoxylate; alcohol-alkylene oxide addition products, such as tridecyl alcohol-C.sub. 16 ethoxylate; soaps, such as sodium stearate; alkylnaphthalenesulfonate salts, such as sodium dibutylnaphthalenesulfonate; dialkyl esters of sulfosuccinate salts, such as sodium di(2-ethylhexyl) sulfosuccinate; sorbitol esters, such as sorbitol oleate; quaternary amines, such as lauryl trimethylammonium chloride; polyethylene glycol esters of fatty acids, such as polyethylene glycol stearate; block copolymers of ethylene oxide and propylene oxide; and salts of mono and dialkyl phosphate esters.

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

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

The following combinations of a compound of formula I with another active substance in a weight ratio of 1:1 are preferred (where the abbreviation "TX" means "one compound selected from the compounds defined in the Tables 1.1 to 1.27, Tables 2.1 to 2.45, Tables 3.1 to 3.55, Tables 4.1 to 4.24, and Table A):
(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, (E)-6-methylhept-2-en-4-ol + 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,Z)-tetradeca-4,10-dien-1-yl acetate + TX, (Z)-dodec-7-en-1-yl acetate + TX, (Z)-hexadec-11-en-1-yl acetate + TX, (Z)-hexadec-11-enal + TX, (Z)-

hexadec-13-en-11-yn-1-yl acetate + TX, (Z)-icos-13-en-10-one + TX, (Z)-tetradec-7-en-1-al + TX, (Z)-tetradec-9-en-1-ol + TX, (Z)-tetradec-9-en-1-yl acetate + TX, 1,2-dibromo-3-chloropropane + TX, 1,2-dichloropropane + TX, 1,2-dichloropropane with 1,3-dichloropropene + TX, 1,3-dichloropropene + TX, 14-methyloctadec-1-ene + TX, 1-hydroxy-1H-pyridine-2-thione + TX, 2-(octylthio)ethanol + TX, 2-chlorophenyl N-methylcarbamate (CPMC) + TX, 3-(4-chlorophenyl)-5-methylrhodanine + TX, 3,4-dichlorotetrahydrothiophene 1,1-dioxide + TX, 4-(quinoxalin-2-ylamino)benzenesulfonamide + TX, 4-methylnonan-5-ol with 4-methylnonan-5-one + TX, 5-methyl-6-thioxo-1,3,5-thiadiazinan-3-ylacetic acid + TX, 6-isopentenylaminopurine + TX, 8-hydroxyquinoline sulfate + TX, abamectin + TX, acequinocyl + TX, acetamiprid + TX, acetoprole + TX, acrinathrin + TX, acynonapyr + TX, Adoxophyes orana GV + TX, afidopyropen + TX, afoxolaner + TX, Agrobacterium radiobacter + TX, AKD-3088 + TX, alanycarb + TX, aldicarb + TX, aldoxycarb + TX, allethrin + TX, alpha-cypermethrin + TX, alphamethrin + TX, alpha-multistriatin + TX, Amblyseius spp. + TX, amidoflumet + TX, amino acids + TX, aminocarb + TX, Anagrapha falcifera NPV + TX, Anagrus atomus + TX, Aphelinus abdominalis + TX, Aphidius colemani + TX, Aphidoletes aphidimyza + TX, apholate + TX, Autographa californica NPV + TX, AZ 60541 + TX, azadirachtin + TX, azocyclotin + TX, Bacillus aizawai + TX, Bacillus chitinosporus AQ746 (NRRL Accession No B-21 618) + TX, Bacillus firmus + TX, Bacillus kurstaki + TX, Bacillus mycoides AQ726 (NRRL Accession No. B-21664) + TX, Bacillus pumilus (NRRL Accession No B-30087) + TX, Bacillus pumilus AQ717 (NRRL Accession No. B-21662) + TX, Bacillus sp. AQ175 (ATCC Accession No. 55608) + TX, Bacillus sp. AQ177 (ATCC Accession No. 55609) + TX, Bacillus sp. AQ178 (ATCC Accession No. 53522) + TX, Bacillus sphaericus Neide + TX, Bacillus subtilis AQ153 (ATCC Accession No. 55614) + TX, Bacillus subtilis AQ30002 (NRRL Accession No. B-50421) + TX, Bacillus subtilis AQ30004 (NRRL Accession No. B- 50455) + TX, Bacillus subtilis AQ713 (NRRL Accession No. B-21661) + TX, Bacillus subtilis AQ743 (NRRL Accession No. B-21665) + TX, Bacillus subtilis unspecified + TX, Bacillus thuringiensis AQ52 (NRRL Accession No. B-21619) + TX, Bacillus thuringiensis BD#32 (NRRL Accession No B-21530) + TX, Bacillus thuringiensis Berliner + TX, Bacillus thuringiensis subsp. Aizawai + TX, Bacillus thuringiensis subsp. Israelensis + TX, Bacillus thuringiensis subsp. Japonensis + TX, Bacillus thuringiensis subsp. Kurstaki + TX, Bacillus thuringiensis subsp. Tenebrionis + TX, Bacillus thuringiensis subspec. kurstaki BMP 123 + TX, Beauveria bassiana + TX, Beauveria brongniartii + TX, benclothiaz + TX, benomyl + TX, bensultap + TX, benzoximate + TX, benzpyrimoxan + TX, betacyfluthrin + TX, beta-cypermethrin + TX, bethoxazin + TX, bifenazate + TX, bifenthrin + TX, binapacryl + TX, bioallethrin + TX, bioresmethrin + TX, bis(tributyltin) oxide + TX, bisazir + TX, bistrifluron + TX, bisulflufen + TX, brevicomin + TX, broflanilide + TX, brofluthrinate + TX, bromoacetamide + TX, bromophos-ethyl + TX, bronopol + TX, busulfan + TX, butocarboxim + TX, butopyronoxyl + TX, butoxy(polypropylene glycol) + TX, butylpyridaben + TX, cadusafos + TX, calcium arsenate + TX, carbaryl + TX, carbofuran + TX, carbon disulfide + TX, carbosulfan + TX, cartap + TX, CAS number: 1594624-87-9 + TX, CAS number: 1922957-47-8 + TX, CAS number: 1255091-74-7 + TX, CAS number: 1365070-72-9 + TX, CAS number: 1445683-71-5 + TX, CAS number: 1445684-82-1 + TX, CAS number: 1594626-19-3 + TX, CAS number: 1594637-65-6 + TX, CAS number: 1632218-00-8 + TX, CAS number: 1808115-49-2 + TX, CAS number: 1922957-46-7 + TX, CAS number: 1922957-48-9 + TX, CAS number: 1956329-03-5 + TX, CAS number: 1990457-52-7 + TX, CAS number: 1990457-

55-0 + TX, CAS number: 1990457-57-2 + TX, CAS number: 1990457-66-3 + TX, CAS number: 1990457-77-6 + TX, CAS number: 1990457-85-6 + TX, CAS number: 2032403-97-5 + TX, CAS number: 2044701-44-0 + TX, CAS number: 2095470-94-1 + TX, CAS Number: 2128706-04-5 + TX, CAS number: 2128706-05-6 + TX, CAS number: 2133042-31-4 + TX, CAS number: 2133042-44-9 + TX, CAS number: 2171099-09-3 + TX, CAS number: 2220132-55-6 + TX, CAS number: 2396747-83-2 + TX, CAS number: 2408220-91-5 + TX, CAS number: 2408220-94-8 + TX, CAS number: 2415706-16-8 + TX, Piperflanilide (CAS number: 2615135-05-0) + TX, CAS number: 2719848-60-7 + TX, CAS number: RNA (Leptinotarsa decemlineata-specific recombinant double-stranded interfering GS2) + TX, chlorantraniliprole + TX, chlordane + TX, chlorfenapyr + TX, chloropicrin + TX, chloroprallethrin + TX, chlorpyrifos + TX, chromafenozide + TX, Chrysoperla carnea + TX, clenpirin + TX, cloethocarb + TX, clothianidin + TX, codlelure + TX, codlemone + TX, copper acetoarsenite + TX, copper dioctanoate + TX, copper hydroxide + TX, copper sulfate + TX, cresol + TX, crufomate + TX, Cryptolaemus montrouzieri + TX, cuelure + TX, cyanofenphos + TX, cyantraniliprole + TX, cybutryne + TX, cyclaniliprole + TX, cyclobutrifluram + TX, cycloprothrin + TX, cycloxaprid + TX, Cydia pomonella GV + TX, cyenopyrafen + TX, cyetpyrafen + TX, cyflumetofen + TX, cyfluthrin + TX, cyhalodiamide + TX, cylohalothrin + TX, cypermethrin + TX, cyphenothrin + TX, cyproflanilide + TX, cyromazine + TX, cytokinins + TX, Dacnusa sibirica + TX, dazomet + TX, DBCP + TX, DCIP + TX, deltamethrin + TX, diafenthiuron + TX, dialifos + TX, diamidafos + TX, dibrom + TX, dibutyl adipate + TX, dibutyl phthalate + TX, dibutyl succinate + TX, dichlofenthion + TX, dichlone + TX, dichlorophen + TX, dicliphos + TX, dicloromezotiaz + TX, diethyltoluamide + TX, diflubenzuron + TX, Diglyphus isaea + TX, dimatif + TX, dimethoate + TX, dimethyl carbate + TX, dimethyl phthalate + TX, dimpropyridaz + TX, dinactin + TX, dinocap + TX, dinotefuran + TX, dioxabenzofos + TX, dipyrithione + TX, disparlure + TX, D-limonene + TX, dodec-8-en-1-yl acetate + TX, dodec-9-en-1-yl acetate + TX, dodeca-8,10-dien-1-yl acetate + TX, dodicin + TX, dominicalure + TX, doramectin + TX, emamectin + TX, emamectin benzoate + TX, empenthrin + TX, Encarsia formosa + TX, endothal + TX, endrin + TX, eprinomectin + TX, epsilon - momfluorothrin + TX, epsilon-metofluthrin + TX, Eretmocerus eremicus + TX, esfenvalerate + TX, ethion + TX, ethiprole + TX, ethoprophos + TX, ethyl 4-methyloctanoate + TX, ethyl hexanediol + TX, ethylene dibromide + TX, etofenprox + TX, etoxazole + TX, etpyrafen + TX, eugenol + TX, Extract of seaweed and fermentation product derived from melasse + TX, Extract of seaweed and fermentation product derived from melasse comprising urea + TX, Extract of seaweed and fermented plant products + TX, Extract of seaweed and fermented plant products comprising phytohormones, vitamins, EDTA-chelated copper, zinc, and iron + TX, famphur + TX, fenaminosulf + TX, fenamiphos + TX, fenazaquin + TX, fenfluthrin + TX, fenitrothion + TX, fenmezoditiaz + TX, fenobucarb + TX, fenothiocarb + TX, fenoxycarb + TX, fenpropathrin + TX, fenpyrad + TX, fenpyroximate + TX, fensulfothion + TX, fenthion + TX, fentin + TX, fentinacetate + TX, fenvalerate + TX, ferric phosphate + TX, fipronil + TX, flometoquin + TX, flonicamid + TX, fluacrypyrim + TX, fluazaindolizine + TX, fluazuron + TX, flubendiamide + TX, flubenzimine + TX, fluchlordiniliprole + TX, flucitrinate + TX, flucycloxuron + TX, flucythrinate + TX, fluensulfone [318290-98-1] + TX, fluensulfone + TX, flufenerim + TX, flufenprox + TX, flufiprole + TX, fluhexafon + TX, flumethrin + TX, fluopyram + TX, flupyradifurone + TX, flupyrimin + TX, flupyroxystrobin + TX, fluralaner + TX, fluvalinate + TX, fluxametamide + TX, formaldehyde + TX, fosthiazate + TX,

fosthietan + TX, frontalin + TX, furfural + TX, gamma-cyhalothrin + TX, Gossyplure® (1:1 mixture of the (Z,E) and (Z,Z) isomers of hexadeca-7,11-dien-1-yl-acetate) + TX, grandlure + TX, grandlure I + TX, grandlure II + TX, grandlure III + TX, grandlure IV + TX, Granulovirus + TX, guadipyr + TX, GY-81 + TX, halfenprox + TX, halofenozide + TX, Harpin + TX, Helicoverpa armigera Nucleopolyhedrovirus + TX, Helicoverpa zea NPV + TX, Helicoverpa zea Nucleopolyhedrovirus + TX, Heliothis punctigera Nucleopolyhedrovirus + TX, Heliothis virescens Nucleopolyhedrovirus + TX, hemel + TX, hempa + TX, heptafluthrin + TX, heterophos + TX, Heterorhabditis bacteriophora and H. megidis + TX, hexalure + TX, hexamide + TX, hexythiazox + TX, Hippodamia convergens + TX, hydramethylnon + TX, hydrargaphen + TX, hydrated lime + TX, imicyafos + TX, imidacloprid + TX, imiprothrin + TX, Indazapyroxamet + TX, indoxacarb + TX, iodomethane + TX, iprodione + TX, ipsdienol + TX, ipsenol + TX, isamidofos + TX, isazofos + TX, isocycloseram + TX, Isoflualanam (CAS number: 2892524-05-7) + TX, isothioate + TX, ivermectin + TX, japonilure + TX, kappa-bifenthrin + TX, kappa-tefluthrin + TX, kasugamycin + TX, kasugamycin hydrochloride hydrate + TX, kinetin + TX, lambda-cyhalothrin + TX, ledprona + TX, lepimectin + TX, Leptomastix dactylopii + TX, lineatin + TX, litlure + TX, looplure + TX, lotilaner + TX, lufenuron + TX, Macrolophus caliginosus + TX, Mamestra brassicae NPV + TX, mecarphon + TX, medlure + TX, megatomoic acid + TX, metaflumizone + TX, metaldehyde + TX, metam + TX, metam-potassium + TX, metam-sodium + TX, Metaphycus helvolus + TX, Metarhizium anisopliae var. acridum + TX, Metarhizium anisopliae var. anisopliae + TX, Metarhizium spp. + TX, metepa + TX, methiocarb + TX, methiotepa + TX, methomyl + TX, methoquin-butyl + TX, methoxyfenozide + TX, methyl apholate + TX, methyl bromide + TX, methyl eugenol + TX, methyl isothiocyanate + TX, methylneodecanamide + TX, metofluthrin + TX, metolcarb + TX, mexacarbate + TX, milbemectin + TX, milbemycin oxime + TX, momfluorothrin + TX, morzid + TX, moxidectin + TX, muscalure + TX, Muscodor albus 620 (NRRL Accession No. 30547) + TX, Muscodor roseus A3-5 (NRRL Accession No. 30548) + TX, Myrothecium verrucaria composition + TX, nabam + TX, NC-184 + TX, Neem tree based products + TX, Neodiprion sertifer NPV and N. lecontei NPV + TX, nickel bis(dimethyldithiocarbamate) + TX, niclosamide + TX, niclosamide-olamine + TX, nicofluprole + TX, nitenpyram + TX, nithiazine + TX, nitrapyrin + TX, octadeca-2,13-dien-1-yl acetate + TX, octadeca-3,13-dien-1-yl acetate + TX, octhilinone + TX, omethoate + TX, orfralure + TX, Orius spp. + TX, oryctalure + TX, ostramone + TX, oxamate + TX, oxamyl + TX, oxazosulfyl + TX, oxolinic acid + TX, oxytetracycline + TX, Paecilomyces fumosoroseus + TX, Paecilomyces lilacinus + TX, parathion-ethyl + TX, Pasteuria nishizawae + TX, Pasteuria penetrans + TX, Pasteuria ramosa + TX, Pasteuria thornei + TX, Pasteuria usgae + TX, P-cymene + TX, penfluron + TX, pentachlorophenol + TX, permethrin + TX, phenothrin + TX, phorate + TX, phosphamidon + TX, phosphocarb + TX, Phytoseiulus persimilis + TX, picaridin + TX, pioxaniliprole + TX, piperazine + TX, piperonylbutoxide + TX, pirimicarb + TX, pirimiphos-ethyl + TX, pirimiphos-methyl + TX, Plutella xylostella Granulosis virus + TX, Plutella xylostella Nucleopolyhedrovirus + TX, Polyhedrosis virus + TX, potassium and molybdenum and EDTA-chelated manganese + TX, potassium ethylxanthate + TX, potassium hydroxyquinoline sulfate + TX, prallethrin + TX, probenazole + TX, profenofos + TX, profluthrin + TX, propargite + TX, propetamphos + TX, propoxur + TX, prothiophos + TX, protrifenbute + TX, pyflubumide + TX, pymetrozine + TX, pyraclofos + TX, pyrafluprole + TX, pyrethrum + TX, pyridaben + TX, pyridalyl + TX, pyridin-4-amine + TX,

pyrifluquinazon + TX, pyrimidifen + TX, pyriminostrobin + TX, pyriprole [394730-71-3] + TX, pyriprole + TX, pyriproxyfen + TX, QRD 420 (a terpenoid blend) + TX, QRD 452 (a terpenoid blend) + TX, QRD 460 (a terpenoid blend) + TX, Quillaja saponaria + TX, quinoclamine + TX, quinonamid + TX, resmethrin + TX, Rhodococcus globerulus AQ719 (NRRL Accession No B-21663) + TX, sarolaner + TX, S-bioallethrin + TX, sebufos + TX, selamectin + TX, siglure + TX, silafluofen + TX, simazine + TX, sodium pentachlorophenoxide + TX, sordidin + TX, spidoxamat + TX, spinetoram + TX, spinosad + TX, spirobudifen + TX, spirodiclofen + TX, spiromesifen + TX, spiropidion + TX, spirotetramat + TX, Spodoptera exigua multicapsid nuclear polyhedrosis virus + TX, Spodoptera frugiperda Nucleopolyhedrovirus + TX, Steinernema bibionis + TX, Steinernema carpocapsae + TX, Steinernema feltiae + TX, Steinernema glaseri + TX, Steinernema riobrave + TX, Steinernema riobravis + TX, Steinernema scapterisci + TX, Steinernema spp. + TX, Streptomyces galbus (NRRL Accession No. 30232) + TX, Streptomyces sp. (NRRL Accession No. B-30145) + TX, streptomycin + TX, streptomycin sesquisulfate + TX, strychnine + TX, sulcatol + TX, sulfiflumin (CAS number: 2377084-09-6) + TX, sulfoxaflor + TX, tazimcarb + TX, tebufenozide + TX, tebufenpyrad + TX, tebupirimiphos + TX, tecloftalam + TX, tefluthrin + TX, temephos + TX, tepa + TX, terbam + TX, terbufos + TX, terpenoid blend + TX, tetrachlorantraniliprole + TX, tetrachlorothiophene + TX, tetradec-11-en-1-yl acetate + TX, tetradiphon + TX, tetramethrin + TX, tetramethylfluthrin + TX, tetranactin + TX, tetraniliprole + TX, theta-cypermethrin + TX, thiacloprid + TX, thiafenox + TX, thiamethoxam + TX, thiocyclam + TX, thiodicarb + TX, thiofanox + TX, thiohempa + TX, thiomersal + TX, thiometon + TX, thionazin + TX, thiophanate + TX, thiosultap + TX, thiotepa + TX, tigolaner + TX, tiorantraniliprole + TX, tioxazafen + TX, tolfenpyrad + TX, toxaphene + TX, tralomethrin + TX, transfluthrin + TX, tretamine + TX, triazamate + TX, triazophos + TX, triazuron + TX, tributyltin oxide + TX, trichlorfon + TX, trichloronate + TX, trichlorphon + TX, Trichogramma spp. + TX, trifenmorph + TX, trifluenfuronate + TX, triflumezopyrim + TX, trimedlure + TX, trimedlure A + TX, trimedlure B1 + TX, trimedlure B2 + TX, trimedlure C + TX, trimethacarb + TX, triphenyltin acetate + TX, triphenyltin hydroxide + TX, trunc-call + TX, tyclopyrazoflor + TX, Typhlodromus occidentalis + TX, uredepa + TX, Verticillium lecanii + TX, Verticillium spp. + TX, xylenols + TX, YI-5302 + TX, zeatin + TX, zeta-Cypermethrin + 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, N-ethyl-N'-[5-methoxy-2-methyl-4-[(2-trifuoromethyl)tetrahydrofuran-2-yl]phenyl]-N-methyl-formamidine (these compounds may be prepared from the methods described in WO2019/110427) + TX, (3',4',5'-trifluoro-biphenyl-2-yl)-amide + TX, (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 WO 2017/220485) + TX, (4-phenoxyphenyl)methyl 2-amino-6-methyl-pyridine-3-carboxylate (this compound may be prepared from the methods described in WO 2014/006945) + TX, (5-methyl-2-pyridyl)-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methanone + 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, (E)-6-methylhept-2-en-4-ol + 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,Z)-tetradeca-4,10-dien-1-yl acetate, + TX, (R)-3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide + TX, (Z)-dodec-7-en-1-yl acetate + TX, (Z)-hexadec-11-en-1-yl acetate +

TX, (Z)-hexadec-11-enal + TX, (Z)-hexadec-13-en-11-yn-1-yl acetate + TX, (Z)-icos-13-en-10-one + TX, (Z)-tetradec-7-en-1-al + TX, (Z)-tetradec-9-en-1-ol + TX, (Z)-tetradec-9-en-1-yl acetate + TX, (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 WO 2018/153707) + TX, (Z,2E)-5-[1-(4-chlorophenyl)pyrazol-3-yl]oxy-2-methoxyimino-N,3-dimethyl-pent-3-enamide + 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, 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, 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, 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) + TX, 1,1-bis(4-chlorophenyl)-2-ethoxyethanol + TX, 1,1-dichloro-2,2-bis(4-ethylphenyl)ethane + TX, 1,2-dibromo-3-chloropropane + TX, 1,2-dichloropropane with 1,3-dichloropropene + TX, 1,3-dichloropropene + TX, 1,3-dimethoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea + TX, 1-[2-[[1-(4-chlorophenyl)pyrazol-3-yl]oxymethyl]-3-methyl-phenyl]-4-methyl-tetrazol-5-one + TX, 10-dien-1-yl acetate + TX, 14-methyloctadec-1-ene + TX, 1-bromo-2-chloroethane + TX, 1-dichloro-1-nitroethane + TX, 1-hydroxy-1H-pyridine-2-thione + TX, 1-methoxy-3-methyl-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea + TX, 1-methyl-4-[3-methyl-2-[[2-methyl-4-(3,4,5-trimethylpyrazol-1-yl)phenoxy]methyl]phenyl]tetrazol-5-one + TX, 2- (difluoromethyl) - N- ((3R) - 1, 1, 3- trimethylindan- 4-yl) pyridine- 3- carboxamide + TX, 2- (difluoromethyl) - N- ((3R) - 1, 1, 3- trimethylindan- 4-yl) pyridine-3- carboxamide + TX, 2-(1,3-dithiolan-2-yl)phenyl dimethylcarbamate + TX, 2-(2-butoxyethoxy)ethyl piperonylate + 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-(difluoromethyl)-N-(3-ethyl-1,1-dimethyl-indan-4-yl)pyridine-3-carboxamide + TX, 2-(difluoromethyl)-N-[(3R)-3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX, 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 WO 2014/095675) + TX, 2-(difluoromethyl)-N-[3-ethyl-1,1-dimethyl-indan-4-yl]pyridine-3-carboxamide + TX, 2-(octylthio)ethanol + TX, 2,2,2-trichloro-1-(3,4-dichlorophenyl)ethyl acetate + TX, 2,2-dichlorovinyl 2-ethylsulfinylethyl methyl phosphate + TX, 2,2-difluoro-N-methyl-2-[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]acetamide + TX, 2,4-dichlorophenyl benzenesulfonate + TX, 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 WO 2011/138281) + TX, 2-[2-fluoro-6-[(8-fluoro-2-methyl-3-quinolyl)oxy]phenyl]propan-2-ol + TX, 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 WO 2017/029179) + TX, 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 WO 2017/029179) + TX, 2-chlorovinyl diethyl phosphate + TX, 2-fluoro-N-methyl-N-1-naphthylacetamide + TX, 2-imidazolidone + TX, 2-isovalerylindan-1,3-dione + TX, 2-methyl(prop-2-ynyl)aminophenyl methylcarbamate + TX, 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 WO 2018/065414) + TX, 2-thiocyanatoethyl laurate + TX, 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) + TX, 3-(4,4-difluoro-3,4-dihydro-3,3-dimethylisoquinolin-1-yl)quinolone + TX, 3-(4-chlorophenyl)-5-methylrhodanine + TX, 3-(difluoromethyl)-1-methyl-N-[1,1,3-trimethylindan-4-yl]pyrazole-4-carboxamide + TX, 3,4-dichlorotetrahydrothiophene 1,1-dioxide + TX, 3-[2-(1-chlorocyclopropyl)-3-(2-fluorophenyl)-2-hydroxy-propyl]imidazole-4-carbonitrile (this compound may be prepared from the methods described in WO 2016/156290) + TX, 3-[2-(1-chlorocyclopropyl)-3-(3-chloro-2-fluoro-phenyl)-2-hydroxy-propyl]imidazole-4-carbonitrile (this compound may be prepared from the methods described in WO 2016/156290) + TX, 3-bromo-1-chloroprop-1-ene + TX, 3-chloro-6-methyl-5-phenyl-4-(2,4,6-trifluorophenyl)pyridazine + TX, 3-difluoromethyl-1-methyl-1H-pyrazole-4-carboxylic acid + TX, 3-ethyl-1-methoxy-1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]urea + TX, 3-methyl-1-phenylpyrazol-5-yl dimethylcarbamate + TX, 4- (2- bromo- 4- fluorophenyl) - N- (2- chloro- 6-fluorophenyl) - 1, 3- dimethyl- 1H- pyrazol- 5- amine + TX, 4-(2,6-difluorophenyl)-6-methyl-5-phenyl-pyridazine-3-carbonitrile + TX, 4-(2-bromo-4-fluoro-phenyl)-N-(2-chloro-6-fluoro-phenyl)-2,5-dimethyl-pyrazol-3-amine + TX, 4-(quinoxalin-2-ylamino)benzenesulfonamide + TX, 4,4-difluoro-1-(5-fluoro-4-methyl-benzimidazol-1-yl)-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, 4,4-dimethyl-2-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]isoxazolidin-3-one + 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, 4-chloro-2-(2-chloro-2-methyl-propyl)-5-[(6-iodo-3-pyridyl)methoxy]pyridazin-3-one + TX, 4-chlorophenyl phenyl sulfone + TX, 4-methyl(prop-2-ynyl)amino-3,5-xylyl methylcarbamate + TX, 4-methylnonan-5-ol with 4-methylnonan-5-one + TX, 5-(1,3-benzodioxol-5-yl)-3-hexylcyclohex-2-enone + TX, 5,5-dimethyl-2-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]isoxazolidin-3-one + TX, 5,5-dimethyl-3-oxocyclohex-1-enyl dimethylcarbamate + TX, 5-amino-1,3,4-thiadiazole-2-thiol zinc salt (2:1) + TX, 5-methyl-6-thioxo-1,3,5-thiadiazinan-3-ylacetic acid + TX, 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 WO 2020/109391) + TX, 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 WO 2020/109391) + TX, 6-chloro-4,4-difluoro-3,3-dimethyl-1-(4-methylbenzimidazol-1-yl)isoquinoline + TX, 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 WO 2020/109391) + TX, 6-ethyl-5,7-dioxo-pyrrolo[4,5][1,4]dithiino[1,2-c]isothiazole-3-carbonitrile + TX, 6-isopentenylaminopurine + 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, 8-hydroxyquinoline sulfate + TX, acethion + TX, acetoprole + TX, acibenzolar + TX, acibenzolar-S-methyl + TX, acrylonitrile + TX,

Adoxophyes orana GV + TX, Agrobacterium radiobacter + TX, aldoxycarb + TX, aldrin + TX, allosamidin + TX, allyxycarb + TX, alpha-chlorohydrin + TX, alpha-ecdysone + TX, alpha-multistriatin + TX, aluminium phosphide + TX, Amblyseius spp. + TX, amectotractin + TX, ametoctradin + TX, amidithion + TX, amidothioate + TX, aminocarb + TX, aminopyrifen + TX, amisulbrom + TX, amiton + TX, amiton hydrogen oxalate + TX, amitraz + TX, anabasine + TX, Anagrapha falcifera NPV + TX, Anagrus atomus + TX, ancymidol + TX, anilazine + TX, anisiflupurin + TX, anthraquinone + TX, antu + TX, Aphelinus abdominalis + TX, Aphidius colemani + TX, Aphidoletes aphidimyza + TX, apholate + TX, aramite + TX, arsenous oxide + TX, athidathion + TX, Autographa californica NPV + TX, azaconazole + TX, azamethiphos + TX, azobenzene + TX, azothoate + TX, azoxystrobin + TX, Bacillus sphaericus Neide + TX, Bacillus thuringiensis delta endotoxins + TX, barium carbonate + TX, barium hexafluorosilicate + TX, barium polysulfide + TX, barthrin + TX, Bayer 22/190 + TX, Bayer 22408 + TX, Beauveria brongniartii + TX, benalaxyl + TX, benclothiaz + TX, benomyl + TX, benoxafos + TX, benthiavalicarb + TX, benzothiostrobin + TX, benzovindiflupyr + TX, benzyl benzoate + TX, beta-cyfluthrin + TX, beta-cypermethrin + TX, bethoxazin + TX, bioethanomethrin + TX, biopermethrin + TX, bis(2-chloroethyl) ether + TX, bis(tributyltin) oxide + TX, bisazir + TX, bisthiosemi + TX, bitertanol + TX, bixafen + TX, blasticidin-S + TX, borax + TX, bordeaux mixture + TX, boscalid + TX, brevicomin + TX, brodifacoum + TX, brofenvalerate + TX, bromadiolone + TX, bromethalin + TX, bromfenvinfos + TX, bromoacetamide + TX, bromocyclen + TX, bromo-DDT + TX, bromophos + TX, bromopropylate + TX, bromuconazole + TX, bronopol + TX, bufencarb + TX, bupirimate + TX, buprofezin + TX, busulfan + TX, but-3-ynyl N-[6-[[(Z)-[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate + TX, butacarb + TX, butathiofos + TX, butocarboxim + TX, butonate + TX, butopyronoxyl + TX, butoxy(polypropylene glycol) + TX, butoxycarboxim + TX, butylpyridaben + TX, calcium arsenate + TX, calcium cyanide + TX, calcium polysulfide + TX, camphechlor + TX, captafol + TX, captan + TX, carbanolate + TX, carbendazim + TX, carbon disulfide + TX, carbon tetrachloride + TX, carbophenothion + TX, carboxin + TX, cartap hydrochloride + TX, CAS Number: 2132414-04-9 + TX, CAS Number: 2344721-61-3 + TX, cevadine + TX, chinomethionat + TX, chloralose + TX, chlorbenside + TX, chlorbicyclen + TX, chlordane + TX, chlordecone + TX, chlordimeform + TX, chlordimeform hydrochloride + TX, chlorfenethol + TX, chlorfenson + TX, chlorfensulfide + TX, chlorobenzilate + TX, chloroform + TX, chloroinconazide + TX, chloromebuform + TX, chloromethiuron + TX, chloroneb + TX, chlorophacinone + TX, chloropicrin + TX, chloropropylate + TX, chlorothalonil + TX, chlorphoxim + TX, chlorprazophos + TX, chlorthiophos + TX, chlozolinate + TX, cholecalciferol + TX, Chrysoperla carnea + TX, cinerin I + TX, cinerin II + TX, cinerins + TX, cismethrin + TX, cis-resmethrin + TX, clocythrin + TX, closantel + TX, codlelure + TX, codlemone + TX, copper acetoarsenite + TX, copper arsenate + TX, copper dioctanoate + TX, copper hydroxide + TX, copper naphthenate + TX, copper oleate + TX, copper oxide + TX, copper oxychloride + TX, copper sulfate + TX, coumachlor + TX, coumafuryl + TX, coumaphos + TX, coumatetralyl + TX, coumethoxystrobin (jiaxiangjunzhi) + TX, coumithoate + TX, coumoxystrobin + TX, cresol + TX, crimidine + TX, crotamiton + TX, crotoxyphos + TX, crufomate + TX, cryolite + TX, Cryptolaemus montrouzieri + TX, CS 708 + TX, cuelure + TX, cufraneb + TX, cyanofenphos + TX, cyanophos + TX, cyanthoate + TX, cyazofamid + TX, cybutryne + TX, cyclethrin + TX, cyclobutrifluram + TX, Cydia pomonella GV + TX, cyflufenamid + TX, cymiazole + TX, cymoxanil + TX, cyproconazole + TX, cyprodinil

+ TX, cythioate + TX, cytokinins + TX, Dacnusa sibirica + TX, DAEP + TX, dazomet + TX, DCIP + TX, DCPM + TX, DDT + TX, debacarb + TX, decarbofuran + 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, diamidafos + TX, dibutyl adipate + TX, dibutyl phthalate + TX, dibutyl succinate + TX, dicapthon + TX, dichlobentiazox + TX, dichlofenthion + TX, dichlofluanid + TX, dichlone + TX, dichlorophen + TX, dichlorvos + TX, dichlozoline + TX, dicliphos + TX, diclocymet + TX, diclomezine + TX, dicloran + TX, dicresyl + TX, dicyclanil + TX, dicyclopentadiene + TX, dieldrin + TX, dienochlor + TX, diethofencarb + TX, diethyl 5-methylpyrazol-3-yl phosphate + TX, diethyltoluamide + TX, difenacoum + TX, difenoconazole + TX, difethialone + TX, diflovidazin + TX, Diglyphus isaea + TX, dilor + TX, dimatif + TX, dimefluthrin + TX, dimefox + TX, dimetan + TX, dimethirimol + TX, dimethomorph + TX, dimethrin + TX, dimethyl carbate + TX, dimethyl phthalate + TX, dimethylvinphos + TX, dimetilan + TX, dimoxystrobin + TX, dinex + TX, dinex-diclexine + TX, diniconazole + TX, dinocap-4 + TX, dinocap-6 + TX, dinocton + TX, dinopenton + TX, dinoprop + TX, dinosam + TX, dinoseb + TX, dinosulfon + TX, dinoterbon + TX, diofenolan + TX, dioxabenzofos + TX, dioxathion + TX, diphacinone + TX, diphenyl sulfone + TX, dipymetitrone + TX, dipyrithione + TX, disparlure + TX, disulfiram + TX, dithianon + TX, dithicrofos + TX, DNOC + TX, dodec-8-en-1-yl acetate + TX, dodec-9-en-1-yl acetate + TX, dodeca-8 + TX, dodemorph + TX, dodicin + TX, dodine + TX, dofenapyn + TX, dominicalure + TX, doramectin + TX, DSP + TX, d-tetramethrin + TX, ecdysterone + TX, edifenphos + TX, EI 1642 + TX, EMPC + TX, Encarsia formosa + TX, endothal + TX, endothion + TX, enestroburin + TX, enoxastrobin + TX, EPBP + TX, epoxiconazole + TX, eprinomectin + TX, Eretmocerus eremicus + TX, ergocalciferol + TX, etaphos + TX, ethaboxam + TX, ethiofencarb + TX, ethirimol + TX, ethoate-methyl + TX, 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 WO 2020/056090) + TX, ethyl 1-[[4-[[2-(trifluoromethyl)-1,3-dioxolan-2-yl]methoxy]phenyl]methyl]pyrazole-3-carboxylate (may be prepared from the methods described in WO 2020/056090) + TX, ethyl 1-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]pyrazole-4-carboxylate + TX, 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 WO 2018/158365) + TX, ethyl 4-methyloctanoate + TX, ethyl formate + TX, ethyl hexanediol + TX, ethylene dibromide + TX, ethylene dichloride + TX, ethylene oxide + TX, etridiazole + TX, etrimfos + TX, eugenol + TX, EXD + TX, famoxadone + TX, farnesol + TX, farnesol with nerolidol + TX, fenamidone + TX, fenaminosulf + TX, fenaminstrobin + TX, fenarimol + TX, fenazaflor + TX, fenbuconazole + TX, fenbutatin oxide + TX, fenchlorphos + TX, fenethacarb + TX, fenfuram + TX, fenhexamid + TX, fenitrothion + TX, fenothiocarb + TX, fenoxacrim + TX, fenoxanil + TX, fenpiclonil + TX, fenpicoxamid + TX, fenpirithrin + TX, fenpropidin + TX, fenpropimorph + TX, fenpyrad + TX, fenpyrazamine + TX, fenpyroximate + TX, fenson + TX, fensulfothion + TX, fenthion + TX, fenthion-ethyl + TX, fentin + TX, fentrifanil + TX, ferbam + TX, ferimzone + TX, ferric phosphate + TX, flocoumafen + TX, florylpicoxamid + TX, fluazinam + TX, flubeneteram + TX, flubenzimine + TX, flucofuron + TX, flucycloxuron + TX, fludioxonil + TX, fluenetil + TX, flufenoxadiazam + TX, flufenoxystrobin + TX, fluindapyr + TX, flumetylsulforim + TX, flumorph + TX, fluopicolide + TX, fluopimomide + TX, fluopyram + TX, fluorbenside + TX, fluoroacetamide + TX, fluoroimide + TX,

fluoxapiprolin + TX, fluoxastrobin + TX, fluoxytioconazole + TX, flupropadine + TX, flupropadine hydrochloride + TX, fluquinconazole + TX, flusilazole + TX, flusulfamide + TX, flutianil + TX, flutolanil + TX, flutriafol + TX, fluxapyroxad + TX, FMC 1137 + TX, folpet + TX, formaldehyde + TX, formetanate + TX, formetanate hydrochloride + TX, formparanate + TX, fosetyl-aluminium + TX, fosmethilan + TX, fospirate + TX, fosthietan + TX, frontalin + TX, fuberidazole + TX, furalaxyl + TX, furametpyr + TX, furathiocarb + TX, furethrin + TX, furfural + TX, gamma-HCH + TX, glyodin + TX, grandlure + TX, grandlure I + TX, grandlure II + TX, grandlure III + TX, grandlure IV + TX, guazatine + TX, guazatine acetates + TX, halfenprox + TX, HCH + TX, hemel + TX, hempa + TX, HEOD + TX, heptachlor + TX, heterophos + TX, Heterorhabditis bacteriophora and H. megidis + TX, hexaconazole + TX, hexadecyl cyclopropanecarboxylate + TX, hexalure + TX, hexamide + TX, HHDN + TX, Hippodamia convergens + TX, hydrargaphen + TX, hydrated lime + TX, hydrogen cyanide + TX, hymexazol + TX, hyquincarb + TX, imanin + TX, imazalil + TX, imibenconazole + TX, iminoctadine + TX, inpyrfluxam + TX, ipconazole + TX, ipfentrifluconazole + TX, ipflufenoquin + TX, iprobenphos + TX, iprodione + TX, iprovalicarb + TX, ipsdienol + TX, ipsenol + TX, IPSP + TX, isamidofos + TX, isazofos + TX, isobenzan + TX, isocarbophos + TX, isodrin + TX, isofenphos + TX, isofetamid + TX, isoflucypram + TX, isolane + TX, isoprothiolane + TX, isopyrazam + TX, isotianil + TX, isoxathion + TX, japonilure + TX, jasmolin I + TX, jasmolin II + TX, jodfenphos + TX, juvenile hormone I + TX, juvenile hormone II + TX, juvenile hormone III + TX, kadethrin + TX, kasugamycin + TX, kasugamycin hydrochloride hydrate + TX, kelevan + TX, kinetin + TX, kinoprene + TX, kresoxim-methyl + TX, lead arsenate + TX, Leptomastix dactylopii + TX, leptophos + TX, lindane + TX, lineatin + TX, lirimfos + TX, litlure + TX, looplure + TX, lvbenmixianan + TX, lythidathion + TX, Macrolophus caliginosus + TX, magnesium phosphide + TX, malonoben + TX, Mamestra brassicae NPV + TX, mancopper + TX, mancozeb + TX, mandestrobin + TX, mandipropamid + TX, maneb + TX, mazidox + TX, m-cumenyl methylcarbamate + TX, mecarbam + TX, mecarphon + TX, medlure + TX, mefentrifluconazole + TX, megatomoic acid + TX, menazon + TX, mepanipyrim + TX, meperfluthrin + TX, mephosfolan + TX, mepronil + TX, mercuric oxide + TX, mercurous chloride + TX, mesulfen + TX, mesulfenfos + TX, metalaxyl + TX, metam + TX, metam-potassium + TX, metam-sodium + TX, Metaphycus helvolus + TX, Metarhizium anisopliae var. acridum + TX, Metarhizium anisopliae var. anisopliae + TX, metarylpicoxamid + TX, metconazole + TX, metepa + TX, methacrifos + TX, methanesulfonyl fluoride + TX, methasulfocarb + TX, methiotepa + TX, methocrotophos + TX, methoprene + TX, methoquin-butyl + TX, methothrin + TX, methoxychlor + TX, methyl (Z)-2-(5-cyclohexyl-2-methyl-phenoxy)-3-methoxy-prop-2-enoate + TX, 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) + TX, methyl (Z)-2-[5-(3-isopropylpyrazol-1-yl)-2-methyl-phenoxy]-3-methoxy-prop-2-enoate + TX, methyl (Z)-3-methoxy-2-[2-methyl-5-(3-propylpyrazol-1-yl)phenoxy]prop-2-enoate + TX, methyl (Z)-3-methoxy-2-[2-methyl-5-(4-propyltriazol-2-yl)phenoxy]prop-2-enoate + TX, 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) + TX, methyl (Z)-3-methoxy-2-[2-methyl-5-[4-(trifluoromethyl)triazol-2-yl]phenoxy]prop-2-enoate + TX, methyl apholate + TX, methyl bromide + TX, methyl eugenol + TX, methyl isothiocyanate + TX, 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 WO 2020/097012) + TX, 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 WO 2020/097012) + TX, methyl N-[[5-[4-(2,4-dimethylphenyl)triazol-2-yl]-2-methyl-phenyl]methyl]carbamate + TX, methylchloroform + TX, methylene chloride + TX, methylneodecanamide + TX, metiram + TX, metolcarb + TX, metominostrobin + TX, metoxadiazone + TX, metrafenone + TX, metyltetraprole + TX, MGK 264 + TX, milbemycin oxime + TX, mipafox + TX, mirex + TX, monocrotophos + TX, morphothion + TX, morzid + TX, moxidectin + TX, muscalure + TX, myclobutanil + TX, myclozoline + TX, Myrothecium verrucaria composition + TX, N-((1R)-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) + TX, 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) + TX, N'-(2,5-dimethyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine + TX, N'-(2-chloro-5-methyl-4-phenoxy-phenyl)-N-ethyl-N-methyl-formamidine + TX, N,2-dimethoxy-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide + TX, 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 WO 2017/055473, WO 2017/055469, WO 2017/093348 and WO 2017/118689) + TX, N-[(1R)-1-benzyl-1,3-dimethyl-butyl]-7,8-difluoro-quinoline-3-carboxamide + TX, N-[(1R)-1-benzyl-1,3-dimethyl-butyl]-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-1,3-dimethyl-butyl]-7,8-difluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-1,3-dimethyl-butyl]-8-fluoro-quinoline-3-carboxamide + TX, N-[(1S)-1-benzyl-3,3,3-trifluoro-1-methyl-propyl]-8-fluoro-quinoline-3-carboxamide + 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-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide + 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, N'-[2-chloro-4-(2-fluorophenoxy)-5-methyl-phenyl]-N-ethyl-N-methyl-formamidine (this compound may be prepared from the methods described in WO 2016/202742) + TX, N'-[4-(4,5-dichlorothiazol-2-yl)oxy-2,5-dimethyl-phenyl]-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-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) + TX, 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) + 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-[(1S)-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-[N-methoxy-C-methyl-carbonimidoyl]-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide (these compounds may be prepared from the methods described in WO 2018/202428) + TX, 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) + TX, nabam + TX, naftalofos + TX, naled + TX, naphthalene + TX, NC-170 + TX, Neodiprion sertifer NPV and N. lecontei NPV + TX, nerolidol + TX, N-ethyl-2-methyl-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]propanamide + TX, N-ethyl-N'-[5-methoxy-2-methyl-4-[(2-trifluoromethyl)oxetan-2-yl]phenyl]-N-methyl-formamidine + TX, nickel bis(dimethyldithiocarbamate) + TX, niclosamide-olamine + TX, nicotine + TX, nicotine sulfate + TX, nifluridide + TX, nikkomycins + TX, N-isopropyl-N'-[5-methoxy-2-methyl-4-(2,2,2-trifluoro-1-hydroxy-1-phenyl-ethyl)phenyl]-N-methyl-formamidine + TX, nithiazine + TX, nitrapyrin + TX, nitrilacarb + TX, nitrilacarb 1:1 zinc chloride complex + TX, nitrothal-isopropyl + TX, N-methoxy-N-[[4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]phenyl]methyl]cyclopropanecarboxamide + TX, N-methyl-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzamide + TX, N-methyl-4-[5-(trifluoromethyl)-1,2,4-oxadiazol-3-yl]benzenecarbothioamide + TX, norbormide + TX, nuarimol + TX, O,O,O',O'-tetrapropyl dithiopyrophosphate + TX, octadeca-2,13-dien-1-yl acetate + TX, octadeca-3,13-dien-1-yl acetate + TX, octhilinone + TX, ofurace + TX, oleic acid + TX, omethoate + TX, orfralure + TX, Orius spp. + TX, oryctalure + TX, orysastrobin + TX, ostramone + TX, oxadixyl + TX, oxamate + TX, oxathiapiprolin + TX, oxine-copper + TX, oxolinic acid + TX, oxycarboxin + TX, oxydeprofos + TX, oxydisulfoton + TX, oxytetracycline + TX, paclobutrazole + TX, Paecilomyces fumosoroseus + TX, para-dichlorobenzene + TX, parathion + TX, parathion-methyl + TX, pefurazoate + TX, penconazole + TX, pencycuron + TX, penflufen + TX, penfluron + TX, pentachlorophenol + TX, pentachlorophenyl laurate + TX, penthiopyrad + TX, permethrin + TX, PH 60-38 + TX, phenamacril + TX, phenkapton + TX, phosacetim + TX, phosalone + TX, phosdiphen + TX, phosfolan + TX, phosglycin + TX, phosnichlor + TX, phosphamidon + TX, phosphine + TX, phosphorus + TX, phoxim-methyl + TX, phthalide + TX, Phytoseiulus persimilis + TX, picarbutrazox + TX, picaridin + TX, picoxystrobin + TX, pindone + TX, piperazine + TX, piperonyl butoxide + TX, piprotal + TX, pirimetaphos + TX, polychlorodicyclopentadiene isomers + TX, polychloroterpenes + TX, polynactins + TX, polyoxins + TX, potassium arsenite + TX, potassium ethylxanthate + TX, potassium hydroxyquinoline sulfate + TX, potassium thiocyanate + TX, pp'-DDT + TX, precocene I + TX, precocene II + TX, precocene III + TX, primidophos + TX, probenazole + TX, prochloraz + TX, proclonol + TX, procymidone + TX, profluthrin + TX, promacyl + TX, promecarb + TX, propamocarb + TX, propiconazole + TX, propineb + TX, propoxur + TX, propyl isomer + TX, proquinazid + TX, prothidathion + TX, prothioconazole + TX, prothiofos + TX, prothoate + TX, pydiflumetofen + TX, pyraclostrobin + TX, pyrametostrobin + TX, pyraoxystrobin + TX, pyrapropoyne + TX, pyraziflumid + TX, pyrazophos + TX, pyresmethrin + TX, pyrethrin I + TX, pyrethrin II + TX, pyrethrins + TX, pyribencarb + TX, pyridachlometyl + TX, pyridaphenthion + TX, pyridin-4-amine + TX, pyrifenox + TX, pyrimethanil + TX, pyrimitate + TX, pyrimorph + TX, pyrinuron + TX, pyriofenone + TX, pyrisoxazole + TX, pyroquilon + TX, quassia + TX, quinalphos + TX, quinalphos-methyl + TX, quinoclamine + TX, quinofumelin + TX, quinonamid + TX, quinothion + TX, quinoxyfen + TX, quintiofos + TX, quintozene + TX, R-1492 + TX, rafoxanide + TX, resmethrin + TX, Reynoutria sachalinensis extract + TX, ribavirin + TX, Rmetalaxyl + TX, rotenone + TX, ryania + TX, ryanodine + TX, S421 + TX, sabadilla + TX, schradan + TX, scilliroside + TX, seboctylamine + TX, sebufos + TX, sedaxane + TX, selamectin + TX, sesamex + TX, sesasmolin + TX, SI-0009 + TX, siglure + TX, simazine + TX, simeconazole + TX, sodium arsenite + TX, sodium cyanide + TX, sodium fluoride + TX, sodium fluoroacetate + TX, sodium hexafluorosilicate + TX, sodium

pentachlorophenoxide + TX, sodium selenate + TX, sodium tetrathiocarbonate + TX, sodium thiocyanate + TX, sophamide + TX, sordidin + TX, spiroxamine + TX, SSI-121 + TX, Steinernema bibionis + TX, Steinernema carpocapsae + TX, Steinernema feltiae + TX, Steinernema glaseri + TX, Steinernema riobrave + TX, Steinernema riobravis + TX, Steinernema scapterisci + TX, Steinernema spp. + TX, streptomycin + TX, streptomycin sesquisulfate + TX, strychnine + TX, sulcatol + TX, sulcofuron + TX, sulcofuron-sodium + TX, sulfiram + TX, sulfluramid + TX, sulfotep + TX, sulfoxide + TX, sulfur + TX, sulfuryl fluoride + TX, sulprofos + TX, tar oils + TX, tau-fluvalinate + TX, tazimcarb + TX, TDE + TX, tebuconazole + TX, tebufloquin + TX, tebupirimfos + TX, tecloftalam + TX, temephos + TX, tepa + TX, TEPP + TX, terallethrin + TX, terbam + TX, tert-butyl N-[6-[[[(1-methyltetrazol-5-yl)-phenyl-methylene]amino]oxymethyl]-2-pyridyl]carbamate + TX, tetrachloroethane + TX, tetrachlorothiophene + TX, tetraconazole + TX, tetradec-11-en-1-yl acetate + TX, tetradifon + TX, tetramethylfluthrin + TX, tetrasul + TX, thallium sulfate + TX, thiabendazole + TX, thiafenox + TX, thiapronil + TX, thicrofos + TX, thifluzamide + TX, thiocarboxime + TX, thiocyclam + TX, thiocyclam hydrogen oxalate + TX, thiodiazole copper + TX, thiofanox + TX, thiohempa + TX, thiomersal + TX, thiometon + TX, thionazin + TX, thiophanate + TX, thiophanate-methyl + TX, thioquinox + TX, thiosultap + TX, thiosultap-sodium + TX, thiotepa + TX, thiram + TX, thuringiensin + TX, tiadinil + TX, tolclofos-methyl + TX, tolprocarb + TX, tolylfluanid + TX, tralomethrin + TX, transpermethrin + TX, tretamine + TX, triadimefon + TX, triadimenol + TX, triamiphos + TX, triarathene + TX, triazamate + TX, triazophos + TX, triazoxide + TX, triazuron + TX, tributyltin oxide + TX, trichlormetaphos-3 + TX, trichloronat + TX, Trichogramma spp. + TX, triclopyricarb + TX, tricyclazole + TX, tridemorph + TX, trifenmorph + TX, trifenofos + TX, trifloxystrobin + TX, triflumizole + TX, triforine + TX, trimedlure + TX, trimedlure A + TX, trimedlure B1 + TX, trimedlure B2 + TX, trimedlure C + TX, trimethacarb + TX, trinactin + TX, trinexapac + TX, triphenyltin acetate + TX, triphenyltin hydroxide + TX, triprene + TX, triticonazole + TX, trunc-call + TX, Typhlodromus occidentalis + TX, uredepa + TX, validamycin + TX, valifenalate + TX, vamidothion + TX, vaniliprole + TX, veratridine + TX, veratrine + TX, verbutin + TX, Verticillium lecanii + TX, vinclozoline + TX, warfarin + TX, XMC + TX, xylenols + TX, zeatin + TX, zetamethrin + TX, zhongshengmycin + TX, zinc naphthenate + TX, zinc phosphide + TX, zinc thiazole + TX, zineb + TX, ziram + TX, zolaprofos + TX;

Acinetobacter lwoffii + TX, Acremonium alternatum + TX, Acremonium cephalosporium + TX, Acremonium diospyri + TX, Acremonium obclavatum + TX, Adoxophyes orana granulovirus (AdoxGV) (Capex®) + TX, Agrobacterium radiobacter strain K84 (Galltrol-A®) + TX, Alternaria alternate + TX, Alternaria cassia + TX, Alternaria destruens (Smolder®) + TX, Ampelomyces quisqualis (AQ10®) + TX, Aspergillus flavus AF36 (AF36®) + TX, Aspergillus flavus NRRL 21882 (Aflaguard®) + TX, Aspergillus spp. + TX, Aureobasidium pullulans + TX, Azospirillum (MicroAZ®, TAZO B®) + TX, Azotobacter + TX, Azotobacter chroocuccum (Azotomeal®) + TX, Azotobacter cysts (Bionatural Blooming Blossoms®) + TX, Bacillus amyloliquefaciens + TX, Bacillus cereus + TX, Bacillus chitinosporus strain AQ746 + TX, Bacillus chitinosporus strain CM-1 + TX, Bacillus circulans + TX, Bacillus firmus (BioSafe®, BioNem-WP®) in particular strain CNMC 1-1582 (e.g. VOTIVO® from BASF SE) + TX, Bacillus licheniformis strain 3086 (EcoGuard®, Green Releaf®) + TX, Bacillus licheniformis strain HB-2 (Biostart™ formerly Rhizoboost®) + TX, Bacillus macerans + TX, Bacillus marismortui + TX, Bacillus megaterium + TX,

Bacillus mycoides strain AQ726 + TX, Bacillus papillae (Milky Spore Powder®) + TX, Bacillus pumilus spp. + TX, Bacillus pumilus strain AQ717 + TX, Bacillus pumilus strain GB34 (Yield Shield®) + TX, Bacillus pumilus strain QST 2808 (Sonata®, Ballad Plus®) + TX, Bacillus sphaericus (VectoLex®) + TX, Bacillus spp. + TX, Bacillus spp. strain AQ175 + TX, Bacillus spp. strain AQ177 + TX, Bacillus spp. strain AQ178 + TX, Bacillus subtilis strain AQ153 + TX, Bacillus subtilis strain AQ743 + TX, Bacillus subtilis strain QST 713 (CEASE®, Serenade®, Rhapsody®) + TX, Bacillus subtilis strain QST 714 (JAZZ®) + TX, Bacillus subtilis strain QST3002 + TX, Bacillus subtilis strain QST3004 + TX, Bacillus subtilis var. amyloliquefaciens strain FZB24 (Taegro®, Rhizopro®) + TX, Bacillus thuringiensis aizawai GC 91 (Agree®) + TX, Bacillus thuringiensis Cry 2Ae + TX, Bacillus thuringiensis Cry1Ab + TX, Bacillus thuringiensis israelensis (BMP123®, Aquabac®, VectoBac®) + TX, Bacillus thuringiensis kurstaki (Javelin®, Deliver®, CryMax®, Bonide®, Scutella WP®, Turilav WP ®, Astuto®, Dipel WP®, Biobit®, Foray®) + TX, Bacillus thuringiensis kurstaki BMP 123 (Baritone®) + TX, Bacillus thuringiensis kurstaki HD-1 (Bioprotec-CAF / 3P®) + TX, Bacillus thuringiensis strain AQ52 + TX, Bacillus thuringiensis strain BD#32 + TX, Bacillus thuringiensis tenebrionis (Novodor®, BtBooster) + TX, Bacillus thuringiensis var. aizawai (XenTari®, DiPel®) + TX, bacteria spp. (GROWMEND®, GROWSWEET®, Shootup®) + TX, bacteriophage of Clavipacter michiganensis (AgriPhage®, Bakflor®) + TX, Beauveria bassiana (Beaugenic®, Brocaril WP®) + TX, Beauveria bassiana GHA (Mycotrol ES®, Mycotrol O®, BotaniGuard®) + TX, Beauveria brongniartii (Engerlingspilz®, Schweizer Beauveria®, Melocont®) + TX, Beauveria spp. + TX, Botrytis cineria + TX, Bradyrhizobium japonicum (TerraMax®) + TX, Brevibacillus brevis + TX, Burkholderia cepacia (Deny®, Intercept®, Blue Circle®) + TX, Burkholderia gladii + TX, Burkholderia gladioli + TX, Burkholderia spp. + TX, Canadian thistle fungus (CBH Canadian Bioherbicide®) + TX, Candida butyri + TX, Candida famata + TX, Candida fructus + TX, Candida glabrata + TX, Candida guilliermondii + TX, Candida melibiosica + TX, Candida oleophila strain O + TX, Candida parapsilosis + TX, Candida pelliculosa + TX, Candida pulcherrima + TX, Candida reukaufii + TX, Candida saitoana (Bio-Coat®, Biocure®) + TX, Candida sake + TX, Candida spp. + TX, Candida tenius + TX, Cedecea davisae + TX, Cellulomonas flavigena + TX, Chaetomium cochliodes (Nova-Cide®) + TX, Chaetomium globosum (Nova-Cide®) + TX, Chromobacterium subtsugae strain PRAA4-1T (Grandevo®) + TX, Cladosporium chlorocephalum + TX, Cladosporium cladosporioides + TX, Cladosporium oxysporum + TX, Cladosporium spp. + TX, Cladosporium tenuissimum + TX, Clonostachys rosea (EndoFine®) + TX, Colletotrichum acutatum + TX, Coniothyrium minitans (Cotans WG®) + TX, Coniothyrium spp. + TX, Cryptococcus albidus (YIELDPLUS®) + TX, Cryptococcus humicola + TX, Cryptococcus infirmo-miniatus + TX, Cryptococcus laurentii + TX, Cryptophlebia leucotreta granulovirus (Cryptex®) + TX, Cupriavidus campinensis + TX, Cydia pomonella granulovirus (CYD-X®, Madex®, Madex® Plus, Madex Max, Carpovirusine® + TX, Cylindrobasidium laeve (Stumpout®) + TX, Cylindrocladium + TX, Debaryomyces hansenii + TX, Drechslera hawaiinensis + TX, Enterobacter cloacae + TX, Enterobacteriaceae + TX, Entomophtora virulenta (Vektor®) + TX, Epicoccum nigrum + TX, Epicoccum purpurascens + TX, Epicoccum spp. + TX, Filobasidium floriforme + TX, Fusarium acuminatum + TX, Fusarium chlamydosporum + TX, Fusarium oxysporum (Fusaclean®, Biofox C®) + TX, Fusarium proliferatum + TX, Fusarium spp. + TX, Galactomyces geotrichum + TX, Gliocladium catenulatum (Primastop®, Prestop®) + TX, Gliocladium roseum + TX, Gliocladium spp.

(SoilGard®) + TX, Gliocladium virens (Soilgard®) + TX, Granulovirus (Granupom®) + TX, Halobacillus halophilus + TX, Halobacillus litoralis + TX, Halobacillus trueperi + TX, Halomonas spp. + TX, Halomonas subglaciescola + TX, Halovibrio variabilis + TX, Hanseniaspora uvarum + TX, Helicoverpa armigera nucleopolyhedrovirus (Helicovex®) + TX, Helicoverpa zea nuclear polyhedrosis virus (Gemstar®) + TX, Isaria fumosorosea (previously known as Paecilomyces fumosoroseus strain, PFR-97®, PreFeRal®) + TX, Isoflavone formononetin (Myconate®) + TX, Kloeckera apiculata + TX, Kloeckera spp. + TX, Lagenidium giganteum (Laginex®) + TX, Lecanicillium lecanii (formerly known as Verticillium lecanii (Mycotal®) conidia of strain KV01 (e.g. Vertalec® by Koppert/Arysta) + TX, Lecanicillium longisporum (Vertiblast®) + TX, Lecanicillium muscarium (Vertikil®) + TX, Lymantria Dispar nucleopolyhedrosis virus (Disparvirus®) + TX, Marinococcus halophilus + TX, Meira geulakonigii + TX, Metarhizium anisopliae (Destruxin WP®) + TX, Metarhizium anisopliae (Met52®) + TX, Metschnikowia fruticola (Shemer®) + TX, Metschnikowia pulcherrima + TX, Microdochium dimerum (Antibot®) + TX, Micromonospora coerulea + TX, Microsphaeropsis ochracea + TX, Muscodor albus 620 (Muscudor®) + TX, Muscodor roseus in particular strain A3-5 (Accession No. NRRL 30548) + TX, Mycorrhizae spp. (AMykor®, Root Maximizer®) + TX, Myrothecium verrucaria strain AARC-0255 (DiTera®, BROS PLUS®) + TX, Ophiostoma piliferum strain D97 (Sylvanex®) + TX, Paecilomyces farinosus + TX, Paecilomyces lilacinus strain 251 (MeloCon WG®) + TX, Paecilomyces linacinus (Biostat WP®) + TX, Paenibacillus polymyxa + TX, Pantoea agglomerans (BlightBan C9-1®) + TX, Pantoea spp. + TX, Pasteuria nishizawae in particular strain Pn1 (CLARIVA from Syngenta/ChemChina); + TX, Pasteuria spp. (Econem®) + TX, Penicillium aurantiogriseum + TX, Penicillium billai (Jumpstart®, TagTeam®) + TX, Penicillium brevicompactum + TX, Penicillium frequentans + TX, Penicillium griseofulvum + TX, Penicillium purpurogenum + TX, Penicillium spp. + TX, Penicillium viridicatum + TX, Phlebiopsis gigantean (Rotstop®) + TX, phosphate solubilizing bacteria (Phosphomeal®) + TX, Phytophthora cryptogea + TX, Phytophthora palmivora (Devine®) + TX, Pichia anomala + TX, Pichia guilliermondii + TX, Pichia membranaefaciens + TX, Pichia onychis + TX, Pichia stipites + TX, Pseudomonas aeruginosa + TX, Pseudomonas aureofasciens (Spot-Less Biofungicide®) + TX, Pseudomonas cepacia + TX, Pseudomonas chlororaphis (AtEze®) + TX, Pseudomonas corrugate + TX, Pseudomonas fluorescens (Zequanox®) + TX, Pseudomonas fluorescens strain A506 (BlightBan A506®) + TX, Pseudomonas putida + TX, Pseudomonas reactans + TX, Pseudomonas spp. + TX, Pseudomonas syringae (Bio-Save®) + TX, Pseudomonas viridiflava + TX, Pseudozyma flocculosa strain PF-A22 UL (Sporodex L®) + TX, Puccinia canaliculata + TX, Puccinia thlaspeos (Wood Warrior®) + TX, Pythium paroecandrum + TX, Pythium oligandrum (Polygandron®, Polyversum®) + TX, Pythium periplocum + TX, Rhanella aquatilis + TX, Rhanella spp. + TX, Rhizobia (Dormal®, Vault®) + TX, Rhizoctonia + TX, Rhodococcus globerulus strain AQ719 + TX, Rhodosporidium diobovatum + TX, Rhodosporidium toruloides + TX, Rhodotorula glutinis + TX, Rhodotorula graminis + TX, Rhodotorula mucilagnosa + TX, Rhodotorula rubra + TX, Rhodotorula spp. + TX, Saccharomyces cerevisiae + TX, Salinococcus roseus + TX, Sclerotinia minor (SARRITOR®) + TX, Sclerotinia minor + TX, Scytalidium spp. + TX, Scytalidium uredinicola + TX, Serratia marcescens + TX, Serratia plymuthica + TX, Serratia spp. + TX, Sordaria fimicola + TX, Spodoptera exigua nuclear polyhedrosis virus (Spod-X®, Spexit®) + TX, Spodoptera littoralis nucleopolyhedrovirus (Littovir®) + TX,

Sporobolomyces roseus + TX, Stenotrophomonas maltophilia + TX, Streptomyces albaduncus + TX, Streptomyces exfoliates + TX, Streptomyces galbus + TX, Streptomyces griseoplanus + TX, Streptomyces griseoviridis (Mycostop®) + TX, Streptomyces hygroscopicus + TX, Streptomyces lydicus (Actinovate®) + TX, Streptomyces lydicus WYEC-108 (ActinoGrow®) + TX, Streptomyces violaceus + TX, Tilletiopsis minor + TX, Tilletiopsis spp. + TX, Trichoderma asperellum (T34 Biocontrol®) + TX, Trichoderma atroviride (Plantmate®) + TX, Trichoderma gamsii (Tenet®) + TX, Trichoderma hamatum TH 382 + TX, Trichoderma harzianum rifai (Mycostar®) + TX, Trichoderma harzianum T-22 (Trianum-P®, PlantShield HC®, RootShield®, Trianum-G® + TX, Trichoderma harzianum T-39 (Trichodex®) + TX, Trichoderma inhamatum + TX, Trichoderma koningii + TX, Trichoderma lignorum + TX, Trichoderma longibrachiatum + TX, Trichoderma polysporum (Binab T®) + TX, Trichoderma spp. LC 52 (Sentinel®) + TX, Trichoderma taxi + TX, Trichoderma virens (formerly Gliocladium virens GL-21) (SoilGuard®) + TX, Trichoderma virens + TX, Trichoderma viride + TX, Trichoderma viride strain ICC 080 (Remedier®) + TX, Trichosporon pullulans + TX, Trichosporon spp. + TX, Trichothecium roseum + TX, Trichothecium spp. + TX, Typhula phacorrhiza strain 94670 + TX, Typhula phacorrhiza strain 94671 + TX, Ulocladium atrum + TX, Ulocladium oudemansii (Botry-Zen®) + TX, Ustilago maydis + TX, various bacteria and supplementary micronutrients (Natural II®) + TX, various fungi (Millennium Microbes®) + TX, Verticillium chlamydosporium + TX, Vip3Aa20 (VIPtera®) + TX, Virgibaclillus marismortui + TX, Xanthomonas campestris pv. Poae (Camperico®) + TX, Xenorhabdus bovienii + TX, Xenorhabdus nematophilus + TX;

AGNIQUE® MMF + TX, azadirachtin (Plasma Neem Oil®, AzaGuard®, MeemAzal®, Molt-X® e.g. AZATIN XL from Certis, US) + TX, Botanical IGR (Neemazad®, Neemix®) + TX, BugOil® + TX, canola oil (Lilly Miller Vegol®) + TX, Chenopodium ambrosioides near ambrosioides (Requiem®) + TX, Chrysanthemum extract (Crisant®) + TX, essentials oils of Labiatae (Botania®) + TX, extract of neem oil (Trilogy®) + TX, extracts of clove rosemary peppermint and thyme oil (Garden insect killer®) + TX, garlic + TX, Glycinebetaine (Greenstim®) + TX, kaolin (Screen®) + TX, lemongrass oil (GreenMatch®) + TX, Melaleuca alternifolia extract (also called tea tree oil) (Timorex Gold®) + TX, mixture of clove pepermint garlic oil and mint (Soil Shot®) + TX, mixture of clove rosemary and peppermint extract (EF 400®) + TX, mixture of rosemary sesame pepermint thyme and cinnamon extracts (EF 300®) + TX, neem oil + TX, Nepeta cataria (Catnip oil) + TX, Nepeta catarina + TX, nicotine + TX, oregano oil (MossBuster®) + TX, Pedaliaceae oil (Nematon®) + TX, pine oil (Retenol®) + TX, pyrethrum + TX, Quillaja saponaria (NemaQ®) + TX, Reynoutria sachalinensis (Regalia®, Sakalia®) + TX, rotenone (Eco Roten®) + TX, Rutaceae plant extract (Soleo®) + TX, soybean oil (Ortho ecosense®) + TX, storage glucam of brown algae (Laminarin®) + TX, thyme oil + TX;

(E,Z)-7,9-Dodecadien-1-yl acetate + TX, (E,Z,Z)-3,8,11 Tetradecatrienyl acetate + TX, (Z,Z,E)-7,11,13-Hexadecatrienal + TX, 2-Methyl-1-butanol + TX, Biolure® + TX, blackheaded fireworm pheromone (3M Sprayable Blackheaded Fireworm Pheromone®) + TX, Calcium acetate + TX, Check-Mate® + TX, Codling Moth Pheromone (Paramount dispenser-(CM)/ Isomate C-Plus®) + TX, Entostat powder (extract from palm tree) (Exosex CM®) + TX, Grape Berry Moth Pheromone (3M MEC-GBM Sprayable Pheromone®) + TX, Lavandulyl senecioate + TX, Leafroller pheromone (3M MEC – LR Sprayable Pheromone®) + TX, Muscamone (Snip7 Fly Bait® + TX, Oriental Fruit Moth Pheromone (3M oriental

fruit moth sprayable pheromone®) + TX, Peachtree Borer Pheromone (Isomate-P®) + TX, Scenturion® + TX, Starbar Premium Fly Bait®) + TX, Tomato Pinworm Pheromone (3M Sprayable pheromone®) + TX;

Acerophagus papaya + TX, Adalia bipunctata (Adalia-System®) + TX, Adalia bipunctata (Adaline®) + TX, Adalia bipunctata (Aphidalia®) + TX, Ageniaspis citricola + TX, Ageniaspis fuscicollis + TX, Amblyseius andersoni (Anderline®, Andersoni-System®) + TX, Amblyseius californicus (Amblyline®, Spical®) + TX, Amblyseius cucumeris (Thripex®, Bugline cucumeris®) + TX, Amblyseius fallacis (Fallacis®) + TX, Amblyseius swirskii (Bugline swirskii®, Swirskii-Mite®) + TX, Amblyseius womersleyi (WomerMite®) + TX, Amitus hesperidum + TX, Anagrus atomus + TX, Anagyrus fusciventris + TX, Anagyrus kamali + TX, Anagyrus loecki + TX, Anagyrus pseudococci (Citripar®) + TX, Anicetus benefices + TX, Anisopteromalus calandrae + TX, Anthocoris nemoralis (Anthocoris-System®) + TX, Aphelinus abdominalis (Apheline®, Aphiline®), + TX, Aphelinus asychis + TX, Aphidius colemani (Aphipar®) + TX, Aphidius ervi (Aphelinus-System®) + TX, Aphidius ervi (Ervipar®) + TX, Aphidius gifuensis + TX, Aphidius matricariae (Aphipar-M®) + TX, Aphidoletes aphidimyza (Aphidend®, Aphidoline®) + TX, Aphytis lingnanensis + TX, Aphytis melinus + TX, Aprostocetus hagenowii + TX, Atheta coriaria (Staphyline®) + TX, Bombus spp. + TX, Bombus terrestris (Beeline®, Tripol®) + TX, Bombus terrestris (Natupol Beehive®) + TX, Cephalonomia stephanoderis + TX, Chilocorus nigritus + TX, Chrysoperla carnea (Chrysoline®, Chrysopa®) + TX, Chrysoperla rufilabris + TX, Cirrospilus ingenuus + TX, Cirrospilus quadristriatus + TX, Citrostichus phyllocnistoides + TX, Closterocerus chamaeleon + TX, Closterocerus spp. + TX, Coccidoxenoides perminutus (Planopar®) + TX, Coccophagus cowperi + TX, Coccophagus lycimnia + TX, Cotesia flavipes + TX, Cotesia plutellae + TX, Cryptolaemus montrouzieri (Cryptobug®, Cryptoline®) + TX, Cybocephalus nipponicus + TX, Dacnusa sibirica (Minusa®, DacDigline®, Minex®) + TX, Delphastus catalinae (Delphastus®) + TX, Delphastus pusillus + TX, Diachasmimorpha krausii + TX, Diachasmimorpha longicaudata + TX, Diaparsis jucunda + TX, Diaphorencyrtus aligarhensis + TX, Diglyphus isaea (Diminex®, Miglyphus®, Digline®) + TX, Diversinervus spp. + TX, Encarsia citrina + TX, Encarsia formosa (Encarsia max®, Encarline®, En-Strip®) + TX, Encarsia guadeloupae + TX, Encarsia haitiensis + TX, Episyrphus balteatus (Syrphidend®) + TX, Eretmoceris siphonini + TX, Eretmocerus californicus + TX, Eretmocerus eremicus (Enermix®, Ercal®, Eretline e®, Bemimix®) + TX, Eretmocerus hayati + TX, Eretmocerus mundus (Bemipar®, Eretline m®) + TX, Eretmocerus siphonini + TX, Exochomus quadripustulatus + TX, Feltiella acarisuga (Feltiline®) + TX, Feltiella acarisuga (Spidend®) + TX, Fopius arisanus + TX, Fopius ceratitivorus + TX, Formononetin (Wirless Beehome®) + TX, Franklinothrips vespiformis (Vespop®) + TX, Galendromus occidentalis + TX, Goniozus legneri + TX, Habrobracon hebetor + TX, Harmonia axyridis (HarmoBeetle®) + TX, Heterorhabditis bacteriophora (NemaShield HB®, Nemaseek®, Terranem-Nam®, Terranem®, Larvanem®, B-Green®, NemAttack ®, Nematop®) + TX, Heterorhabditis megidis (Nemasys H®, BioNem H®, Exhibitline hm®, Larvanem-M®) + TX, Heterorhabditis spp. (Lawn Patrol®) + TX, Hippodamia convergens + TX, Hypoaspis aculeifer (Aculeifer-System®, Entomite-A®) + TX, Hypoaspis miles (Hypoline m®, Entomite-M®) + TX, Lbalia leucospoides + TX, Lecanoideus floccissimus + TX, Lemophagus errabundus + TX, Leptomastidea abnormis + TX, Leptomastix dactylopii (Leptopar®) + TX, Leptomastix epona + TX, Lindorus lophanthae + TX, Lipolexis oregmae +

TX, Lucilia caesar (Natufly®) + TX, Lysiphlebus testaceipes + TX, Macrolophus caliginosus (Mirical-N®, Macroline c®, Mirical®) + TX, Mesoseiulus longipes + TX, Metaphycus flavus + TX, Metaphycus lounsburyi + TX, Micromus angulatus (Milacewing®) + TX, Microterys flavus + TX, Muscidifurax raptorellus and Spalangia cameroni (Biopar®) + TX, Neodryinus typhlocybae + TX, Neoseiulus californicus + TX, Neoseiulus cucumeris (THRYPEX®) + TX, Neoseiulus fallacis + TX, Nesideocoris tenuis (NesidioBug®, Nesibug®) + TX, Ophyra aenescens (Biofly®) + TX, Orius insidiosus (Thripor-I®, Oriline i®) + TX, Orius laevigatus (Thripor-L®, Oriline l®) + TX, Orius majusculus (Oriline m®) + TX, Orius strigicollis (Thripor-S®) + TX, Pauesia juniperorum + TX, Pediobius foveolatus + TX, Phasmarhabditis hermaphrodita (Nemaslug®) + TX, Phymastichus coffea + TX, Phytoseiulus macropilus + TX, Phytoseiulus persimilis (Spidex®, Phytoline p®) + TX, Podisus maculiventris (Podisus®) + TX, Pseudacteon curvatus + TX, Pseudacteon obtusus + TX, Pseudacteon tricuspis + TX, Pseudaphycus maculipennis + TX, Pseudleptomastix mexicana + TX, Psyllaephagus pilosus + TX, Psyttalia concolor (complex) + TX, Quadrastichus spp. + TX, Rhyzobius lophanthae + TX, Rodolia cardinalis + TX, Rumina decollate + TX, Semielacher petiolatus + TX, Sitobion avenae (Ervibank®) + TX, Steinernema carpocapsae (Nematac C®, Millenium®, BioNem C®, NemAttack®, Nemastar®, Capsanem®) + TX, Steinernema feltiae (NemaShield®, Nemasys F®, BioNem F®, Steinernema-System®, NemAttack®, Nemaplus®, Exhibitline sf®, Scia-rid®, Entonem®) + TX, Steinernema kraussei (Nemasys L®, BioNem L®, Exhibitline srb®) + TX, Steinernema riobrave (BioVector®, BioVektor®) + TX, Steinernema scapterisci (Nematac S®) + TX, Steinernema spp. + TX, Steinernematid spp. (Guardian Nematodes®) + TX, Stethorus punctillum (Stethorus®) + TX, Tamarixia radiate + TX, Tetrastichus setifer + TX, Thripobius semiluteus + TX, Torymus sinensis + TX, Trichogramma brassicae (Tricholine b®) + TX, Trichogramma brassicae (Tricho-Strip®) + TX, Trichogramma evanescens + TX, Trichogramma minutum + TX, Trichogramma ostriniae + TX, Trichogramma platneri + TX, Trichogramma pretiosum + TX, Xanthopimpla stemmator + TX;

abscisic acid + TX, Aminomite® + TX, BioGain® + TX, bioSea® + TX, CAS Number: 2643947-26-4 + TX, Chondrostereum purpureum (Chontrol Paste®) + TX, Colletotrichum gloeosporioides (Collego®) + TX, Copper Octanoate (Cueva®) + TX, Delta traps (Trapline d®) + TX, Erwinia amylovora (Harpin) (ProAct®, Ni-HIBIT Gold CST®) + TX, fatty acids derived from a natural by-product of extra virgin olive oil (FLIPPER®) + TX, Ferri-phosphate (Ferramol®) + TX, Funnel traps (Trapline y®) + TX, Gallex® + TX, Grower's Secret® + TX, Homo-brassonolide + TX, Iron Phosphate (Lilly Miller Worry Free Ferramol Slug & Snail Bait®) + TX, MCP hail trap (Trapline f®) + TX, Microctonus hyperodae + TX, Mycoleptodiscus terrestris (Des-X®) + TX, Nosema locustae (Semaspore Organic Grasshopper Control®) + TX, Pheromone trap (Thripline ams®) + TX, potassium bicarbonate (MilStop®) + TX, potassium iodide + potassiumthiocyanate (Enzicur®) + TX, potassium salts of fatty acids (Sanova®) + TX, potassium silicate solution (Sil-Matrix®) + TX, Spider venom + TX, Sticky traps (Trapline YF®, Rebell Amarillo®) + TX, SuffOil-X® + TX, Traps (Takitrapline y + b®) + TX;

Bacillus mojavensis strain R3B (Accession No. NCAIM (P) B001389) (WO 2013/034938) from Certis USA LLC + TX, Bacillus pumilus, in particular strain BU F-33, having NRRL Accession No. 50185 (CARTISSA® from BASF, EPA Reg. No. 71840-19) + TX, Bacillus subtilis CX-9060 from Certis USA LLC, Bacillus sp., in particular strain D747 (available as DOUBLE NICKEL® from Kumiai Chemical

Industry Co., Ltd.), having Accession No. FERM BP-8234, U.S. Patent No. 7,094,592 + TX, Bacillus subtilis strain BU1814, (VELONDIS® PLUS, VELONDIS® FLEX and VELONDIS® EXTRA from BASF SE) + TX, Bacillus subtilis var. amyloliquefaciens strain FZB24 having Accession No. DSM 10271 (available from Novozymes as TAEGRO® or TAEGRO® ECO (EPA Registration No. 70127-5)) + TX, Bacillus subtilis, in particular strain QST713/AQ713 (having NRRL Accession No. B-21661 and described in U.S. Patent No. 6,060,051, available as SERENADE® OPTI or SERENADE® ASO from Bayer CropScience LP, US) + TX, Paenibacillus polymyxa, in particular strain AC-1 (e.g. TOPSEED® from Green Biotech Company Ltd.) + TX, Paenibacillus sp. strain having Accession No. NRRL B-50972 or Accession No. NRRL B-67129, WO 2016/154297 + TX, Pantoea agglomerans, in particular strain E325 (Accession No. NRRL B-21856) (available as BLOOMTIME BIOLOGICAL™ FD BIOPESTICIDE from Northwest Agri Products) + TX, Pseudomonas proradix (e.g. PRORADIX® from Sourcon Padena) + TX;

Aureobasidium pullulans, in particular blastospores of strain DSM14940, blastospores of strain DSM 14941 or mixtures of blastospores of strains DSM14940 and DSM14941 (e.g., BOTECTOR® and BLOSSOM PROTECT® from bio-ferm, CH) + TX, Pseudozyma aphidis (as disclosed in WO2011/151819 by Yissum Research Development Company of the Hebrew University of Jerusalem) + TX, Saccharomyces cerevisiae, in particular strains CNCM No. 1-3936, CNCM No. 1-3937, CNCM No. 1-3938 or CNCM No. 1-3939 (WO 2010/086790) from Lesaffre et Compagnie, FR + TX;

Agrobacterium radiobacter strain K84 (e.g. GALLTROL-A® from AgBioChem, CA) + TX, Bacillus amyloliquefaciens isolate B246 (e.g. AVOGREEN™ from University of Pretoria) + TX, Bacillus amyloliquefaciens strain F727 (also known as strain MBI110) (NRRL Accession No. B-50768, WO 2014/028521) (STARGUS® from Marrone Bio Innovations) + TX, Bacillus amyloliquefaciens strain FZB42, Accession No. DSM 23117 (available as RHIZOVITAL® from ABiTEP, DE) + TX, Bacillus amyloliquefaciens, in particular strain D747 (available as Double Nickel™ from Kumiai Chemical Industry Co., Ltd., having accession number FERM BP-8234, US Patent No. 7,094,592) + TX, Bacillus licheniformis FMCH001 and Bacillus subtilis FMCH002 (QUARTZO® (WG) and PRESENCE® (WP) from FMC Corporation) + TX, Bacillus licheniformis, in particular strain SB3086, having Accession No. ATCC 55406, WO 2003/000051 (available as ECOGUARD® Biofungicide and GREEN RELEAF™ from Novozymes) + TX, Bacillus methylotrophicus strain BAC-9912 (from Chinese Academy of Sciences' Institute of Applied Ecology) + TX, Bacillus mycoides, isolate, having Accession No. B-30890 (available as BMJ TGAI® or WG and LifeGard™ from Certis USA LLC) + TX, Bacillus pumilus, in particular strain GB34 (available as Yield Shield® from Bayer AG, DE) + TX, Bacillus pumilus, in particular strain QST2808 (available as SONATA® from Bayer CropScience LP, US, having Accession No. NRRL B-30087 and described in U.S. Patent No. 6,245,551) + TX, Bacillus subtilis CX-9060 from Certis USA LLC + TX, Bacillus subtilis IAB/BS03 (AVIV™ from STK Bio-Ag Technologies, PORTENTO® from Idai Nature) + TX, Bacillus subtilis KTSB strain (FOLIACTIVE® from Donaghys) + TX, Bacillus subtilis strain BU1814, (available as VELONDIS® PLUS, VELONDIS® FLEX and VELONDIS® EXTRA from BASF SE) + TX, Bacillus subtilis strain GB03 (available as Kodiak® from Bayer AG, DE) + TX, Bacillus subtilis strain MBI 600 (available as SUBTILEX from BASF SE), having Accession Number NRRL B-50595, U.S. Patent No. 5,061,495 + TX, Bacillus subtilis strain Y1336 (available as BIOBAC® WP from Bion-

Tech, Taiwan, registered as a biological fungicide in Taiwan under Registration Nos. 4764, 5454, 5096 and 5277) + TX, Bacillus subtilis var. amyloliquefaciens strain FZB24 having Accession No. DSM 10271 (available from Novozymes as TAEGRO® or TAEGRO® ECO (EPA Registration No. 70127-5)) + TX, Bacillus subtilis Y1336 (available as BIOBAC® WP from Bion-Tech, Taiwan, registered as a biological fungicide in Taiwan under Registration Nos. 4764, 5454, 5096 and 5277) + TX, Paenibacillus epiphyticus (WO 2016/020371) from BASF SE + TX, Paenibacillus polymyxa ssp. plantarum (WO 2016/020371) from BASF SE + TX, Paenibacillus sp. strain having Accession No. NRRL B-50972 or Accession No. NRRL B-67129, WO 2016/154297 + TX, Pseudomonas chlororaphis strain AFS009, having Accession No. NRRL B-50897, WO 2017/019448 (e.g., HOWLER™ and ZIO® from AgBiome Innovations, US) + TX, Pseudomonas chlororaphis, in particular strain MA342 (e.g. CEDOMON®, CERALL®, and CEDRESS® by Bioagri and Koppert) + TX, Pseudomonas fluorescens strain A506 (e.g. BLIGHTBAN® A506 by NuFarm) + TX, Pseudomonas proradix (e.g. PRORADIX® from Sourcon Padena) + TX, Streptomyces griseoviridis strain K61 (also known as Streptomyces galbus strain K61) (Accession No. DSM 7206) (MYCOSTOP® from Verdera, PREFENCE® from BioWorks, cf. Crop Protection 2006, 25, 468-475) + TX, Streptomyces lydicus strain WYEC108 (also known as Streptomyces lydicus strain WYCD108US) (ACTINO-IRON® and ACTINOVATE® from Novozymes) + TX;

Trichoderma atroviride strain T11 (IMI352941/ CECT20498) + TX, Ampelomyces quisqualis strain AQ10, having Accession No. CNCM 1-807 (e.g., AQ 10® by IntrachemBio Italia) + TX, Ampelomyces quisqualis, in particular strain AQ 10 (e.g. AQ 10® by IntrachemBio Italia) + TX, Aspergillus flavus strain NRRL 21882 (products known as AFLA-GUARD® from Syngenta/ChemChina) + TX, Aureobasidium pullulans, in particular blastospores of strain DSM 14941 + TX, Aureobasidium pullulans, in particular blastospores of strain DSM14940 + TX, Aureobasidium pullulans, in particular mixtures of blastospores of strains DSM14940 and DSM 14941 (e.g. Botector® by bio-ferm, CH) + TX, Chaetomium cupreum (Accession No. CABI 353812) (e.g. BIOKUPRUM™ by AgriLife) + TX, Chaetomium globosum (available as RIVADIOM® by Rivale) + TX, Cladosporium cladosporioides, strain H39, having Accession No. CBS122244, US 2010/0291039 (by Stichting Dienst Landbouwkundig Onderzoek) + TX, Coniothyrium minitans, in particular strain CON/M/91-8 (Accession No. DSM9660, e.g. Contans ® from Bayer CropScience Biologics GmbH) + TX, Cryptococcus flavescens, strain 3C (NRRL Y-50378), + TX, Dactylaria candida, Dilophosphora alopecuri (available as TWIST FUNGUS®), Fusarium oxysporum, strain Fo47 (available as FUSACLEAN® by Natural Plant Protection) + TX, Gliocladium catenulatum (Synonym: Clonostachys rosea f. catenulate) strain J1446 (e.g. Prestop ® by Lallemand) + TX, Gliocladium roseum (also known as Clonostachys rosea f rosea) strain IK726 (Jensen DF, et al. Development of a biocontrol agent for plant disease control with special emphasis on the near commercial fungal antagonist Clonostachys rosea strain 'IK726', Australasian Plant Pathol. 2007,36(2):95-101) + TX, Gliocladium roseum (also known as Clonostachys rosea f rosea), in particular strain 321U from Adjuvants Plus, strain ACM941 as disclosed in Xue A.G. (Efficacy of Clonostachys rosea strain ACM941 and fungicide seed treatments for controlling the root tot complex of field pea, Can Jour Plant Sci 2003, 83(3): 519-524) + TX, Metschnikowia fructicola, in particular strain NRRL Y-30752 + TX, Microsphaeropsis ochracea, Penicillium steckii (DSM 27859, WO 2015/067800) from BASF SE +

TX, mixtures of Trichoderma asperellum strain ICC 012 (also known as Trichoderma harzianum ICC012), having Accession No. CABI CC IMI 392716 and Trichoderma gamsii (formerly T. viride) strain ICC 080, having Accession No. IMI 392151 (e.g., BIO-TAM™ from Isagro USA, Inc. or BIODERMA® by Agrobiosol de Mexico, S.A. de C.V.) + TX, Penicillium vermiculatum + TX, Phlebiopsis gigantea strain VRA 1992 (ROTSTOP® C from Danstar Ferment) + TX, Pseudozyma flocculosa, strain PF-A22 UL (available as SPORODEX® L by Plant Products Co., CA) + TX, Saccharomyces cerevisiae strain LAS117 cell walls (CEREVISANE® from Lesaffre, ROMEO® from BASF SE) + TX, Saccharomyces cerevisiae strains CNCM No. 1-3936, CNCM No. 1-3937, CNCM No. 1-3938, CNCM No. 1-3939 (WO 2010/086790) from Lesaffre et Compagnie, FR + TX, Saccharomyces cerevisiae, in particular strain LASO2 (from Agro-Levures et Dérivés) + TX, Simplicillium lanosoniveum + TX, strain T34 (e.g. T34 Biocontrol by Biocontrol Technologies S.L., ES) or strain ICC 012 from Isagro + TX, strain WRL-076 (NRRL Y-30842), U.S. Patent No. 7,579,183 + TX, Talaromyces flavus, strain V117b + TX, Trichoderma asperelloides JM41R (Accession No. NRRL B-50759) (TRICHO PLUS® from BASF SE) + TX, Trichoderma asperellum, in particular strain SKT-1, having Accession No. FERM P-16510 (e.g. ECO-HOPE® from Kumiai Chemical Industry) + TX, Trichoderma asperellum, in particular, strain kd (e.g. T-Gro from Andermatt Biocontrol) + TX, Trichoderma atroviride strain 77B (T77 from Andermatt Biocontrol) + TX, Trichoderma atroviride strain ATCC 20476 (IMI 206040) + TX, Trichoderma atroviride strain LC52 (e.g. Tenet by Agrimm Technologies Limited) + TX, Trichoderma atroviride strain LU132 (e.g. Sentinel from Agrimm Technologies Limited) + TX, Trichoderma atroviride strain NMI no. V08/002388 + TX, Trichoderma atroviride strain NMI no. V08/002389 + TX, Trichoderma atroviride strain NMI no. V08/002390 + TX, Trichoderma atroviride strain no. V08/002387 + TX, Trichoderma atroviride strain SKT-1 (FERM P-16510), JP Patent Publication (Kokai) 11-253151 A + TX, Trichoderma atroviride strain SKT-2 (FERM P-16511), JP Patent Publication (Kokai) 11-253151 A + TX, Trichoderma atroviride strain SKT-3 (FERM P-17021), JP Patent Publication (Kokai) 11-253151 A + TX, Trichoderma atroviride, in particular strain SC1 (Accession No. CBS 122089, WO 2009/116106 and U.S. Patent No. 8,431,120 (from Bi-PA)) + TX, Trichoderma atroviride,strain CNCM 1-1237 (e.g. Esquive® WP from Agrauxine, FR) + TX, Trichoderma fertile (e.g. product TrichoPlus from BASF) + TX, Trichoderma gamsii (formerly T. viride) + TX, Trichoderma gamsii (formerly T. viride) strain ICC 080 (IMI CC 392151 CABI) (available as BIODERMA® by AGROBIOSOL DE MEXICO, S.A. DE C.V.), + TX, Trichoderma gamsii strain ICC080 (IMI CC 392151 CABI, e.g. BioDerma by AGROBIOSOL DE MEXICO, S.A. DE C.V.), + TX, Trichoderma harmatum + TX, Trichoderma harmatum, having Accession No. ATCC 28012 + TX, Trichoderma harzianum + TX, Trichoderma harzianum rifai T39 (e.g. Trichodex® from Makhteshim, US) + TX, Trichoderma harzianum strain Cepa SimbT5 (from Simbiose Agro), + TX, Trichoderma harzianum strain DB 103 (available as T-GRO® 7456 by Dagutat Biolab) + TX, Trichoderma harzianum strain ITEM 908 (e.g. Trianum-P from Koppert) + TX, Trichoderma harzianum strain T-22 (e.g. Trianum-P from Andermatt Biocontrol or Koppert) + TX, Trichoderma harzianum strain TH35 (e.g. Root-Pro by Mycontrol) + TX, Trichoderma polysporum strain IMI 206039 (e.g. Binab TF WP by BINAB Bio-Innovation AB, Sweden) + TX, Trichoderma stromaticum having Accession No. Ts3550 (e.g. Tricovab by CEPLAC, Brazil) + TX, Trichoderma virens (also known as Gliocladium virens) in particular strain GL-21 (e.g. SoilGard by Certis, US) + TX, Trichoderma virens strain G-41, formerly known as

Gliocladium virens (Accession No. ATCC 20906) (e.g., ROOTSHIELD® PLUS WP and TURFSHIELD® PLUS WP from BioWorks, US) + TX, Trichoderma viride in particular strain B35 (Pietr et al., 1993, Zesz. Nauk. A R w Szczecinie 161: 125-137) + TX, Trichoderma viride strain TV1(e.g. Trianum-P by Koppert) + TX, Ulocladium oudemansii strain U3, having Accession No. NM 99/06216 (e.g., BOTRY-ZEN® by Botry-Zen Ltd, New Zealand and BOTRYSTOP® from BioWorks, Inc.) + TX, Verticillium albo-atrum (formerly V. dahliae) strain WCS850 having Accession No. WCS850, deposited at the Central Bureau for Fungi Cultures (e.g., DUTCH TRIG® by Tree Care Innovations) + TX, Verticillium chlamydosporium + TX;

a mixture of Azotobacter vinelandii and Clostridium pasteurianum (available as INVIGORATE® from Agrinos) + TX, a mixture of Bacillus licheniformis FMCH001 and Bacillus subtilis FMCH002 (available as QUARTZO® (WG), PRESENCE® (WP) from FMC Corporation) + TX, Azorhizobium caulinodans, in particular strain ZB-SK-5 + TX, Azospirillum brasilense (e.g., VIGOR® from KALO, Inc.) + TX, Azospirillum lipoferum (e.g., VERTEX-IF™ from TerraMax, Inc.) + TX, Azotobacter chroococcum, in particular strain H23 + TX, Azotobacter vinelandii, in particular strain ATCC 12837 + TX, Bacillus amyloliquefaciens BS27 (Accession No. NRRL B-5015) + TX, Bacillus amyloliquefaciens in particular strain FZB42 (e.g. RHIZOVITAL® from ABiTEP, DE) + TX, Bacillus amyloliquefaciens in particular strain IN937a + TX, Bacillus amyloliquefaciens pm414 (LOLI-PEPTA® from Biofilm Crop Protection) + TX, Bacillus amyloliquefaciens SB3281 (ATCC # PTA-7542, WO 2017/205258) + TX, Bacillus amyloliquefaciens TJ1000 (available as QUIKROOTS® from Novozymes) + TX, Bacillus cereus family member EE128 (NRRL No. B-50917) + TX, Bacillus cereus family member EE349 (NRRL No. B-50928) + TX, Bacillus cereus in particular strain BP01 (ATCC 55675, e.g. MEPICHLOR® from Arysta Lifescience, US) + TX, Bacillus mycoides BT155 (NRRL No. B-50921) + TX, Bacillus mycoides BT46-3 (NRRL No. B-50922) + TX, Bacillus mycoides EE118 (NRRL No. B-50918) + TX, Bacillus mycoides EE141 (NRRL No. B-50916) + TX, Bacillus pumilus in particular strain GB34 (e.g. YIELD SHIELD® from Bayer Crop Science, DE), + TX, Bacillus pumilus in particular strain QST2808 (Accession No. NRRL No. B-30087) + TX, Bacillus siamensis in particular strain KCTC 13613T + TX, Bacillus subtilis in particular strain AQ30002 (Accession No. NRRL No. B-50421 and described in U.S. Patent Application No. 13/330,576) + TX, Bacillus subtilis in particular strain AQ30004 (NRRL No. B-50455 and described in U.S. Patent Application No. 13/330,576) + TX, Bacillus subtilis in particular strain MBI 600 (e.g. SUBTILEX® from BASF SE) + TX, Bacillus subtilis rm303 (RHIZOMAX® from Biofilm Crop Protection) + TX, Bacillus subtilis strain BU1814 (available as TEQUALIS® from BASF SE) + TX, Bacillus tequilensis in particular strain NII-0943 + TX, Bacillus thuringiensis BT013A (NRRL No. B-50924) also known as Bacillus thuringiensis 4Q7 + TX, Bradyrhizobium japonicum (e.g. OPTIMIZE® from Novozymes) + TX, Delftia acidovorans in particular strain RAY209 (e.g. BIOBOOST® from Brett Young Seeds) + TX, Lactobacillus sp. (e.g. LACTOPLANT® from LactoPAFI) + TX, Mesorhizobium cicer (e.g., NODULATOR from BASF SE) + TX, Paenibacillus polymyxa in particular strain AC-1 (e.g. TOPSEED® from Green Biotech Company Ltd.) + TX, Pseudomonas aeruginosa in particular strain PN1 + TX, Pseudomonas proradix (e.g. PRORADIX® from Sourcon Padena) + TX, Rhizobium leguminosarium biovar viciae (e.g., NODULATOR from BASF SE) + TX, Rhizobium leguminosarum in particular bv. viceae strain Z25 (Accession No. CECT 4585) + TX, Serratia marcescens in particular strain SRM

(Accession No. MTCC 8708), + TX, Sinorhizobium meliloti strain NRG-185-1 (NITRAGIN® GOLD from Bayer CropScience) + TX, Thiobacillus sp. (e.g. CROPAID® from Cropaid Ltd UK) + TX;
Myrothecium verrucaria strain AARC-0255 (e.g. DiTera™ from Valent Biosciences) + TX, Penicillium bilaii strain ATCC 22348 (e.g. JumpStart® from Acceleron BioAg) + TX, Penicillium bilaii strain ATCC ATCC20851 + TX, Purpureocillium lilacinum (previously known as Paecilomyces lilacinus) strain 251 (AGAL 89/030550, e.g. BioAct from Bayer CropScience Biologics GmbH) + TX, Pythium oligandrum strain DV74 + TX, Pythium oligandrum strain M1 (ATCC 38472 e.g. Polyversum from Biopreprаty, CZ) + TX, Rhizopogon amylopogon (Myco-Sol from Agri-Enterprise, LLC, formerly Helena Chemical Company) + TX, Rhizopogon fulvigleba (e.g. Myco-Sol from Agri-Enterprise, LLC, formerly Helena Chemical Company) + TX, Talaromyces flavus strain V117b + TX, Trichoderma asperellum strain (Eco-T from Plant Health Products, ZA) + TX, Trichoderma asperellum strain kd (e.g. T-Gro from Andermatt Biocontrol) + TX, Trichoderma atroviride in particular strain no. V08/002387 + TX, Trichoderma atroviride strain CNCM 1-1237 (e.g. Esquive® WP from Agrauxine, FR) + TX, Trichoderma atroviride strain LC52 (also known as Trichoderma atroviride strain LU132, e.g. Sentinel from Agrimm Technologies Limited) + TX, Trichoderma atroviride strain no. NMI No. V08/002388 + TX, Trichoderma atroviride strain no. NMI No. V08/002389 + TX, Trichoderma atroviride strain no. NMI No. V08/002390 + TX, Trichoderma atroviride strain SC1 (described in WO2009/116106) + TX, Trichoderma harzianum strain 1295-22 + TX, Trichoderma harzianum strain ITEM 908 + TX, Trichoderma harzianum strain T-22 (e.g. Trianum-P from Andermatt Biocontrol or Koppert) + TX, Trichoderma harzianum strain TSTh20, + TX, Trichoderma virens strain GI-3 + TX, Trichoderma virens strain GL-21 (e.g. SoilGard® from Certis, USA) + TX, Trichoderma viride strain B35 (Pietr et al., 1993, Zesz. Nauk. A R w Szczecinie 161: 125-137) + TX, Verticillium albo-atrum (formerly V. dahliae) strain WCS850 (CBS 276.92, e.g. Dutch Trig from Tree Care Innovations) + TX;
Agrobacterium radiobacter strain K84 (Galltrol from AgBiochem Inc.), + TX, Bacillus amyloliquefaciens in particular strain PTS-4838 (e.g. AVEO from Valent Biosciences, US), + TX, Bacillus mycoides, isolate J. (e.g. BmJ from Certis USA LLC), + TX, Bacillus sphaericus in particular Serotype H5a5b strain 2362 (strain ABTS-1743) (e.g. VECTOLEX® from Valent BioSciences, US), + TX, Bacillus thuringiensis israelensis strain BMP 144 (e.g. AQUABAC® by Becker Microbial Products IL) + TX, Bacillus thuringiensis subsp. aizawai strain GC-91 + TX, Bacillus thuringiensis subsp. aizawai, in particular serotype H-7 (e.g. FLORBAC® WG from Valent BioSciences, US) + TX, Bacillus thuringiensis subsp. aizawai, in particular strain ABTS-1857 (SD-1372, e.g. XENTARI® from Valent BioSciences) + TX, Bacillus thuringiensis subsp. israelensis (serotype H-14) strain AM65-52 (Accession No. ATCC 1276) (e.g. VECTOBAC® by Valent BioSciences, US) + TX, Bacillus thuringiensis subsp. kurstaki strain ABTS 351 + TX, Bacillus thuringiensis subsp. kurstaki strain BMP 123 (from Becker Microbial Products, IL, BARITONE from Bayer CropScience) + TX, Bacillus thuringiensis subsp. kurstaki strain EG 2348 (LEPINOX from Certis, US) + TX, Bacillus thuringiensis subsp. kurstaki strain EG 7841 (CRYMAX from Certis, US) + TX, Bacillus thuringiensis subsp. kurstaki strain HD-1 (e.g. DIPEL® ES from Valent BioSciences, US) + TX, Bacillus thuringiensis subsp. kurstaki strain PB 54 + TX, Bacillus thuringiensis subsp. kurstaki strain SA 11 (JAVELIN from Certis, US) + TX, Bacillus thuringiensis subsp. kurstaki strain SA 12 (THURICIDE from Certis, US) + TX, Bacillus thuringiensis subsp. tenebrionis strain NB 176

(SD-5428, e.g. NOVODOR® FC from BioFa DE) + TX, Bacillus thuringiensis var. Colmeri (e.g. TIANBAOBTC by Changzhou Jianghai Chemical Factory) + TX, Bacillus thuringiensis var. japonensis strain Buibui + TX, Bacillus thuringiensis var. kurstaki strain EVB-113-19 (e.g., BIOPROTEC® from AEF Global) + TX, Brevibacillus laterosporus + TX, Burkholderia spp. in particular Burkholderia rinojensis strain A396 (also known as Burkholderia rinojensis strain MBI 305) (Accession No. NRRL B-50319, WO 2011/106491 and WO 2013/032693, e.g. MBI206 TGAI and ZELTO® from Marrone Bio Innovations), + TX, Chromobacterium subtsugae in particular strain PRAA4-1T (e.g. MBI-203, e.g. GRANDEVO® from Marrone Bio Innovations) + TX, Lecanicillium muscarium Ve6 (MYCOTAL from Koppert) + TX, Paenibacillus popilliae (formerly Bacillus popilliae, e.g. MILKY SPORE POWDER™ or MILKY SPORE GRANULAR™ from St. Gabriel Laboratories) + TX, Serratia entomophila (e.g. INVADE® by Wrightson Seeds) + TX, Serratia marcescens in particular strain SRM (Accession No. MTCC 8708) + TX, Trichoderma asperellum (TRICHODERMAX from Novozymes) + TX, Wolbachia pipientis ZAP strain (e.g., ZAP MALES® from MosquitoMate) + TX;

Beauveria bassiana strain ATCC 74040 (e.g. NATURALIS® from Intrachem Bio Italia) + TX, Beauveria bassiana strain ATP02 (Accession No. DSM 24665), Apopka 97 (PREFERAL from SePRO) + TX, Beauveria bassiana strain GHA (Accession No. ATCC74250, e.g. BOTANIGUARD® ES and MYCONTROL-O® from Laverlam International Corporation) + TX, Metarhizium anisopliae 3213-1 (deposited under NRRL accession number 67074 disclosed in WO 2017/066094, Pioneer Hi-Bred International) + TX, Metarhizium robertsii 15013-1 (deposited under NRRL accession number 67073) + TX, Metarhizium robertsii 23013-3 (deposited under NRRL accession number 67075) + TX, Paecilomyces lilacinus strain 251 (MELOCON from Certis, US) + TX;

Cydia pomonella (codling moth) granulosis virus (GV) + TX, Helicoverpa armigera (cotton bollworm) nuclear polyhedrosis virus (NPV) + TX, of Adoxophyes orana (summer fruit tortrix) granulosis virus (GV) + TX, Spodoptera exigua (beet armyworm) mNPV + TX, Spodoptera frugiperda (fall armyworm) mNPV + TX;

Burkholderia spp. in particular Burkholderia cepacia (formerly known as Pseudomonas cepacia) + TX, Gigaspora spp. + TX, Glomus spp. + TX, Laccaria spp. + TX, LactoBacillus buchneri + TX, Paraglomus spp. + TX, Pisolithus tinctorus + TX, Pseudomonas spp. + TX, Rhizobium spp. in particular Rhizobium trifolii + TX, Rhizopogon spp. + TX, Scleroderma spp. + TX, Streptomyces spp. + TX, Suillus spp. + TX, Agrobacterium spp. + TX, Azorhizobium caulinodans + TX, Azospirillum spp. + TX, Azotobacter spp. + TX, Bradyrhizobium spp. + TX, Gigaspora monosporum + TX;

Allium sativum (NEMGUARD from Eco-Spray, BRALIC from ADAMA) + TX, Armour-Zen + TX, Artemisia absinthium + TX, Biokeeper WP + TX, Brassicaceae extract in particular oilseed rape powder or mustard powder + TX, Cassia nigricans + TX, Celastrus angulatus + TX, Chenopodium anthelminticum + TX, Chenopodium quinoa saponin extract from quinoa seeds (e.g. Heads Up® (Saponins of Quinoa) from Heads Up plant Protectants, CA) + TX, Chitin + TX, Dryopteris filix-mas + TX, Equisetum arvense + TX, Fortune Aza + TX, Fungastop + TX, Melaleuca alternifolia extract (TIMOREX GOLD from STK) + TX, naturally occurring Blad polypeptide extracted from Lupin seeds (FRACTURE® from FMC) + TX, naturally occurring Blad polypeptide extracted from Lupin seeds (PROBLAD® from Certis EU) + TX, Pyrethrins + TX, Quassia amara + TX, Quercus + TX, Quillaja extract (QL AGRI 35 from BASF) + TX,

REGALIA MAXX from Marrone Bio) + TX, Requiem™ Insecticide + TX, Reynoutria sachalinensis extract (REGALLIA + TX, ryania/ryanodine + TX, Symphytum officinale + TX, Tanacetum vulgare + TX, Thymol + TX, Thymol mixed with Geraniol (CEDROZ from Eden Research) + TX, Thymol mixed with Geraniol and Eugenol (MEVALONE from Eden Research) + TX, Triact 70 + TX, TriCon + TX, Tropaeulum majus + TX, Urtica dioica + TX, Veratrin + TX, Viscum album + TX;
mercuric oxide + TX, octhilinone + TX, thiophanate-methyl + TX;
MGK 264 + TX, 2-(2-butoxyethoxy)ethyl piperonylate + TX, 2-isovalerylindan-1,3-dione + TX, 4-(quinoxalin-2-ylamino)benzenesulfonamide + TX, 5-(1,3-benzodioxol-5-yl)-3-hexylcyclohex-2-enone + TX, acibenzolar + TX, acibenzolar-S-methyl + TX, alpha-bromadiolone + TX, alpha-chlorohydrin + TX, aluminium phosphide + TX, anthraquinone + TX, antu + TX, arsenous oxide + TX, barium carbonate + TX, benoxacor + TX, bisthiosemi + TX, brodifacoum + TX, bromadiolone + TX, bromethalin + TX, calcium cyanide + TX, chloralose + TX, chlorophacinone + TX, cholecalciferol + TX, cloquintocet (including cloquintocet-mexyl) + TX, copper naphthenate + TX, copper oxychloride + TX, coumachlor + TX, coumafuryl + TX, coumatetralyl + TX, crimidine + TX, cyprosulfamide + TX, diazinon + TX, dichlormid + TX, dicyclopentadiene + TX, difenacoum + TX, difethialone + TX, diphacinone + TX, ergocalciferol + TX, farnesol + TX, farnesol with nerolidol + TX, fenchlorazole (including fenchlorazole-ethyl) + TX, fenclorim + TX, flocoumafen + TX, fluoroacetamide + TX, flupropadine + TX, flupropadine hydrochloride + TX, fluxofenim + TX, furilazole + TX, gamma-HCH + TX, guazatine + TX, guazatine acetates + TX, HCH + TX, hydrogen cyanide + TX, imanin + TX, iodomethane + TX, isoxadifen (including isoxadifen-ethyl) + TX, lindane + TX, magnesium phosphide + TX, MB-599 + TX, mefenpyr (including mefenpyr-diethyl) + TX, metcamifen + TX, methiocarb + TX, methyl bromide + TX, nerolidol + TX, norbormide + TX, petroleum oils + TX, phosacetim + TX, phosphine + TX, phosphorus + TX, pindone + TX, piperonyl butoxide + TX, piprotal + TX, potassium arsenite + TX, probenazole + TX, propyl isomer + TX, pyridin-4-amine + TX, pyrinuron + TX, Reynoutria sachalinensis extract + TX, ribavirin + TX, S421 + TX, scilliroside + TX, sesamex + TX, sesasmolin + TX, sodium arsenite + TX, sodium cyanide + TX, sodium fluoroacetate + TX, strychnine + TX, sulfoxide + TX, thallium sulfate + TX, thiram + TX, trimethacarb + TX, warfarin + TX, zinc naphthenate + TX, zinc phosphide + TX, ziram + TX.

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) as defined in the present invention are normally used in the form of 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, nematicides, 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) as defined in the present 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) as defined in the present invention, or of at least one preferred individual compound as above-defined, in free form or in agrochemically usable salt form, and at least one of the above-mentioned adjuvants.

The invention therefore provides a composition, preferably a fungicidal composition, comprising at least one compound of formula (I) as defined in the present 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 pesticidally active compounds, for example an additional fungicidal active ingredient in addition to the compound of formula (I) as defined in the present invention.

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) as defined in the present invention or of a preferred individual compound as above-defined as active ingredient to the plants, to parts of the plants or to the locus thereof, to the propagation material 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, which comprises the application of a compound of formula (I) as defined in the present invention, or an agrochemical composition which contains at least one of said compounds, is foliar application. The frequency of application and the rate of application will depend on the risk of infestation by the corresponding pathogen or insect. However, the compounds of formula (I) as defined in the present 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) as defined in any the present invention 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) as defined in the present invention, and, if desired, a solid or liquid adjuvant or monomers for encapsulating the compound of formula (I) as defined in the present invention, 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).

The application methods for the compositions, that is the methods of controlling pathogens of the abovementioned type, such as spraying, atomizing, dusting, brushing on, dressing, scattering or pouring - which are to be selected to suit the intended aims of the prevailing circumstances - and the use of the compositions for controlling pathogens of the abovementioned type are other subjects of the invention. Typical rates of concentration are between 0.1 and 1000 ppm, preferably between 0.1 and 500 ppm, of active ingredient. The rate of application per hectare is preferably 1g to 2000 g of active ingredient per hectare, more preferably 10 to 1000 g/ha, most preferably 10 to 600 g/ha. When used as seed drenching agent, convenient dosages are from 10mg to 1g of active substance per kg of seeds.

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

Suitably, a composition comprising a compound of formula (I) as defined in the present invention 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 (diluents, 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 ondensation 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) as defined in the present invention together with component (B) and (C), and optionally 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.

EXAMPLES

The Examples which follow serve to illustrate the invention. Certain compounds of the invention can be distinguished from known compounds by virtue of greater efficacy at low application rates, which can be verified by the person skilled in the art using the experimental procedures outlined in the Examples.

Formulation Examples

Wettable powders	a)	b)	c)
active ingredient [compound of formula (I)]	25 %	50 %	75 %
sodium lignosulfonate	5 %	5 %	-
sodium lauryl sulfate	3 %	-	5 %
sodium diisobutylnaphthalenesulfonate	-	6 %	10 %
phenol polyethylene glycol ether (7-8 mol of ethylene oxide)	-	2 %	-
highly dispersed silicic acid	5 %	10 %	10 %

Kaolin	62 %	27 %	-

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

Powders for dry seed treatment	a)	b)	c)
active ingredient [compound of formula (I)]	25 %	50 %	75 %
light mineral oil	5 %	5 %	5 %
highly dispersed silicic acid	5 %	5 %	-
Kaolin	65 %	40 %	-
Talcum	-		20%

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

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

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

Dusts	a)	b)	c)
Active ingredient [compound of formula (I)]	5 %	6 %	4 %
talcum	95 %	-	-
Kaolin	-	94 %	-
mineral filler	-	-	96 %

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

Extruder granules	
Active ingredient [compound of formula (I)]	15 %
sodium lignosulfonate	2 %

carboxymethylcellulose	1 %
Kaolin	82 %

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

Coated granules

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

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

Suspension concentrate

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

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

Flowable concentrate for seed treatment

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

The finely ground active ingredient is intimately mixed with the adjuvants, giving a suspension concentrate from which suspensions of any desired dilution can be obtained by dilution with water. Using

such dilutions, living plants as well as plant propagation material can be treated and protected against infestation by microorganisms, by spraying, pouring or immersion.

Slow Release Capsule Suspension

28 parts of a combination of the compound of formula (I) are mixed with 2 parts of an aromatic solvent and 7 parts of toluene diisocyanate/polymethylene-polyphenylisocyanate-mixture (8:1). This mixture is emulsified in a mixture of 1.2 parts of polyvinylalcohol, 0.05 parts of a defoamer and 51.6 parts of water until the desired particle size is achieved. To this emulsion a mixture of 2.8 parts 1,6-diaminohexane in 5.3 parts of water is added. The mixture is agitated until the polymerization reaction is completed. 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.

Analytical Methods:

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

Method A:

Equipment: Shimadzu LCMS 2020 Mass Spectrometer; Column: HALO C_{18} 2.7 µm, 3.0 mm × 30 mm; Mobile Phase: MeCN (with either 0.05% HCOOH or 0.05% TFA) - Water (with either 0.05% HCOOH or 0.05% TFA); Gradient: MeCN from 5% to 95% over 1.4 min, hold 0.6 min, total run time is 2.5 min; Flow rate: 1.8 mL/min; Column temperature: 50 °C; Wavelength: 214 and 254 nm PDA.

Methods B1 and B2:

Agilent 1100 Series LC/MSD system with DAD\ELSD Alltech 2000ES and Agilent LC\MSD VL (G1956B), SL (G1956B) mass-spectrometer.

Agilent 1200 Series LC/MSD system with DAD\ELSD Alltech 3300 and Agilent LC\MSD G6130A, G6120B mass-spectrometer.

Agilent Technologies 1260 Infinity LC/MSD system with DAD\ELSD Alltech 3300 and Agilent LC\MSDG6120B mass-spectrometer.

Agilent Technologies 1260 Infinity II LC/MSD system with DAD\ELSD G7102A 1290 Infinity II and Agilent LC\MSD G6120B mass-spectrometer.

Agilent 1260 Series LC/MSD system with DAD\ELSD and Agilent LC\MSD (G6120B) mass-spectrometer.

UHPLC Agilent 1290 Series LC/MSD system with DAD\ELSD and Agilent LC\MSD (G6125B) mass-spectrometer.

Method B1:

Column: Agilent Poroshell 120 SB-C18 4.6x30mm 2.7 µm

Column Temperature: 60°C

Mobile phase: A – water (0.1% formic acid), B – acetonitrile (0.1% formic acid)

Flow rate: 3 ml/min

Gradient: 0.01 min – 1% B, 1.5 min – 100% B, 1.73 min – 100% B

MS Ionization mode: Electrospray ionization (ESI)

MS Scan range: 83 – 600 m/z

UV detection: 215 nm, 254nm, 280 nm

Method B2:

Column: Agilent Poroshell 120 SB-C18 4.6x30mm 2.7

Temperature: 60°C

Mobile phase: A – water (0.1% formic acid), B – acetonitrile (0.1% formic acid)

Flow rate: 3 ml/min

Gradient: 0.01 min –1% B, 1.5 min – 100% B, 2.2 min –100% B.

MS Ionization mode: Electrospray ionization (ESI)

MS Scan range: 83 – 1000 m/z

UV detection: 215 nm, 254nm, 280 nm

Method C:

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: 110 to 950 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

Method D:

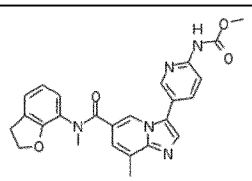
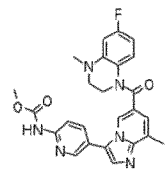
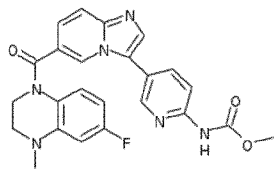
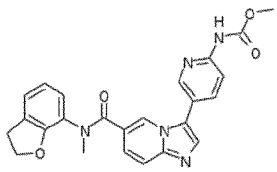
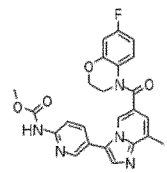
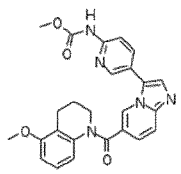
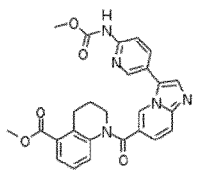
Spectra were recorded on a ACQUITY Mass Spectrometer from Waters Corporations (SQD or SQDII Single quadrupole mass spectrometer) equipped with an electrospray source (Polarity: positive or negative ions, Capillary: 3.0 kV, Cone: 30V, Extractor: 3.00 V, Source Temperature: 150°C, Desolvation Temperature: 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,

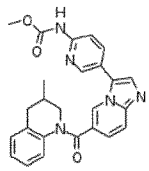
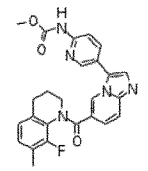
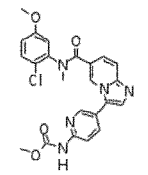
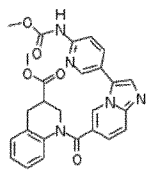
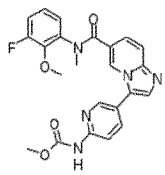
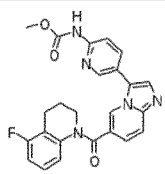
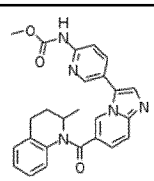
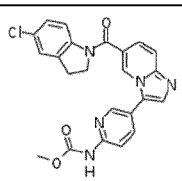
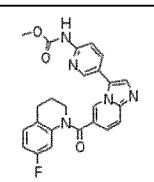
Temp: 60 °C, DAD Wavelength range (nm): 210 to 400, Solvent Gradient: A = Water/Methanol 9:1 + 0.1% formic acid, B= Acetonitrile + 0.1% formic acid, gradient: 0-100% B in 2.5 min; Flow (mL/min) 0.75.

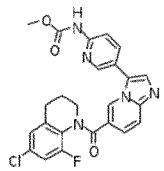
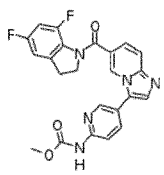
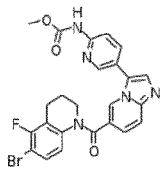
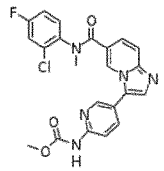
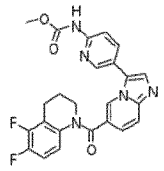
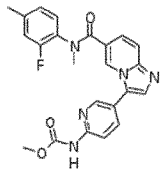
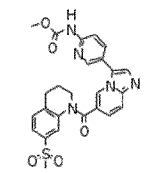
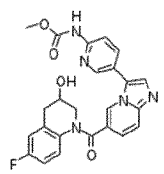
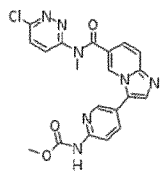
The below Table A gathers for compounds of formula (I):

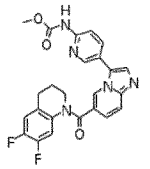
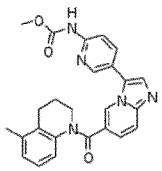
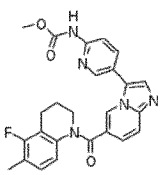
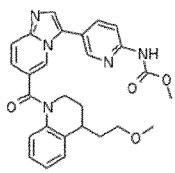
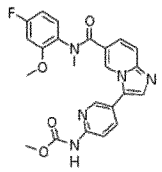
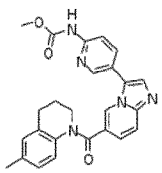
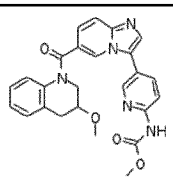
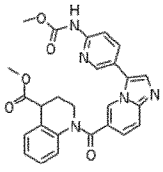
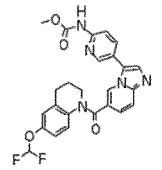
- LC/MS data, such as retention time (RT), $[M+H]^+$,
- the type of method, and/or
- melting point (mp).

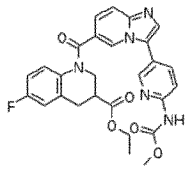
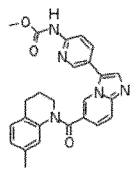
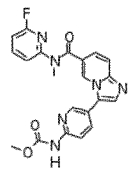
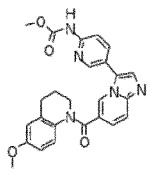
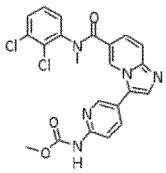
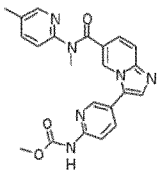
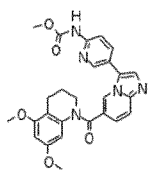
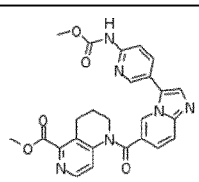
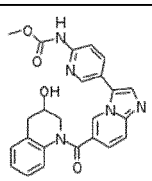
Table A:

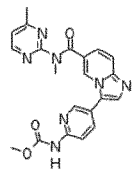
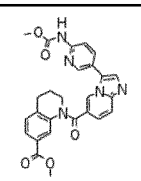
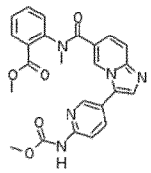
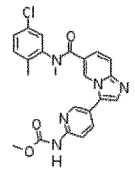
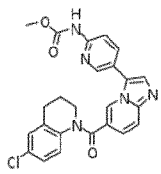
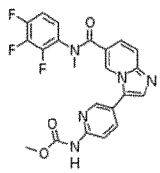
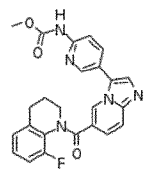
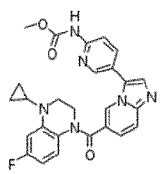
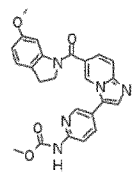
	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
1	methyl *N*-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.96	458	A	194 - 197
2	methyl *N*-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.05	461	A	173 - 176
3	methyl *N*-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.05	461	A	217 - 219
4	methyl *N*-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.47	444	A	180 - 182
5	methyl *N*-[5-[6-(7-fluoro-2,3-dihydro-1,4-benzoxazine-4-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.03	462	A	213 - 216
6	methyl *N*-[5-[6-(5-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.87	458	B2	
7	methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2*H*-quinoline-5-carboxylate		0.85	486	B2	

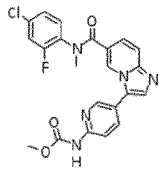
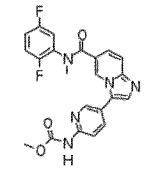
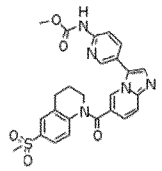
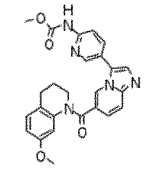
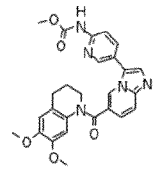
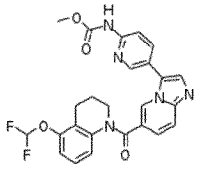
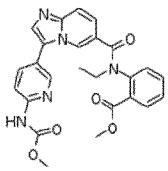
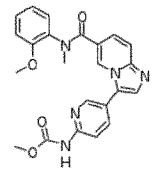
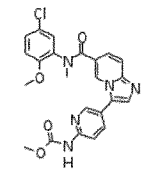
	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
8	methyl *N*-[5-[6-(3-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.89	442	B2	
9	methyl *N*-[5-[6-(8-fluoro-7-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.18	460	B1	
10	methyl *N*-[5-[6-[(2-chloro-5-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.13	466	B1	
11	methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2*H*-quinoline-3-carboxylate		1.03	486	B1	
12	methyl *N*-[5-[6-[(3-fluoro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.07	450	B1	
13	methyl *N*-[5-[6-(5-fluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.14	446	B1	
14	methyl *N*-[5-[6-(2-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.13	442	B1	
15	methyl *N*-[5-[6-(5-chloroindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.12	448	B1	
16	methyl *N*-[5-[6-(7-fluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.96	446	B1	

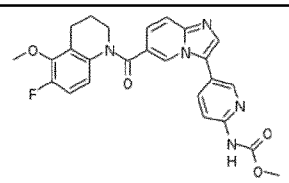
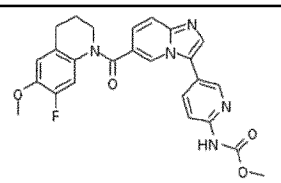
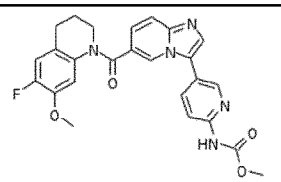
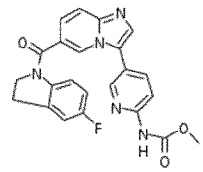
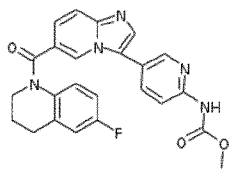
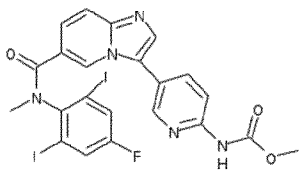
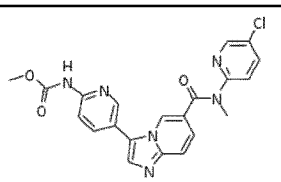
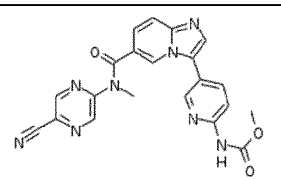
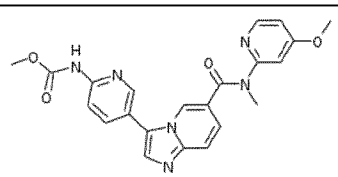
	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
17	methyl *N*-[5-[6-(6-chloro-8-fluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.09	480	B1	
18	methyl *N*-[5-[6-(5,7-difluoroindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.04	450	B1	
19	methyl *N*-[5-[6-(6-bromo-5-fluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.12	526	B1	
20	methyl *N*-[5-[6-[(2-chloro-4-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.84	454	B1	
21	methyl *N*-[5-[6-(5,6-difluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.14	464	B1	
22	methyl *N*-[5-[6-[(2-fluoro-4-methyl-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.04	434	B1	
23	methyl *N*-[5-[6-(7-methylsulfonyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.75	506	B1	
24	methyl *N*-[5-[6-(6-fluoro-3-hydroxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.98	462	B1	
25	methyl *N*-[5-[6-[(6-chloropyridazin-3-yl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.91	438	B1	

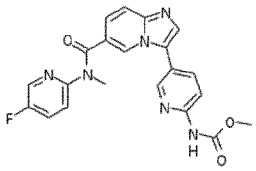
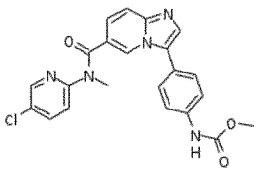
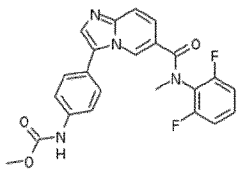
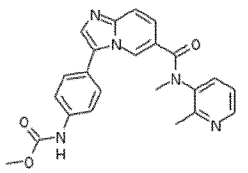
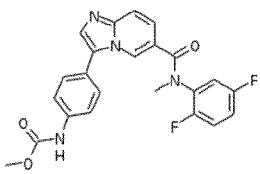
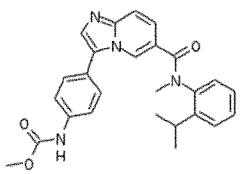
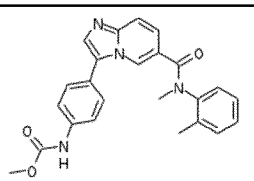
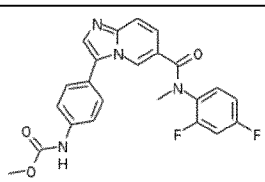
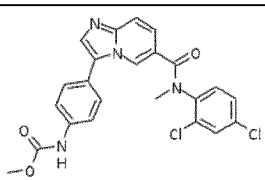
	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
26	methyl *N*-[5-[6-(6,7-difluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.13	464	B1	
27	methyl *N*-[5-[6-(5-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.16	442	B1	
28	methyl *N*-[5-[6-(5-fluoro-6-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.19	460	B1	
29	methyl *N*-[5-[6-[4-(2-methoxyethyl)-3,4-dihydro-2*H*-quinoline-1-carbonyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.13	486	B1	
30	methyl *N*-[5-[6-[(4-fluoro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.06	450	B1	
31	methyl *N*-[5-[6-(6-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.13	442	B1	
32	methyl *N*-[5-[6-(3-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.02	458	B1	
33	methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2*H*-quinoline-4-carboxylate		1.05	486	B1	
34	methyl *N*-[5-[6-[6-(difluoromethoxy)-3,4-dihydro-2*H*-quinoline-1-carbonyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.16	494	B1	

	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
35	ethyl 6-fluoro-1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2*H*-quinoline-3-carboxylate		1.16	518	B1	
36	methyl *N*-[5-[6-(7-methyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.13	442	B1	
37	methyl *N*-[5-[6-[(6-fluoro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.05	421	B1	
38	methyl *N*-[5-[6-(6-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.12	458	B1	
39	methyl *N*-[5-[6-[(2,3-dichlorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.93	470	B1	
40	methyl *N*-[5-[6-[methyl-(5-methyl-2-pyridyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.82	417	B2	
41	methyl *N*-[5-[6-(5,7-dimethoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.08	488	B1	
42	methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2*H*-1,6-naphthyridine-5-carboxylate		0.59	487	B1	
43	methyl *N*-[5-[6-(3-hydroxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.92	444	B1	

	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
44	methyl *N*-[5-[6-[methyl-(4-methylpyrimidin-2-yl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.95	418	B1	
45	methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2*H*-quinoline-7-carboxylate		1.09	486	B1	
46	methyl 2-[[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-methyl-amino]benzoate		0.79	460	B1	
47	methyl *N*-[5-[6-[(5-chloro-2-methyl-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.79	450	B1	
48	methyl *N*-[5-[6-(6-chloro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.84	462	B1	
49	methyl *N*-[5-[6-[methyl-(2,3,4-trifluorophenyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.76	456	B1	
50	methyl *N*-[5-[6-(8-fluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.77	446	B1	
51	methyl *N*-[5-[6-(4-cyclopropyl-6-fluoro-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.87	487	B1	
52	methyl *N*-[5-[6-(6-methoxyindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.75	444	B1	

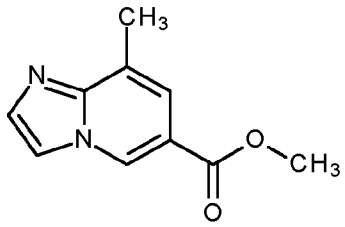
	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
53	methyl *N*-[5-[6-[(4-chloro-2-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.79	454	B1	
54	methyl *N*-[5-[6-[(2,5-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.72	438	B1	
55	methyl *N*-[5-[6-(6-methylsulfonyl-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.02	506	B1	
56	methyl *N*-[5-[6-(7-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.77	458	B1	
57	methyl *N*-[5-[6-(6,7-dimethoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.02	488	B1	
58	methyl *N*-[5-[6-[5-(difluoromethoxy)-3,4-dihydro-2*H*-quinoline-1-carbonyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.84	494	B1	
59	methyl 2-[ethyl-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]amino]benzoate		0.75	474	B1	
60	methyl *N*-[5-[6-[(2-methoxyphenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.99	432	B1	
61	methyl *N*-[5-[6-[(5-chloro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		1.09	466	B1	

	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
62	methyl *N*-[5-[6-(6-fluoro-5-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.74	476	C	
63	methyl *N*-[5-[6-(7-fluoro-6-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.71	476	C	
64	methyl *N*-[5-[6-(6-fluoro-7-methoxy-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.72	476	C	
65	methyl *N*-[5-[6-(5-fluoroindoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.72	476	C	210 - 212
66	methyl *N*-[5-[6-(6-fluoro-3,4-dihydro-2*H*-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.72	467	C	179 - 183
67	methyl *N*-[5-[6-[(4-fluoro-2,6-diiodo-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.94	672	C	
68	methyl *N*-[5-[6-[(5-chloro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.90	437	D	
69	methyl *N*-[5-[6-[(5-cyanopyrazin-2-yl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.70	429	C	
70	methyl *N*-[5-[6-[(4-methoxy-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.71	432	D	

	Compound name	Structure	RT (min)	[M+H] (measured)	Method	MP (°C)
71	methyl *N*-[5-[6-[(5-fluoro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate		0.73	420	D	
72	methyl *N*-[4-[6-[(5-chloro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		0.71	436	C	
73	methyl *N*-[4-[6-[(2,6-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		1.03	438	D	
74	methyl *N*-[4-[6-[methyl-(2-methyl-3-pyridyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		0.73	416	D	
75	methyl *N*-[4-[6-[(2,5-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		1.00	438	D	
76	methyl *N*-[4-[6-[(2-isopropylphenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		1.17	444	D	
77	methyl *N*-[4-[6-[methyl(o-tolyl)carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		1.00	416	D	
78	methyl *N*-[4-[6-[(2,4-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		1.00	438	D	
79	methyl *N*-[4-[6-[(2,4-dichlorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate		1.16	469	D	

Example 1: This example illustrates the preparation of methyl N-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 1)

Step 1: Preparation of methyl 8-methylimidazo[1,2-a]pyridine-6-carboxylate

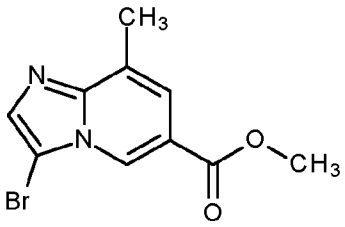


A mixture of methyl 8-bromoimidazo[1,2-a]pyridine-6-carboxylate (CAS 1234616-08-0; 1.00 g, 3.80 mmol, 1.00 eq.), methylboronic acid (0.460 g, 7.50 mmol, 2.00 eq.) and potassium carbonate (1.00 g, 7.50 mmol, 2.00 eq.) in 2-methyl tetrahydrofuran (28 mL) was flushed with argon for 5 min. XPhos Pd G4 (CAS 1599466-81-5; 0.17 g, 0.19 mmol, 0.05 eq.) was then added and the reaction mixture was heated at 80 °C and stirred for an additional 16 hours. The reaction mixture was cooled down to room temperature and then water was added. The aqueous layer was extracted with ethyl acetate and the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (cyclohexane/ethyl acetate) to afford methyl 8-methylimidazo[1,2-a]pyridine-6-carboxylate as a light brown solid.

LC/MS (Method C) retention time = 0.14 min; $[M+H]^+$ = 190

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.81 (s, 1H), 7.70 (d, *J* = 1.2 Hz, 1H), 7.66 (d, J = 1.2 Hz, 1H), 7.54 (s, 1H), 3.95 (s, 3H), 2.65 (s, 3H).

Step 2: Preparation of methyl 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylate

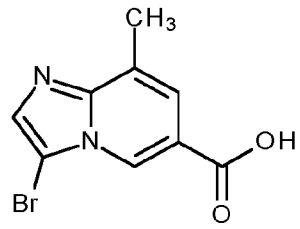


To a stirred solution of methyl 8-methylimidazo[1,2-a]pyridine-6-carboxylate (3.00 g, 16.0 mmol, 1.00 eq.) in acetonitrile (79 mL) at room temperature was added N-bromosuccinimide (3.20 g, 17.0 mmol, 1.10 eq.) and the mixture was stirred for an additional 2 hours. The reaction mixture was quenched with a saturated aqueous solution of sodium bisulfite and the precipitate was collected by filtration. The filter cake was washed with water and dried in vacuo at 40 °C overnight. The crude residue was purified over a silica gel (cyclohexane/ethyl acetate) to afford methyl 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylate as a light yellow solid.

LC/MS (Method C) retention time = 0.79; $[M+H]^+$ = 269/271

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.78 (br s, 1H), 7.68 (s, 1H), 7.60 – 7.64 (m, 1H), 3.99 (s, 3H), 2.60 (s, 3H).

Step 3: Preparation of 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid (compound X1)



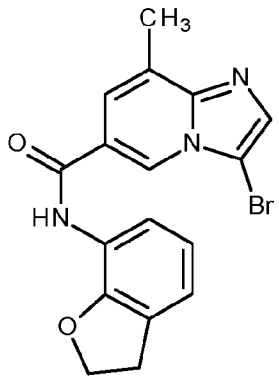
(Compound X1)

To a stirred mixture of methyl 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylate (7.00 g, 26.0 mmol, 1.00 eq.) in tetrahydrofuran/water (1/1; 120 mL) was added lithium hydroxide (1.25 g, 52.0 mmol, 2.00 eq.). The resulting mixture was stirred at room temperature for 1 hour. The reaction was diluted with water and extracted with diethyl ether. Then the aqueous layer was acidified to pH = 2 with 2M HCl aqueous solution and the precipitate was collected by filtration, washed with water and concentrated under reduced pressure to afford 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid as a brown solid.

LC/MS (Method C) retention time = 0.44; $[M+H]^+$ = 255/257

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 13.46 (br s, 1H), 8.64 (br s, 1H), 7.82 (s, 1H), 7.58 (s, 1H), 2.54 (s, 3H).

Step 4: Preparation of 3-bromo-N-(2,3-dihydrobenzofuran-7-yl)-8-methyl-imidazo[1,2-a]pyridine-6-carboxamide

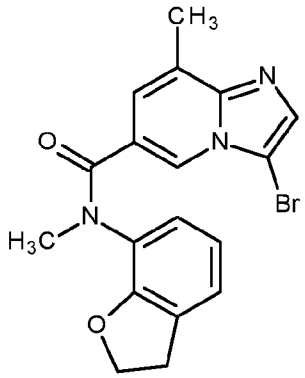


To an ice-cooled solution of 2,3-dihydrobenzofuran-7-amine (0.400 g, 2.96 mmol, 1.00 eq.) and 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid (compound X1) (0.830 g, 3.26 mmol, 1.10 eq.) in pyridine (10.0 mL) was added dropwise phosphoryl trichloride (1.36 g, 8.88 mmol, 3.00 eq.). The solution was stirred at room temperature for 2 hours. The aqueous solution was adjusted to pH~7 with a saturated solution of sodium bicarbonate The reaction mixture was cooled down to room temperature and then water was added. The aqueous layer was extracted with ethyl acetate and the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (petroleum ether/ethyl acetate) to afford 3-bromo-N-(2,3-dihydrobenzofuran-7-yl)-8-methyl-imidazo[1,2-a]pyridine-6-carboxamide as a yellow solid.

LC/MS (Method B) retention time = 1.16; $[M+H]^+$ = 372/374

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 10.16 (s, 1H), 8.85 (s, 1H), 7.81 (s, 1H), 7.67 (s, 1H), 7.31 (d, *J* = 7.8 Hz, 1H), 7.12 (d, *J* = 7.2 Hz, 1H), 6.85 (t, *J* = 7.6 Hz, 1H), 4.58 (t, *J* = 8.6 Hz, 2H), 3.25 (t, *J* = 8.6 Hz, 2H), 2.56 (s, 3H).

Step 5: Preparation of 3-bromo-N-(2,3-dihydrobenzofuran-7-yl)-N,8-dimethyl-imidazo[1,2-a]pyridine-6-carboxamide

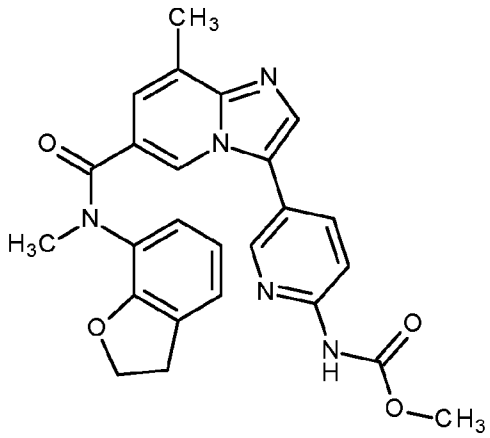


To an ice-cooled mixture of 3-bromo-8-methyl-N-(2,3,4,5-tetrahydrobenzofuran-7-yl)imidazo[1,2-a]pyridine-6-carboxamide (0.260 g, 0.695 mmol, 1.00 eq.) dissolved in dimethyl formamide (3.0 mL) and purged with a stream of argon, was added portion wise sodium hydride (60 mass% in oil; 0.025 g, 1.0 mmol, 1.50 eq.) and the resulting mixture was stirred at 0 °C for 20 minutes. Iodomethane (0.197 g, 1.39 mmol, 2.00 eq.) was then added dropwise and the mixture was stirred warmed to room temperature and stirred for an additional 2 hours. The mixture was then diluted with ethyl acetate and treated with ice cold water. The aqueous phase was extracted with ethyl acetate, the combined organic layers were washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over silica gel cartridge (dichloromethane / methanol) to afford 3-bromo-N-(2,3-dihydrobenzofuran-7-yl)-N,8-dimethyl-imidazo[1,2-a]pyridine-6-carboxamide as a yellow solid.

LC/MS (Method B) retention time = 1.15; $[M+H]^+$ = 386/388

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 7.93 (s, 1H), 7.67 (s, 1H), 7.31 – 7.05 (m, 2H), 6.98 (d, *J* = 7.6 Hz, 1H), 6.72 (t, *J* = 7.6 Hz, 1H), 4.56 (br s, 2H), 3.27 (s, 3H), 3.17 (br m, 2H), 2.41 (s, 3H).

Step 6: Preparation of methyl N-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate



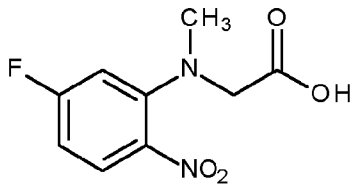
To a mixture of 3-bromo-N-(2,3-dihydrobenzofuran-7-yl)-N,8-dimethyl-imidazo[1,2-a]pyridine-6-carboxamide (0.210 g, 0.544 mmol, 1.00 eq.) and methyl N-[5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-pyridyl]carbamate (0.227 g, 0.816 mmol, 1.50 eq.) were added dioxane/water (4/1; 3.0 mL), potassium carbonate (0.188 g, 1.36 mmol, 2.50 eq.) and the mixture was purged with a stream of argon for 5 minutes. Then [1,1′-bis-(diphenylphosphino)-ferrocen]-dichloro-palladium(II) (0.040 g, 0.054 mmol, 0.10 eq.) was added and the mixture was heated under microwave irradiation at 100 °C for 30 minutes. The mixture was the cooled down and diluted with dichloromethane and water. The aqueous phase was extracted with dichloromethane, the combined organic layers were washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over silica gel cartridge (dichloromethane / methanol) to afford methyl N-[5-[6-[2,3-dihydrobenzofuran-7-yl(methyl)carbamoyl]-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as an off-white solid.

LC/MS (Method B) retention time = 0.924; $[M+H]^+$ = 458

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 10.48 (s, 1H), 8.23 – 8.15 (m, 1H), 7.98 (d, *J* = 8.6 Hz, 1H), 7.90 (s, 1H), 7.70 (s, 1H), 7.60 (d, *J* = 7.4 Hz, 1H), 7.20 (s, 1H), 7.07 (d, *J* = 6.8 Hz, 1H), 6.89 (d, *J* = 7.6 Hz, 1H), 6.69 (t, *J* = 7.6 Hz, 1H), 4.55 (br s, 1H), 4.29 (br s, 1H), 3.74 (s, 3H), 3.24 (s, 3H), 3.11 (br s, 2H), 2.47 (s, 3H).

Example 2: This example illustrates the preparation of methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 2)

Step 1: Preparation of 2-(5-fluoro-N-methyl-2-nitro-anilino)acetic acid

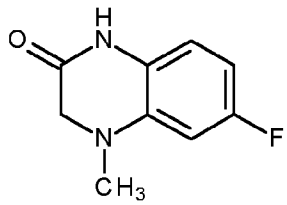


To a solution of 2,4-difluoro-1-nitro-benzene (CAS 446-35-5) (5.00 g, 31.4 mmol, 1.00 eq.) in a mixture of ethanol/water (7:3, 130 mL) was added 2-(methylamino)acetic acid (2.80 g, 31.4 mmol, 1.00 eq.) and sodium bicarbonate (6.60 g, 78.6 mmol, 2.50 eq.). The mixture was then heated to 80°C and stirred for an additional 2 hours. Then the organic solvent was removed under reduced pressure and the aqueous

solution was adjusted to pH~4 with 2N HCl. The resulting mixture was diluted with water and extracted with dichloromethane, the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure to afford 2-(5-fluoro-N-methyl-2-nitro-anilino)acetic acid.

LC/MS (Method B) retention time = 1.00; $[M+H]^+$ = 229

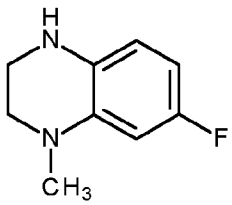
Step 2: Preparation of 6-fluoro-4-methyl-1,3-dihydroquinoxalin-2-one



To a solution of 2-(5-fluoro-N-methyl-2-nitro-anilino)acetic acid (4.00 g, 17.5 mmol, 1.00 eq.) and potassium carbonate (18.9 g, 137 mmol, 7.80 eq.) in water (45 mL) was added dropwise a solution of sodium hydrosulfite (19.2 g, 110 mmol, 6.30 eq.) in water (55 mL). The reaction mixture was stirred at room temperature for an additional hour after which the aqueous solution was adjusted to pH~4 with 6N HCl. The resulting mixture was diluted with water and extracted with ethyl acetate. The combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (petroleum ether/ethyl acetate) to afford 6-fluoro-4-methyl-1,3-dihydroquinoxalin-2-one as a yellow solid.

LC/MS (Method B) retention time = 0.94; $[M+H]^+$ = 181

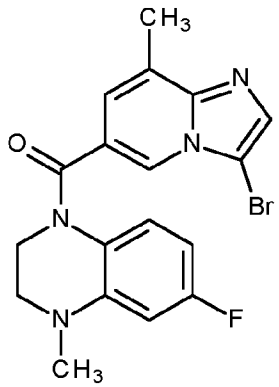
Step 3: Preparation of 6-fluoro-4-methyl-2,3-dihydro-1H-quinoxaline



To an ice-cooled solution of lithium aluminium hydride (1.01 g, 26.6 mmol, 4.00 eq.) in tetrahydrofuran (30.0 mL) was added dropwise a solution of 6-fluoro-4-methyl-1,3-dihydroquinoxalin-2-one (1.20 g, 6.66 mmol, 1.00 eq.) in tetrahydrofuran (20.0 mL) after which the reaction mixture was warmed to room temperature and stirred for an additional 6 hours. The resulting mixture was quenched with water, 15% aqueous sodium hydroxide and water. The mixture was filtered off and the filtrated concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (petroleum ether/ethyl acetate) to afford 6-fluoro-4-methyl-2,3-dihydro-1H-quinoxaline as a yellow oil. This compound is also commercially available (CAS 1354953-50-6).

LC/MS (Method B) retention time = 0.68; $[M+H]^+$ = 167

Step 4: Preparation of (3-bromo-8-methyl-imidazo[1,2-a]pyridin-6-yl)-(6-fluoro-4-methyl-2,3-dihydroquinoxalin-1-yl)methanone

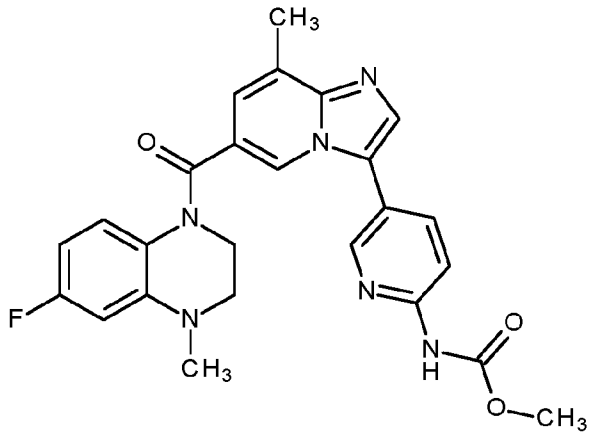


To an ice-cooled solution of 6-fluoro-4-methyl-2,3-dihydro-1H-quinoxaline (0.200 g, 1.20 mmol, 1.00 eq.) and 3-bromo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid (Compound X1) (0.338 g, 1.32 mmol, 1.10 eq.) in pyridine (5.0 mL) was added dropwise phosphoryl trichloride (0.554 g, 3.61 mmol, 3.00 eq.) and the reaction mixture was stirred at room temperature for an additional 3 hours. The mixture was then adjusted to pH~7 with a saturated solution of sodium bicarbonate, further diluted with water and extracted with ethyl acetate. The combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (petroleum ether/ethyl acetate) to afford (3-bromo-8-methyl-imidazo[1,2-a]pyridin-6-yl)-(6-fluoro-4-methyl-2,3-dihydroquinoxalin-1-yl)methanone as a yellow solid.

LC/MS (Method B) retention time = 1.26; $[M+H]^+$ = 403/405

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 8.24 (s, 1H), 7.76 (s, 1H), 7.09 (s, 1H), 6.92 (s, 1H), 6.57 (dd, *J* = 12.0, 2.8 Hz, 1H), 6.19 (t, *J* = 8.2 Hz, 1H), 3.88 (t, *J* = 5.2 Hz, 2H), 3.44 (t, *J* = 5.0 Hz, 2H), 2.96 (s, 3H), 2.45 (s, 3H).

Step 5: Preparation of methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate



To a mixture of (3-bromo-8-methyl-imidazo[1,2-a]pyridin-6-yl)-(6-fluoro-4-methyl-2,3-dihydroquinoxalin-1-yl)methanone (0.140 g, 0.347 mmol, 1.00 eq.), methyl N-[5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-pyridyl]carbamate (0.145 g, 0.521 mmol, 1.50 eq.) in 1,4-dioxane/water (4:1, 2.5 mL) was added potassium carbonate (0.120 g, 0.868 mmol, 2.50 eq.). The mixture was purged with a stream of argon

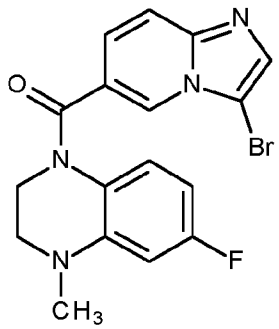
for 2 minutes and then [1,1'-bis(diphenylphosphino)ferrocene]dichloropalladium(II) (0.0254 g, 0.0347 mmol, 0.100 eq.) was added to the reaction mixture under N_2 atmosphere. The resulting reaction mixture was heated at 65 °C for 1 hour. After cooling down to room temperature, the reaction mixture was filtered through a celite pad whish was further extracted with ethyl acetate. The filtrate was washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified by trituration with acetonitrile to afford methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as a yellow solid.

LC/MS (Method B) retention time = 1.10; $[M+H]^+$ = 475

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 10.45 (s, 1H), 8.43 (d, *J* = 1.6 Hz, 1H), 8.28 (s, 1H), 7.96 (d, *J* = 8.6 Hz, 1H), 7.81 (s, 1H), 7.73 (s, 1H), 7.11 (s, 1H), 6.88 (s, 1H), 6.57 (dd, *J* = 12.0, 2.6 Hz, 1H), 6.21 (t, *J* = 7.2 Hz, 1H), 3.88 (t, *J* = 4.9 Hz, 2H), 3.72 (s, 3H), 3.43 (t, *J* = 4.9 Hz, 2H), 2.94 (s, 3H), 2.49 (s, 3H)

Example 3: This example illustrates the preparation of methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 3)

Step 1: Preparation of (3-bromoimidazo[1,2-a]pyridin-6-yl)-(6-fluoro-4-methyl-2,3-dihydroquinoxalin-1-yl)methanone

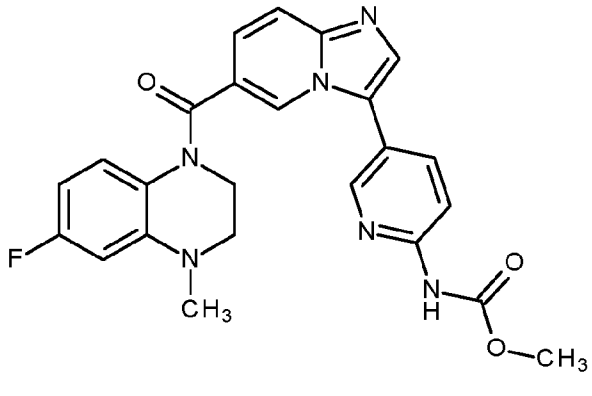


To an ice-cooled solution of 6-fluoro-4-methyl-2,3-dihydro-1H-quinoxaline (0.400 g, 2.41 mmol, 1.00 eq.) and 3-bromoimidazo[1,2-a]pyridine-6-carboxylic acid (CAS 886362-00-1) (0.638 g, 2.65 mmol, 1.10 eq.) in pyridine (10.0 mL) was added dropwise phosphoryl trichloride (1.11 g, 7.22 mmol, 3.00 eq.). The reaction mixture was stirred at room temperature for 3 hours. The mixture was then adjusted to pH~7 with a saturated solution of sodium bicarbonate, further diluted with water and extracted with ethyl acetate. The combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (petroleum ether/ethyl acetate) to afford (3-bromoimidazo[1,2-a]pyridin-6-yl)-(6-fluoro-4-methyl-2,3-dihydroquinoxalin-1-yl)methanone as a yellow solid.

LC/MS (Method B) retention time = 1.22; $[M+H]^+$ = 389/391

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 8.44 (s, 1H), 7.80 (s, 1H), 7.57 (d, *J* = 9.2 Hz, 1H), 7.14 (d, *J* = 8.0 Hz, 1H), 6.84 (s, 1H), 6.57 (dd, *J* = 12.0, 2.6 Hz, 1H), 6.16 (s, 1H), 3.90 (t, *J* = 5.0 Hz, 2H), 3.47 (t, *J* = 5.0 Hz, 2H), 2.96 (s, 3H).

Step 2: Preparation of methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 3)



(Compound 3)

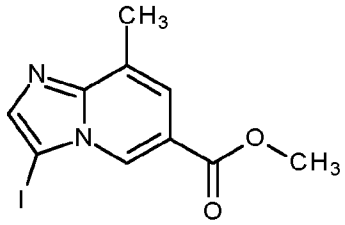
To a mixture of (3-bromoimidazo[1,2-a]pyridin-6-yl)-(6-fluoro-4-methyl-2,3-dihydroquinoxalin-1-yl)methanone (0.280 g, 0.719 mmol, 1.00 eq.) and methyl N-[5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-pyridyl]carbamate (0.300 g, 1.08 mmol, 1.50 eq.) in 1,4-dioxane/water (4:1, 3.00 mL) was added potassium carbonate (0.249 g, 1.80 mmol, 2.50 eq.). The mixture was purged with a stream of argon for 2 minutes, [1,1′-bis-(diphenylphosphino)-ferrocen]-dichloro-palladium(II) (0.053 g, 0.072 mmol, 0.10 eq.) was added and the resulting reaction mixture was heated at 65 °C for 1 hour. After cooling down to room temperature, the reaction mixture was filtered through a celite pad whish was further extracted with ethyl acetate. The filtrate was washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified by trituration with acetonitrile to afford methyl N-[5-[6-(6-fluoro-4-methyl-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as a yellow solid.

LC/MS (Method B) retention time = 1.03; $[M+H]^+$ = 461

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 10.46 (s, 1H), 8.55 – 8.41 (m, 2H), 7.98 (d, *J* = 8.6 Hz, 1H), 7.86 (s, 1H), 7.85 (d, *J* = 5.0 Hz, 1H), 7.60 (d, *J* = 9.2 Hz, 1H), 7.17 (d, *J* = 8.8 Hz, 1H), 6.84 (s, 1H), 6.57 (dd, *J* = 12.0, 2.6 Hz, 1H), 6.19 (t, *J* = 7.4 Hz, 1H), 3.89 (t, *J* = 5.0 Hz, 2H), 3.72 (s, 3H), 3.46 (t, *J* = 4.8 Hz, 2H), 2.95 (s, 3H).

Example 4: This example illustrates the preparation of methyl N-[5-[6-(7-fluoro-2,3-dihydro-1,4-benzoxazine-4-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 5)

Step 1: Preparation of methyl 3-iodo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylate



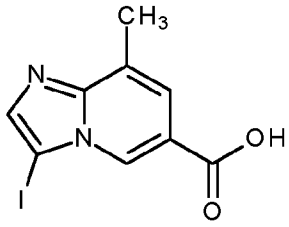
To a solution of methyl 8-methylimidazo[1,2-a]pyridine-6-carboxylate (3.00 g, 16.0 mmol, 1.00 eq.) in acetonitrile (79 mL, 5.00 mL/mmol) was added N-iodosuccinimide (3.20 g, 17.0 mmol, 1.10 eq.) at room

temperature and the mixture was stirred for 2 hours. The reaction mixture was then quenched with a saturated aqueous solution of sodium thiosulfate and the precipitate was collected by filtration. The filter cake was washed with water and dried in vacuo at 40 °C overnight. The crude residue was purified over a silica gel cartridge (cyclohexane/ethyl acetate) to afford methyl 3-iodo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylate as a light yellow solid.

LC/MS (Method B) retention time = 1.13; $[M+H]^+$ = 317

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 8.62 (dd, *J* = 1.6, 0.6 Hz, 1H), 7.81 (s, 1H), 7.51 - 7.54 (m, 1H), 3.91 (s, 3H), 2.53 (s, 3H).

Step 2: Preparation of 3-iodo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid (compound X2)



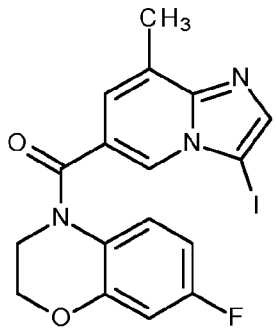
(compound X2)

To a stirred mixture of methyl 3-iodo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylate (7.00 g, 26.0 mmol, 1.00 eq.) in a mixture tetrahydrofuran/water (1:1, 120.0 mL) was added lithium hydroxide (1.25 g, 52.0 mmol, 2.00 eq.). The resulting mixture was stirred at room temperature for 1 hour. The reaction was diluted with water and extracted with diethyl ether. Then the aqueous layer was acidified to pH 2 with a 2M HCl aqueous solution and the precipitate was collected by filtration, washed with water and concentrated under reduced pressure to afford 3-iodo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid as a brown solid.

LC/MS (Method B) retention time = 0.75; $[M+H]^+$ = 303

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 8.52 (s, 1H), 7.64 (s, 1H), 7.58 - 7.62 (m, 1H), 2.47 (s, 3H).

Step 3: Preparation of (7-fluoro-2,3-dihydro-1,4-benzoxazin-4-yl)-(3-iodo-8-methyl-imidazo[1,2-a]pyridin-6-yl)methanone

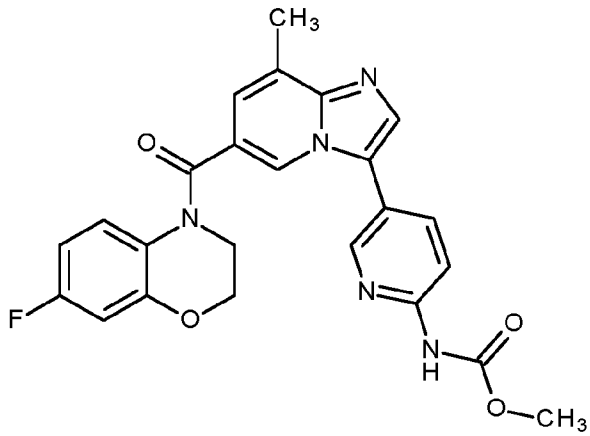


To a mixture of 3-iodo-8-methyl-imidazo[1,2-a]pyridine-6-carboxylic acid (compound X2) (0.500 g, 1.66 mmol, 1.00 eq.) in dimethyl formamide (8.00 mL) was added 1-methylimidazole (0.340 g, 4.14 mmol, 2.50 eq.) and [chloro(dimethylamino)methylene]-dimethyl-ammonium hexafluorophosphate (0.697 g, 2.48 mmol, 1.50 eq.).The solution was stirred at room temperature for 15 minutes and then 7-fluoro-3,4-

dihydro-2H-1,4-benzoxazine (0.279 g, 1.82 mmol,1.10 eq.) was added and the resulting mixture was stirred at room temperature for an additional 3 hours. The reaction mixture was then cooled to room temperature and then water was added. The aqueous layer was extracted with ethyl acetate and the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (ethyl acetate/ petroleum ether) to afford (7-fluoro-2,3-dihydro-1,4-benzoxazin-4-yl)-(3-iodo-8-methyl-imidazo[1,2-a]pyridin-6-yl)methanone as a brown solid.

LC/MS (Method B) retention time = 1.10; [M+H]- = 438

Step 4: Preparation of methyl N-[5-[6-(7-fluoro-2,3-dihydro-1,4-benzoxazine-4-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 5)



(Compound 5)

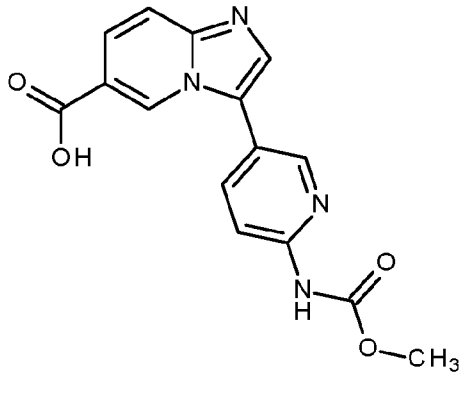
To a solution of (7-fluoro-2,3-dihydro-1,4-benzoxazin-4-yl)-(3-iodo-8-methyl-imidazo[1,2-a]pyridin-6-yl)methanone (200 mg, 0.457 mmol, 1.00 eq.), (methyl N-[5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-pyridyl]carbamate (191 mg, 0.686 mmol, 1.50 eq.) in 1,4-dioxane/water (4/1, 5.00 mL) was added potassium carbonate (158 mg, 1.14 mmol, 2.50 eq.). The mixture was purged with a stream of argon for 2 minutes after which [1,1′-bis-(diphenylphosphino)-ferrocen]-dichloro-palladium(II) (33.5 mg, 0.0457 mmol, 0.10 eq.) was added and the resulting mixture was heated at 65 °C for 1 hour. After cooling to room temperature, the reaction mixture was filtered through a celite pad and washed with ethyl acetate. The filtrate was washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified by trituration with acetonitrile to afford methyl N-[5-[6-(7-fluoro-2,3-dihydro-1,4-benzoxazine-4-carbonyl)-8-methyl-imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as an off white solid.

LC/MS (Method B) retention time = 1.03; $[M+H]^+$ = 462

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 10.44 (s, 1H), 8.60 – 8.44 (m, 2H), 8.04 – 7.87 (m, 2H), 7.84 (s, 1H), 7.47 (s, 1H), 7.25 (s, 1H), 6.83 (dd, *J* = 10.0, 3.0 Hz, 1H), 6.68 (td, *J* = 8.7, 2.9 Hz, 1H), 4.39- 4.25 (m, 2H), 4.03 – 3.85 (m, 2H), 3.71 (s, 3H), 2.54 (s, 3H).

Example 5: This example illustrates the preparation of methyl N-[5-[6-[(2-chloro-4-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 20)

Step 1: Preparation of 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3)



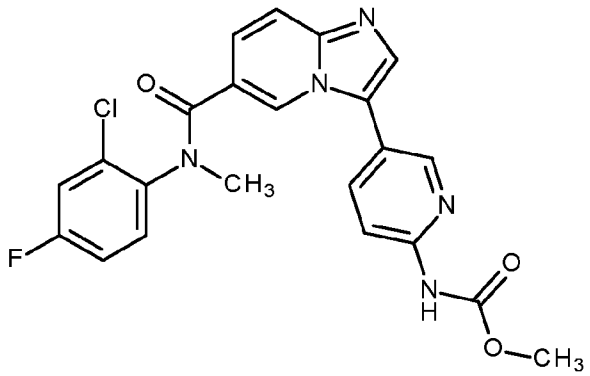
(Compound X3)

To a stirred solution of 3-bromoimidazo[1,2-a]pyridine-6-carboxylic acid (CAS 886362-00-1) (0.100 g, 0.415 mmol, 1.00 eq.), methyl N-[5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-pyridyl]carbamate (0.173 g, 0.622 mmol, 1.50 eq.) in 1,4-dioxane/water (4/1, 2.00 mL) was added sodium carbonate (0.132 g, 1.24 mmol, 3.00 eq.). The mixture was purged with a stream of argon for 2 minutes and then tetrakistriphenylphosphine palladium(0) (0.024 g, 0.021 mmol, 0.050 eq.) was added and the resulting reaction mixture was heated at 90 °C for 4 hours. The reaction mixture was then cooled to room temperature and concentrated under reduced pressure. The residue was diluted with water, the aqueous layer was acidified to pH 2 with a 2M aqueous solution of HCl and the resulting precipitate was collected by filtration, washed with water and dried under reduced pressure to afford 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid as an off white solid.

LC/MS (Method B) retention time = 0.82; $[M+H]^+$ = 313

^{1}H NMR (400 MHz, CD_3OD) δ ppm 9.13 - 9.17 (m, 1 H) 8.68 - 8.73 (m, 1 H) 8.50 - 8.57 (m, 1 H) 8.33 - 8.44 (m, 3 H) 8.11 - 8.17 (m, 1 H) 7.98 - 8.05 (m, 1 H) 3.85 (s, 3 H).

Step 2: Preparation of methyl N-[5-[6-[(2-chloro-4-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 20)



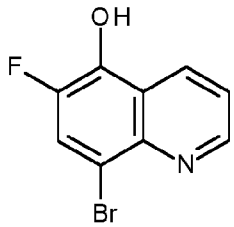
(Compound 20)

To a mixture of 2-chloro-4-fluoro-N-methyl-aniline (18 mg, 0.113 mmol, 2.00 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol, 1.00 eq.), in dry acetonitrile (0.5ml) were added 2-chloro-N-methyl pyridinium iodide (27

mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl N-[5-[6-[(2-chloro-4-fluoro-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.
LC/MS (Method B) retention time = 0.84; $[M+H]^+$ = 454

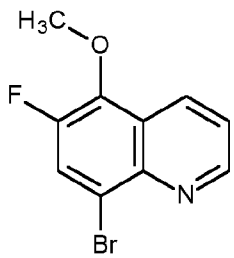
Example 6: This example illustrates the preparation of methyl N-[5-[6-(6-fluoro-5-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 62)

Step 1: Preparation of 8-bromo-6-fluoro-quinolin-5-ol



To a solution of 2-bromo-4-fluoro-5-methoxyaniline (1,00 g, 4.41 mmol, 1.00 eq.) and sodium iodide (0,007 g, 0.04 mmol, 0.01 eq.) in sulfuric acid (4.4 mL) at room temperature was added glycerol (0.390 mL, 0.492 g, 1.20 eq.). The reaction mixture was heated to 150 °C and stirred an additional 5 hours. The mixture was then cooled to 0-5°C and slowly basified with a saturated solution of sodium bicarbonate to reach pH 5. The aqueous layer was extracted with ethyl acetate and the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (cyclohexane/ethyl acetate; ethanol (3/1)) to afford 8-bromo-6-fluoro-quinolin-5-ol as a light pink solid.
LC/MS (Method C) retention time = 0.72 min; $[M+H]^+$ = 242/244
^{1}H NMR (400 MHz, CD_3OD) δ ppm 8.85 - 8.92 (m, 1 H) 8.68 - 8.75 (m, 1 H) 7.91 - 8.00 (m, 1 H) 7.55 - 7.58 (m, 1 H)

Step 2: Preparation of 8-bromo-6-fluoro-5-methoxy-quinoline



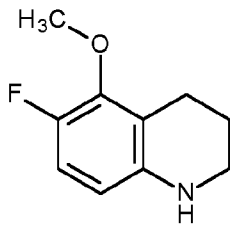
To a solution of 8-bromo-6-fluoro-quinolin-5-ol (0.420 g, 0.868 mmol, 1.00 eq.) and potassium carbonate (0.600 g, 4.34 mmol, 5.00 eq.) in acetone (8.68 mL, 10 mL/mmol) was added dropwise methyl iodide (0.271 mL, 0.619 g, 4.34 mmol, 5.00 eq.). The reaction mixture was stirred at room temperature for 2

hours and then quenched with water, the aqueous layer was extracted with ethyl acetate and the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over a silica gel cartridge (cyclohexane/ethyl acetate) to afford 8-bromo-6-fluoro-5-methoxy-quinoline as a white solid.

LC/MS (Method C) retention time = 0.92 min; $[M+H]^+$ = 256/258

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.91 - 9.03 (m, 1H) 8.43 - 8.58 (m, 1H) 7.81 - 7.95 (m, 1H) 7.41 - 7.54 (m, 1H) 4.15 (s, 3H).

Step 3: Preparation of 6-fluoro-5-methoxy-1,2,3,4-tetrahydroquinoline

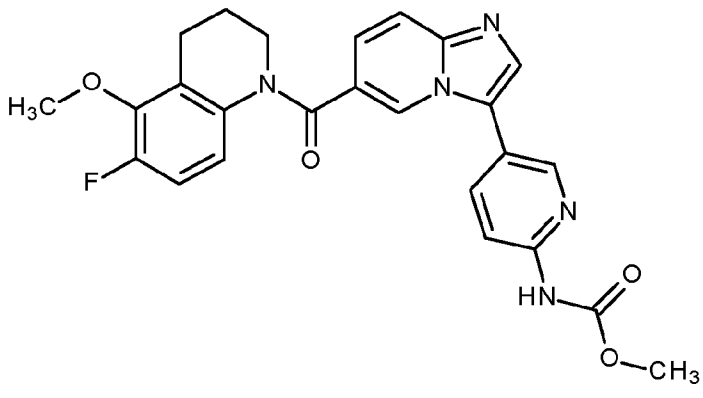


A solution of 8-bromo-6-fluoro-5-methoxy-quinoline (0.140 g, 0.547 mmol, 1.00 eq.) in ethanol (13.7 mL) went through H-Cube® under the following conditions: Pd/C cartridge, full H_2, 40 bar, 50 °C, 1mL/min flow. The reaction mixture was concentrated under reduced pressure to afford 6-fluoro-5-methoxy-1,2,3,4-tetrahydroquinoline as a white solid.

LC/MS (Method C) retention time = 0.55 min; $[M+H]^+$ = 182

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 10.67 - 11.28 (br s, 1H) 7.40 (dd, *J* = 9.1, 4.0 Hz, 1H), 7.05 (dd, *J* = 11.1, 8.9 Hz, 1H), 3.99 (s, 3H), 3.45 - 3.59 (m, 2H), 2.83 (t, *J* = 6.5 Hz, 2H), 2.22 - 2.32 (m, 2H).

Step 4: Preparation of methyl N-[5-[6-(6-fluoro-5-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 62)



(Compound 62)

To a suspension of 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (0.135 g, 0.432 mmol, 1.00 eq.), 6-fluoro-5-methoxy-1,2,3,4-tetrahydroquinoline (0.0783 g, 0.432 mmol, 1.00 eq.) and triethylamine (0.241 mL, 1.73 mmol, 4.00 eq.) in acetonitrile (4.32 mL, 10 mL/mmol) was added propylphosphonic anhydride (50% in ethyl acetate; 0.515 mL, 0.865 mmol, 2.00 eq.). The reaction mixture was stirred at room temperature for 18 hours after which it was diluted with ethyl acetate and treated with a saturated solution of sodium bicarbonate. The aqueous layer was

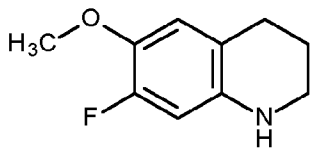
extracted with ethyl acetate, the combined organic layers were washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over silica gel cartridge (cyclohexane/ ethyl acetate: ethanol (3/1)) to afford methyl N-[5-[6-(6-fluoro-5-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as a yellow solid.

LC/MS (Method C) retention time = 0.73 min; $[M+H]^+$ = 476

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.40 - 8.46 (m, 1H), 8.34 - 8.40 (m, 1H), 8.21 - 8.29 (m, 1H), 8.14 (d, *J* = 8.7 Hz, 1H), 7.72 - 7.73 (m, 1H), 7.70 (dd, *J* = 8.7, 2.5 Hz, 1H), 7.51 (dd, *J* = 9.5, 0.7 Hz, 1H), 7.02 (dd, *J* = 9.5, 1.5 Hz, 1H), 6.70 (dd, *J* = 11.3, 8.7 Hz, 1H), 6.46 (br dd, J = 8.5, 3.8 Hz, 1H), 4.01 (d, *J* = 2.5 Hz, 3H), 3.86 - 3.89 (t, *J* = 6.4 Hz, 2H), 3.85 (s, 3H), 2.84 (t, *J* = 6.7 Hz, 2H), 1.99 - 2.08 (m, 2H).

Example 7: This example illustrates the preparation of methyl N-[5-[6-(7-fluoro-6-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 63)

Step 1: Preparation of 7-fluoro-6-methoxy-1,2,3,4-tetrahydroquinoline

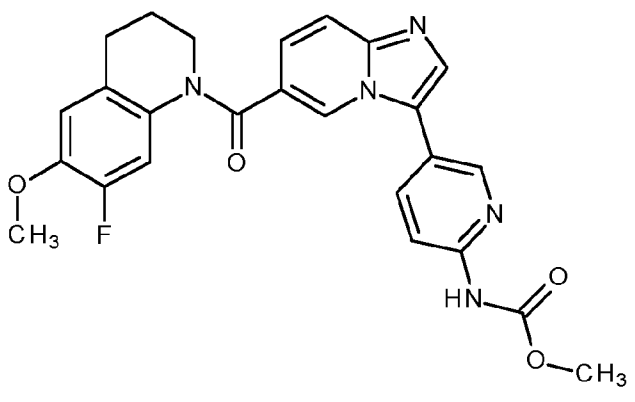


A colorless solution of 7-fluoro-6-methoxy-quinoline (50.0 mg, 0.280 mmol, 1.00 eq.) in ethanol (7.1 mL) was treated through a Pd/C cartridge at 40 bar H_2 and 50 °C with a flow rate of 1 mL/min in a H-Cube®. The reaction mixture was concentrated under reduced pressure to afford 7-fluoro-6-methoxy-1,2,3,4-tetrahydroquinoline as colorless liquid.

LC/MS (Method C) retention time = 0.38 min; $[M+H]^+$ = 182

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 6.59 (d, *J* = 9.1 Hz, 1H), 6.26 (d, *J* = 12.7 Hz, 1H), 3.79 (s, 3H), 3.16 - 3.32 (m, 2H), 2.70 (t, 2H), 1.84 - 1.99 (m, 2H).

Step 2: Preparation of methyl N-[5-[6-(7-fluoro-6-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 63)



(Compound 63)

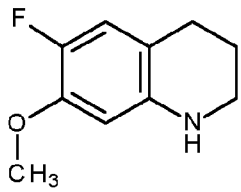
To a suspension of 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (75.0 mg, 0.240 mmol, 1.00 eq.) and 7-fluoro-6-methoxy-1,2,3,4-tetrahydroquinoline (44.0 mg, 0.240 mmol, 1.00 eq.) in acetonitrile (3.60 mL) and triethylamine (0.130 mL, 0.960 mmol, 4.00 eq.) was added propylphosphonic anhydride (50% in ethyl acetate, 0.290 mL, 0.480 mmol, 2.00 eq.). The reaction mixture was stirred at room temperature for 16 hours, then it was quenched with saturated aqueous Sodium bicarbonate and diluted with ethyl acetate. The mixture was extracted with ethyl acetate, the combined organic layer was washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude product was purified over silica gel cartridge (cyclohexane/(ethyl acetate/ethanol 3:1)) to afford methyl N-[5-[6-(7-fluoro-6-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as white solid.

LC/MS (Method C) retention time = 0.70 min; $[M+H]^+$ = 476

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.50 (br s, 1H), 8.36 - 8.43 (m, 2H), 8.11 (d, *J* = 8.72 Hz, 1H), 7.73 (s, 1H), 7.64 (dd, *J* = 8.54, 2.36 Hz, 1H), 7.54 (d, *J* = 9.45 Hz, 1H), 7.09 (dd, *J* = 9.45, 1.45 Hz, 1H), 6.82 (d, *J* = 9.08 Hz, 1H), 6.59 - 6.70 (m, 1H), 3.90 (s, 3H), 3.84 - 3.89 (m, 5H), 2.79 (t, 2H), 2.02 - 2.06 (m, 2H).

Example 8: This example illustrates the preparation of methyl N-[5-[6-(6-fluoro-7-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 64)

Step 1: Preparation of 6-fluoro-7-methoxy-1,2,3,4-tetrahydroquinoline

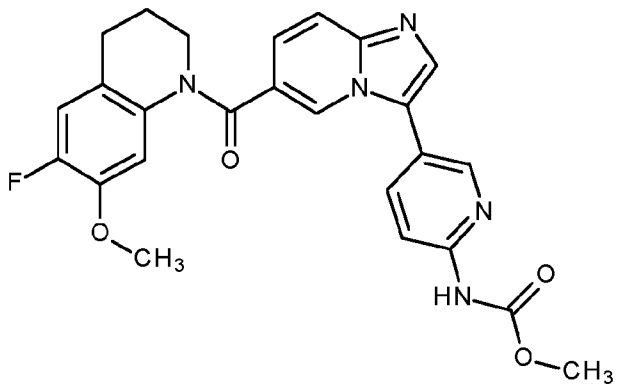


A colorless solution of 6-fluoro-7-methoxy-quinoline (CAS 851985-93-8), prepared as described for example in WO2005047280A1, (50.0 mg, 0.280 mmol, 1.00 eq.) in ethanol (5.60 mL) went through a Pd/C cartridge at 30 bar and 40°C with 1 mL/min in H-Cube®. A second run was needed at 40 bar, 50 °C and 1 mL/min. The reaction mixture was concentrated to afford 6-fluoro-7-methoxy-1,2,3,4-tetrahydroquinoline as colorless gum.

LC/MS (Method C) retention time = 0.50 min; $[M+H]^+$ = 182

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 6.68 (d, *J* = 11.99 Hz, 1H), 6.11 (d, *J* = 7.63 Hz, 1H), 3.80 (s, 3H), 3.23 - 3.27 (m, 2H), 2.66 (t, 2H), 1.84 - 1.97 (m, 2H).

Step 2: Preparation of methyl N-[5-[6-(6-fluoro-7-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 64)



(Compound 64)

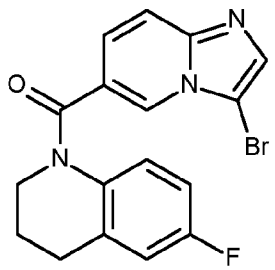
To a suspension of 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (62.0 mg, 0.200 mmol, 1.00 eq.) and 6-fluoro-7-methoxy-1,2,3,4-tetrahydroquinoline (36.0 mg, 0.200 mmol, 1.00 eq.) in acetonitrile (2.00 mL) and triethylamine (0.110 mL, 0.790 mmol, 4.00 eq.) was added propylphosphonic anhydride (50% in ethyl acetate, 0.240 mL, 0.400 mmol, 2.00 eq.). The reaction mixture was stirred at room temperature for 3 hours, then it was quenched with a saturated aqueous sodium bicarbonate solution and further diluted with ethyl acetate. The mixture was extracted with ethyl acetate, the combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over silica gel cartridge (cyclohexane/(ethyl acetate/ethanol 3:1)) to afford methyl N-[5-[6-(6-fluoro-7-methoxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate as white solid.

LC/MS (Method C) retention time = 0.72 min; $[M+H]^+$ = 476

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.35 - 8.43 (m, 3H), 8.14 (d, *J* = 8.4 Hz, 1H), 7.74 (s, 1H), 7.61 - 7.69 (m, 1H), 7.59 (d, *J* = 9.5 Hz, 1H), 7.16 (dd, *J* = 9.1, 1.5 Hz, 1H), 6.94 (d, *J* = 11.3 Hz, 1H), 6.50 - 6.62 (m, 1H), 3.89 (t, *J* = 6.5 Hz, 2H), 3.86 (s, 3H), 3.50 (s, 3H), 2.77 (t, *J* = 6.7 Hz, 2H), 1.99 - 2.04 (m, 2H).

Example 9: This example illustrates the preparation of methyl N-[5-[6-(6-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (compound 66)

Step 1: Preparation of (3-bromoimidazo[1,2-a]pyridin-6-yl)-(6-fluoro-3,4-dihydro-2H-quinolin-1-yl)methanone



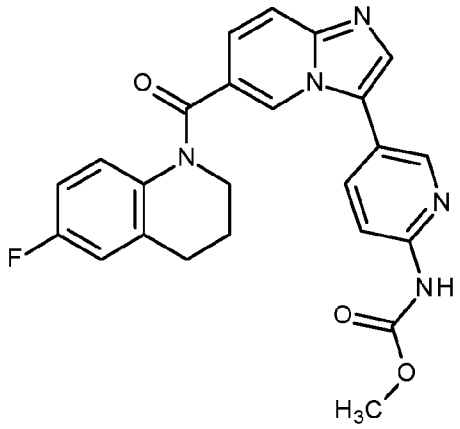
To a mixture of 3-bromoimidazo[1,2-a]pyridine-6-carboxylic acid (200 mg, 0.830 mmol, 1.00 eq.) and 6-fluoro-1,2,3,4-tetrahydroquinoline (CAS 59611-52-8; 192 mg, 1.25 mmol, 1.50 eq.) in N,N-dimethylacetamide (5.00 mL) was added N-ethyl-N-isopropyl-propan-2-amine (0.710 mL, 4.15 mmol, 5.00 eq.) and propylphosphonic anhydride (50% in ethyl acetate, 1.24 mL, 2.07 mmol, 2.50 eq.). The

reaction mixture was stirred at 55 °C for 35 min, then it was diluted with ethyl acetate and quenched with saturated aqueous sodium bicarbonate. The mixture was extracted with ethyl acetate and the combined organic layers were washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude product was purified over silica gel cartridge (cyclohexane/ethyl acetate) to afford (3-bromoimidazo[1,2-a]pyridin-6-yl)-(6-fluoro-3,4-dihydro-2H-quinolin-1-yl)methanone as a white solid.

LC/MS (Method C) retention time = 0.88 min; $[M+H]^+$ = 374

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.48 (dd, *J* = 1.6, 0.9 Hz, 1H), 7.68 (s, 1H), 7.42 (dd, *J* = 9.5, 0.7 Hz, 1H), 6.96 (br dd, *J* = 8.4, 2.9 Hz, 1H), 6.93 (br dd, *J* = 9.5, 1.5 Hz, 1H), 6.75 (br d, *J* = 4.7 Hz, 1H), 6.70 - 6.63 (m, 1H), 3.96 (t, *J* = 6.7 Hz, 2H), 2.89 (t, *J* = 6.5 Hz, 2H), 2.15 - 2.06 (m, 2H).

Step 2: Preparation of methyl N-[5-[6-(6-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 66)



(Compound 66)

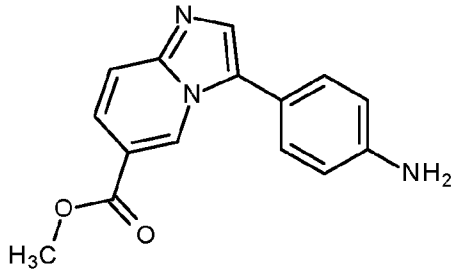
To a solution of (3-bromoimidazo[1,2-a]pyridin-6-yl)-(6-fluoro-3,4-dihydro-2H-quinolin-1-yl)methanone (280 mg, 0.748 mmol, 1.00 eq.) and methyl N-[5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-2-pyridyl]carbamate (307 mg, 1.12 mmol, 1.50 eq.) in a mixture of 2-methyltetrahydrofuran (4.5 mL) and water (1.50 mL) was added cesium carbonate (366 mg, 1.12 mmol, 1.50 eq.). The mixture was purged with argon for 5 minutes and then tetrakis(triphenylphosphine)palladium(0) (456 mg, 0.0370 mmol, 0.050 eq.) was added and the mixture was heated under microwave irradiation at 100 °C for 1 hour. The mixture was cooled down to room temperature, water was added, and the aqueous layer was extracted with ethyl acetate. The combined organic layers were washed with brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over silica gel cartridge (cyclohexane/(ethyl acetate/ethanol 3:1)) to afford methyl N-[5-[6-(6-fluoro-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.

LC/MS (Method C) retention time = 0.75 min; $[M+H]^+$ = 446

^{1}H NMR (400 MHz, $CDCl_3$) δ ppm 8.44 - 8.36 (m, 3H), 8.15 (d, *J* = 8.7 Hz, 1H), 7.75 (s, 1H), 7.65 (dd, *J* = 8.7, 2.2 Hz, 1H), 7.51 (d, *J* = 9.5 Hz, 1H), 7.03 (dd, *J* = 9.5, 1.5 Hz, 1H), 6.98 (dd, *J* = 8.5, 2.7 Hz, 1H), 6.77 - 6.65 (m, 2H), 3.92 (t, *J* = 6.5 Hz, 2H), 3.87 (s, 3H), 2.83 (t, *J* = 6.5 Hz, 2H), 2.12 - 2.02 (m, 2H).

Example 10: This example illustrates the preparation of methyl N-[4-[6-[(2,4-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate (compound 78)

Step 1: Preparation of methyl 3-(4-aminophenyl)imidazo[1,2-a]pyridine-6-carboxylate

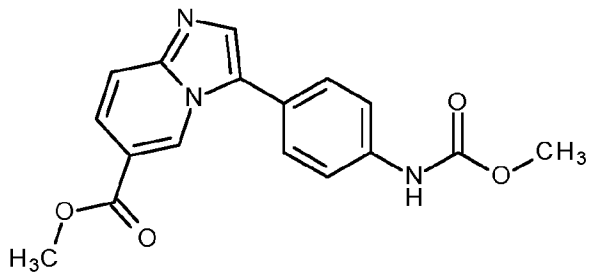


To a stirred mixture of methyl 3-bromoimidazo[1,2-a]pyridine-6-carboxylate (1.00 g, 3.80 mmol, 1.00 eq.) and (4-aminophenyl)boronic acid hydrochloride (0.893 g, 4.94 mmol, 1.30 eq.) in a mixture of 1,4-dioxane (57 mL) and water (5.7 mL) was added cesium carbonate (3.13 g, 9.51 mmol, 2.50 eq.). The mixture was purged with a stream of argon for 2 minutes, cataCXium A Pd G3 (CAS 1651823-59-4, 0.146 g, 0.190 mmol, 0.050 eq.) was added and the mixture was stirred at 80 °C for 16 hours. The reaction mixture was cooled down, diluted with ethyl aetate, quenched with a saturated solution of sodium bicarbonate and extracted with ethyl acetate. The combined organic layers were washed with water and brine, dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude residue was purified over silica gel cartridge (cyclohexane/ ethyl acetate) to afford methyl 3-(4-aminophenyl)imidazo[1,2-a]pyridine-6-carboxylate as a yellow solid.

LC/MS (Method C) retention time = 0.41min; $[M+H]^+$ = 268

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 8.99 (dd, *J* = 1.8, 1.1 Hz, 1H), 7.69 - 7.74 (m, 1H), 7.66 (s, 1H), 7.63 - 7.66 (m, 1H), 7.31 - 7.38 (m, 2H), 6.83 - 6.88 (m, 2H), 3.93 (s, 3H), 3.91 (br s, 2H).

Step 2: Preparation of methyl 3-[4-(methoxycarbonylamino)phenyl]imidazo[1,2-a]pyridine-6-carboxylate

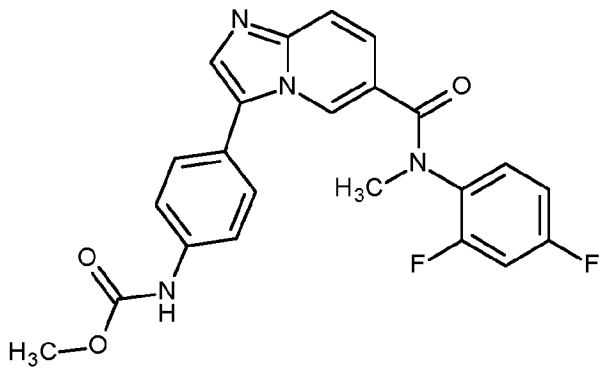


To a mixture of methyl 3-(4-aminophenyl)imidazo[1,2-a]pyridine-6-carboxylate (905 mg, 3.22 mmol, 1.00 eq.) and pyridine (1280 mg, 16.1 mmol, 1.31 mL, 5.00 eq.) in ethyl acetate (36 mL) was added dropwise methyl chloroformate (614 mg, 6.43 mmol, 0. 502 mL, 2.00 eq.). The reaction mixture was stirred at room temperature for 4 hours and then quenched with an aqueous saturated solution of sodium bicarbonate. The resulting solid that formed was filtered, washed with water and ethyl acetate. The solid was further dried under reduced pressure to afford methyl 3-[4-(methoxycarbonylamino)phenyl]imidazo[1,2-a]pyridine-6-carboxylate as a beige solid.

LC/MS (Method C) retention time = 0.66 min; $[M+H]^+$ = 326

^{1}H NMR (400 MHz, DMSO-d_6) δ ppm 9.91 (s, 1H), 8.91 - 8.94 (m, 1H), 7.81 (s, 1H), 7.57 - 7.72 (m, 6H) 3.87 (m, 3H), 3.71 (s, 3H).

Step 3: Preparation of methyl N-[4-[6-[(2,4-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate (Compound 78)

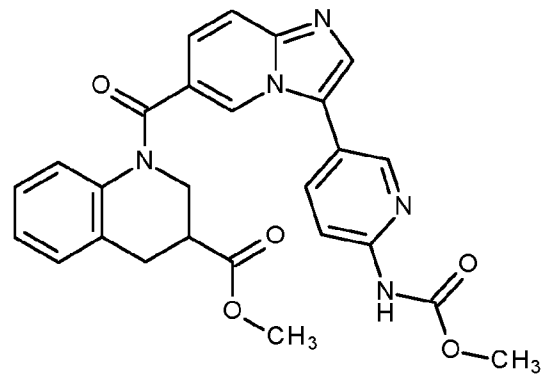


(Compound 78)

To a solution of methyl 3-[4-(methoxycarbonylamino)phenyl]imidazo[1,2-a]pyridine-6-carboxylate (0.035 mmol, 1.00 eq.), 2,4-difluoro-N-methyl-aniline (0.070 mmol, 2.00 eq.) and diisopropylamine (0.21 mmol, 6.00 eq.) in dimethylacetamide (0.20 mL) was added bis(2-oxo-3-oxazolidinyl)phosphinic chloride (0.088 mmol, 2.50 eq.). The reaction mixture was stirred at 70 °C for 16 hours, cooled to room temperature and the solvent was evaporated under reduced pressure. The resulting residue was purified by HPLC to afford methyl N-[4-[6-[(2,4-difluorophenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]phenyl]carbamate.

LC/MS (Method D) retention time = 1.00min; $[M+H]^+$ = 437

Example 11: This example illustrates the preparation of methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-3-carboxylate (compound 11)



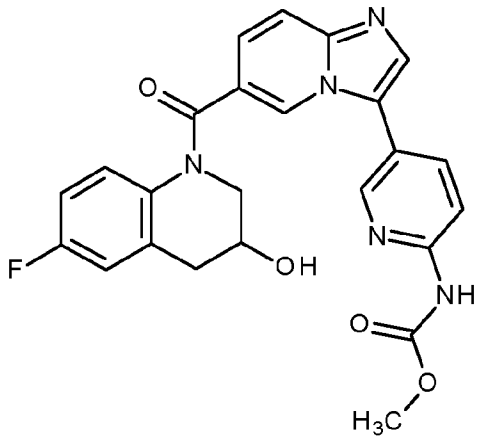
(Compound 11)

To a mixture of methyl 1,2,3,4-tetrahydroquinoline-3-carboxylate (CAS 177202-62-9, 18 mg, 0.094 mmol, 1.2 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and

stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl 1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-3-carboxylate.

LC/MS (Method B1) retention time = 1.03; $[M+H]^+$ = 486

Example 12: This example illustrates the preparation of methyl N-[5-[6-(6-fluoro-3-hydroxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 24)

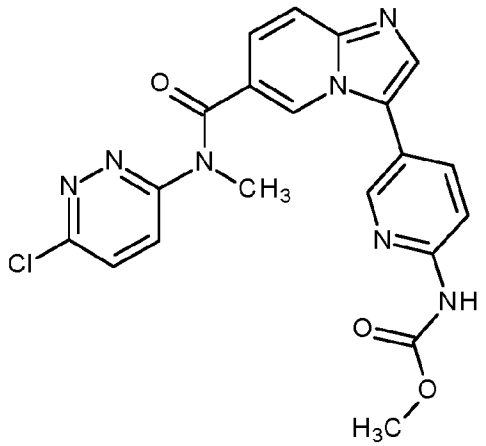


(Compound 24)

To a mixture of 6-fluoro-1,2,3,4-tetrahydroquinolin-3-ol (CAS 1513216-64-2, 18 mg, 0.11 mmol, 1.4 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl N-[5-[6-(6-fluoro-3-hydroxy-3,4-dihydro-2H-quinoline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.

LC/MS (Method B1) retention time = 0.98; $[M+H]^+$ = 462

Example 13: This example illustrates the preparation of methyl N-[5-[6-[(6-chloropyridazin-3-yl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 25)

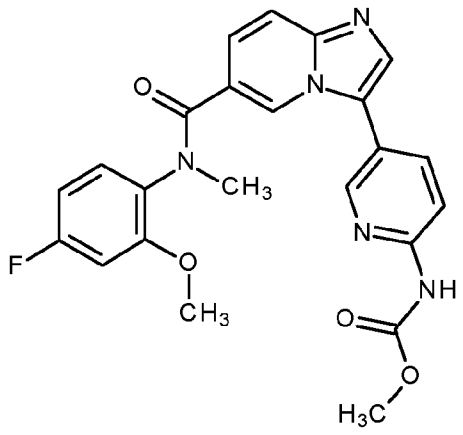


(Compound 25)

To a mixture of 6-chloro-N-methyl-pyridazin-3-amine (18 mg, 0.13 mmol, 1.6 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl N-[5-[6-[(6-chloropyridazin-3-yl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.

LC/MS (Method B1) retention time = 0.91; $[M+H]^+$ = 438

Example 14: This example illustrates the preparation of methyl N-[5-[6-[(4-fluoro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 30)

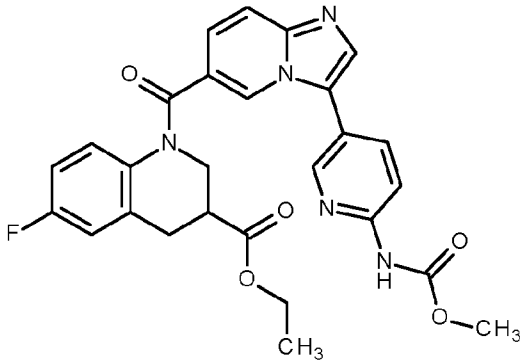


(Compound 30)

To a mixture of 4-fluoro-2-methoxy-N-methylbenzenamine (18 mg, 0.12 mmol, 1. 5 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced

pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl N-[5-[6-[(4-fluoro-2-methoxy-phenyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.
LC/MS (Method B1) retention time = 1.16; $[M+H]^+$ = 518

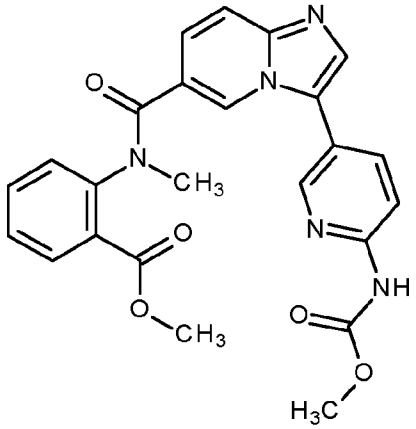
Example 15: This example illustrates the preparation of ethyl 6-fluoro-1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-3-carboxylate (Compound 35)



(Compound 35)

To a mixture of ethyl 6-fluoro-1,2,3,4-tetrahydroquinoline-3-carboxylate (18 mg, 0.081 mmol, 1.05 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford ethyl 6-fluoro-1-[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-3,4-dihydro-2H-quinoline-3-carboxylate.
LC/MS (Method B1) retention time = 1.16; $[M+H]^+$ = 518

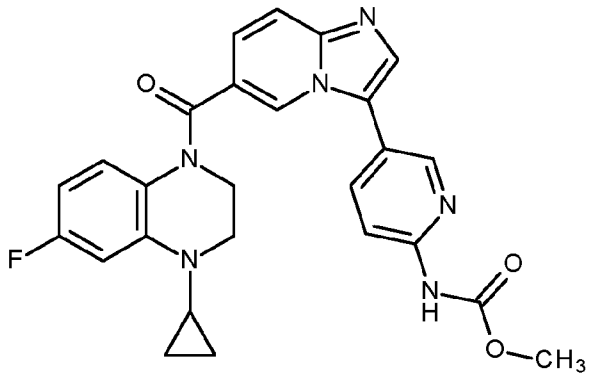
Example 16: This example illustrates the preparation of methyl 2-[[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-methyl-amino]benzoate (Compound 46)



(Compound 46)

To a mixture of ethyl 2-(methylamino)benzoate (18 mg, 0.11 mmol, 1.4 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl 2-[[3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carbonyl]-methyl-amino]benzoate.
LC/MS (Method B1) retention time = 0.79; $[M+H]^+$ = 460

Example 17: This example illustrates the preparation of methyl N-[5-[6-(4-cyclopropyl-6-fluoro-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 51)



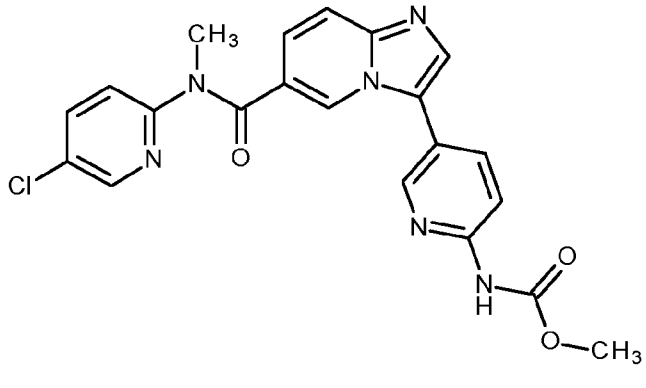
(Compound 51)

To a mixture of 1-cyclopropyl-7-fluoro-1,2,3,4-tetrahydroquinoxaline (CAS 1503466-47-4, 18 mg, 0.093 mmol, 1.2 eq.) and 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (24 mg, 0.077 mmol) in dry acetonitrile (0.50 mL) were added 2-chloro-N-methyl pyridinium iodide (27 mg, 0.11 mmol, 1.40 eq.), and diisopropylethylamine (31 mg, 0.24 mmol, 3.1 eq.). The reaction mixture was stirred at room temperature for 30 minutes and then heated to 80 °C and stirred for an additional 12 hours. The mixture was then cooled to room temperature, the solvent was

evaporated under reduced pressure. The resulting residue was dissolved dimethylsulfoxide, the solution was filtered, and the crude was purified by HPLC (water (0.1% formic acid) /acetonitrile (0.1% formic acid)) to afford methyl N-[5-[6-(4-cyclopropyl-6-fluoro-2,3-dihydroquinoxaline-1-carbonyl)imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.

LC/MS (Method B1) retention time = 0.87; $[M+H]^+$ = 487

Example 18: This example illustrates the preparation of methyl N-[5-[6-[(5-chloro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate (Compound 68)



(Compound 68)

To a solution of 5-chloro-N-methyl-pyridin-2-amine (15.2 mg, 0.11 mmol, 1.5 eq.) in dimethylacetamide (0.300 mL) was added a solution of 3-[6-(methoxycarbonylamino)-3-pyridyl]imidazo[1,2-a]pyridine-6-carboxylic acid (compound X3) (22 mg, 0.071 mmol) in dimethylacetamide (0.800 mL). Diisopropylethylamine (0.055 mL, 0.32 mmol, 2.8 eq.) was added, followed by addition of a solution of bis(2-oxo-3-oxazolidinyl)phosphonic chloride (36 mg, 0.14 mmol, 1.3 eq.) in dimethylacetamide (0.400 mL). The mixture was stirred at 75 °C for 16 hours. Dimethylacetamide was evaporated. The crude residue was purified by reverse phase HPLC (water/acetonitrile) to afford methyl N-[5-[6-[(5-chloro-2-pyridyl)-methyl-carbamoyl]imidazo[1,2-a]pyridin-3-yl]-2-pyridyl]carbamate.

LC/MS (Method D) retention time = 0.90; $[M+H]^+$ = 437

Biological examples:

The fungicidal activity of the compounds of the invention have been tested as follows:

Phytophthora infestans / tomato / leaf disc preventative (late blight)

Tomato leaf disks are placed on water 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 disks are incubated at 16 °C and 75% 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 disks (5 - 7 days after application).

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

2, 3, 5, 11, 12, 17, 21, 24, 27, 30, 32, 35, 43, 46, 51, 54, 59, 62, 64, 66.

Plasmopara viticola / grape / leaf disc preventative (late blight)

Grape vine leaf disks are placed on water 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 disks are incubated at 19 °C and 80% 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 (6 - 8 days after application).

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

1, 2, 3, 4, 7, 11, 21, 30, 35, 39, 51, 64, 66, 78.

Pythium ultimum / liquid culture (seedling damping off)

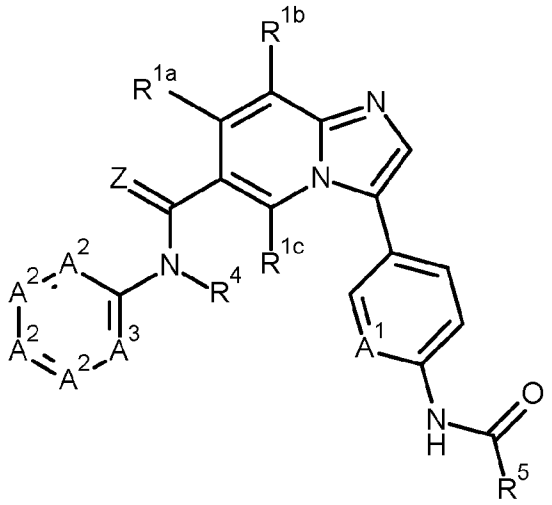
Mycelia fragments and oospores of a newly grown liquid culture of the fungus are directly mixed into nutrient broth (PDB potato dextrose broth). After placing a (DMSO) solution of test compound into a microtiter plate (96-well format), the nutrient broth containing the fungal mycelia/spore mixture is added. The test plates are incubated at 24 °C and the inhibition of growth is determined photometrically 2-3 days after application.

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

2, 3, 4, 5, 7, 8, 11, 12, 13, 14, 17, 21, 24, 26, 27, 28, 30, 32, 35, 43, 46, 47, 48, 51, 53, 54, 56, 58, 60, 61, 62, 63, 64, 66, 68, 78.

Claims

1. A compound of formula (I)



(I)

wherein Z is O or S, and preferably Z is O;

A^1 is CH or N, and preferably N;

R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkylsulfanyl. C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxy, amino, and -NHC(O)C_{1-6}alkyl;

A^2 are independently CR^2 or N, with the proviso that no more than three A^2 are N, preferably no more than two A^2 are N, preferably no more than one A^2 is N, and more preferably the four A^2 are CR^2;

R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN;

A^3 is independently CR^3 or N;

R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-}

$_{6}$alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN;

wherein R^3 taken together with the adjacent R^2 optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 5-membered heterocycle or a 6-membered heterocycle;

R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, and CN, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl and diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN;

wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle; and

R^5 is selected from C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxyC_{1-6}alkyl, C_{1-6}alkylamino, diC_{1-6}alkylamino, C_{1-6}alkoxyamino, and C_{1-6}alkylC_{1-6}alkoxyamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxyC_{1-6}alkyl, C_{1-6}alkylamino, diC_{1-6}alkylamino, C_{1-6}alkoxyamino, and C_{1-6}alkylC_{1-6}alkoxyamino groups is optionally substituted with one to three substituents independently selected from halogen and CN;

or a salt or N-oxide thereof.

2. The compound according to claim 1, wherein R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy, and preferably from hydrogen and C_{1-6}alkyl.

3. The compound according to claim 1, wherein R^{1a} and R^{1c} are hydrogen; and R^{1b} is selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkoxy, amino, and NHC(O)C_{1-6}alkyl.

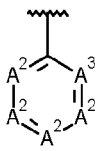
4. The compound according to any one of the preceding claims, wherein R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxy-C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl, C_{1-5}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{1-6}alkoxycarbonyl,

C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN.

5. The compound according to any one of the preceding claims, wherein R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN.

6. The compound according to any one of the preceding claims, wherein four A^2 are CR^2 and A^3 is N.

7. The compound according to any one of the claims 1 to 5, wherein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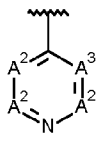
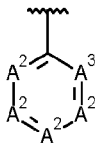
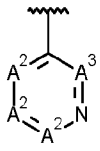

, and preferably the three A^2 are CR^2 and A^3 is CR^3.

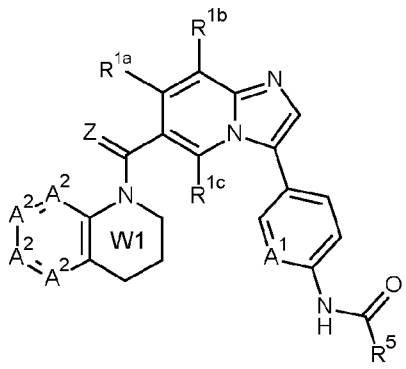
8. The compound according to any one of the claims 1 to 5, wherein


is

, and preferably the three A^2 are CR^2 and A^3 is CR^3.

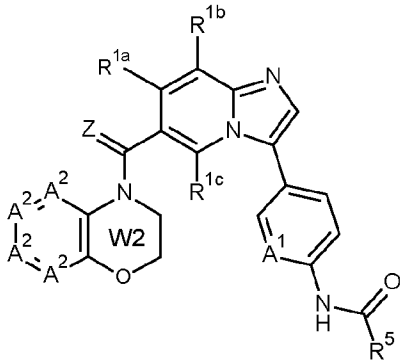
9. The compound according to any one of the claims 1 to 5, wherein four A^2 are CR^2 and A^3 is CR^3.

10. The compound according to any one of the preceding claims, wherein R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents independently selected from halogen and CN.

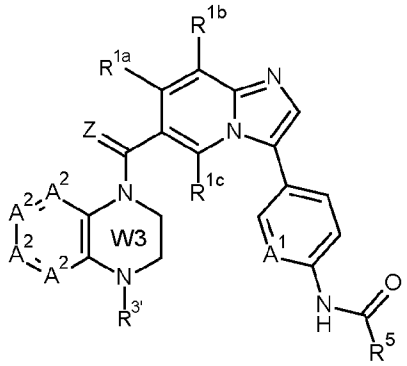
11. The compound according to any one of the claims 1 to 5, wherein the compound of formula (I) is the compound I-W1, I-W2 or I-W3:



(I-W1)

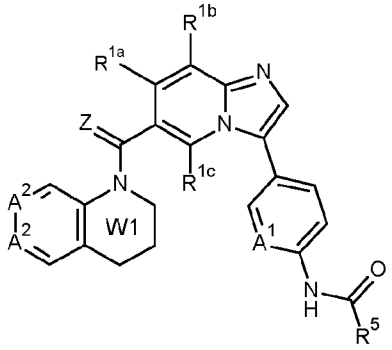


(I-W2)

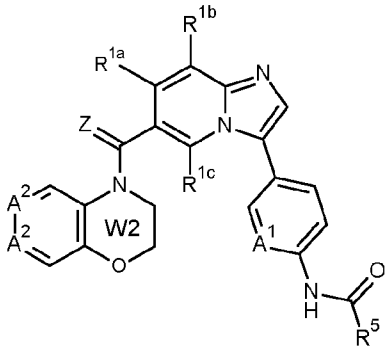


(I-W3),

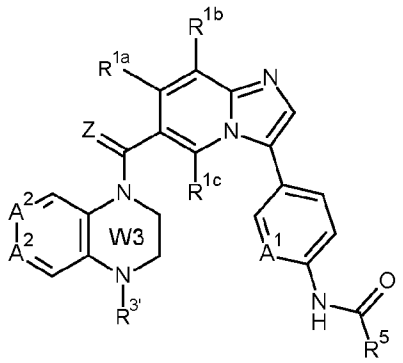
and more preferably



(I-W1)



(I-W2)



(I-W3),

wherein $R^{3'}$ is selected from hydrogen, C_{1-6}alkyl and C_{3-6}cycloalkyl, wherein each of the C_{1-6}alkyl and C_{3-6}cycloalkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN.

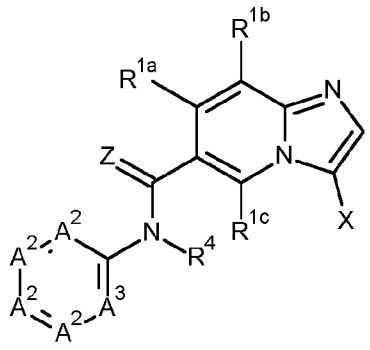
12. The compound according to any one of the preceding claims, wherein R^5 is selected from C_{1-6}alkyl, C_{1-6}alkoxy, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, and C_{1-6}alkoxyC_{1-6}alkyl, wherein each of said groups is optionally substituted with one to three substituents independently selected from halogen and CN.

13. A composition comprising a fungicidally effective amount of a compound as defined in any one of claims 1 to 12.

14. A composition according to claim 13, wherein the composition further comprises at least one compound selected among an additional active ingredient, an appropriate formulation inert, a carrier, an adjuvant, and any mixtures thereof.

15. A method of combating, preventing or controlling phytopathogenic diseases which comprises applying to a phytopathogen, to the locus of a phytopathogen, to a plant susceptible to attack by a phytopathogen, or to a plant propagation material thereof, a fungicidally effective amount of a compound according to any one of claims 1 to 12, or a composition comprising a compound according to any one of claims 1 to 12, or a composition according to claim 13 or 14.

16. A compound of formula (II)



(II)

wherein Z is O or S, and preferably Z is O;

R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkylsulfanyl. C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxy, amino, and -NHC(O)C_{1-6}alkyl; preferably R^{1a} and R^{1c} are hydrogen and R^{1b} is selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkylsulfonyl, and -NHC(O)C_{1-6}alkyl;

A^2 are independently CR^2 or N, with the proviso that no more than three A^2 are N, preferably no more than two A^2 are N, preferably no more than one A^2 is N, and more preferably the four A^2 are CR^2;

R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; preferably R^2 are independently selected from hydrogen, halogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and CN;

A^3 is CR^3 or N;

R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; and preferably R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen, hydroxy, and CN; and wherein R^3 taken together with the adjacent R^2 optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 5-membered heterocycle or a 6-membered heterocycle;

R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-}

$_{6}$alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, and CN, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl and diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN; and preferably R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen and CN; and wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle;

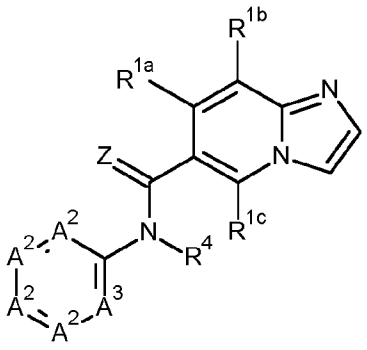
and

X is Cl, Br or I;

or a salt or N-oxide thereof;

or

a compound of formula (XVII)



(XVII)

wherein Z is O or S, and preferably Z is O;

R^{1a}, R^{1b} and R^{1c} are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{1-6}alkylsulfanyl. C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxy, amino, and -NHC(O)C_{1-6}alkyl; preferably R1a and R^{1c} are hydrogen and R^{1b} is selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkylsulfonyl, and -NHC(O)C_{1-6}alkyl;

A^2 are independently CR^2 or N, with the proviso that no more than three A^2 are N, preferably no more than two A^2 are N, preferably no more than one A^2 is N, and more preferably the four A^2 are CR^2;

R^2 are independently selected from hydrogen, hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}alkylaminocarbonyl, and C_{1-6}alkylcarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylaminocarbonyl, diC_{1-6}-

$_{6}$alkylaminocarbonyl, and C_{1-6}alkylcarbonyl groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; preferably R^2 are independently selected from hydrogen, halogen, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and CN;

A^3 is CR^3 or N;

R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkoxy, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl, C_{1-6}alkylsulfanyl, C_{1-6}alkylsulfinyl, C_{1-6}alkylsulfonyl, amino, C_{1-6}alkylamino, diC_{1-6}-alkylamino, and C_{3-6}cycloalkylamino groups is optionally substituted with one to three substituents independently selected from halogen, hydroxy, and CN; and preferably R^3 is selected from hydroxy, halogen, CN, C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy, C_{1-6}alkoxy-C_{1-6}alkyl, and C_{1-6}alkoxycarbonyl groups is optionally substituted with one substituent selected from halogen, hydroxy, and CN; and wherein R^3 taken together with the adjacent R^2 optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 5-membered heterocycle or a 6-membered heterocycle; and

R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl, and CN, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, C_{2-6}alkenyl, C_{2-6}alkynyl, C_{1-6}alkoxy, C_{1-6}alkylsulfanyl-C_{1-6}alkyl, C_{1-6}alkylsulfinyl-C_{1-6}alkyl, C_{1-6}alkylsulfonyl-C_{1-6}alkyl, C_{1-6}alkoxycarbonyl-C_{1-6}alkyl, C_{1-6}alkylaminocarbonyl-C_{1-6}alkyl and diC_{1-6}alkylaminocarbonyl-C_{1-6}alkyl groups is optionally substituted with one to three substituents independently selected from halogen and CN; and preferably R^4 is selected from C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy, wherein each of the C_{1-6}alkyl, C_{1-6}alkoxy-C_{1-6}alkyl, C_{3-6}cycloalkyl, C_{3-6}cycloalkyl-C_{1-4}alkyl, and C_{1-6}alkoxy groups is optionally substituted with one to three substituents, preferably one substituent, independently selected from halogen and CN; and wherein A^3 and R^4 taken together optionally form a ring, preferably a 5-8-membered heterocycle, and more preferably a 6-membered heterocycle;

or a salt or N-oxide thereof.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/059863

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D471/04 A01N43/90 A01P3/00
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C07D A01N A01P

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 229 028 A1 (DOW AGROSCIENCES LLC [US]) 7 August 2002 (2002-08-07) claims 1, 2; examples 131, 135, 139	1-16
A	WO 2014/078813 A1 (IRM LLC [US]; NOVARTIS AG [CH] ET AL.) 22 May 2014 (2014-05-22) claims 1, 11; examples 373, 415	1-16
X	US 2016/256458 A1 (BAIR KENNETH W [US] ET AL) 8 September 2016 (2016-09-08) page 287; examples I-776	16

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

[x] See patent family annex.

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 June 2024	24/06/2024

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Koch, Kristian

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE REGISTRY [Online] Chemical Abstract Service, Columbus, Ohio, US; 10 November 2010 (2010-11-10), XP093174064, Database accession no. 1252532-06-1 abstract -----	16
X	DATABASE REGISTRY [Online] Chemical Abstract Service, Columbus, Ohio, US; 20 May 2011 (2011-05-20), XP093174068, Database accession no. 1297764-77-2 abstract -----	16
X	DATABASE REGISTRY [Online] Chemical Abstract Service, Columbus, Ohio, US; 29 June 2015 (2015-06-29), XP093174086, Database accession no. 1791184-06-9 abstract -----	16
X	DATABASE REGISTRY [Online] Chemical Abstract Service, Columbus, Ohio, US; 29 June 2015 (2015-06-29), XP093174092, Database accession no. 1791309-94-8 abstract -----	16
X	DATABASE REGISTRY [Online] Chemical Abstract Service, Columbus, Ohio, US; 27 December 2015 (2015-12-27), XP093174140, Database accession no. 1836657-77-2 abstract -----	16
A,P	WO 2023/061838 A1 (SYNGENTA CROP PROTECTION AG [CH]) 20 April 2023 (2023-04-20) page 1, line 3 - line 14 table A; compounds 1-213 claims 1-15 -----	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2024/059863

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