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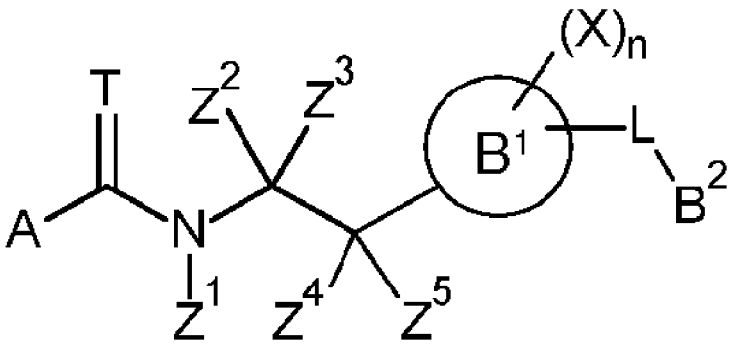
(54) Title: N-CYCLOALKYL-N-(BIHETEROCYCLYETHYLENE)-(THIO)CARBOXAMIDE DERIVATIVES



(I)

(57) Abstract: The present invention relates to fungicidal N-cycloalkyl-N-(biheterocyclylethylene)carboxamide derivatives and their thiocarbonyl derivatives, their process of preparation and intermediate compounds for their preparation, their use as fungicides, particularly in the form of fungicidal compositions and methods for the control of phytopathogenic fungi of plants using these compounds or their compositions.

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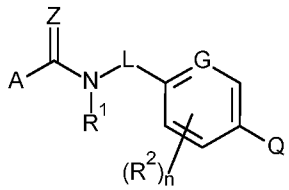
N-CYCLOALKYL-N-(BIHETEROCYCLYETHYLENE)-(THIO)CARBOXAMIDE DERIVATIVES

DESCRIPTION

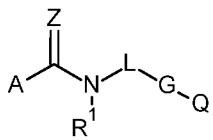
The present invention relates to fungicidal N-cycloalkyl-N-(biheterocyclylethylene)carboxamide derivatives and their thiocarbonyl derivatives, their process of preparation and intermediate compounds for their preparation, their use as fungicides, particularly in the form of fungicidal compositions and methods for the control of phytopathogenic fungi of plants using these compounds or their compositions.

In international patent application WO-2014/004064 certain fungicidal amides are generically embraced in a broad disclosure of numerous compounds of the following formula:



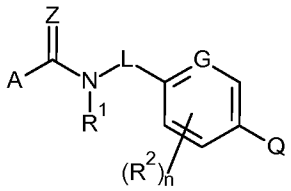
wherein A represents several carbo-linked, partially saturated or unsaturated, 5- or 6-membered heterocyclyl groups, Z represents O or S, R^1 represents among other groups, a cyclopropyl group, L represents among other groups, an optionally substituted ethane-1,2-diyl group, G can represent N and Q represents a 5-membered heterocyclyl group. However, there is no disclosure or suggestion to select in this document of any such derivative wherein the group Q can be attached to the pyridyl ring, when G represents N, in an ortho or meta position relative to the linker L. Furthermore, there is no disclosure or suggestion to select in this document of any such derivative wherein the group Q can represent a 3- to 4- or 6- to 10-membered heterocyclyl group.

In international patent application WO-2014/172190 certain fungicidal amides are generically embraced in a broad disclosure of numerous compounds of the following formula:



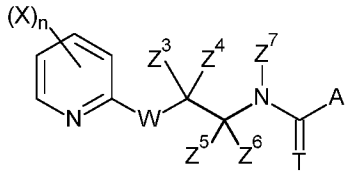
wherein A represents several carbo-linked, partially saturated or unsaturated, 5- or 6-membered heterocyclyl groups, Z represents O or S, R^1 represents among other groups, a cyclopropyl group, L represents among other groups, an optionally substituted ethane-1,2-diyl group, G represents several 6-membered heterocyclyl groups and Q represents a 5-membered heterocyclyl group. However, there is no disclosure or suggestion to select in this document of any such derivative wherein the group Q can be attached to the heterocyclyl group G, in a ortho ou meta position relative to the linker L. Furthermore, there is no disclosure or suggestion to select in this document of any such derivative wherein the group Q can represent a 3- to 4- or 6- to 10-membered heterocyclyl group.

In United States patent application US2014/0005231 certain fungicidal amides are generically embraced in a broad disclosure of numerous compounds of the following formula:



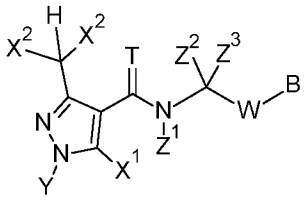
wherein A represents several carbo-linked, partially saturated or unsaturated, 5- or 6-membered heterocyclyl groups, Z represents O or S, R^1 represents among other groups, a cyclopropyl group, L represents among other groups, an optionally substituted ethane-1,2-diyl group, G can represent N and Q represents a 5-membered heterocyclyl group. However, there is no disclosure or suggestion to select in this document of any such derivative wherein the group Q can be attached to the pyridyl ring, when G represents N, in a ortho ou meta position relative to the linker L. Furthermore, there is no disclosure or suggestion to select in this document of any such derivative wherein the group Q can represent a 3- to 4- or 6- to 10-membered heterocyclyl group.

In international patent application WO-2010/015681 certain fungicidal N-(2-pyridylpropyl)carboxamides are generically embraced in a broad disclosure of numerous compounds of the following formula:



wherein A represents a carbo-linked, partially saturated or unsaturated, 5-membered heterocyclyl group, T represents O or S, Z^7 represents a substituted or non-substituted C_3-C_7-cycloalkyl group, W represents among other groups, an an optionally substituted methylene group and X represents among other groups, an hetero-aryl or aryloxy group such as pyridinyl or pyridinyloxy. However, there is no explicit disclosure or suggestion to select in this document of any such derivative wherein W is a direct bond. Furthermore, there is no disclosure or suggestion to select in this document of any such derivative wherein the pyridine moiety can be replaced by another 3- to 10-membered heterocyclyl group.

In international patent application WO-2011/151369 certain fungicidal N-[(het)arylethyl)] pyrazole-(thio)carboxamides are generically embraced in a broad disclosure of numerous compounds of the following formula:

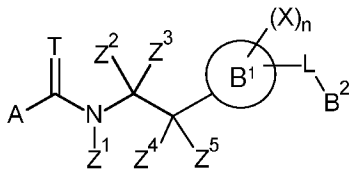


wherein X^1 and X^2 represent F or Cl, Y represent an alkyl group, T represents O or S, Z^1 represents among other groups, a substituted or non-substituted C_3-C_7-cycloalkyl group, W represents among other

groups, an optionally substituted methylene group and B represents among other groups, a 4- to 10-membered heterocyclyl group that can be substituted by an aryl, arylalkyl, aryloxy, arylsulfanyl or arylamino group such as pyridinyl, pyridinylalkyl, pyridinyloxy, pyridinylsulfanyl or pyridinylamino.

However, there is no explicit disclosure or suggestion to select in this document of any such derivative wherein B can be substituted by other heteroaryl, heteroarylalkyl, heteroaryloxy, heteroarylsulfanyl or heteroarylamino groups than pyridinyl, pyridinylalkyl, pyridinyloxy, pyridinylsulfanyl or pyridinylamino. Furthermore, there is no disclosure or suggestion to select in this document of any such derivative wherein the 1-alkyl-3-(difluoro or dichloro)methyl-5-(chloro or fluoro)-4-pyrazolyl moiety can be replaced by an other carbo-linked, partially saturated or unsaturated, 5-membered heterocyclyl group

Accordingly, the present invention provides a N-cycloalkyl-N-(biheterocyclylethylene)(thio)carboxamide of formula (I)



(I)

wherein

- A represents a carbo-linked, unsaturated or partially saturated, 5-membered heterocyclyl group that can be substituted by up to four groups R that can be the same or different ;
- T represents O or S ;
- n represents 0, 1, 2, 3 or 4 ;
- L represents a direct bond, CZ^6Z^7, O, S, SO, SO_2 or NZ^8 ;
- B^1 represents a carbo-linked unsaturated, monocyclic or fused bicyclic 5-, 6-, 8-, 9-, 10-membered heterocyclyl ring comprising from 1 up to 4 heteroatoms selected in the list consisting of N, O, S ;
- B^2 represents a saturated, partially saturated or unsaturated, monocyclic or fused bicyclic 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-membered heterocyclyl ring comprising from 1 up to 4 heteroatoms selected in the list consisting of N, O, S, that can be substituted by up to 6 groups Y which can be the same or different ;
  with the proviso that B^2 does not represent a pyridyl ring when L represents a direct bond or CZ^6Z^7 or an oxygen atom or a sulfur atom or NZ^8 and A represents a 1-C_1-C_4-alkyl-3-(difluoro or dichloro)methyl-5-(chloro or fluoro)-4-pyrazolyl moiety;
- Z^1 represents a non-substituted C_3-C_7-cycloalkyl or a C_3-C_7-cycloalkyl substituted by up to 10 atoms or groups that can be the same or different and that can be selected in the list consisting of halogen atoms, cyano, C_1-C_8-alkyl, C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different, C_1-C_8-alkoxy, C_1-C_8-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different, C_1-C_8-alkoxycarbonyl, C_1-C_8-halogenoalkoxycarbonyl

comprising up to 9 halogen atoms that can be the same or different, C_1-C_8-alkylaminocarbonyl and di-C_1-C_8-alkylaminocarbonyl ;

with the proviso that Z^1 does not represent a non-substituted cyclopropyl when B^1 represents a 5-substituted (by B^2) pyridin-2-yl group or a 6-substituted (by B^2) pyridin-3-yl group or a 6-substituted (by B^2) pyridazin-3-yl group or a 5-substituted (by B^2) pyrimidin-2-yl group or a 2-substituted (by B^2) pyrimidin-5-yl group or a 5-substituted (by B^2) pyrazin-2-yl group and B^2 represents a 5-membered heterocyclyl group.

- Z^2, Z^3, Z^4 and Z^5 which can be the same or different, represent a hydrogen atom ; substituted or non-substituted C_1-C_8-alkyl ; substituted or non-substituted C_2-C_8-alkenyl ; substituted or non-substituted C_2-C_8-alkynyl ; cyano ; isonitrile ; nitro ; a halogen atom ; substituted or non-substituted C_1-C_8-alkoxy ; substituted or non-substituted C_2-C_8-alkenyloxy ; substituted or non-substituted C_2-C_8-alkynyloxy ; substituted or non-substituted C_3-C_7-cycloalkyl ; substituted or non-substituted C_1-C_8-alkylsulfanyl ; substituted or non-substituted C_1-C_8-alkylsulfonyl ; substituted or non-substituted C_1-C_8-alkylsulfinyl ; amino ; substituted or non-substituted C_1-C_8-alkylamino ; substituted or non-substituted di-C_1-C_8-alkylamino ; substituted or non-substituted C_1-C_8-alkoxycarbonyl ; substituted or non-substituted C_1-C_8-alkylcarbamoyl ; substituted or non-substituted di-C_1-C_8-alkylcarbamoyl ; or substituted or non-substituted N-C_1-C_8-alkyl-C_1-C_8-alkoxy-carbamoyl ; or
- Z^i and Z^{i+1} , i being an integer from 2 to 4, together with the carbon atom to which they are linked can form a substituted or non-substituted C_3-C_7 cycloalkyl ; or

- Z^5 and the substituent X vicinal to the point of attachment of the B^1 heterocyclic ring, together with the consecutive carbon atoms to which they are linked, can form a substituted or non-substituted 5-, 6- or 7-membered, partly saturated, carbo- or heterocycle comprising up to 3 heteroatoms and Z^4 is herein-described ;

- Z^6 and Z^7 independently represent a hydrogen atom ; a halogen atom ; cyano ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms ; substituted or non-substituted C_1-C_8-alkoxy; substituted or non-substituted C_1-C_8-alkylsulfanyl ; or substituted or non-substituted C_1-C_8-alkoxycarbonyl ; or
- Z^6 and Z^7 together with the carbon atom to which they are linked can form a C(=O) carbonyl group ;

- Z^8 represents a hydrogen atom ; a substituted or non-substituted C_1-C_8-alkyl ; a C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_2-C_8-alkenyl ; C_2-C_8-halogenoalkenyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_3-C_8-alkynyl ; C_3-C_8-halogenoalkynyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_3-C_7-cycloalkyl ; C_3-C_7-halogeno-cycloalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_3-C_7-cycloalkyl-C_1-C_8-alkyl ; formyl ; substituted or non-substituted C_1-C_8-alkylcarbonyl ; C_1-C_8-halogenoalkylcarbonyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_8-alkoxycarbonyl ; C_1-C_8-halogenoalkoxycarbonyl comprising up to 9 halogen atoms that can be

the same or different ; substituted or non-substituted C_1-C_8-alkylsulfonyl ; C_1-C_8-halogenoalkylsulfonyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted benzyl ; or substituted or non-substituted phenylsulfonyl;X independently represents a halogen atom ; nitro ; cyano ; isonitrile ; hydroxy ; amino ; sulfanyl ; pentafluoro-λ^6-sulfanyl ; formyl ; formyloxy ; formylamino ; substituted or non-substituted (hydroxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (C_1-C_8-alkoxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (C_2-C_8-alkenyloxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (C_2-C_8-alkynyloxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (benzyloxyimino)-C_1-C_8-alkyl ; carboxy ; carbamoyl ; N-hydroxycarbamoyl ; carbamate ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl having 1 to 9 halogen atoms ; substituted or non-substituted C_2-C_8-alkenyl ; C_2-C_8-halogenoalkenyl having 1 to 9 halogen atoms ; substituted or non-substituted C_2-C_8-alkynyl ; C_2-C_8-halogenoalkynyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkoxy ; C_1-C_8-halogenoalkoxy having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylsulfanyl ; C_1-C_8-halogenoalkylsulfanyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylsulfinyl ; C_1-C_8-halogenoalkylsulfinyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylsulfonyl ; C_1-C_8-halogenoalkylsulfonyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylamino ; substituted or non-substituted di-C_1-C_8-alkylamino ; substituted or non-substituted C_2-C_8-alkenyloxy ; C_2-C_8-halogenoalkenyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_3-C_8-alkynyloxy ; C_2-C_8-halogenoalkynyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_3-C_7-cycloalkyl ; C_3-C_7-halogenocycloalkyl having 1 to 9 halogen atoms ; substituted or non-substituted (C_3-C_7-cycloalkyl)-C_1-C_8-alkyl ; substituted or non-substituted C_4-C_7-cycloalkenyl ; C_4-C_7-halogenocycloalkenyl having 1 to 9 halogen atoms ; substituted or non-substituted (C_3-C_7-cycloalkyl)-C_2-C_8-alkenyl ; substituted or non-substituted (C_3-C_7-cycloalkyl)-C_2-C_8-alkynyl ; substituted or non-substituted tri(C_1-C_8)alkylsilyl ; substituted or non-substituted tri(C_1-C_8)alkylsilyl-C_1-C_8-alkyl ; substituted or non-substituted C_1-C_8-alkylcarbonyl ; C_1-C_8-halogenoalkylcarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylcarbonyloxy ; C_1-C_8-halogenoalkylcarbonyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylcarbonylamino ; C_1-C_8-halogenoalkylcarbonylamino having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkoxycarbonyl ; C_1-C_8-halogenoalkoxycarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkyloxycarbonyloxy ; C_1-C_8-halogenoalkoxycarbonyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylcarbamoyl ; substituted or non-substituted di-C_1-C_8-alkylcarbamoyl ; substituted or non-substituted C_1-C_8-alkylaminocarbonyloxy ; substituted or non-substituted di-C_1-C_8-alkylaminocarbonyloxy ; substituted or non-substituted N-(C_1-C_8-alkyl)hydroxy carbamoyl ; substituted or non-substituted C_1-C_8-alkoxycarbamoyl ; substituted or non-substituted N-(C_1-C_8-alkyl)-C_1-C_8-alkoxycarbamoyl ; aryl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkyl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_2-C_8-alkenyl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_2-C_8-alkynyl that can be substituted by up to 6 groups Q which can be the same or different ; aryloxy that can be substituted by up to 6 groups Q which can be the same or different ; arylsulfanyl that can be substituted by up to 6

groups Q which can be the same or different ; arylamino that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkyloxy that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkylsulfanyl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkylamino that can be substituted by up to 6 groups Q which can be the same or different ;

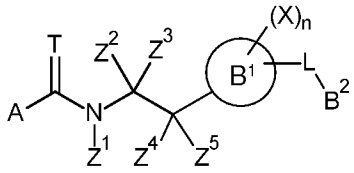
- Y independently represents a halogen atom atom ; cyano ; hydroxy ; amino ; sulfanyl ; substituted or non-substituted C1-C8-alkyl ; C1-C8-halogenoalkyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxy ; C1-C8-halogenoalkoxy having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfanyl ; C1-C8-halogenoalkylsulfanyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfinyl ; C1-C8-halogenoalkylsulfinyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfonyl ; C1-C8-halogenoalkylsulfonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylamino ; substituted or non-substituted di-C1-C8-alkylamino ; substituted or non-substituted C1-C8-alkylcarbonyl ; C1-C8-halogenoalkylcarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxycarbonyl ; C1-C8-halogenoalkoxycarbonyl having 1 to 9 halogen atoms ; aryl that can be substituted by up to 6 groups Q which can be the same or different ;
- Q independently represents a halogen atom, cyano, nitro, substituted or non-substituted C1-C8-alkyl, C1-C8-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different, substituted or non-substituted C1-C8-alkoxy, C1-C8-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different, substituted or non-substituted C1-C8-alkylsulfanyl, C1-C8-halogenoalkylsulfanyl comprising up to 9 halogen atoms that can be the same or different, substituted or non-substituted tri(C1-C8)alkylsilyl, substituted or non-substituted tri(C1-C8)alkylsilyl-C1-C8-alkyl, substituted or non-substituted (C1-C8-alkoxyimino)-C1-C8-alkyl , or substituted or non-substituted (benzyloxyimino)-C1-C8-alkyl ;
- R independently represents hydrogen atom ; halogen atom ; nitro ; cyano ; hydroxy ; amino ; sulfanyl ; pentafluoro-λ6-sulfanyl ; substituted or non-substituted (C1-C8-alkoxyimino)-C1-C8-alkyl ; substituted or non-substituted (benzyloxyimino)-C1-C8-alkyl ; substituted or non-substituted C1-C8-alkyl ; C1-C8-halogenoalkyl having 1 to 9 halogen atoms ; substituted or non-substituted C2-C8-alkenyl ; C2-C8-halogenoalkenyl having 1 to 9 halogen atoms ; substituted or non-substituted C2-C8-alkynyl ; C2-C8-halogenoalkynyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxy ; C1-C8-halogenoalkoxy having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfanyl ; C1-C8-halogenoalkylsulfanyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfinyl ; C1-C8-halogenoalkylsulfinyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfonyl ; C1-C8-halogenoalkylsulfonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylamino ; substituted or non-substituted di-C1-C8-alkylamino ; substituted or non-substituted C2-C8-alkenyloxy ; substituted or non-substituted C3-C8-alkynyloxy ; substituted or non-substituted C3-C7-cycloalkyl ; C3-C7-halogenocycloalkyl having 1 to 9 halogen atoms ; substituted or non-substituted tri(C1-C8)alkylsilyl ; substituted or non-substituted C1-C8-alkylcarbonyl ; C1-C8-halogenoalkylcarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxycarbonyl ; C1-C8-halogenoalkoxycarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylcarbamoyl ; substituted or non-substituted di-C1-C8-

alkylcarbamoyl ; phenoxy ; phenylsulfanyl ; phenylamino ; benzyloxy ; benzylsulfanyl ; or benzylamino ;

as well as its salts, N-oxides, metal complexes, metalloid complexes and optically active isomers or geometric isomers.

The following compounds of formula (I) are mentioned in chemical databases and/or suppliers' databases but without any references or information which enables it to be prepared and separated :
- N-{2-[3-(1,3-benzodioxol-5-yl)-1,2,4-oxadiazol-5-yl]ethyl}-N-cyclohexylthiophene-2-carboxamide, and
- N-{2-[3-(1,3-benzodioxol-5-yl)-1,2,4-oxadiazol-5-yl]ethyl}-N-cyclohexyl-2-furamide.

In a particular embodiment of the invention, compounds of the invention are compounds of formula (I)



(I)

wherein A, T, Z^1 to Z^5, B^1, X, n, L and B^2 are as defined above, with the exclusion of N-{2-[3-(1,3-benzodioxol-5-yl)-1,2,4-oxadiazol-5-yl]ethyl}-N-cyclohexylthiophene-2-carboxamide and N-{2-[3-(1,3-benzodioxol-5-yl)-1,2,4-oxadiazol-5-yl]ethyl}-N-cyclohexyl-2-furamide.

Unless indicated otherwise, a group or a substituent that is substituted according to the invention can be substituted by one or more of the following groups or atoms: a halogen atom ; nitro ; hydroxyl ; cyano ; isonitrile ; amino ; sulfanyl ; a pentafluoro-λ^6-sulfanyl group ; formyl ; formyloxy ; formylamino ; carbamoyl ; N-hydroxycarbamoyl ; carbamate ; (hydroxyimino)-C_1-C_6-alkyl ; C_1-C_8-alkyl ; a tri(C_1-C_8-alkyl)silyl ; C_3-C_8-cycloalkyl ; C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms ; a C_3-C_8-halogenocycloalkyl having 1 to 5 halogen atoms ; C_2-C_8-alkenyl ; C_2-C_8-alkynyl ; C_2-C_8-alkenyloxy ; C_2-C_8-alkynyloxy ; C_1-C_8-alkylamino ; di-C_1-C_8-alkylamino ; C_1-C_8-alkoxy ; C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms ; C_1-C_8-alkylsulfanyl ; C_1-C_8-halogenoalkylsulfanyl having 1 to 5 halogen atoms ; C_2-C_8-alkenyloxy ; C_2-C_8-halogenoalkenyloxy having 1 to 5 halogen atoms ; C_3-C_8-alkynyloxy ; C_3-C_8-halogenoalkynyloxy having 1 to 5 halogen atoms ; C_1-C_8-alkylcarbonyl ; C_1-C_8-halogenoalkylcarbonyl having 1 to 5 halogen atoms ; C_1-C_8-alkylcarbamoyl ; di-C_1-C_8-alkylcarbamoyl ; N-C_1-C_8-alkyloxycarbamoyl ; C_1-C_8-alkoxycarbamoyl ; N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl ; C_1-C_8-alkoxycarbonyl ; C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms ; C_1-C_8-alkylcarbonyloxy ; C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms ; C_1-C_8-alkylcarbonylamino ; C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms ; C_1-C_8-alkylaminocarbonyloxy ; di-C_1-C_8-alkylaminocarbonyloxy ; C_1-C_8-alkyloxycarbonyloxy ; C_1-C_8-alkylsulfanyl ; C_1-C_8-halogenoalkylsulfanyl having 1 to 5 halogen atoms; C_1-C_8-alkylsulfinyl ; C_1-C_8-halogenoalkylsulfinyl having 1 to 5 halogen atoms ; C_1-C_8-alkylsulfonyl ; C_1-C_8-halogenoalkylsulfonyl having 1 to 5 halogen atoms ; C_1-C_8-alkylaminosulfamoyl ; di-C_1-C_8-alkylaminosulfamoyl ; (C_1-C_6-alkoxyimino)-C_1-C_6-alkyl ; (C_1-C_6-alkenyloxyimino)-C_1-C_6-alkyl ; (C_1-C_6-alkynyloxyimino)-C_1-C_6-alkyl ; 2-oxopyrrolidin-1-yl ;

(benzyloxyimino)-C_1-C_6-alkyl ; C_1-C_8-alkoxyalkyl ; C_1-C_8-halogenoalkoxyalkyl having 1 to 5 halogen atoms ; benzyloxy ; benzylsulfanyl ; benzylamino ; aryloxy ; arylsulfanyl or arylamino.

According to the invention, the following generic terms are generally used with the following meanings:

- halogen means fluorine, chlorine, bromine or iodine ,
  carboxy means -C(=O)OH ;
  carbonyl means -C(=O)- ;
  carbamoyl means -C(=O)NH_2 ;
  N-hydroxycarbamoyl means -C(=O)NHOH ;
  SO represents a sulfoxide group ;
  SO_2 represents a sulfone group ;
  heteroatom means sulfur, nitrogen or oxygen ;
  methylene means the diradical -CH_2- ;
- an alkyl group, an alkenyl group and an alkynyl group as well as moieties containing these terms, can be linear or branched ;
- halogenated groups, notably haloalkyl, haloalkoxy and cycloalkyl groups, can comprise up to nine identical or different halogen atoms ;
- the term “aryl” means phenyl or naphthyl ;
- In the case of an amino group or the amino moiety of any other amino-containing group, substituted by two substituents that can be the same or different, the two substituents together with the nitrogen atom to which they are linked can form a heterocyclyl group, preferably a 5- to 7-membered heterocyclyl group, that can be substituted or that can include other hetero atoms, for example a morpholino group or piperidinyl group.

Any of the compounds of the present invention can exist in one or more optical or chiral isomer forms depending on the number of asymmetric centres in the compound. The invention thus relates equally to all the optical isomers and to their racemic or scalemic mixtures (the term "scalemic" denotes a mixture of enantiomers in different proportions) and to the mixtures of all the possible stereoisomers, in all proportions. The diastereoisomers and/or the optical isomers can be separated according to the methods which are known *per se* by the man ordinary skilled in the art.

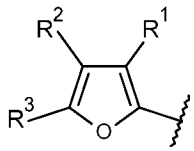
Any of the compounds of the present invention can also exist in one or more geometric isomer forms depending on the number of double bonds in the compound. The invention thus relates equally to all geometric isomers and to all possible mixtures, in all proportions. The geometric isomers can be separated according to general methods, which are known *per se* by the man ordinary skilled in the art.

Any of the compounds of the present invention can also exist in one or more geometric isomer forms depending on the relative position (syn/anti or cis/trans) of the substituents of the chain or ring. The invention thus relates equally to all syn/anti (or cis/trans) isomers and to all possible syn/anti (or cis/trans) mixtures, in all proportions. The syn/anti (or cis/trans) isomers can be separated according to general methods, which are known *per se* by the man ordinary skilled in the art.

Where a compound of the invention can be present in tautomeric form, such a compound is understood hereinabove and hereinbelow also to include, where applicable, corresponding tautomeric forms, even when these are not specifically mentioned in each case.

Preferred compounds according to the invention are compounds of formula (I) wherein A is selected in the list consisting of:

- a heterocycle of formula (A^1)

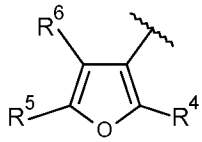


(A^1)

wherein :

R^1 to R^3 that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^2)

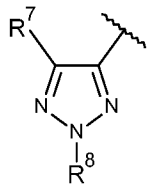


(A^2)

wherein :

R^4 to R^6 that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^3)



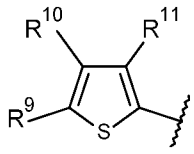
(A^3)

wherein :

R^7 represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^8 represents a hydrogen atom or a substituted or non-substituted C_1-C_5-alkyl ;

- a heterocycle of formula (A^4)

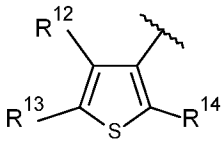


(A4)

wherein :

R^9 to R^{11} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; amino ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_1-C_5-alkylsulfanyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A5)



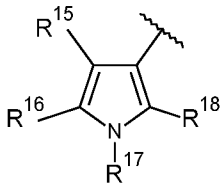
(A5)

wherein :

R^{12} and R^{13} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; amino ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^{14} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; amino ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A6)



(A6)

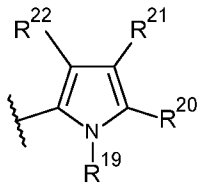
wherein :

R^{15} represents a hydrogen atom ; a halogen atom ; a cyano ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{16} and R^{18} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkoxycarbonyl ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{17} represent a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

- a heterocycle of formula (A^7)



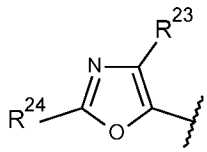
(A^7)

wherein :

R^{19} represents a hydrogen atom or a C_1-C_5-alkyl

R^{20} to R^{22} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^8)



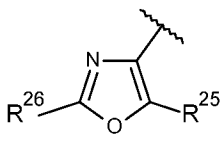
(A^8)

wherein :

R^{23} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{24} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different;

- a heterocycle of formula (A^9)



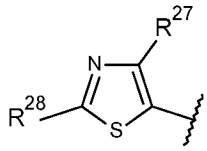
(A^9)

wherein :

R^{25} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{26} represents a hydrogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^{10})



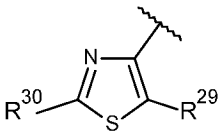
(A^{10})

wherein :

R^{27} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{28} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or substituted or non-substituted di(C_1-C_5-alkyl)amino ;

- a heterocycle of formula (A^{11})



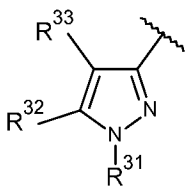
(A^{11})

wherein :

R^{29} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{30} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or substituted or non-substituted di(C_1-C_5-alkyl)amino ;

- a heterocycle of formula (A^{12})



(A^{12})

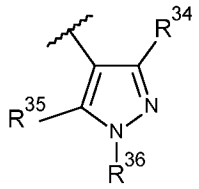
wherein :

R^{31} represents a hydrogen atom or a substituted or non-substituted C_1-C_5-alkyl

R^{32} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{33} represents a hydrogen atom ; a halogen atom ; a nitro ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^{13})



(A^{13})

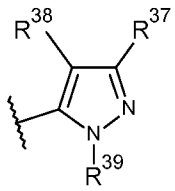
wherein :

R^{34} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_3-C_5-cycloalkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_2-C_5-alkynyloxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^{35} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; a cyano ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_1-C_5-alkylsulfanyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or substituted or non-substituted di(C_1-C_5-alkyl)amino;

R^{36} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{14})



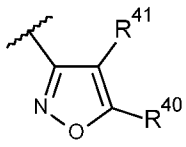
(A^{14})

wherein :

R^{37} and R^{38} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or a substituted or non-substituted C_1-C_5-alkylsulfanyl ;

R^{39} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

- a heterocycle of formula (A^{15})

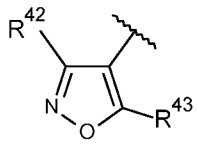


(A[15])

wherein :

R^{40} and R^{41} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A[16])

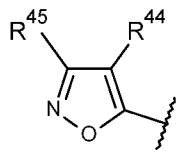


(A[16])

wherein :

R^{42} and R^{43} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or amino ;

-a heterocycle of formula (A[17])

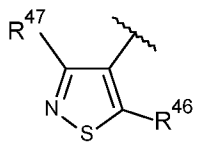


(A[17])

wherein :

R^{44} and R^{45} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A[18])



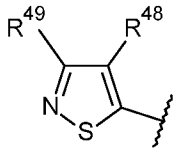
(A[18])

wherein :

R^{47} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{46} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or substituted or non-substituted C_1-C_5-alkylsulfanyl ;

- a heterocycle of formula (A^{19})

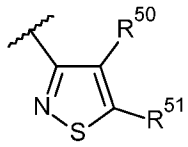


(A^{19})

wherein :

R^{49} and R^{48} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^{20})

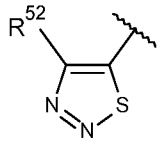


(A^{20})

wherein :

R^{50} and R^{51} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

-a heterocycle of formula (A^{21})



(A^{21})

wherein :

R^{52} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different.

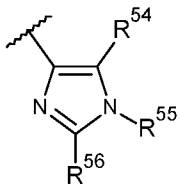
-a heterocycle of formula (A^{22})

(A22)

wherein :

R^{53} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different.

-a heterocycle of formula (A^{23})



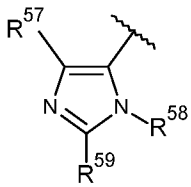
(A^{23})

wherein :

R^{54} and R^{56} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{55} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{24})



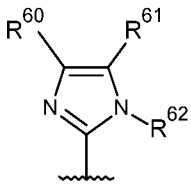
(A^{24})

wherein :

R^{57} and R^{59} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{58} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{25})



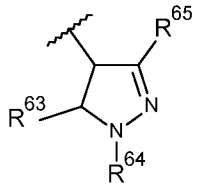
(A^{25})

wherein :

R^{60} and R^{61} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{62} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{26})



(A^{26})

wherein :

R^{65} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_3-C_5-cycloalkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_2-C_5-alkynyloxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^{63} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; a cyano ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_1-C_5-alkylsulfanyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or di(C_1-C_5-alkyl)amino;

R^{64} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl.

More preferred compounds according to the invention are compounds of formula (I) wherein A is selected in the list consisting of A^2 ; A^3 ; A^5 ; A^6 ; A^{10} and A^{13} as herein-defined.

Even more preferred compounds according to the invention are compounds of formula (I) wherein A represents A^{13} wherein R^{34} represents a substituted or non-substituted C_1-C_5-alkyl, C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy ; R^{35} represents a hydrogen atom or a halogen atom and R^{36} represents a substituted or non-substituted C_1-C_5-alkyl.

Even more preferred compounds according to the invention are compounds of formula (I) wherein A represents A^{13} wherein R^{34} represents C_1-C_5-alkyl, C_1-C_5-halogenoalkyl comprising up to 3 halogen atoms that can be the same or different ; R^{35} represents a hydrogen atom ; a chlorine atom ; or a fluorine atom ; and R^{36} represents a methyl.

Other preferred compounds according to the invention are compounds of formula (I) wherein T represents O.

Other preferred compounds according to the invention are compounds of formula (I) wherein Z^1 represents a substituted or non-substituted cyclopropyl.

Other more preferred compounds according to the invention are compounds of formula (I) wherein Z^1 represents a non-substituted cyclopropyl or a 2-C_1-C_5-alkylcyclopropyl.

Other even more preferred compounds according to the invention are compounds of formula (I) wherein Z^1 represents a non-substituted cyclopropyl.

Other even more preferred compounds according to the invention are compounds of formula (I) wherein Z^1 represents a 2-methylcyclopropyl.

Other preferred compounds according to the invention are compounds of formula (I) wherein Z^2, Z^3, Z^4 and Z^5 independently represent a hydrogen atom or C_1-C_8-alkyl, preferably a hydrogen atom or a methyl.

More preferred compounds according to the invention are compounds of formula (I) wherein Z^2 represents a methyl and Z^3, Z^4 and Z^5 independently represent a hydrogen atom or a methyl.

Other preferred compounds according to the invention are compounds of formula (I) wherein n represents 0, 1 or 2.

Other preferred compounds according to the invention are compounds of formula (I) wherein L represents a direct bond.

Other preferred compounds according to the invention are compounds of formula (I) wherein L represents an oxygen atom.

Other preferred compounds according to the invention are compounds of formula (I) wherein L represents a methylene group or a carbonyl group.

Other preferred compounds according to the invention are compounds of formula (I) wherein B^1 represents a substituted or non-substituted thienyl ring; a substituted or non-substituted benzothiophenyl ring; a substituted or non-substituted pyridinyl ring; a substituted or non-substituted furyl ring; a substituted or non-substituted imidazo[1,2-a]pyridin-2-yl ring.; or a substituted or non-substituted benzofuranyl ring.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^1 represents a substituted or non-substituted thienyl ring; a substituted or non-substituted benzothiophenyl ring; a substituted or non-substituted pyridinyl ring or substituted or non-substituted imidazo[1,2-a]pyridin-2-yl ring.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^1 represents a pyridinyl ring or imidazo[1,2-a]pyridin-2-yl ring.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^1 represents pyridine-2-yl or imidazo[1,2-a]pyridin-2-yl.

Other preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a substituted or non-substituted thienyl ring; a substituted or non-substituted benzothiophenyl ring; a substituted or non-substituted pyridine ring; a substituted or non-substituted quinolinyl ring; a substituted or non-substituted furyl ring; or a substituted or non-substituted benzofuranyl ring; or a substituted or non-substituted pyrimidinyl ring.

Other preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a thienyl ring; a benzothiophenyl ring; a pyridine ring; a quinolinyl ring; a furyl ring; a benzofuranyl ring; or a pyrimidinyl ring, wherein each of these rings can be non-substituted or substituted by one or more groups or atoms selected among C_1-C_8-alkyl, a halogen atom, C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, C_1-C_8-alkoxy and C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms.
Other more preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a non-substituted thienyl ring or thienyl ring substituted by C_1-C_8-alkyl.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a non-substituted furyl ring or furyl ring substituted by C_1-C_8-alkyl.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a non-substituted benzothiophenyl ring or benzothiophenyl ring substituted by C_1-C_8-alkyl.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a non-substituted quinolinyl ring or quinolinyl ring substituted by C_1-C_8-alkyl or halogen atom.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a non-substituted benzofuranyl ring or benzofuranyl ring substituted by C_1-C_8-alkyl.

Other more preferred compounds according to the invention are compounds of formula (I) wherein B^2 represents a non-substituted pyrimidinyl ring or pyrimidinyl ring substituted by C_1-C_8-alkyl or C_1-C_8-alkoxy.
Other preferred compounds according to the invention are compounds of formula (I) wherein X independently, represents a halogen atom ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms which can be the same or different ; substituted or non-substituted C_3-C_7-cycloalkyl ; tri(C_1-C_8-alkyl)silyl; substituted or non-substituted C_1-C_8-alkoxy; or substituted or non-substituted C_1-C_8-alkylsulfanyl.

Other preferred compounds according to the invention are compounds of formula (I) wherein Y independently, represents a halogen atom ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-

halogenoalkyl comprising up to 9 halogen atoms which can be the same or different ; substituted or non-substituted C_1-C_8-alkoxy ; C_1-C_8-halogenoalkoxy comprising up to 9 halogen atoms which can be the same or different.

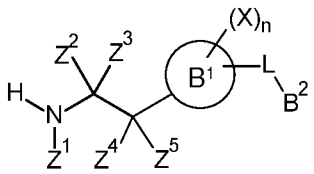
The above mentioned preferences with regard to the substituents of the compounds according to the invention can be combined in various manners. These combinations of preferred features thus provide sub-classes of compounds according to the invention. Examples of such sub-classes of preferred compounds according to the invention are:

- preferred features of A with preferred features of T, Z^1 to Z^5, n, X, L, B^1, B^2 and Y;
- preferred features of T with preferred features of A, Z^1 to Z^5, n, X, L, B^1, B^2 and Y;
- preferred features of Z^1 with preferred features of A, T, Z^2 to Z^5, n, X, L, B^1, B^2 and Y;
- preferred features of Z^2 with preferred features of A, T, Z^1,Z^3 to Z^5, n, X, L, B^1, B^2 and Y;
- preferred features of Z^3 with preferred features of A, T, Z^1 to Z^2, Z^4 to Z^5, n, X, L, B^1, B^2 and Y;
- preferred features of Z^4 with preferred features of A, T, Z^1 to Z^3, Z^5, n, X, L, B^1, B^2 and Y;
- preferred features of Z^5 with preferred features of A, T, Z^1 to Z^4, n, X, L, B^1, B^2 and Y;
- preferred features of n with preferred features of A, T, Z^1 to Z^5, X, L, B^1, B^2 and Y;
- preferred features of X with preferred features of A, T, Z^1 to Z^5, n, L, B^1, B^2 and Y;
- preferred features of L with preferred features of A, T, Z^1 to Z^5, n, X, B^1, B^2 and Y;
- preferred features of B^1 with preferred features of A, T, Z^1 to Z^5, n, X, L, B^2 and Y;
- preferred features of B^2 with preferred features of A, T, Z^1 to Z^5, n, X, L, B^1 and Y;
- preferred features of Y with preferred features of A, T, Z^1 to Z^5, n, X, L, B^1 and B^2.

In these combinations of preferred features of the substituents of the compounds according to the invention, the said preferred features can also be selected among the more preferred features of each of A, T, Z^1 to Z^5, n, X, L, B^1, B^2 and Y so as to form most preferred subclasses of compounds according to the invention.

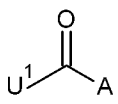
The present invention also relates to a process for the preparation of the compound of formula (I).

Thus, according to a further aspect of the present invention there is provided a process P1 for the preparation of a compound of formula (I) as herein-defined and wherein T represents O and that comprises reaction of an amine of formula (II) or one of its salts:



(II)

wherein Z^1, Z^2, Z^3, Z^4, Z^5, n, X, L, B^1 and B^2 are as herein-defined; with a carboxylic acid derivative of formula (III):



(III)

wherein A is as herein-defined and U^1 represents a leaving group selected in the list consisting of a halogen atom, a hydroxyl group, $-OR^a$, $-OC(=O)R^a$, R^a being a substituted or non-substituted C_1-C_6-alkyl, a substituted or non-substituted C_1-C_6-haloalkyl, a benzyl, 4-methoxybenzyl or pentafluorophenyl group, or a group of formula O-C(=O)A ; in the presence, if necessary, of a catalyst and in the presence of a condensing agent in case U^1 represents a hydroxyl group, and in the presence of an acid binder in case U^1 represents a halogen atom.

N-substituted amine derivatives of formula (II) are known or can be prepared by known processes such as reductive amination of aldehydes or ketones (Bioorganics and Medicinal Chemistry Letters (2006), *16*, 2014), or reduction of imines (Tetrahedron (2005), *61*, 11689), or nucleophilic substitution of a halogen, mesylate or tosylate (Journal of Medicinal Chemistry (2002), *45*, 3887).

Carboxylic acid derivatives of formula (III) are known or can be prepared by known processes.

In case U^1 represents a hydroxy group, process P1 according to the present invention is conducted in the presence of condensing agent. Suitable condensing agent may be selected in the non limited list consisting of acid halide former, such as phosgene, phosphorous tribromide, phosphorous trichloride, phosphorous pentachloride, phosphorous trichloride oxide or thionyl chloride; anhydride former, such as ethyl chloroformate, methyl chloroformate, isopropyl chloroformate, isobutyl chloroformate or methanesulfonyl chloride; carbodiimides, such as N,N'-dicyclohexylcarbodiimide (DCC) or other customary condensing agents, such as phosphorous pentoxide, polyphosphoric acid, N,N'-carbonyl-diimidazole, 2-ethoxy-N-ethoxycarbonyl-1,2-dihydroquinoline (EEDQ), triphenylphosphine/tetrachloro-methane, 4-(4,6-dimethoxy[1.3.5]-triazin-2-yl)-4-methylmorpholinium chloride hydrate, bromo-tripyrrolidinophosphoniumhexafluorophosphate or propanephosphonic anhydride (T3P).
Process P1 according to the present invention may be conducted in the presence of a catalyst. Suitable catalyst may be selected in the list consisting of N,N-dimethylpyridin-4-amine, 1-hydroxy-benzotriazole or N,N-dimethylformamide.

In case U^1 represents a halogen atom, process P1 according to the present invention is conducted in the presence of an acid binder. Suitable acid binders for carrying out process P1 according to the invention are in each case all inorganic and organic bases that are customary for such reactions. Preference is given to using alkaline earth metal, alkali metal hydride, alkali metal hydroxides or alkali metal alkoxides, such as sodium hydroxide, sodium hydride, calcium hydroxide, potassium hydroxide, potassium tert-butoxide or other ammonium hydroxide, alkali metal carbonates, such as caesium carbonate, sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate, alkali metal or alkaline earth metal acetates, such as sodium acetate, potassium acetate, calcium acetate and also tertiary amines, such as trimethylamine, triethylamine, diisopropylethylamine, tributylamine, N,N-dimethylaniline, pyridine, N-methylpiperidine, N,N-dimethylpyridin-4-amine, diazabicyclooctane (DABCO), diazabicyclo-nonene (DBN) or diazabicycloundecene (DBU).

It is also possible to work in the absence of an additional condensing agent or to employ an excess of the amine component, so that it simultaneously acts as acid binder agent.

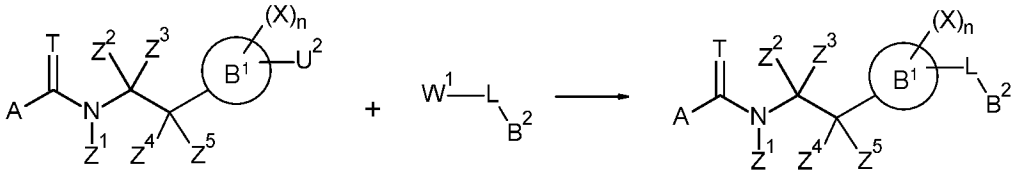
Suitable solvents for carrying out process P1 according to the invention can be customary inert organic solvents. Preference is given to using optionally halogenated aliphatic, alicyclic or aromatic hydrocarbons, such as petroleum ether, hexane, heptane, cyclohexane, methylcyclohexane, benzene, toluene, xylene or decalin; chlorobenzene, dichlorobenzene, dichloromethane, chloroform, carbon tetrachloride, dichlorethane or trichlorethane; ethers, such as diethyl ether, diisopropyl ether, methyl *t*-butyl ether, methyl *t*-amyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, 1,2-diethoxyethane or anisole; nitriles, such as acetonitrile, propionitrile, n- or i-butyronitrile or benzonitrile; amides, such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylformanilide, N-methylpyrrolidone, or hexamethylphosphoric triamide; alcohols such as methanol, ethanol, propanol, isopropanol; esters, such as methyl acetate or ethyl acetate, sulfoxides, such as dimethyl sulfoxide, or sulfones, such as sulfolane.

When carrying out process P1 according to the invention, the amine derivative of formula (II) can be employed as its salt, such as chlorhydrate or any other convenient salt.

When carrying out process P1 according to the invention, 1 mole or an excess of the amine derivative of formula (II) and from 1 to 3 moles of the acid binder can be employed per mole of the reagent of formula (III).

It is also possible to employ the reaction components in other ratios. Work-up is carried out by known methods.

According to a further aspect of the present invention, there is provided a second process P2 for the preparation of a compound of formula (I) wherein L represents a direct bond or a methylene group, as illustrated by the following reaction scheme:



(IV) (V) (I)

Process P2

wherein A, T, Z^1, Z^2, Z^3, Z^4, Z^5, n, X, B^1 and B^2 are as herein-defined, L represents a direct bond or a methylene group, U^2 represents a halogen atom such as chlorine, bromine or iodine, or a triflate group and W^1 represents a boron derivative such as a boronic acid, a boronic ester or a potassium trifluoroborate derivative.

Process P2 can be performed in the presence of a transition metal catalyst such as palladium and if appropriate in the presence of a phosphine ligand or a N-heterocyclic carbene ligand and in the presence of a base and if appropriate in the presence of a solvent.

Compounds of formula (IV) can be prepared by known processes (WO-2011/151369, WO-2007/006739, WO-2006/122955 and WO-2005/103006) and the preparation of compounds of formula (V) is well known.

Process P2 according to the invention can be carried out in the presence of a catalyst, such as a metal salt or complex. Suitable metal derivatives for this purpose are transition metal catalysts such as palladium. Suitable metal salts or complexes for this purpose are for example, palladium chloride, palladium acetate, tetrakis(triphenylphosphine) palladium, bis(dibenzylideneacetone) palladium, bis(triphenylphosphine)palladium dichloride, 1,1'-bis(diphenylphosphino)ferrocene palladium(II) chloride or 1,10-bis(di-tert-butylphosphino)ferrocene palladium(II) dichloride.

It is also possible to generate a palladium complex in the reaction mixture by separate addition to the reaction of a palladium salt and a ligand or salt, such as triethylphosphine, tri-tert-butylphosphine, tri-tert-butylphosphonium tetrafluoroborate, tricyclohexylphosphine, 2-(dicyclohexylphosphine)biphenyl, 2-(di-tert-butylphosphine)biphenyl, 2-(dicyclohexylphosphine)-2'-(N,N-dimethylamino)biphenyl, triphenylphosphine, tris-(o-tolyl)phosphine, sodium 3-(diphenylphosphino)benzenesulfonate, tris-2-(methoxyphenyl)phosphine, 2,2'-bis(diphenylphosphine)-1,1'-binaphthyl, 1,4-bis(diphenylphosphine)butane, 1,2-bis(diphenylphosphine) ethane, 1,4-bis(dicyclohexylphosphine)butane, 1,2-bis(dicyclohexylphosphine)-ethane, 2-(dicyclohexylphosphine)-2'-(N,N-dimethylamino)-biphenyl, 1,1'-bis(diphenylphosphino)-ferrocene, (R)-(-)-1-[(S)-2-diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, tris-(2,4-tert-butylphenyl)phosphite or 1,3-bis(2,4,6-trimethylphenyl)imidazolium chloride.
It is also advantageous to choose the appropriate catalyst and/or ligand from commercial catalogues such as “Metal Catalysts for Organic Synthesis” by Strem Chemicals or “Phosphorous Ligands and Compounds” by Strem Chemicals.

Suitable bases for carrying out process P2 according to the invention can be inorganic and organic bases which are customary for such reactions. Preference is given to using alkaline earth metal or alkali metal hydroxides, such as sodium hydroxide, calcium hydroxide, potassium hydroxide or other ammonium hydroxide derivatives ; alkaline earth metal, alkali metal or ammonium fluorides such as potassium fluoride, caesium fluoride or tetrabutylammonium fluoride ; alkaline earth metal or alkali metal carbonates, such as sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate or caesium carbonate ; alkali metal or alkaline earth metal acetates, such as sodium acetate, potassium acetate or calcium acetate ; alkali metal alcoholates, such as potassium *tert*-butoxide or sodium ter-butoxide ; alkali metal phosphates, such as tri-potassium phosphate ; tertiary amines, such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, N,N-dicyclohexylmethylamine, N-methylpiperidine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU) ; and also aromatic bases, such as pyridine, picolines, lutidines or collidines.

Suitable solvents for carrying out process P2 according to the invention can be customary inert organic solvents. Preference is given to using optionally halogen atomated aliphatic, alicyclic or aromatic hydrocarbons, such as petroleum ether, hexane, heptane, cyclohexane, methylcyclohexane, benzene, toluene, xylene or decalin ; chlorobenzene, dichlorobenzene, dichloromethane, chloroform, carbon

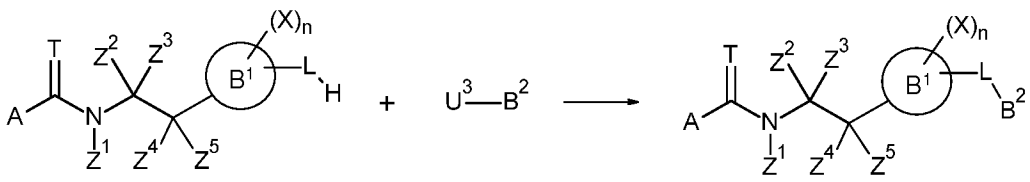
tetrachloride, dichlorethane or trichlorethane ; ethers, such as diethyl ether, diisopropyl ether, methyl *t*-butyl ether, methyl *t*-amyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, 1,2-diethoxyethane or anisole ; nitriles, such as acetonitrile, propionitrile, n- or i-butyronitrile or benzonitrile ; amides, such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylformanilide, N-methylpyrrolidone or hexamethylphosphoric triamide ; esters, such as methyl acetate or ethyl acetate, sulfoxides, such as dimethyl sulfoxide, or sulfones, such as sulfolane.

It can also be advantageous to carry out process P2 according to the invention, with a co-solvent such as water or an alcohol such as methanol, ethanol, propanol, isopropanol or *tert*-butanol.

When carrying out process P2 according to the invention, 1 mole or an excess of compound of formula (V) and from 1 to 5 moles of base and from 0.01 to 20 mole percent of a palladium complex can be employed per mole of compound of formula (IV).

It is also possible to employ the reaction components in other ratios. Work-up is carried out by known methods.

According to a further aspect of the present invention, there is provided a third process P3 for the preparation of a compound of formula (I) wherein L represents a heteroatom, as illustrated by the following reaction scheme:



(VI) (VII) (I)

Process P3

wherein A, T, Z^1, Z^2, Z^3, Z^4, Z^5, n, X, B^1 and B^2 are as herein-defined, U^3 represents a halogen atom and L represents an oxygen atom, a sulfur atom or a mono-substituted or non-substituted nitrogen atom,

Process P3 according to the invention is performed in the presence of a base.

Compounds of formula (VI) can be prepared by known processes (WO-2011/151369, WO-2007/006739, WO-2006/122955 and WO-2005/103006) and the preparation of compounds of formula (VII) is well known.

Suitable bases for carrying out process P3 according to the invention can be inorganic and organic bases which are customary for such reactions. Preference is given to using alkaline earth metal or alkali metal hydroxides, such as sodium hydroxide, calcium hydroxide, potassium hydroxide or other ammonium hydroxide derivatives ; alkaline earth metal, alkali metal or ammonium fluorides such as potassium fluoride, caesium fluoride or tetrabutylammonium fluoride ; alkaline earth metal or alkali metal carbonates,

such as sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate or caesium carbonate ; alkali metal or alkaline earth metal acetates, such as sodium acetate, potassium acetate or calcium acetate ; alkali metal alcoholates, such as potassium ter-butoxide or sodium *tert*-butoxide ; alkali metal phosphates, such as tri-potassium phosphate ; tertiary amines, such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, N,N-dicyclohexylmethylamine, N-methylpiperidine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diaza-bicycloundecene (DBU) ; and also aromatic bases, such as pyridine, picolines, lutidines or collidines.

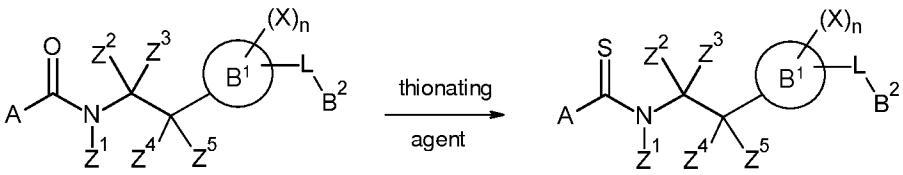
Other suitable bases for carrying out process P3 according to the invention can be amides or organometallic derivatives. Preference is given to alkali metal amides, such as sodium amide or potassium amide ; organic amides, such as lithium diisopropylamine (LDA), lithium hexamethyldisilazane (LiHMDS), potassium hexamethyldisilazane (KHMDS) or sodium hexamethyldisilazane (NaHMDS) ; organolithium derivatives, such as methyllithium, phenyllithium, butyllithium, *sec*-butyllithium, *iso*-butyllithium or *tert*-butyllithium.

Suitable solvents for carrying out process P3 according to the invention can be customary inert organic solvents. Preference is given to using optionally halogen atomated aliphatic, alicyclic or aromatic hydrocarbons, such as petroleum ether, hexane, heptane, cyclohexane, methylcyclohexane, benzene, toluene, xylene or decalin ; chlorobenzene, dichlorobenzene, dichloromethane, chloroform, carbon tetrachloride, dichlorethane or trichlorethane ; ethers, such as diethyl ether, diisopropyl ether, methyl *t*-butyl ether, methyl *t*-amyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, 1,2-diethoxyethane or anisole ; nitriles, such as acetonitrile, propionitrile, *n*- or *i*-butyronitrile or benzonitrile ; amides, such as N,N-dimethylformamide, N,N-dimethylacetamide, N-methylformanilide, N-methylpyrrolidone or hexamethylphosphoric triamide ; esters, such as methyl acetate or ethyl acetate, sulfoxides, such as dimethyl sulfoxide, or sulfones, such as sulfolane.

When carrying out process P3 according to the invention, 1 mole or an excess of compound of formula (VII) and from 1 to 5 moles of base can be employed per mole of compound of formula (VI).

It is also possible to employ the reaction components in other ratios. Work-up is carried out by known methods.

According to a further aspect according to the invention, there is provided a fourth process P4 for the preparation of a compound of formula (I) wherein T represents S, starting from a compound of formula (I) wherein T represents O and illustrated according to the following reaction scheme :



(I) (I)

Process P4

wherein A, Z^1, Z^2, Z^3, Z^4, Z^5, n, X, L, B^1 and B^2 are as herein-defined.

Process P4 according to the invention is performed in the presence of a thionating agent.

Starting amide derivatives of formula (I) wherein T represents O can be prepared according to processes P1, P2 and P3.

Suitable thionating agents for carrying out process P4 according to the invention can be sulfur (S), sulfhydric acid (H_2S), sodium sulfide (Na_2S), sodium hydrosulfide (NaHS), boron trisulfide (B_2S_3), bis(diethylaluminium) sulfide ($(AlEt_2)_2S$), ammonium sulfide ($(NH_4)_2S$), phosphorous pentasulfide (P_2S_5), Lawesson's reagent (2,4-bis(4-methoxyphenyl)-1,2,3,4-dithiadiphosphetane 2,4-disulfide) or a polymer-supported thionating reagent such as described in Journal of the Chemical Society, Perkin 1 (2001), 358, in the optionally presence of a catalytic or stoichiometric or excess amount, quantity of a base such as an inorganic and organic base. Preference is given to using alkali metal carbonates, such as sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate ; heterocyclic aromatic bases, such as pyridine, picoline, lutidine, collidine ; and also tertiary amines, such as trimethylamine, triethylamine, tributylamine, N,N-dimethylaniline, N,N-dimethylpyridin-4-amine or N-methyl-piperidine.

Suitable solvents for carrying out process P4 according to the invention can be customary inert organic solvents. Preference is given to using optionally halogenated aliphatic, alicyclic or aromatic hydrocarbons, such as petroleum ether, hexane, heptane, cyclohexane, methylcyclohexane, benzene, toluene, xylene or decalin, chlorobenzene, dichlorobenzene, dichloromethane, chloroform, carbon tetrachloride, dichlorethane or trichlorethane, ethers, such as diethyl ether, diisopropyl ether, methyl *t*-butyl ether, methyl *t*-amyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane or 1,2-diethoxyethane, nitriles, such as acetonitrile, propionitrile, *n*- or *i*-butyronitrile or benzonitrile, sulfurous solvents, such as sulfolane or carbon disulfide.

When carrying out process P4 according to the invention, 1 mole or an excess of the sulfur equivalent of the thionating agent and from 1 to 3 moles of the base can be employed per mole of the amide reactant (I).
It is also possible to employ the reaction components in other ratios. Work-up is carried out by known methods.

Processes P1, P2, P3 and P4 according to the invention are generally carried out under atmospheric pressure. It is also possible to operate under elevated or reduced pressure.

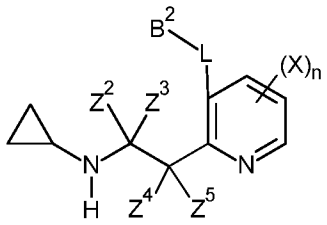
When carrying out processes P1, P2, P3 and P4 according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, these processes are carried out at temperatures from - 75 °C to 200 °C, preferably from 10 °C to 15 0 °C. A way to control the temperature for the processes according to the invention is to use microwave technology.

In general, the reaction mixture is concentrated under reduced pressure. The residue that remains can be freed by known methods, such as chromatography or crystallization, from any impurities that can still be present.

Work-up is carried out by customary methods. Generally, the reaction mixture is treated with water and the organic phase is separated off and, after drying, concentrated under reduced pressure. If appropriate, the remaining residue can, be freed by customary methods, such as chromatography, crystallization or distillation, from any impurities that may still be present.

The compound according to the present invention can be prepared according to the general processes of preparation described above. It will nevertheless be understood that, on the basis of his general knowledge and of available publications, the skilled worker will be able to adapt this method according to the specifics of each of the compounds, which it is desired to synthesize.

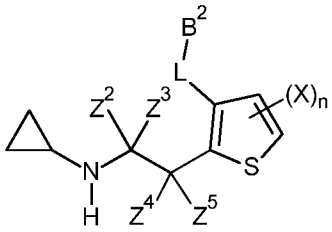
The present invention thus provides compounds of formula (IIa) as well as their acceptable salts:



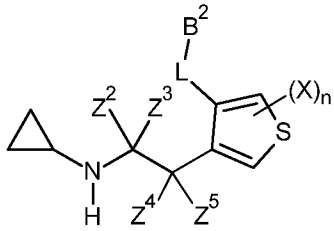
(IIa)

wherein n represents 0, 1, 2 or 3, L is a direct bond or CZ^6Z^7, and Z^2, Z^3, Z^4, Z^5, Z^6, Z^7, B^2 and X are as herein-defined.

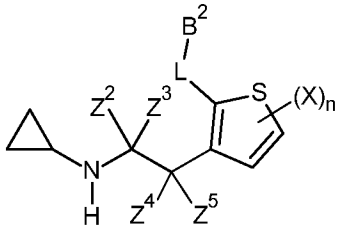
The present invention also provides compounds of formula (IIb), (IIc) and (IId),as well as their acceptable salts:



(IIb)



(IIc)



(IId)

wherein n represents 0, 1 or 2, L is a direct bond or CZ^6Z^7, and Z^2, Z^3, Z^4, Z^5, Z^6, Z^7, B^2 and X are as herein-defined.

In a further aspect, the present invention also relates to a fungicide composition comprising an effective and non-phytotoxic amount of an active compound of formula (I).

The expression "effective and non-phytotoxic amount" means an amount of composition according to the invention that is sufficient to control or destroy the fungi present or liable to appear on the crops and that does not entail any appreciable symptom of phytotoxicity for the said crops. Such an amount can vary within a wide range depending on the fungus to be controlled, the type of crop, the climatic conditions and the compounds included in the fungicide composition according to the invention. This amount can be determined by systematic field trials that are within the capabilities of a person skilled in the art.

Thus, according to the invention, there is provided a fungicide composition comprising, as an active ingredient, an effective amount of a compound of formula (I) as herein defined and an agriculturally acceptable support, carrier or filler.

According to the invention, the term "support" denotes a natural or synthetic, organic or inorganic compound with that the active compound of formula (I) is combined or associated to make it easier to apply, notably to the parts of the plant. This support is thus generally inert and should be agriculturally acceptable. The support can be a solid or a liquid. Examples of suitable supports include clays, natural or synthetic silicates, silica, resins, waxes, solid fertilisers, water, alcohols, in particular butanol, organic solvents, mineral and plant oils and derivatives thereof. Mixtures of such supports can also be used.

The composition according to the invention can also comprise additional components. In particular, the composition can further comprise a surfactant. The surfactant can be an emulsifier, a dispersing agent or a wetting agent of ionic or non-ionic type or a mixture of such surfactants. Mention can be made, for example, of polyacrylic acid salts, lignosulfonic acid salts, phenolsulfonic or naphthalenesulfonic acid salts, polycondensates of ethylene oxide with fatty alcohols or with fatty acids or with fatty amines, substituted phenols (in particular alkylphenols or arylphenols), salts of sulfosuccinic acid esters, taurine derivatives (in particular alkyl taurates), phosphoric esters of polyoxyethylated alcohols or phenols, fatty acid esters of polyolsand derivatives of the above compounds containing sulfate, sulfonate and phosphate functions. The presence of at least one surfactant is generally essential when the active compound and/or the inert support are water-insoluble and when the vector agent for the application is water. Preferably, surfactant content can be comprised from 5% to 40% by weight of the composition.

Optionally, additional components can also be included, e.g. protective colloids, adhesives, thickeners, thixotropic agents, penetration agents, stabilisers, sequestering agents. More generally, the active compounds can be combined with any solid or liquid additive, that complies with the usual formulation techniques.

In general, the composition according to the invention can contain from 0.05 to 99% by weight of active compound, preferably 10 to 70% by weight.

Compositions according to the invention can be used in various forms and formulations such as aerosol dispenser, capsule suspension, cold fogging concentrate, dustable powder, emulsifiable concentrate, emulsion oil in water, emulsion water in oil, encapsulated granule, fine granule, flowable concentrate for seed treatment, gas (under pressure),gas generating product, granule, hot fogging concentrate,

macrogranule, microgranule, oil dispersible powder, oil miscible flowable concentrate, oil miscible liquid, paste, plant rodlet, powder for dry seed treatment, seed coated with a pesticide, soluble concentrate, soluble powder, solution for seed treatment, suspension concentrate (flowable concentrate), ultra low volume (ULV) liquid, ultra low volume (ULV) suspension, water dispersible granules or tablets, water dispersible powder for slurry treatment, water soluble granules or tablets, water soluble powder for seed treatment and wettable powder. These compositions include not only compositions that are ready to be applied to the plant or seed to be treated by means of a suitable device, such as a spraying or dusting device, but also concentrated commercial compositions that must be diluted before application to the crop.

The formulations can be prepared in a manner known per se, for example by mixing the active ingredients with at least one customary extender, solvent or diluent, adjuvant, emulsifier, dispersant, and/or binder or fixative, wetting agent, water repellent, if appropriate desiccants and UV stabilizers and, if appropriate, dyes and pigments, antifoams, preservatives, inorganic and organic thickeners, adhesives, gibberellins and also further processing auxiliaries and also water. Depending on the formulation type to be prepared further processing steps are necessary, e.g. wet grinding, dry grinding and granulation.

The inventive active ingredients may be present as such or in their (commercial) formulations and in the use forms prepared from these formulations as a mixture with other (known) active ingredients, such as insecticides, attractants, sterilants, bactericides, acaricides, nematicides, fungicides, growth regulators, herbicides, fertilizers, safeners and/or semiochemicals.

The compounds of formula (I) and the fungicide composition according to the invention can be used to curatively or preventively control the phytopathogenic fungi of plants or crops.

Thus, according to a further aspect of the invention, there is provided a method for curatively or preventively controlling the phytopathogenic fungi of plants or crops characterised in that a compound of formula (I) or a fungicide composition according to the invention is applied to the seed, the plant or to the fruit of the plant or to the soil wherein the plant is growing or wherein it is desired to grow.

The method of treatment according to the invention can also be useful to treat propagation material such as tubers or rhizomes, but also seeds, seedlings or seedlings pricking out and plants or plants pricking out. This method of treatment can also be useful to treat roots. The method of treatment according to the invention can also be useful to treat the overground parts of the plant such as trunks, stems or stalks, leaves, flowers and fruit of the concerned plant.

According to the invention all plants and plant parts can be treated. By plants is meant all plants and plant populations such as desirable and undesirable wild plants, cultivars and plant varieties (whether or not protectable by plant variety or plant breeder's rights). Cultivars and plant varieties can be plants obtained by conventional propagation and breeding methods which can be assisted or supplemented by one or more biotechnological methods such as by use of double haploids, protoplast fusion, random and directed mutagenesis, molecular or genetic markers or by bioengineering and genetic engineering methods. By plant parts is meant all above ground and below ground parts and organs of plants such as shoot, leaf, blossom and root, whereby for example leaves, needles, stems, branches, blossoms, fruiting bodies, fruits and seed as well as roots, corms and rhizomes are listed. Crops and vegetative and

generative propagating material, for example cuttings, corms, rhizomes, runners and seeds also belong to plant parts.

Among the plants that can be protected by the method according to the invention, mention may be made of major field crops like corn, soybean, cotton, *Brassica* oilseeds such as *Brassica napus* (e.g. canola), *Brassica rapa*, *B. juncea* (e.g. mustard) and *Brassica carinata*, rice, wheat, sugarbeet, sugarcane, oats, rye, barley, millet, triticale, flax, vine and various fruits and vegetables of various botanical taxa such as *Rosaceae sp.* (for instance pip fruit such as apples and pears, but also stone fruit such as apricots, cherries, almonds and peaches, berry fruits such as strawberries), *Ribesioidae sp.*, *Juglandaceae sp.*, *Betulaceae sp.*, *Anacardiaceae sp.*, *Fagaceae sp.*, *Moraceae sp.*, *Oleaceae sp.*, *Actinidaceae sp., Lauraceae sp.*, *Musaceae sp.* (for instance banana trees and plantings), *Rubiaceae sp.* (for instance coffee), *Theaceae sp.*, *Sterculiceae sp.*, *Rutaceae sp.* (for instance lemons, oranges and grapefruit) ; *Solanaceae sp.* (for instance tomatoes, potatoes, peppers, eggplant), *Liliaceae sp.*, Compositiae *sp.* (for instance lettuce, artichoke and chicory - including root chicory, endive or common chicory), *Umbelliferae sp.* (for instance carrot, parsley, celery and celeriac), *Cucurbitaceae sp.* (for instance cucumber – including pickling cucumber, squash, watermelon, gourds and melons), *Alliaceae* sp. (for instance onions and leek), Cruciferae *sp.* (for instance white cabbage, red cabbage, broccoli, cauliflower, brussel sprouts, pak choi, kohlrabi, radish, horseradish, cress, Chinese cabbage), Leguminosae *sp.* (for instance peanuts, peas and beans beans - such as climbing beans and broad beans), *Chenopodiaceae sp.* (for instance mangold, spinach beet, spinach, beetroots), *Malvaceae* (for instance okra), *Asparagaceae* (for instance asparagus); horticultural and forest crops; ornamental plants; as well as genetically modified homologues of these crops.

The method of treatment according to the invention can be used in the treatment of genetically modified organisms (GMOs), e.g. plants or seeds. Genetically modified plants (or transgenic plants) are plants of which a heterologous gene has been stably integrated into genome. The expression “heterologous gene” essentially means a gene which is provided or assembled outside the plant and when introduced in the nuclear, chloroplastic or mitochondrial genome gives the transformed plant new or improved agronomic or other properties by expressing a protein or polypeptide of interest or by downregulating or silencing other gene(s) which are present in the plant (using for example, antisense technology, cosuppression technology or RNA interference – RNAi - technology). A heterologous gene that is located in the genome is also called a transgene. A transgene that is defined by its particular location in the plant genome is called a transformation or transgenic event.

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

At certain application rates, the active compound combinations according to the invention may also have a strengthening effect in plants. Accordingly, they are also suitable for mobilizing the defense system of the plant against attack by unwanted microorganisms. This may, if appropriate, be one of the reasons of the enhanced activity of the combinations according to the invention, for example against fungi. Plant-strengthening (resistance-inducing) substances are to be understood as meaning, in the present context, those substances or combinations of substances which are capable of stimulating the defense system of plants in such a way that, when subsequently inoculated with unwanted microorganisms, the treated plants display a substantial degree of resistance to these microorganisms. In the present case, unwanted microorganisms are to be understood as meaning phytopathogenic fungi, bacteria and viruses. Thus, the substances according to the invention can be employed for protecting plants against attack by the abovementioned pathogens within a certain period of time after the treatment. The period of time within which protection is effected generally extends from 1 to 10 days, preferably 1 to 7 days, after the treatment of the plants with the active compounds.

Plants and plant cultivars which are preferably to be treated according to the invention include all plants which have genetic material which impart particularly advantageous, useful traits to these plants (whether obtained by breeding and/or biotechnological means).

Plants and plant cultivars which are also preferably to be treated according to the invention are resistant against one or more biotic stresses, i.e. said plants show a better defense against animal and microbial pests, such as against nematodes, insects, mites, phytopathogenic fungi, bacteria, viruses and/or viroids.

Examples of nematode resistant plants are described in e.g. US Patent Application Nos 11/765,491, 11/765,494, 10/926,819, 10/782,020, 12/032,479, 10/783,417, 10/782,096, 11/657,964, 12/192,904, 11/396,808, 12/166,253, 12/166,239, 12/166,124, 12/166,209, 11/762,886, 12/364,335, 11/763,947, 12/252,453, 12/209,354, 12/491,396 or 12/497,221.

Plants and plant cultivars which may also be treated according to the invention are those plants which are resistant to one or more abiotic stresses. Abiotic stress conditions may include, for example, drought, cold temperature exposure, heat exposure, osmotic stress, flooding, increased soil salinity, increased mineral exposure, ozone exposure, high light exposure, limited availability of nitrogen nutrients, limited availability of phosphorus nutrients, shade avoidance.

Plants and plant cultivars which may also be treated according to the invention, are those plants characterized by enhanced yield characteristics. Increased yield in said plants can be the result of, for example, improved plant physiology, growth and development, such as water use efficiency, water retention efficiency, improved nitrogen use, enhanced carbon assimilation, improved photosynthesis, increased germination efficiency and accelerated maturation. Yield can furthermore be affected by improved plant architecture (under stress and non-stress conditions), including but not limited to, early flowering, flowering control for hybrid seed production, seedling vigor, plant size, internode number and distance, root growth, seed size, fruit size, pod size, pod or ear number, seed number per pod or ear, seed mass, enhanced seed filling, reduced seed dispersal, reduced pod dehiscence and lodging resistance. Further yield traits include seed composition, such as carbohydrate content, protein content,

oil content and composition, nutritional value, reduction in anti-nutritional compounds, improved processability and better storage stability.

Plants that may be treated according to the invention are hybrid plants that already express the characteristic of heterosis or hybrid vigor which results in generally higher yield, vigor, health and resistance towards biotic and abiotic stresses). Such plants are typically made by crossing an inbred male-sterile parent line (the female parent) with another inbred male-fertile parent line (the male parent). Hybrid seed is typically harvested from the male sterile plants and sold to growers. Male sterile plants can sometimes (e.g. in corn) be produced by detasseling, i.e. the mechanical removal of the male reproductive organs (or males flowers) but, more typically, male sterility is the result of genetic determinants in the plant genome. In that case, and especially when seed is the desired product to be harvested from the hybrid plants it is typically useful to ensure that male fertility in the hybrid plants is fully restored. This can be accomplished by ensuring that the male parents have appropriate fertility restorer genes which are capable of restoring the male fertility in hybrid plants that contain the genetic determinants responsible for male-sterility. Genetic determinants for male sterility may be located in the cytoplasm. Examples of cytoplasmic male sterility (CMS) were for instance described in Brassica species (W0 92/05251, WO 95/09910, WO 98/27806, WO 05/002324, WO 06/021972 and US 6,229,072). However, genetic determinants for male sterility can also be located in the nuclear genome. Male sterile plants can also be obtained by plant biotechnology methods such as genetic engineering. A particularly useful means of obtaining male-sterile plants is described in WO 89/10396 in which, for example, a ribonuclease such as barnase is selectively expressed in the tapetum cells in the stamens. Fertility can then be restored by expression in the tapetum cells of a ribonuclease inhibitor such as barstar (e.g. WO 91/02069).

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may be treated according to the invention are herbicide-tolerant plants, i.e. plants made tolerant to one or more given herbicides. Such plants can be obtained either by genetic transformation, or by selection of plants containing a mutation imparting such herbicide tolerance.

Herbicide-resistant plants are for example glyphosate-tolerant plants, i.e. plants made tolerant to the herbicide glyphosate or salts thereof. Plants can be made tolerant to glyphosate through different means. For example, glyphosate-tolerant plants can be obtained by transforming the plant with a gene encoding the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS). Examples of such EPSPS genes are the AroA gene (mutant CT7) of the bacterium S*almonella typhimurium* (Comai et al., 1983, Science 221, 370-371), the CP4 gene of the bacterium *Agrobacterium sp.* (Barry et al., 1992, Curr. Topics Plant Physiol. 7, 139-145), the genes encoding a Petunia EPSPS (Shah et al., 1986, Science 233, 478-481), a Tomato EPSPS (Gasser et al., 1988, J. Biol. Chem. 263, 4280-4289), or an Eleusine EPSPS (WO 01/66704). It can also be a mutated EPSPS as described in for example EP 0837944, WO 00/66746, WO 00/66747 or WO02/26995. Glyphosate-tolerant plants can also be obtained by expressing a gene that encodes a glyphosate oxido-reductase enzyme as described in U.S. Patent Nos. 5,776,760 and 5,463,175. Glyphosate-tolerant plants can also be obtained by expressing a gene that encodes a glyphosate acetyl transferase enzyme as described in for example WO 02/36782, WO 03/092360, WO 05/012515 and WO 07/024782. Glyphosate-tolerant plants can also be obtained by selecting plants

containing naturally-occurring mutations of the above-mentioned genes, as described in for example WO 01/024615 or WO 03/013226. Plants expressing EPSPS genes that confer glyphosate tolerance are described in e.g. US Patent Application Nos 11/517,991, 10/739,610, 12/139,408, 12/352,532, 11/312,866, 11/315,678, 12/421,292, 11/400,598, 11/651,752, 11/681,285, 11/605,824, 12/468,205, 11/760,570, 11/762,526, 11/769,327, 11/769,255, 11/943801 or 12/362,774. Plants comprising other genes that confer glyphosate tolerance, such as decarboxylase genes, are described in e.g. US patent applications 11/588,811, 11/185,342, 12/364,724, 11/185,560 or 12/423,926.

Other herbicide resistant plants are for example plants that are made tolerant to herbicides inhibiting the enzyme glutamine synthase, such as bialaphos, phosphinothricin or glufosinate. Such plants can be obtained by expressing an enzyme detoxifying the herbicide or a mutant glutamine synthase enzyme that is resistant to inhibition, e.g. described in US Patent Application No 11/760,602. One such efficient detoxifying enzyme is an enzyme encoding a phosphinothricin acetyltransferase (such as the bar or pat protein from Streptomyces species). Plants expressing an exogenous phosphinothricin acetyltransferase are for example described in U.S. Patent Nos. 5,561,236; 5,648,477; 5,646,024; 5,273,894; 5,637,489; 5,276,268; 5,739,082; 5,908,810 and 7,112,665.

Further herbicide-tolerant plants are also plants that are made tolerant to the herbicides inhibiting the enzyme hydroxyphenylpyruvatedioxygenase (HPPD). Hydroxyphenylpyruvatedioxygenases are enzymes that catalyze the reaction in which para-hydroxyphenylpyruvate (HPP) is transformed into homogentisate. Plants tolerant to HPPD-inhibitors can be transformed with a gene encoding a naturally-occurring resistant HPPD enzyme, or a gene encoding a mutated or chimeric HPPD enzyme as described in WO 96/38567, WO 99/24585, WO 99/24586, WO 2009/144079, WO 2002/046387, or US 6,768,044.. Tolerance to HPPD-inhibitors can also be obtained by transforming plants with genes encoding certain enzymes enabling the formation of homogentisate despite the inhibition of the native HPPD enzyme by the HPPD-inhibitor. Such plants and genes are described in WO 99/34008 and WO 02/36787. Tolerance of plants to HPPD inhibitors can also be improved by transforming plants with a gene encoding an enzyme having prephenate deshydrogenase (PDH) activity in addition to a gene encoding an HPPD-tolerant enzyme, as described in WO 2004/024928. Further, plants can be made more tolerant to HPPD-inhibitor herbicides by adding into their genome a gene encoding an enzyme capable of metabolizing or degrading HPPD inhibitors, such as the CYP450 enzymes shown in WO 2007/103567 and WO 2008/150473.

Still further herbicide resistant plants are plants that are made tolerant to acetolactate synthase (ALS) inhibitors. Known ALS-inhibitors include, for example, sulfonylurea, imidazolinone, triazolopyrimidines, pryimidinyoxy(thio)benzoates, and/or sulfonylaminocarbonyltriazolinone herbicides. Different mutations in the ALS enzyme (also known as acetohydroxyacid synthase, AHAS) are known to confer tolerance to different herbicides and groups of herbicides, as described for example in Tranel and Wright (2002, Weed Science 50:700-712), but also, in U.S. Patent No. 5,605,011, 5,378,824, 5,141,870, and 5,013,659. The production of sulfonylurea-tolerant plants and imidazolinone-tolerant plants is described in U.S. Patent Nos. 5,605,011; 5,013,659; 5,141,870; 5,767,361; 5,731,180; 5,304,732; 4,761,373; 5,331,107; 5,928,937; and 5,378,824; and international publication WO 96/33270. Other imidazolinone-tolerant plants are also described in for example WO 2004/040012, WO 2004/106529, WO 2005/020673, WO 2005/093093, WO 2006/007373, WO 2006/015376, WO 2006/024351, and WO 2006/060634. Further

sulfonylurea- and imidazolinone-tolerant plants are also described in for example WO 07/024782 and US Patent Application No 61/288958.

Other plants tolerant to imidazolinone and/or sulfonylurea can be obtained by induced mutagenesis, selection in cell cultures in the presence of the herbicide or mutation breeding as described for example for soybeans in U.S. Patent 5,084,082, for rice in WO 97/41218, for sugar beet in U.S. Patent 5,773,702 and WO 99/057965, for lettuce in U.S. Patent 5,198,599, or for sunflower in WO 01/065922.

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are insect-resistant transgenic plants, i.e. plants made resistant to attack by certain target insects. Such plants can be obtained by genetic transformation, or by selection of plants containing a mutation imparting such insect resistance.

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

1) an insecticidal crystal protein from *Bacillus thuringiensis* or an insecticidal portion thereof, such as the insecticidal crystal proteins listed by Crickmore et al. (1998, Microbiology and Molecular Biology Reviews, 62: 807-813), updated by Crickmore et al. (2005) at the *Bacillus thuringiensis* toxin nomenclature, online at: http://www.lifesci.sussex.ac.uk/Home/Neil_Crickmore/Bt/), or insecticidal portions thereof, e.g., proteins of the Cry protein classes Cry1Ab, Cry1Ac, Cry1B, Cry1C, Cry1D, Cry1F, Cry2Ab, Cry3Aa, or Cry3Bb or insecticidal portions thereof (e.g. EP 1999141 and WO 2007/107302), or such proteins encoded by synthetic genes as e.g. described in and US Patent Application No 12/249,016 ; or

2) a crystal protein from *Bacillus thuringiensis* or a portion thereof which is insecticidal in the presence of a second other crystal protein from *Bacillus thuringiensis* or a portion thereof, such as the binary toxin made up of the Cry34 and Cry35 crystal proteins (Moellenbeck et al. 2001, Nat. Biotechnol. 19: 668-72; Schnepf et al. 2006, Applied Environm. Microbiol. 71, 1765-1774) or the binary toxin made up of the Cry1A or Cry1F proteins and the Cry2Aa or Cry2Ab or Cry2Ae proteins (US Patent Appl. No. 12/214,022 and EP 08010791.5); or

3) a hybrid insecticidal protein comprising parts of different insecticidal crystal proteins from *Bacillus thuringiensis,* such as a hybrid of the proteins of 1) above or a hybrid of the proteins of 2) above, e.g., the Cry1A.105 protein produced by corn event MON89034 (WO 2007/027777); or

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

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

6) a secreted protein from *Bacillus thuringiensis* or *Bacillus cereus* which is insecticidal in the presence of a second secreted protein from *Bacillus thuringiensis* or *B. cereus*, such as the binary toxin made up of the VIP1A and VIP2A proteins (WO 94/21795); or

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

8) a protein of any one of 5) to 7) above wherein some, particularly 1 to 10, amino acids have been replaced by another amino acid to obtain a higher insecticidal activity to a target insect species, and/or to expand the range of target insect species affected, and/or because of changes introduced into the encoding DNA during cloning or transformation (while still encoding an insecticidal protein), such as the VIP3Aa protein in cotton event COT102; or

9) a secreted protein from *Bacillus thuringiensis* or *Bacillus cereus* which is insecticidal in the presence of a crystal protein from *Bacillus thuringiensis*, such as the binary toxin made up of VIP3 and Cry1A or Cry1F (US Patent Appl. No. 61/126083 and 61/195019), or the binary toxin made up of the VIP3 protein and the Cry2Aa or Cry2Ab or Cry2Ae proteins (US Patent Appl. No. 12/214,022 and EP 08010791.5).

10) a protein of 9) above wherein some, particularly 1 to 10, amino acids have been replaced by another amino acid to obtain a higher insecticidal activity to a target insect species, and/or to expand the range of target insect species affected, and/or because of changes introduced into the encoding DNA during cloning or transformation (while still encoding an insecticidal protein)

Of course, an insect-resistant transgenic plant, as used herein, also includes any plant comprising a combination of genes encoding the proteins of any one of the above classes 1 to 10. In one embodiment, an insect-resistant plant contains more than one transgene encoding a protein of any one of the above classes 1 to 10, to expand the range of target insect species affected when using different proteins directed at different target insect species, or to delay insect resistance development to the plants by using different proteins insecticidal to the same target insect species but having a different mode of action, such as binding to different receptor binding sites in the insect.

An “insect-resistant transgenic plant”, as used herein, further includes any plant containing at least one transgene comprising a sequence producing upon expression a double-stranded RNA which upon ingestion by a plant insect pest inhibits the growth of this insect pest, as described e.g. in WO 2007/080126, WO 2006/129204, WO 2007/074405, WO 2007/080127 and WO 2007/035650.

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are tolerant to abiotic stresses. Such plants can be obtained by genetic transformation, or by selection of plants containing a mutation imparting such stress resistance. Particularly useful stress tolerance plants include:

1) plants which contain a transgene capable of reducing the expression and/or the activity of poly(ADP-ribose) polymerase (PARP) gene in the plant cells or plants as described in WO 00/04173, WO/2006/045633, EP 04077984.5, or EP 06009836.5.

2) plants which contain a stress tolerance enhancing transgene capable of reducing the expression and/or the activity of the PARG encoding genes of the plants or plants cells, as described e.g. in WO 2004/090140.

3) plants which contain a stress tolerance enhancing transgene coding for a plant-functional enzyme of the nicotineamide adenine dinucleotide salvage synthesis pathway including nicotinamidase, nicotinate phosphoribosyltransferase, nicotinic acid mononucleotide adenyl transferase, nicotinamide adenine dinucleotide synthetase or nicotine amide phosphorybosyltransferase as described e.g. in EP 04077624.7, WO 2006/133827, PCT/EP07/002433, EP 1999263, or WO 2007/107326.

Plants or plant cultivars (obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention show altered quantity, quality and/or storage-stability of the harvested product and/or altered properties of specific ingredients of the harvested product such as :

1) transgenic plants which synthesize a modified starch, which in its physical-chemical characteristics, in particular the amylose content or the amylose/amylopectin ratio, the degree of branching, the average chain length, the side chain distribution, the viscosity behaviour, the gelling strength, the starch grain size and/or the starch grain morphology, is changed in comparison with the synthesised starch in wild type plant cells or plants, so that this is better suited for special applications. Said transgenic plants synthesizing a modified starch are disclosed, for example, in EP 0571427, WO 95/04826, EP 0719338, WO 96/15248, WO 96/19581, WO 96/27674, WO 97/11188, WO 97/26362, WO 97/32985, WO 97/42328, WO 97/44472, WO 97/45545, WO 98/27212, WO 98/40503, WO99/58688, WO 99/58690, WO 99/58654, WO 00/08184, WO 00/08185, WO 00/08175, WO 00/28052, WO 00/77229, WO 01/12782, WO 01/12826, WO 02/101059, WO 03/071860, WO 2004/056999, WO 2005/030942, WO 2005/030941, WO 2005/095632, WO 2005/095617, WO 2005/095619, WO 2005/095618, WO 2005/123927, WO 2006/018319, WO 2006/103107, WO 2006/108702, WO 2007/009823, WO 00/22140, WO 2006/063862, WO 2006/072603, WO 02/034923, EP 06090134.5, EP 06090228.5, EP 06090227.7, EP 07090007.1, EP 07090009.7, WO 01/14569, WO 02/79410, WO 03/33540, WO 2004/078983, WO 01/19975, WO 95/26407, WO 96/34968, WO 98/20145, WO 99/12950, WO 99/66050, WO 99/53072, US 6,734,341, WO 00/11192, WO 98/22604, WO 98/32326, WO 01/98509, WO 01/98509, WO 2005/002359, US 5,824,790, US 6,013,861, WO 94/04693, WO 94/09144, WO 94/11520, WO 95/35026, WO 97/20936

2) transgenic plants which synthesize non starch carbohydrate polymers or which synthesize non starch carbohydrate polymers with altered properties in comparison to wild type plants without genetic modification. Examples are plants producing polyfructose, especially of the inulin and levan-type, as disclosed in EP 0663956, WO 96/01904, WO 96/21023, WO 98/39460, and WO 99/24593, plants producing alpha-1,4-glucans as disclosed in WO 95/31553, US 2002031826, US 6,284,479, US 5,712,107, WO 97/47806, WO 97/47807, WO 97/47808 and WO 00/14249, plants producing alpha-1,6 branched alpha-1,4-glucans, as disclosed in WO 00/73422, plants producing alternan, as disclosed in e.g. WO 00/47727, WO 00/73422, EP 06077301.7, US 5,908,975 and EP 0728213,

3) transgenic plants which produce hyaluronan, as for example disclosed in WO 2006/032538, WO 2007/039314, WO 2007/039315, WO 2007/039316, JP 2006304779, and WO 2005/012529.

4) transgenic plants or hybrid plants, such as onions with characteristics such as 'high soluble solids content', 'low pungency' (LP) and/or 'long storage' (LS), as described in US Patent Appl. No. 12/020,360 and 61/054,026.

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as cotton plants, with altered fiber characteristics. Such plants can be obtained by genetic transformation, or by selection of plants contain a mutation imparting such altered fiber characteristics and include:

a) Plants, such as cotton plants, containing an altered form of cellulose synthase genes as described in WO 98/00549

b) Plants, such as cotton plants, containing an altered form of rsw2 or rsw3 homologous nucleic acids as described in WO 2004/053219

c) Plants, such as cotton plants, with increased expression of sucrose phosphate synthase as described in WO 01/17333

d) Plants, such as cotton plants, with increased expression of sucrose synthase as described in WO 02/45485

e) Plants, such as cotton plants, wherein the timing of the plasmodesmatal gating at the basis of the fiber cell is altered, e.g. through downregulation of fiber-selective β-1,3-glucanase as described in WO 2005/017157, or as described in EP 08075514.3 or US Patent Appl. No. 61/128,938

f) Plants, such as cotton plants, having fibers with altered reactivity, e.g. through the expression of N-acetylglucosaminetransferase gene including nodC and chitin synthase genes as described in WO 2006/136351

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as oilseed rape or related Brassica plants, with altered oil profile characteristics. Such plants can be obtained by genetic transformation, or by selection of plants contain a mutation imparting such altered oil profile characteristics and include:

a) Plants, such as oilseed rape plants, producing oil having a high oleic acid content as described e.g. in US 5,969,169, US 5,840,946 or US 6,323,392 or US 6,063,947

b) Plants such as oilseed rape plants, producing oil having a low linolenic acid content as described in US 6,270,828, US 6,169,190, or US 5,965,755

c) Plant such as oilseed rape plants, producing oil having a low level of saturated fatty acids as described e.g. in US Patent No. 5,434,283 or US Patent Application No 12/668303

Plants or plant cultivars (that can be obtained by plant biotechnology methods such as genetic engineering) which may also be treated according to the invention are plants, such as oilseed rape or related Brassica plants, with altered seed shattering characteristics. Such plants can be obtained by genetic transformation, or by selection of plants contain a mutation imparting such altered seed shattering

characteristics and include plants such as oilseed rape plants with delayed or reduced seed shattering as described in US Patent Appl. No. 61/135,230 WO09/068313 and WO10/006732.

Particularly useful transgenic plants which may be treated according to the invention are plants containing transformation events, or combination of transformation events, that are the subject of petitions for non-regulated status, in the United States of America, to the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) whether such petitions are granted or are still pending. At any time this information is readily available from APHIS (4700 River Road Riverdale, MD 20737, USA), for instance on its internet site (URL http://www.aphis.usda.gov/brs/not_reg.html). On the filing date of this application the petitions for nonregulated status that were pending with APHIS or granted by APHIS were those which contains the following information:

- Petition : the identification number of the petition. Technical descriptions of the transformation events can be found in the individual petition documents which are obtainable from APHIS, for example on the APHIS website, by reference to this petition number. These descriptions are herein incorporated by reference.
- Extension of Petition : reference to a previous petition for which an extension is requested.
- Institution : the name of the entity submitting the petition.
- Regulated article : the plant species concerned.
- Transgenic phenotype : the trait conferred to the plants by the transformation event.
- Transformation event or line : the name of the event or events (sometimes also designated as lines or lines) for which nonregulated status is requested.
- APHIS documents : various documents published by APHIS in relation to the Petition and which can be requested with APHIS.

Additional particularly useful plants containing single transformation events or combinations of transformation events are listed for example in the databases from various national or regional regulatory agencies (see for example http://gmoinfo.jrc.it/gmp_browse.aspx and http://www.agbios.com/dbase.php).

Particularly useful transgenic plants which may be treated according to the invention are plants containing transformation events, or a combination of transformation events, and that are listed for example in the databases for various national or regional regulatory agencies including Event 1143-14A (cotton, insect control, not deposited, described in WO 2006/128569); Event 1143-51B (cotton, insect control, not deposited, described in WO 2006/128570); Event 1445 (cotton, herbicide tolerance, not deposited, described in US-A 2002-120964 or WO 02/034946); Event 17053 (rice, herbicide tolerance, deposited as PTA-9843, described in WO 2010/117737); Event 17314 (rice, herbicide tolerance, deposited as PTA-9844, described in WO 2010/117735); Event 281-24-236 (cotton, insect control - herbicide tolerance, deposited as PTA-6233, described in WO 2005/103266 or US-A 2005-216969); Event 3006-210-23 (cotton, insect control - herbicide tolerance, deposited as PTA-6233, described in US-A 2007-143876 or WO 2005/103266); Event 3272 (corn, quality trait, deposited as PTA-9972, described in WO 2006/098952 or US-A 2006-230473); Event 40416 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-11508, described in WO 2011/075593); Event 43A47 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-11509, described in WO 2011/075595); Event 5307 (corn, insect control, deposited as ATCC PTA-9561, described in WO 2010/077816); Event ASR-368 (bent grass,

herbicide tolerance, deposited as ATCC PTA-4816, described in US-A 2006-162007 or WO 2004/053062); Event B16 (corn, herbicide tolerance, not deposited, described in US-A 2003-126634); Event BPS-CV127-9 (soybean, herbicide tolerance, deposited as NCIMB No. 41603, described in WO 2010/080829); Event CE43-67B (cotton, insect control, deposited as DSM ACC2724, described in US-A 2009-217423 or WO2006/128573); Event CE44-69D (cotton, insect control, not deposited, described in US-A 2010-0024077); Event CE44-69D (cotton, insect control, not deposited, described in WO 2006/128571); Event CE46-02A (cotton, insect control, not deposited, described in WO 2006/128572); Event COT102 (cotton, insect control, not deposited, described in US-A 2006-130175 or WO 2004/039986); Event COT202 (cotton, insect control, not deposited, described in US-A 2007-067868 or WO 2005/054479); Event COT203 (cotton, insect control, not deposited, described in WO 2005/054480); Event DAS40278 (corn, herbicide tolerance, deposited as ATCC PTA-10244, described in WO 2011/022469); Event DAS-59122-7 (corn, insect control - herbicide tolerance, deposited as ATCC PTA 11384 , described in US-A 2006-070139); Event DAS-59132 (corn, insect control - herbicide tolerance, not deposited, described in WO 2009/100188); Event DAS68416 (soybean, herbicide tolerance, deposited as ATCC PTA-10442, described in WO 2011/066384 or WO 2011/066360); Event DP-098140-6 (corn, herbicide tolerance, deposited as ATCC PTA-8296, described in US-A 2009-137395 or WO 2008/112019); Event DP-305423-1 (soybean, quality trait, not deposited, described in US-A 2008-312082 or WO 2008/054747); Event DP-32138-1 (corn, hybridization system, deposited as ATCC PTA-9158, described in US-A 2009-0210970 or WO 2009/103049); Event DP-356043-5 (soybean, herbicide tolerance, deposited as ATCC PTA-8287, described in US-A 2010-0184079 or WO 2008/002872); Event EE-1 (brinjal, insect control, not deposited, described in WO 2007/091277); Event FI117 (corn, herbicide tolerance, deposited as ATCC 209031, described in US-A 2006-059581 or WO 98/044140); Event GA21 (corn, herbicide tolerance, deposited as ATCC 209033, described in US-A 2005-086719 or WO 98/044140); Event GG25 (corn, herbicide tolerance, deposited as ATCC 209032, described in US-A 2005-188434 or WO 98/044140); Event GHB119 (cotton, insect control - herbicide tolerance, deposited as ATCC PTA-8398, described in WO 2008/151780); Event GHB614 (cotton, herbicide tolerance, deposited as ATCC PTA-6878, described in US-A 2010-050282 or WO 2007/017186); Event GJ11 (corn, herbicide tolerance, deposited as ATCC 209030, described in US-A 2005-188434 or WO 98/044140); Event GM RZ13 (sugar beet, virus resistance , deposited as NCIMB-41601, described in WO 2010/076212); Event H7-1 (sugar beet, herbicide tolerance, deposited as NCIMB 41158 or NCIMB 41159, described in US-A 2004-172669 or WO 2004/074492); Event JOPLIN1 (wheat, disease tolerance, not deposited, described in US-A 2008-064032); Event LL27 (soybean, herbicide tolerance, deposited as NCIMB41658, described in WO 2006/108674 or US-A 2008-320616); Event LL55 (soybean, herbicide tolerance, deposited as NCIMB 41660, described in WO 2006/108675 or US-A 2008-196127); Event LLcotton25 (cotton, herbicide tolerance, deposited as ATCC PTA-3343, described in WO 03/013224 or US-A 2003-097687); Event LLRICE06 (rice, herbicide tolerance, deposited as ATCC-23352, described in US 6,468,747 or WO 00/026345); Event LLRICE601 (rice, herbicide tolerance, deposited as ATCC PTA-2600, described in US-A 2008-2289060 or WO 00/026356); Event LY038 (corn, quality trait, deposited as ATCC PTA-5623, described in US-A 2007-028322 or WO 2005/061720); Event MIR162 (corn, insect control, deposited as PTA-8166, described in US-A 2009-300784 or WO 2007/142840); Event MIR604 (corn, insect control, not deposited, described in US-A 2008-167456 or WO 2005/103301); Event MON15985 (cotton, insect control, deposited as ATCC PTA-2516, described in US-A 2004-250317 or

WO 02/100163); Event MON810 (corn, insect control, not deposited, described in US-A 2002-102582); Event MON863 (corn, insect control, deposited as ATCC PTA-2605, described in WO 2004/011601 or US-A 2006-095986); Event MON87427 (corn, pollination control, deposited as ATCC PTA-7899, described in WO 2011/062904); Event MON87460 (corn, stress tolerance, deposited as ATCC PTA-8910, described in WO 2009/111263 or US-A 2011-0138504); Event MON87701 (soybean, insect control, deposited as ATCC PTA-8194, described in US-A 2009-130071 or WO 2009/064652); Event MON87705 (soybean, quality trait - herbicide tolerance, deposited as ATCC PTA-9241, described in US-A 2010-0080887 or WO 2010/037016); Event MON87708 (soybean, herbicide tolerance, deposited as ATCC PTA9670, described in WO 2011/034704); Event MON87754 (soybean, quality trait, deposited as ATCC PTA-9385, described in WO 2010/024976); Event MON87769 (soybean, quality trait, deposited as ATCC PTA-8911, described in US-A 2011-0067141 or WO 2009/102873); Event MON88017 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-5582, described in US-A 2008-028482 or WO 2005/059103); Event MON88913 (cotton, herbicide tolerance, deposited as ATCC PTA-4854, described in WO 2004/072235 or US-A 2006-059590); Event MON89034 (corn, insect control, deposited as ATCC PTA-7455, described in WO 2007/140256 or US-A 2008-260932); Event MON89788 (soybean, herbicide tolerance, deposited as ATCC PTA-6708, described in US-A 2006-282915 or WO 2006/130436); Event MS11 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-850 or PTA-2485, described in WO 01/031042); Event MS8 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-730, described in WO 01/041558 or US-A 2003-188347); Event NK603 (corn, herbicide tolerance, deposited as ATCC PTA-2478, described in US-A 2007-292854); Event PE-7 (rice, insect control, not deposited, described in WO 2008/114282); Event RF3 (oilseed rape, pollination control - herbicide tolerance, deposited as ATCC PTA-730, described in WO 01/041558 or US-A 2003-188347); Event RT73 (oilseed rape, herbicide tolerance, not deposited, described in WO 02/036831 or US-A 2008-070260); Event T227-1 (sugar beet, herbicide tolerance, not deposited, described in WO 02/44407 or US-A 2009-265817); Event T25 (corn, herbicide tolerance, not deposited, described in US-A 2001-029014 or WO 01/051654); Event T304-40 (cotton, insect control - herbicide tolerance, deposited as ATCC PTA-8171, described in US-A 2010-077501 or WO 2008/122406); Event T342-142 (cotton, insect control, not deposited, described in WO 2006/128568); Event TC1507 (corn, insect control - herbicide tolerance, not deposited, described in US-A 2005-039226 or WO 2004/099447); Event VIP1034 (corn, insect control - herbicide tolerance, deposited as ATCC PTA-3925., described in WO 03/052073), Event 32316 (corn,insect control-herbicide tolerance,deposited as PTA-11507, described in WO 2011/084632), Event 4114 (corn,insect control-herbicide tolerance,deposited as PTA-11506, described in WO 2011/084621).

Among the diseases of plants or crops that can be controlled by the method according to the invention, mention can be made of :

Powdery mildew diseases such as :

Blumeria diseases, caused for example by *Blumeria graminis* ;

Podosphaera diseases, caused for example by *Podosphaera leucotricha* ;

Sphaerotheca diseases, caused for example by *Sphaerotheca fuliginea* ;

Uncinula diseases, caused for example by *Uncinula necator* ;

Rust diseases such as :

Gymnosporangium diseases, caused for example by *Gymnosporangium sabinae* ;

Hemileia diseases, caused for example by *Hemileia vastatrix* ;

Phakopsora diseases, caused for example by *Phakopsora pachyrhizi* or *Phakopsora meibomiae* ;

Puccinia diseases, caused for example by *Puccinia recondite*, *Puccinia graminis or Puccinia striiformis*;

Uromyces diseases, caused for example by *Uromyces appendiculatus* ;

Oomycete diseases such as :

Albugo diseases caused for example by *Albugo candida*;

Bremia diseases, caused for example by *Bremia lactucae* ;

Peronospora diseases, caused for example by *Peronospora pisi* or *P. brassicae* ;

Phytophthora diseases, caused for example by *Phytophthora infestans* ;

Plasmopara diseases, caused for example by Pla*smopara viticola* ;

Pseudoperonospora diseases, caused for example by *Pseudoperonospora humuli* or *Pseudoperonospora cubensis* ;

Pythium diseases, caused for example by *Pythium ultimum* ;

Leafspot, leaf blotch and leaf blight diseases such as :

Alternaria diseases, caused for example by *Alternaria solani* ;

Cercospora diseases, caused for example by *Cercospora beticola* ;

Cladiosporum diseases, caused for example by *Cladiosporium cucumerinum* ;

Cochliobolus diseases, caused for example by *Cochliobolus sativus* (Conidiaform: Drechslera, Syn: Helminthosporium) or *Cochliobolus miyabeanus* ;

Colletotrichum diseases, caused for example by *Colletotrichum lindemuthanium* ;

Cycloconium diseases, caused for example by *Cycloconium oleaginum* ;

Diaporthe diseases, caused for example by *Diaporthe citri* ;

Elsinoe diseases, caused for example by *Elsinoe fawcettii* ;

Gloeosporium diseases, caused for example by *Gloeosporium laeticolor* ;

Glomerella diseases, caused for example by *Glomerella cingulata* ;

Guignardia diseases, caused for example by *Guignardia bidwelli* ;

Leptosphaeria diseases, caused for example by *Leptosphaeria maculans* ; *Leptosphaeria nodorum* ;

Magnaporthe diseases, caused for example by *Magnaporthe grisea* ;

Mycosphaerella diseases, caused for example by *Mycosphaerella graminicola* ; Mycosphaerella arachidicola ; *Mycosphaerella fijiensis* ;

Phaeosphaeria diseases, caused for example by *Phaeosphaeria nodorum* ;

Pyrenophora diseases, caused for example by *Pyrenophora teres*, or *Pyrenophora tritici repentis* ;

Ramularia diseases, caused for example by *Ramularia collocygni* , or *Ramularia areola* ;

Rhynchosporium diseases, caused for example by *Rhynchosporium secalis* ;

Septoria diseases, caused for example by *Septoria apii* or *Septoria lycopercisi* ;

Typhula diseases, caused for example by *Typhula incarnata* ;

Venturia diseases, caused for example by *Venturia inaequalis* ;

Root, Sheath and stem diseases such as :

Corticium diseases, caused for example by *Corticium graminearum* ;

Fusarium diseases, caused for example by *Fusarium oxysporum* ;

Gaeumannomyces diseases, caused for example by *Gaeumannomyces graminis* ;

Rhizoctonia diseases, caused for example by *Rhizoctonia solani* ;

Sarocladium diseases caused for example by *Sarocladium oryzae*;

Sclerotium diseases caused for example by *Sclerotium oryzae*;

Tapesia diseases, caused for example by *Tapesia acuformis* ;

Thielaviopsis diseases, caused for example by *Thielaviopsis basicola* ;

Ear and panicle diseases such as :

Alternaria diseases, caused for example by *Alternaria spp.* ;

Aspergillus diseases, caused for example by *Aspergillus flavus* ;

Cladosporium diseases, caused for example by *Cladosporium spp.* ;

Claviceps diseases, caused for example by *Claviceps purpurea* ;

Fusarium diseases, caused for example by *Fusarium culmorum* ;

Gibberella diseases, caused for example by *Gibberella zeae* ;

Monographella diseases, caused for example by *Monographella nivalis* ;

Smut and bunt diseases such as :

Sphacelotheca diseases, caused for example by *Sphacelotheca reiliana* ;

Tilletia diseases, caused for example by *Tilletia caries* ;

Urocystis diseases, caused for example by *Urocystis occulta* ;

Ustilago diseases, caused for example by *Ustilago nuda* ;

Fruit rot and mould diseases such as :

Aspergillus diseases, caused for example by *Aspergillus flavus* ;

Botrytis diseases, caused for example by *Botrytis cinerea* ;

Penicillium diseases, caused for example by *Penicillium expansum* ;

Rhizopus diseases caused by example by *Rhizopus stolonifer*

Sclerotinia diseases, caused for example by *Sclerotinia sclerotiorum* ;

Verticilium diseases, caused for example by *Verticilium alboatrum* ;

Seed and soilborne decay, mould, wilt, rot and damping-off diseases :

Alternaria diseases, caused for example by *Alternaria brassicicola ;*

Aphanomyces diseases, caused for example by *Aphanomyces euteiches ;*

Ascochyta diseases, caused for example by *Ascochyta lentis ;*

Aspergillus diseases, caused for example by *Aspergillus flavus ;*

Cladosporium diseases, caused for example by *Cladosporium herbarum ;*

Cochliobolus diseases, caused for example by *Cochliobolus sativus* ;

(Conidiaform: *Drechslera, Bipolaris Syn: Helminthosporium*) ;

Colletotrichum diseases, caused for example by *Colletotrichum coccodes* ;

Fusarium diseases, caused for example by *Fusarium culmorum* ;

Gibberella diseases, caused for example by *Gibberella zeae* ;

Macrophomina diseases, caused for example by *Macrophomina phaseolina* ;

Monographella diseases, caused for example by *Monographella nivalis* ;

Penicillium diseases, caused for example by *Penicillium expansum ;*

Phoma diseases, caused for example by *Phoma lingam ;*

Phomopsis diseases, caused for example by *Phomopsis sojae* ;

Phytophthora diseases, caused for example by *Phytophthora cactorum* ;

Pyrenophora diseases, caused for example by *Pyrenophora graminea ;*

Pyricularia diseases, caused for example by *Pyricularia oryzae* ;

Pythium diseases, caused for example by *Pythium ultimum* ;

Rhizoctonia diseases, caused for example by *Rhizoctonia solani* ;

Rhizopus diseases, caused for example by *Rhizopus oryzae ;*

Sclerotium diseases, caused for example by *Sclerotium rolfsii* ;

Septoria diseases, caused for example by *Septoria nodorum* ;

Typhula diseases, caused for example by *Typhula incarnata* ;

Verticillium diseases, caused for example by *Verticillium dahliae* ;

Canker, broom and dieback diseases such as :

Nectria diseases, caused for example by *Nectria galligena* ;

Blight diseases such as :

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

Leaf blister or leaf curl diseases such as :

Exobasidium diseases caused for example by *Exobasidium vexans ;*

Taphrina diseases, caused for example by *Taphrina deformans* ;

Decline diseases of wooden plants such as :

Esca diseases, caused for example by *Phaemoniella clamydospora* ;

Eutypa dyeback, caused for example by *Eutypa lata* ;

Ganoderma diseases caused for example by *Ganoderma boninense* ;

Rigidoporus diseases caused for example by *Rigidoporus lignosus ;*

Diseases of Flowers and Seeds such as :

Botrytis diseases caused for example by *Botrytis cinerea* ;

Diseases of Tubers such as :

Rhizoctonia diseases caused for example by *Rhizoctonia solani* ;

Helminthosporium diseases caused for example by *Helminthosporium solani* ;

Club root diseases such as :

Plasmodiophora diseases, cause for example by *Plamodiophora brassicae* ;

Diseases caused by Bacterial Organisms such as :

Xanthomonas species for example *Xanthomonas campestris* pv. oryzae ;

Pseudomonas species for example *Pseudomonas syringae* pv. lachrymans ;

Erwinia species for example *Erwinia amylovora*.

The composition according to the invention may also be used against fungal diseases liable to grow on or inside timber. The term “timber” means all types of species of wood, and all types of working of this wood intended for construction, for example solid wood, high-density wood, laminated wood, and plywood. The method for treating timber according to the invention mainly consists in contacting one or more compounds according to the invention or a composition according to the invention; this includes for example direct application, spraying, dipping, injection or any other suitable means.

The dose of active compound usually applied in the method of treatment according to the invention is generally and advantageously from 10 to 800 g/ha, preferably from 50 to 300 g/ha for applications in foliar

treatment. The dose of active substance applied is generally and advantageously from 2 to 200 g per 100 kg of seed, preferably from 3 to 150 g per 100 kg of seed in the case of seed treatment.

It is clearly understood that the doses indicated herein are given as illustrative examples of the method according to the invention. A person skilled in the art will know how to adapt the application doses, notably according to the nature of the plant or crop to be treated.

The compounds or mixtures according to the invention can also be used for the preparation of composition useful to curatively or preventively treat human or animal fungal diseases such as, for example, mycoses, dermatoses, trichophyton diseases and candidiases or diseases caused by *Aspergillus spp.*, for example *Aspergillus fumigatus*.

The present invention further relates to the use of compounds of the formula (I) as herein defined for the control of phytopathogenic fungi.

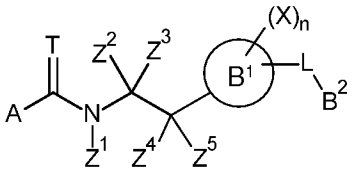
The present invention further relates to the use of compounds of the formula (I) as herein defined for the treatment of transgenic plants.

The present invention further relates to the use of compounds of the formula (I) as herein defined for the treatment of seed and of seed of transgenic plants.

The present invention further relates to a process for producing compositions for controlling phytopathogenic harmful fungi, characterized in that derivatives of the formula (I) as herein defined are mixed with extenders and/or surfactants.

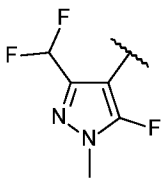
The various aspects of the invention will now be illustrated with reference to the following table of compound examples and the following preparation or efficacy examples.

Table 1 illustrates in a non-limiting manner examples of compounds of formula (I) according to the invention :

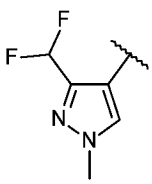


(I)

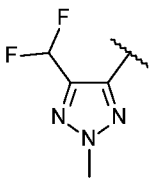
wherein A can be selected in the list consisting of the following groups : A-G1, A-G2, A-G3, A-G4, A-G5 and A-G6 :



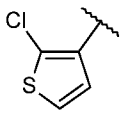
A-G1



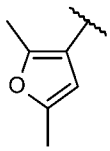
A-G2



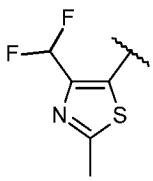
A-G3



A-G4



A-G5



A-G6

wherein the broken bound denotes the point of attachment of the group A to the (thio)carbonyl moiety.

In table 1, "position" denotes the point of attachment of the –L–B^2 residue to the B^1 heterocyclyl ring based on the IUPAC numbering of heterocyclic rings.

In table 1, unless otherwise specified, M+H (ApcI+) means the molecular ion peak plus 1 a.m.u. (atomic mass unit) as observed in mass spectroscopy via positive atmospheric pressure chemical ionisation.

In table 1, the logP values were determined in accordance with EEC Directive 79/831 Annex V.A8 by HPLC (High Performance Liquid Chromatography) on a reversed-phase column (C 18), using the method described below :

Temperature: 40 °C ; Mobile phases : 0.1% aqueous formic acid and acetonitrile ; linear gradient from 10% acetonitrile to 90% acetonitrile.

Calibration was carried out using unbranched alkan-2-ones (comprising 3 to 16 carbon atoms) with known logP values (determination of the logP values by the retention times using linear interpolation between two successive alkanones). lambda-max-values were determined using UV-spectra from 200 nm to 400 nm and the peak values of the chromatographic signals.

Table 1 :

Example	A	T	Z^1	Z^2	Z^3	Z^4	Z^5	B^1	$(X)_n$	position	*—L—B^2	M+H	logP
I.01	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	quinolin-3-yl	548	3.53
I.02	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	1-benzothiophen-3-yl	553	4.72
I.03	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	7-chloroquinolin-4-yl	582	4.20
I.04	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	1-benzofuran-3-yl	537	4.46
I.05	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	3-furyl	487	3.76
I.06	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	3-thienyl	503	4.03
I.07	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	4-methyl-3-thienyl	517	4.37
I.08	A-G2	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	2-furyl	469	3.55
I.09	A-G2	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	3-thienyl	485	3.67
I.10	A-G2	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	4-methyl-3-thienyl	499	3.99

Example	A	T	Z^1	Z^2	Z^3	Z^4	Z^5	B^1	$(X)_n$	position	*—L—B^2	M+H	logP
I.11	A-G2	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	1-benzofuran-3-yl	519	4.11
I.12	A-G2	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	7-chloroquinolin-4-yl	564	3.78
I.13	A-G1	S	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	quinolin-3-yl	564	3.99
I.14	A-G1	S	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	1-benzothiophen-3-yl	569	5.32
I.15	A-G1	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	3-thienyl	542	2.8
I.16	A-G1	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	3-furyl	526	2.63
I.17	A-G1	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	1-benzothiophen-3-yl	592	3.57
I.18	A-G1	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	quinolin-8-yl	587	2.44
I.19	A-G1	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	4-methoxypyrimidin-2-yl	568	2.44
I.20	A-G3	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	3-thienyl	525	3.08
I.21	A-G1	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	piperidin-1-ylmethyl	518	1.82

Example	A	T	Z^1	Z^2	Z^3	Z^4	Z^5	B^1	$(X)_n$	position	*—L—B^2	M+H	logP
I.22	A-G2	O	cyclopropyl	Me	H	H	H	pyridin-2-yl	5-CF_3	3	piperidin-1-ylmethyl	500	1.67
I.23	A-G4	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	3-thienyl	510	4.44
I.24	A-G5	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	3-thienyl	488	3.35
I.25	A-G6	O	cyclopropyl	Me	H	H	H	imidazo [1,2-a]pyridin-2-yl	6-CF_3	3	3-thienyl	541	3.39

Note : Me : methyl

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Table 2 provides the NMR data (^{1}H) of a selected number of compounds from table 1.

The ^{1}H-NMR data of selected examples are stated in the form of ^{1}H-NMR peak lists. For each signal peak, the δ value in ppm and the signal intensity in brackets are listed.

Intensity of sharp signals correlates with the height of the signals in a printed example of a NMR spectrum in cm and shows the real relations of signal intensities. From broad signals several peaks or the middle of the signal and their relative intensity in comparison to the most intensive signal in the spectrum can be shown.

The ^{1}H-NMR peak lists are similar to classical ^{1}H-NMR prints and contain therefore usually all peaks, which are listed at classical NMR-interpretation. Additionally they can show like classical ^{1}H-NMR prints signals of solvents, stereoisomers of the target compounds, which are also object of the invention, and/or peaks of impurities. To show compound signals in the delta-range of solvents and/or water the usual peaks of solvents, for example peaks of DMSO in d6-DMSO and the peak of water are shown in our ^{1}H-NMR peak lists and have usually on average a high intensity.

The peaks of stereoisomers of the target compounds and/or peaks of impurities have usually on average a lower intensity than the peaks of target compounds (for example with a purity >90%). Such stereoisomers and/or impurities can be typical for the specific preparation process. Therefore their peaks can help to recognize the reproduction of our preparation process via “side-products-fingerprints”.

An expert, who calculates the peaks of the target compounds with known methods (MestreC, ACD-simulation, but also with empirically evaluated expectation values), can isolate the peaks of the target compounds as needed optionally using additional intensity filters. This isolation would be similar to relevant peak picking at classical ^{1}H-NMR interpretation.

Further details of NMR-data description with peak lists can be found in the publication "Citation of NMR Peaklist Data within Patent Applications" of the Research Disclosure Database Number 564025.

Table 2 : NMR peak lists

Example	^{1}H-NMR [d6-DMSO at 400 Mhz]
I.01	8.986 (3.9); 8.974 (4.6); 8.969 (4.6); 8.493 (4.2); 8.488 (4.2); 8.249 (4.1); 8.244 (4.1); 8.126 (2.9); 8.104 (3.4); 8.058 (2.7); 8.039 (3.0); 7.953 (0.7); 7.876 (1.5); 7.873 (1.6); 7.859 (2.1); 7.855 (2.9); 7.838 (1.7); 7.834 (1.6); 7.719 (1.9); 7.717 (1.9); 7.699 (3.0); 7.681 (1.4); 7.679 (1.4); 6.845 (1.7); 6.710 (4.0); 6.575 (2.0); 4.565 (0.6); 4.549 (1.1); 4.532 (1.1); 4.527 (1.2); 4.510 (0.7); 3.727 (16.0); 3.447 (1.1); 3.424 (1.1); 3.410 (1.7); 3.387 (1.8); 3.336 (231.7); 3.305 (2.5); 3.283 (1.2); 3.268 (1.0); 2.891 (4.6); 2.731 (4.0); 2.676 (0.6); 2.672 (0.8); 2.668 (0.7); 2.507 (99.2); 2.503 (128.5); 2.498 (97.1); 2.367 (1.3); 2.334 (0.9); 2.330 (0.9); 2.325 (0.7); 1.235 (1.1); 1.197 (9.8); 1.180 (9.8); 0.549 (0.8); 0.536 (1.3); 0.531 (1.2); 0.517 (1.3); 0.510 (1.0); 0.497 (1.1); 0.480 (1.1); 0.467 (1.1); 0.456 (1.2); 0.444 (0.6); 0.403 (1.4); 0.390 (2.7); 0.371 (2.3); 0.008 (0.3); 0.000 (8.1)
I.02	8.985 (3.9); 8.136 (3.4); 8.117 (7.0); 7.953 (2.1); 7.928 (4.2); 7.476 (1.2); 7.457 (2.6); 7.437 (2.0); 7.425 (1.6); 7.405 (3.0); 7.388 (2.1); 7.372 (2.5); 7.353 (1.1); 6.885 (1.2); 6.750 (2.6); 6.615 (1.3); 4.546 (0.8); 4.528 (1.4); 4.509 (1.4); 4.491 (0.8); 3.733 (16.0); 3.340 (210.6); 3.281 (1.0); 3.257 (1.0); 3.244 (1.4); 3.221 (1.2); 3.096 (1.0); 3.084 (1.1); 3.061 (0.9); 3.050 (0.7); 2.891 (10.6); 2.731 (9.7); 2.672 (0.6); 2.503 (87.1); 2.329 (0.7); 2.289 (1.5); 1.237 (0.9); 1.125 (9.1); 1.108 (9.0); 0.428 (1.4); 0.412 (1.0); 0.323 (4.2); -0.001

Example	^{1}H-NMR [d6-DMSO at 400 Mhz]
	(3.7)
I.03	9.129 (5.8); 9.118 (5.9); 9.096 (6.1); 9.086 (8.7); 9.043 (3.7); 9.039 (3.9); 9.034 (5.7); 9.023 (5.3); 8.261 (5.0); 8.255 (5.2); 8.231 (6.1); 8.226 (13.8); 8.221 (9.2); 8.211 (4.0); 8.206 (4.0); 7.952 (2.0); 7.689 (2.8); 7.678 (2.9); 7.672 (6.8); 7.661 (6.2); 7.650 (2.4); 7.644 (2.3); 7.627 (3.2); 7.622 (3.3); 7.588 (2.7); 7.583 (2.7); 7.565 (5.5); 7.560 (5.4); 7.542 (3.5); 7.537 (3.6); 7.520 (6.0); 7.516 (4.9); 7.509 (5.4); 7.493 (3.1); 7.381 (5.2); 7.358 (9.5); 7.335 (4.7); 6.906 (1.8); 6.810 (1.8); 6.771 (4.0); 6.675 (4.1); 6.636 (2.1); 6.540 (2.0); 5.336 (0.4); 5.325 (0.6); 5.313 (0.3); 4.475 (0.8); 4.454 (1.7); 4.437 (2.3); 4.420 (1.7); 4.400 (0.9); 3.806 (0.7); 3.750 (16.0); 3.734 (15.7); 3.503 (0.5); 3.460 (0.4); 3.441 (0.3); 3.432 (0.4); 3.385 (0.9); 3.333 (1016.8); 3.116 (1.2); 3.094 (1.2); 3.080 (2.3); 3.058 (2.3); 3.043 (1.4); 3.020 (1.3); 2.945 (1.4); 2.930 (1.5); 2.908 (1.0); 2.891 (16.0); 2.834 (1.4); 2.819 (1.6); 2.799 (1.3); 2.783 (1.2); 2.747 (0.5); 2.731 (12.9); 2.680 (1.5); 2.676 (3.3); 2.671 (4.6); 2.667 (3.4); 2.594 (0.5); 2.572 (0.6); 2.525 (11.2); 2.520 (17.5); 2.511 (257.9); 2.507 (535.8); 2.502 (712.1); 2.498 (519.7); 2.493 (255.0); 2.401 (1.3); 2.338 (2.3); 2.334 (4.1); 2.329 (5.5); 2.325 (4.4); 2.026 (0.7); 2.008 (1.3); 1.989 (1.3); 1.973 (0.6); 1.472 (0.4); 1.454 (0.6); 1.438 (0.4); 1.419 (0.6); 1.411 (0.4); 1.403 (0.5); 1.392 (0.4); 1.290 (0.8); 1.235 (5.6); 1.184 (0.6); 1.167 (0.6); 1.145 (0.5); 1.120 (9.8); 1.102 (10.1); 1.092 (10.0); 1.075 (9.5); 1.046 (0.4); 0.871 (0.7); 0.854 (1.9); 0.836 (0.9); 0.555 (1.2); 0.541 (1.3); 0.526 (1.8); 0.508 (2.5); 0.503 (2.6); 0.491 (1.7); 0.486 (1.8); 0.473 (0.7); 0.439 (1.0); 0.422 (1.3); 0.399 (0.8); 0.382 (0.3); 0.370 (0.8); 0.335 (5.1); 0.299 (1.4); 0.281 (0.7); 0.008 (1.6); 0.000 (55.7); -0.009 (2.0); -0.068 (0.3)
I.04	8.968 (3.5); 8.965 (3.5); 8.271 (11.0); 8.170 (4.0); 8.165 (4.0); 7.953 (1.5); 7.736 (3.6); 7.715 (4.3); 7.462 (2.6); 7.443 (5.0); 7.428 (2.7); 7.425 (2.8); 7.407 (2.0); 7.404 (1.7); 7.343 (2.5); 7.341 (2.6); 7.324 (3.4); 7.305 (1.4); 7.303 (1.4); 6.874 (1.9); 6.739 (4.5); 6.604 (2.3); 4.598 (0.7); 4.581 (1.2); 4.559 (1.2); 4.543 (0.7); 3.728 (16.0); 3.456 (1.1); 3.434 (1.1); 3.420 (1.7); 3.397 (1.6); 3.370 (0.4); 3.361 (0.6); 3.338 (178.4); 3.318 (0.6); 3.313 (0.4); 3.280 (1.6); 3.264 (1.6); 3.243 (1.1); 3.228 (1.0); 2.891 (11.6); 2.732 (9.4); 2.731 (9.6); 2.677 (0.4); 2.672 (0.5); 2.668 (0.4); 2.526 (1.4); 2.521 (2.2); 2.512 (29.0); 2.508 (59.5); 2.503 (78.3); 2.499 (56.9); 2.494 (27.4); 2.479 (0.4); 2.335 (1.5); 2.330 (1.5); 2.326 (1.3); 1.236 (0.6); 1.191 (10.5); 1.174 (10.4); 0.509 (0.5); 0.492 (1.0); 0.481 (1.2); 0.474 (1.1); 0.463 (0.9); 0.454 (0.7); 0.437 (0.6); 0.426 (1.0); 0.401 (2.1); 0.392 (2.0); 0.378 (1.5); 0.369 (1.8); 0.362 (1.9); 0.353 (1.3); 0.327 (0.4); 0.000 (6.2)
I.05	8.831 (5.1); 8.416 (4.0); 8.413 (4.0); 8.063 (2.6); 7.861 (1.2); 7.857 (1.9); 7.853 (1.2); 6.904 (1.5); 6.878 (1.8); 6.777 (1.1); 6.743 (3.9); 6.642 (0.6); 6.608 (2.0); 4.710 (0.7); 4.694 (1.1); 4.687 (1.0); 4.677 (1.0); 4.671 (1.3); 4.655 (1.0); 4.637 (0.5); 3.737 (16.0); 3.557 (0.5); 3.528 (1.3); 3.520 (0.7); 3.504 (1.3); 3.492 (1.9); 3.468 (1.7); 3.371 (0.6); 3.335 (50.9); 3.311 (1.3); 3.296 (1.1); 2.892 (0.9); 2.733 (0.8); 2.550 (1.4); 2.534 (1.2); 2.527 (1.3); 2.508 (33.2); 2.504 (42.7); 2.500 (32.0); 2.427 (0.4); 1.421 (10.1); 1.404 (10.0); 1.299 (3.5); 1.282 (3.4); 0.738 (0.9); 0.722 (1.2); 0.710 (1.4); 0.701 (1.8); 0.691 (3.4); 0.674 (3.0); 0.596 (0.5); 0.577 (0.5); 0.549 (0.6); 0.537 (0.6); 0.524 (0.6); 0.504 (1.1); 0.490 (1.5); 0.479 (1.4); 0.464 (1.0); 0.000 (2.5)
I.06	8.857 (3.6); 8.832 (0.4); 8.417 (0.4); 8.023 (4.0); 8.018 (4.1); 7.953 (0.6); 7.753 (4.0); 7.750 (4.0); 7.746 (4.9); 7.738 (1.9); 7.734 (3.9); 7.726 (2.1); 7.341 (2.5); 7.331 (2.4); 6.897 (1.5); 6.762 (3.3); 6.742 (0.4); 6.627 (1.7); 4.602 (0.5); 4.585 (0.9); 4.566 (0.9); 4.550 (0.5); 3.727 (16.0); 3.497 (1.2); 3.475 (1.2); 3.460 (1.7); 3.438 (1.6); 3.336 (81.8); 3.317 (1.8); 3.302 (1.8); 3.280 (1.1); 3.265 (1.0); 2.891 (4.2); 2.732 (3.7); 2.673 (0.4); 2.508 (44.8); 2.503 (58.2); 2.499 (44.1); 2.351 (1.3); 2.339 (1.1); 1.421 (1.0); 1.403 (1.0); 1.234 (10.3); 1.217 (10.1); 0.690 (0.4); 0.580 (0.7); 0.562 (1.1); 0.555 (1.3); 0.535 (1.0); 0.466 (1.5); 0.448 (5.5); 0.436 (4.2); 0.000 (2.9)
I.07	8.894 (2.9); 8.891 (2.9); 7.971 (3.4); 7.965 (3.4); 7.954 (0.8); 7.549 (3.2); 7.542 (3.4); 7.383 (2.7); 7.380 (2.8); 7.375 (2.6); 7.372 (2.6); 6.912 (1.6); 6.777 (3.6); 6.642 (1.8); 4.564 (0.6); 4.548 (1.0); 4.526 (1.0); 4.510 (0.6); 3.732 (13.5); 3.335 (65.6); 3.277 (1.0); 3.255 (0.9); 3.241 (1.4); 3.219 (1.3); 3.091 (1.1); 3.076 (1.1); 3.054 (0.8); 3.039 (0.7); 2.891 (5.3); 2.732 (4.5); 2.672 (0.4); 2.525 (0.9); 2.521 (1.3); 2.512 (21.4); 2.508 (44.2); 2.503 (58.3); 2.499 (42.4); 2.494 (20.7); 2.379 (0.9); 2.330 (0.4); 2.076 (1.0); 1.974 (16.0); 1.185 (9.0); 1.168 (9.0); 0.586 (0.6); 0.563 (1.3); 0.546 (0.9); 0.498 (0.7); 0.492 (0.8); 0.475 (1.1); 0.470 (1.1); 0.462 (1.1); 0.433 (3.2); 0.000 (3.5)
I.08	8.821 (2.8); 8.818 (2.6); 8.399 (0.3); 8.283 (2.7); 8.278 (2.7); 8.095 (0.5); 8.054 (3.2); 7.953 (0.6); 7.939 (3.3); 7.935 (3.4); 7.084 (2.7); 7.075 (2.8); 7.018 (1.2); 6.882 (2.5); 6.858 (0.4); 6.746 (1.3); 6.728 (2.4); 6.723 (2.6); 6.719 (2.5); 6.715 (2.3); 4.715 (0.5); 4.699 (1.0); 4.679 (1.0); 4.662 (0.6); 3.875 (16.0); 3.604 (0.6); 3.583 (0.6); 3.568 (1.3); 3.547 (1.2); 3.509 (1.2); 3.493 (1.3); 3.472 (0.7); 3.457 (0.6); 3.382 (0.4); 3.336 (216.7); 2.891 (4.0); 2.731 (3.5); 2.680 (1.0); 2.676 (1.3); 2.672 (1.4); 2.667 (1.1); 2.525 (2.0); 2.511 (54.7); 2.507 (111.9); 2.503 (147.7); 2.498 (108.3); 2.494 (53.7); 2.334 (0.7); 2.329 (1.0); 2.325 (0.7); 1.415 (0.9); 1.397 (0.9); 1.372 (7.3); 1.354 (7.3); 0.750 (0.3); 0.743 (0.4); 0.733 (0.5); 0.714 (0.7); 0.699 (2.4); 0.682 (2.2); 0.671 (0.8); 0.657 (0.4); 0.649 (0.4); 0.620 (0.6); 0.603 (0.8); 0.593 (0.8); 0.502 (0.9); 0.487 (0.7); 0.477 (0.6); 0.000 (6.2)
I.09	8.861 (2.5); 8.858 (2.5); 8.095 (0.4); 8.018 (3.6); 8.002 (2.9); 7.997 (2.8); 7.953 (0.6); 7.739 (6.7); 7.727 (3.5); 7.720 (1.3); 7.333 (2.1); 7.329 (1.9); 7.322 (2.0); 7.318 (1.9); 7.028 (1.2); 6.892 (2.7); 6.756 (1.4);

Example	^{1}H-NMR [d6-DMSO at 400 Mhz]
	4.605 (0.5); 4.588 (1.0); 4.568 (1.0); 4.552 (0.6); 3.874 (16.0); 3.456 (1.1); 3.435 (1.0); 3.419 (1.6); 3.399 (1.8); 3.337 (859.3); 3.298 (2.0); 3.282 (1.6); 3.262 (1.0); 3.245 (0.9); 2.891 (4.4); 2.730 (3.7); 2.680 (1.1); 2.676 (2.4); 2.671 (3.4); 2.667 (2.5); 2.662 (1.1); 2.525 (8.6); 2.520 (13.4); 2.511 (196.3); 2.507 (404.8); 2.502 (534.6); 2.498 (387.2); 2.493 (187.0); 2.459 (1.0); 2.409 (0.3); 2.338 (1.2); 2.334 (2.5); 2.329 (3.4); 2.324 (2.6); 2.320 (1.2); 1.414 (0.8); 1.397 (0.8); 1.236 (8.0); 1.219 (7.7); 0.656 (0.5); 0.639 (0.9); 0.630 (0.8); 0.616 (0.6); 0.569 (0.7); 0.552 (0.8); 0.546 (0.7); 0.536 (0.5); 0.529 (0.4); 0.518 (0.3); 0.490 (0.5); 0.476 (0.6); 0.465 (1.0); 0.452 (1.3); 0.442 (1.2); 0.428 (0.8); 0.418 (0.6); 0.008 (0.9); 0.000 (32.0); -0.009 (1.1)
I.10	8.899 (2.8); 8.896 (2.8); 8.043 (4.1); 7.951 (3.7); 7.945 (3.2); 7.541 (3.1); 7.533 (3.4); 7.377 (2.4); 7.375 (2.6); 7.369 (2.4); 7.367 (2.3); 7.046 (1.3); 6.910 (3.0); 6.774 (1.5); 4.548 (0.6); 4.531 (1.1); 4.512 (1.1); 4.495 (0.6); 3.876 (16.0); 3.333 (466.8); 3.247 (0.9); 3.227 (0.9); 3.211 (1.3); 3.191 (1.2); 3.074 (1.1); 3.058 (1.1); 3.038 (0.8); 3.022 (0.7); 2.890 (5.9); 2.731 (4.9); 2.676 (1.9); 2.671 (2.6); 2.667 (1.9); 2.547 (1.2); 2.524 (6.5); 2.511 (143.9); 2.507 (293.1); 2.502 (385.2); 2.498 (281.8); 2.493 (138.2); 2.333 (1.7); 2.329 (2.4); 2.324 (1.8); 1.969 (14.6); 1.182 (8.2); 1.165 (8.1); 0.657 (0.5); 0.646 (0.7); 0.639 (0.9); 0.633 (0.9); 0.617 (0.7); 0.579 (0.7); 0.563 (0.9); 0.555 (0.8); 0.545 (0.5); 0.472 (0.5); 0.456 (0.6); 0.446 (1.0); 0.432 (1.3); 0.420 (1.3); 0.407 (1.0); 0.396 (0.7); 0.008 (0.7); 0.000 (22.5); -0.009 (0.8)
I.11	8.970 (2.8); 8.966 (2.8); 8.251 (8.8); 8.148 (3.1); 8.143 (3.1); 8.002 (4.2); 7.953 (1.6); 7.730 (2.8); 7.709 (3.3); 7.465 (2.1); 7.446 (3.8); 7.427 (2.1); 7.425 (2.2); 7.407 (1.5); 7.404 (1.3); 7.338 (1.9); 7.336 (1.9); 7.319 (2.7); 7.301 (1.1); 7.299 (1.1); 6.987 (1.4); 6.851 (3.2); 6.715 (1.7); 4.571 (0.6); 4.554 (1.1); 4.535 (1.1); 4.517 (0.6); 3.865 (16.0); 3.440 (0.9); 3.419 (0.9); 3.404 (1.3); 3.383 (1.3); 3.336 (80.2); 3.262 (1.2); 3.246 (1.3); 3.226 (0.9); 3.210 (0.8); 2.891 (12.0); 2.731 (10.0); 2.672 (0.4); 2.526 (1.7); 2.521 (2.2); 2.512 (22.2); 2.508 (45.0); 2.503 (59.2); 2.499 (43.0); 2.494 (21.1); 2.330 (0.4); 1.197 (8.1); 1.180 (8.0); 0.579 (0.7); 0.573 (0.8); 0.562 (0.9); 0.556 (0.7); 0.545 (0.6); 0.534 (0.5); 0.508 (0.3); 0.492 (0.8); 0.480 (0.9); 0.463 (0.8); 0.452 (0.9); 0.443 (0.9); 0.429 (0.7); 0.418 (0.9); 0.407 (0.7); 0.334 (0.4); 0.324 (0.7); 0.308 (0.8); 0.298 (0.8); 0.000 (3.3)
I.12	9.097 (4.2); 9.086 (3.9); 9.048 (2.1); 9.045 (2.1); 8.997 (2.5); 8.986 (2.6); 8.828 (0.5); 8.825 (0.5); 8.399 (0.5); 8.396 (0.5); 8.228 (2.5); 8.223 (2.7); 8.217 (3.1); 8.211 (3.1); 8.205 (2.0); 8.200 (1.9); 8.186 (2.2); 8.182 (2.2); 8.097 (0.6); 8.050 (3.0); 8.029 (2.6); 7.954 (1.0); 7.687 (1.6); 7.677 (1.6); 7.646 (1.2); 7.641 (1.2); 7.624 (1.6); 7.619 (1.6); 7.555 (1.4); 7.550 (1.4); 7.533 (1.9); 7.527 (1.9); 7.517 (2.1); 7.506 (2.7); 7.495 (4.0); 7.390 (2.9); 7.368 (2.4); 7.033 (0.9); 6.896 (2.0); 6.887 (0.9); 6.861 (0.5); 6.760 (1.1); 6.750 (2.0); 6.614 (1.0); 4.466 (0.6); 4.448 (1.2); 4.430 (1.3); 4.412 (0.7); 3.876 (16.0); 3.366 (0.4); 3.338 (64.1); 3.131 (0.6); 3.109 (0.7); 3.094 (1.1); 3.073 (1.1); 3.056 (0.7); 3.035 (0.7); 2.920 (0.7); 2.903 (0.8); 2.892 (7.2); 2.867 (0.5); 2.806 (0.8); 2.790 (0.8); 2.771 (0.7); 2.754 (0.7); 2.732 (6.0); 2.673 (0.4); 2.562 (0.7); 2.526 (1.1); 2.513 (21.9); 2.509 (44.1); 2.504 (57.3); 2.500 (41.5); 2.495 (20.2); 2.331 (0.4); 1.416 (1.3); 1.399 (1.3); 1.131 (5.4); 1.114 (5.5); 1.103 (5.0); 1.086 (4.7); 0.753 (0.5); 0.745 (0.4); 0.735 (0.5); 0.594 (0.7); 0.581 (1.0); 0.575 (1.2); 0.569 (1.2); 0.557 (1.4); 0.541 (1.0); 0.516 (0.7); 0.503 (0.7); 0.491 (0.7); 0.477 (0.6); 0.466 (0.5); 0.451 (0.5); 0.436 (0.6); 0.421 (0.7); 0.399 (0.4); 0.358 (0.3); 0.344 (0.5); 0.333 (0.6); 0.319 (0.7); 0.291 (0.9); 0.281 (1.0); 0.272 (0.9); 0.000 (3.6)
I.13*	8.941 (2.4); 8.869 (2.9); 8.255 (2.4); 8.211 (3.4); 8.190 (3.7); 8.020 (0.6); 7.928 (3.1); 7.908 (3.5); 7.841 (3.6); 7.825 (3.5); 7.806 (1.7); 7.673 (2.0); 7.654 (3.0); 7.636 (1.5); 7.519 (0.5); 7.260 (90.3); 6.996 (0.6); 5.783 (0.6); 5.769 (0.6); 3.730 (16.0); 3.601 (0.6); 3.570 (0.9); 3.551 (0.8); 3.299 (0.4); 3.254 (0.5); 3.225 (0.4); 3.209 (0.4); 3.174 (0.4); 2.956 (3.7); 2.884 (3.3); 2.727 (1.2); 1.548 (18.3); 1.473 (0.6); 1.438 (1.2); 1.394 (1.0); 1.333 (1.5); 1.258 (2.6); 1.226 (0.4); 1.164 (0.3); 1.159 (0.4); 1.151 (0.4); 0.880 (0.7); 0.863 (0.6); 0.850 (0.6); 0.829 (0.6); 0.792 (0.4); 0.778 (0.3); 0.687 (0.8); 0.662 (0.7); 0.657 (0.7); 0.624 (0.7); 0.543 (1.2); 0.146 (0.4); 0.008 (4.4); 0.000 (88.8); -0.008 (4.9); -0.149 (0.4)
I.14*	8.910 (0.4); 8.872 (2.8); 8.841 (0.5); 8.020 (0.4); 7.977 (3.1); 7.958 (3.2); 7.850 (2.9); 7.543 (0.9); 7.518 (0.7); 7.454 (1.5); 7.437 (2.9); 7.417 (2.4); 7.408 (2.2); 7.389 (3.6); 7.372 (2.8); 7.358 (2.6); 7.259 (46.9); 6.996 (0.4); 5.768 (0.8); 3.753 (2.4); 3.738 (16.0); 3.497 (0.7); 3.464 (0.9); 3.442 (0.7); 3.075 (0.5); 3.049 (0.5); 3.034 (0.6); 3.017 (0.5); 2.999 (0.5); 2.985 (0.4); 2.956 (2.8); 2.884 (2.4); 2.674 (1.1); 1.543 (8.6); 1.489 (0.4); 1.472 (0.3); 1.254 (4.3); 1.235 (2.6); 1.202 (0.5); 1.169 (0.4); 0.881 (0.5); 0.777 (0.5); 0.733 (0.4); 0.713 (0.4); 0.608 (0.5); 0.531 (0.9); 0.518 (0.9); 0.448 (1.5); 0.000 (45.3)
I.15	8.507 (4.2); 8.136 (0.4); 7.969 (3.4); 7.964 (3.6); 7.859 (2.8); 7.852 (2.8); 7.847 (3.2); 7.839 (2.7); 7.784 (2.7); 7.760 (3.3); 7.517 (2.7); 7.513 (2.7); 7.494 (2.4); 7.490 (2.3); 7.453 (3.1); 7.442 (2.9); 6.964 (1.3); 6.829 (2.7); 6.694 (1.4); 5.752 (15.5); 4.503 (0.8); 4.485 (1.7); 4.467 (1.7); 4.450 (0.9); 3.731 (16.0); 3.343 (2.9); 3.311 (211.6); 3.155 (1.8); 3.136 (1.8); 3.119 (1.4); 3.101 (1.3); 2.693 (0.5); 2.670 (0.8); 2.592 (1.3); 2.505 (90.9); 2.501 (119.6); 2.497 (91.5); 2.328 (0.7); 1.311 (9.7); 1.294 (9.8); 1.235 (0.6); 0.598 (1.6); 0.581 (1.9); 0.564 (1.7); 0.548 (1.1); 0.524 (0.8); 0.502 (1.2); 0.489 (2.1); 0.478 (2.8); 0.000 (3.1); -0.061 (1.4)
I.16	8.514 (4.2); 8.202 (5.4); 7.959 (5.4); 7.776 (2.7); 7.753 (3.2); 7.515 (2.7); 7.512 (2.7); 7.492 (2.2); 7.489 (2.2); 6.973 (1.3); 6.932 (4.6); 6.838 (2.7); 6.703 (1.4); 5.752 (10.4); 4.500 (0.8); 4.482 (1.7); 4.465 (1.7); 4.447 (0.8); 3.730 (16.0); 3.337 (1.8); 3.309 (84.9); 3.283 (2.0); 3.140 (1.7); 3.121 (1.7); 3.104 (1.3); 3.085

Example	^{1}H-NMR [d6-DMSO at 400 Mhz]
	(1.2); 2.671 (0.5); 2.621 (1.3); 2.502 (80.8); 2.329 (0.5); 1.329 (9.6); 1.312 (9.5); 0.635 (1.7); 0.619 (3.0); 0.602 (2.0); 0.503 (3.3); 0.494 (3.3); 0.000 (2.7)
I.17	8.263 (3.0); 8.203 (3.3); 8.181 (3.3); 8.161 (8.0); 7.855 (2.6); 7.832 (3.1); 7.559 (2.6); 7.536 (2.2); 7.504 (0.7); 7.486 (1.6); 7.476 (1.6); 7.468 (1.2); 7.457 (1.0); 7.433 (0.9); 7.412 (2.0); 7.391 (1.7); 7.373 (0.8); 7.345 (1.8); 7.325 (1.1); 7.267 (1.7); 7.247 (1.3); 6.953 (0.8); 6.930 (0.7); 6.819 (1.6); 6.796 (1.7); 6.684 (0.8); 6.661 (0.9); 5.753 (16.0); 4.471 (0.4); 4.453 (0.9); 4.446 (0.7); 4.436 (1.0); 4.427 (1.1); 4.417 (0.7); 4.410 (1.0); 4.392 (0.5); 3.730 (14.3); 3.308 (82.5); 3.272 (0.9); 3.253 (0.8); 3.212 (0.5); 3.193 (0.5); 3.176 (0.8); 3.157 (0.8); 3.115 (0.9); 3.096 (1.0); 3.079 (0.6); 3.060 (0.5); 3.036 (0.8); 3.017 (0.8); 3.000 (0.7); 2.981 (0.6); 2.671 (0.6); 2.506 (82.1); 2.502 (107.5); 2.497 (80.3); 2.333 (0.5); 2.329 (0.6); 1.239 (5.2); 1.228 (5.8); 1.222 (5.9); 1.211 (4.8); 0.532 (0.7); 0.522 (0.5); 0.514 (0.6); 0.475 (1.1); 0.457 (1.0); 0.441 (0.9); 0.423 (1.2); 0.395 (3.5); 0.373 (1.3); 0.360 (0.6); 0.000 (5.3)
I.18	8.793 (0.4); 8.789 (0.4); 8.783 (0.4); 8.779 (0.4); 8.746 (0.4); 8.742 (0.4); 8.735 (0.4); 8.731 (0.4); 8.561 (0.4); 8.557 (0.4); 8.540 (0.7); 8.523 (0.4); 8.520 (0.4); 8.233 (0.6); 8.213 (0.7); 8.011 (1.2); 7.982 (0.6); 7.960 (0.4); 7.858 (0.4); 7.839 (0.7); 7.829 (0.8); 7.821 (0.8); 7.809 (0.6); 7.634 (0.4); 7.624 (0.6); 7.613 (0.7); 7.603 (0.4); 7.593 (0.4); 7.526 (0.7); 7.502 (0.6); 6.888 (0.5); 6.696 (0.5); 5.754 (16.0); 3.753 (2.1); 3.712 (2.2); 3.310 (4.7); 2.508 (14.6); 2.504 (19.2); 2.499 (14.6); 1.292 (1.3); 1.275 (1.3); 1.108 (1.3); 1.091 (1.3); 0.396 (0.5); 0.352 (0.3); 0.329 (0.4); 0.000 (1.2)
I.19	8.778 (11.3); 8.685 (2.5); 7.790 (1.6); 7.766 (1.9); 7.537 (1.6); 7.533 (1.6); 7.513 (1.4); 7.510 (1.4); 6.947 (0.9); 6.812 (2.1); 6.677 (1.0); 5.752 (7.9); 4.430 (0.5); 4.412 (1.0); 4.395 (1.1); 4.377 (0.5); 4.021 (16.0); 3.730 (9.5); 3.304 (29.6); 3.244 (0.7); 3.225 (0.7); 3.207 (1.0); 3.189 (0.9); 3.045 (1.0); 3.027 (1.1); 3.009 (0.8); 2.991 (0.7); 2.669 (0.5); 2.629 (0.7); 2.505 (55.1); 2.501 (72.0); 2.497 (54.3); 2.328 (0.4); 1.304 (5.7); 1.287 (5.7); 1.159 (0.5); 0.635 (0.7); 0.622 (0.9); 0.605 (1.1); 0.588 (0.9); 0.556 (0.5); 0.541 (0.5); 0.529 (0.5); 0.517 (1.0); 0.507 (1.0); 0.497 (0.9); 0.486 (0.9); 0.000 (3.4)

Note * : in $CDCl_3$

The following examples illustrate in a non-limiting manner the preparation and efficacy of the compounds of formula (I) according to the invention.

Preparation example 1 : preparation of N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-{1-[3-(3-thienyl)-5-(trifluoromethyl)pyridin-2-yl]propan-2-yl}-1H-pyrazole-4-carboxamide (compound I.06)

In a 5 mL microwave vial, 182 mg (0.40 mmol) of N-{1-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]propan-2-yl}-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide are added to a mixture of 102 mg (0.80 mmol) of 3-thienylboronic acid and 5 mg (0.008 mmol) of 1,10-bis(di-tert-butyl-phosphino)ferrocene palladium(II) dichloride in solution in 1.5 mL of acetonitrile and degassed with argon. 138 mg (1 mmol) of potassium carbonate in solution in 1.5 mL of water are further added and the mixture is heated under microwave at 130 °C for 20 minutes. To the cooled reaction mixture are added 1 mL of water and 2 mL of dichloromethane. The mixture is deposited of a ChemElut™ cartridge (3 g) and eluted three times by 6 mL of dichloromethane. The organic extracts are concentrated under vacuum and the residue (74 mg) is purified by preparative HPLC (gradient acetonitrile/water + 0.1% HCO_2H) to provide 22 mg (10% yield) of N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-{1-[3-(3-thienyl)-5-(trifluoromethyl)-pyridin-2-yl]propan-2-yl}-1H-pyrazole-4-carboxamide as an oil. LogP = 4.03. (M+H) = 503.

General preparation example 2 : thionation of amide of formula (I) on Chemspeed™ apparatus

In a 13 mL Chemspeed™ vial is weighted 0.27 mmol of phosphorous pentasulfide (P_2S_5). 3 mL of a 0.18 M solution of the amide (I) (0.54 mmol) in dioxane is added and the mixture is heated at reflux for two hours. The temperature is then cooled to 80 °C and 2.5 mL of water are added. The mixture is heated

at 80 °C for one more hour. 2 mL of water are then added and the reaction mixture is extracted twice by 4 mL of dichloromethane. The organic phase is deposited on a basic alumina cartridge (2 g) and eluted twice by 8 mL of dichloromethane. The solvents are removed and the crude thioamide derivative is analyzed by LCMS and NMR. Insufficiently pure compounds are further purified by preparative LC.

Example A : in vivo preventive test on *Alternaria brassicae* (leaf spot on radish)

Solvent:	5%	by volume of Dimethyl sulfoxide
	10%	by volume of Acetone
Emulsifier:	1 µL	of Tween® 80 per mg of active ingredient

The active ingredients are made soluble and homogenized in a mixture of Dimethyl sulfoxide/Acetone/ /Tween® 80 and then diluted in water to the desired concentration.

The young plants of radish are treated by spraying the active ingredient prepared as described above. Control plants are treated only with an aqueous solution of Acetone/Dimethyl sulfoxide/ Tween® 80.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of Alternaria brassicae spores. The contaminated radish plants are incubated for 6 days at 20 °C and at 100% relative humidity.

The test is evaluated 6 days after the inoculation. 0% means an efficacy which corresponds to that of the control plants while an efficacy of 100% means that no disease is observed.

In this test the following compounds according to the invention showed efficacy between 70% and 79% at a concentration of 500 ppm of active ingredient: I.19

In this test the following compounds according to the invention showed efficacy between 80% and 89% at a concentration of 500 ppm of active ingredient: I.16; I.18

In this test the following compounds according to the invention showed efficacy between 90% and 100% at a concentration of 500 ppm of active ingredient: I.14; I.15; I.17.

Under the same conditions, high (at least 80%) protection was observed at a dose of 100 and 500 ppm of active ingredient with compound of example I.16, whereas poor (less than 50%) protection was observed with compound CMP1 (pyridyl analogue) disclosed in patent application WO-2011/151369 as in table A2:

Table A2:

Example	dose (ppm)	Efficacy
I.16 from this patent	500	86
	100	86
CMP1 from WO2011/151369	500	43
	100	0

Example CMP1 disclosed in international patent WO-2011/0151369 corresponds to N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-{1-[3-(pyridin-3-yl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]propan-2-yl}-1H-pyrazole-4-carboxamide.

These results showed that the compounds according to the invention have a much better biological activity than the structurally closest compounds disclosed in WO-2011/015369.

Example B : *in vivo* preventive test on *Puccinia recondita* (brown rust on wheat)

Solvent: 5% by volume of Dimethyl sulfoxide
10% by volume of Acetone

Emulsifier: 1 µL of Tween® 80 per mg of active ingredient

The active ingredients are made soluble and homogenized in a mixture of Dimethyl sulfoxide/Acetone/ /Tween® 80 and then diluted in water to the desired concentration.

The young plants of wheat are treated by spraying the active ingredient prepared as described above. Control plants are treated only with an aqueous solution of Acetone/Dimethyl sulfoxide/ Tween® 80.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of Puccinia recondita spores. The contaminated wheat plants are incubated for 24 hours at 20 °C and at 100% relative humidity and then for 10 days at 20 °C and at 70-80% relative humidity.

The test is evaluated 11 days after the inoculation. 0% means an efficacy which corresponds to that of the control plants while an efficacy of 100% means that no disease is observed.

In this test the following compounds according to the invention showed efficacy between 70% and 79% at a concentration of 500 ppm of active ingredient: I.14; I.15; I.16; I.17; I.18.

In this test the following compounds according to the invention showed efficacy between 80% and 89% at a concentration of 500 ppm of active ingredient: I.01; I.03; I.08

In this test the following compounds according to the invention showed efficacy between 90% and 100% at a concentration of 500 ppm of active ingredient: I.04; I.05; I.06; I.07; I.11; I.12.

Under the same conditions, good (at least 70%) protection was observed at a dose of 500 ppm of active ingredient with compound of example I.16, whereas no protection was observed with compound CMP1 (pyridyl analogue) disclosed in patent application WO-2011/151369 as in table B2:

Table B2:

Example	dose (ppm)	Efficacy
I.16 from this patent	500	78
CMP1 from WO2011/151369	500	0

Example CMP1 disclosed in international patent WO-2011/0151369 corresponds to N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-{1-[3-(pyridin-3-yl)-6-(trifluoromethyl)imidazo[1,2-a]pyridin-2-yl]propan-2-yl}-1H-pyrazole-4-carboxamide.

These results showed that the compounds according to the invention have a much better biological activity than the structurally closest compounds disclosed in WO-2011/015369.

Under the same conditions, excellent (at least 90%) to total protection was observed at a dose of 100 and 500 ppm of active ingredient with compound of example I.05, whereas average (less than 70%) protection was observed with compound CMP2 (pyridyl analogue) disclosed in patent application WO-2011/151369 as in table B3:

Table B3:

Example	dose (ppm)	Efficacy
I.05 from this patent	500	100
	100	93
CMP2 from WO2011/151369	500	69
	100	38

Example CMP2 disclosed in international patent WO-2011/0151369 corresponds to N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-{1-[5-(trifluoromethyl)-3,3'-bipyridin-2-yl]propan-2-yl}-1H-pyrazole-4-carboxamide.

These results showed that the compounds according to the invention have a much better biological activity than the structurally closest compounds disclosed in WO-2011/015369.

Example C : in vivo preventive test on *Pyrenophora teres* (net blotch on barley)

Solvent: 5% by volume of Dimethyl sulfoxide
10% by volume of Acetone
Emulsifier: 1 µL of Tween® 80 per mg of active ingredient

The active ingredients are made soluble and homogenized in a mixture of Dimethyl sulfoxide/Acetone/ /Tween® 80 and then diluted in water to the desired concentration.

The young plants of barley are treated by spraying the active ingredient prepared as described above. Control plants are treated only with an aqueous solution of Acetone/Dimethyl sulfoxide/ Tween® 80.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of Pyrenophora teres spores. The contaminated barley plants are incubated for 48 hours at 20 ℃ and at 100% relative humidity and then for 12 days at 20 °C and at 70-80% relative humidity.

The test is evaluated 14 days after the inoculation. 0% means an efficacy which corresponds to that of the control plants while an efficacy of 100% means that no disease is observed.

In this test the following compounds according to the invention showed efficacy between 80% and 89% at a concentration of 500 ppm of active ingredient: I.13; I.19

In this test the following compounds according to the invention showed efficacy between 90% and 100% at a concentration of 500 ppm of active ingredient: I.14; I.15; I.16; I.17.

Example D : *in vivo* preventive test on *Septoria tritici* (wheat)

Solvent: 5% by volume of Dimethyl sulfoxide
10% by volume of Acetone
Emulsifier: 1 µL of Tween® 80 per mg of active ingredient

The active ingredients are made soluble and homogenized in a mixture of Dimethyl sulfoxide/Acetone/ /Tween® 80 and then diluted in water to the desired concentration.

The young plants of wheat are treated by spraying the active ingredient prepared as described above. Control plants are treated only with an aqueous solution of Acetone/Dimethyl sulfoxide/ Tween® 80.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of *Septoria tritici* spores. The contaminated wheat plants are incubated for 72 hours at 18 °C and at 100% relative humidity and then for 21 days at 20 °C and at 90% relative humidity.

The test is evaluated 24 days after the inoculation. 0% means an efficacy which corresponds to that of the control plants while an efficacy of 100% means that no disease is observed.

In this test the following compounds according to the invention showed efficacy between 70% and 79% at a concentration of 500 ppm of active ingredient: I.18; I.19

In this test the following compounds according to the invention showed efficacy between 80% and 89% at a concentration of 500 ppm of active ingredient: I.16

In this test the following compounds according to the invention showed efficacy between 90% and 100% at a concentration of 500 ppm of active ingredient: I.01; I.02; I.03; I.04; I.05; I.06; I.07; I.11; I.12; I.13; I.14; I.15; I.17.

Example E : *in vivo* preventive test on *Sphaerotheca fuliginea* (powdery mildew on cucurbits)

Solvent:	5%	by volume of Dimethyl sulfoxide
	10%	by volume of Acetone
Emulsifier:	1 µL	of Tween® 80 per mg of active ingredient

The active ingredients are made soluble and homogenized in a mixture of Dimethyl sulfoxide/Acetone/ /Tween® 80 and then diluted in water to the desired concentration.

The young plants of gherkin are treated by spraying the active ingredient prepared as described above. Control plants are treated only with an aqueous solution of Acetone/Dimethyl sulfoxide/ Tween® 80.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of Sphaerotheca fuliginea spores. The contaminated gherkin plants are incubated for 72 hours at 18 °C and at 100% relative humidity and then for 12 days at 20 °C and at 70-80% relative humidity.

The test is evaluated 15 days after the inoculation. 0% means an efficacy which corresponds to that of the control plants while an efficacy of 100% means that no disease is observed.

In this test the following compounds according to the invention showed efficacy between 90% and 100% at a concentration of 500 ppm of active ingredient: I.01; I.02; I.03; I.04; I.05; I.06; I.07; I.08; I.11; I.12; I.13; I.14; I.15; I.16; I.17; I.18; I.19.

Example F : *in vivo* preventive test on *Uromyces appendiculatus* (bean rust)

Solvent:	5%	by volume of Dimethyl sulfoxide
	10%	by volume of Acetone
Emulsifier:	1 µL	of Tween® 80 per mg of active ingredient

The active ingredients are made soluble and homogenized in a mixture of Dimethyl sulfoxide/Acetone/ /Tween® 80 and then diluted in water to the desired concentration.

The young plants of bean are treated by spraying the active ingredient prepared as described above. Control plants are treated only with an aqueous solution of Acetone/Dimethyl sulfoxide/ Tween® 80.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of *Uromyces appendiculatus* spores. The contaminated bean plants are incubated for 24 hours at 20 °C and at 100% relative humidity and then for 10 days at 20 °C and at 70-80% relative humidity.

The test is evaluated 11 days after the inoculation. 0% means an efficacy which corresponds to that of the control plants while an efficacy of 100% means that no disease is observed.

In this test the following compounds according to the invention showed efficacy between 70% and 79% at a concentration of 500 ppm of active ingredient: I.02

In this test the following compounds according to the invention showed efficacy between 90% and 100% at a concentration of 500 ppm of active ingredient: I.04; I.05; I.06; I.07.

Under the same conditions, total protection was observed at a dose of 500 ppm of active ingredient with compound of example I.05, whereas no protection was observed with compound CMP2 (pyridyl analogue) disclosed in patent application WO-2011/151369 as in table F2:

Table F2:

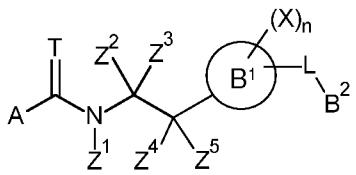
Example	dose (ppm)	Efficacy
I.05 from this patent	500	100
CMP2 from WO2011/151369	500	0

Example CMP2 disclosed in international patent WO-2011/0151369 corresponds to N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-{1-[5-(trifluoromethyl)-3,3'-bipyridin-2-yl]propan-2-yl}-1H-pyrazole-4-carboxamide.

These results showed that the compounds according to the invention have a much better biological activity than the structurally closest compounds disclosed in WO-2011/015369.

CLAIMS

1. A compound of formula (I)



(I)

wherein

- A represents a carbo-linked, unsaturated or partially saturated, 5-membered heterocyclyl group that can be substituted by up to four groups R that can be the same or different ;
- T represents O or S ;
- n represents 0, 1, 2, 3 or 4 ;
- L represents a direct bond, CZ^6Z^7, O, S, SO, SO_2 or NZ^8 ;
- B^1 represents a carbo-linked unsaturated, monocyclic or fused bicyclic 5-, 6-, 8-, 9-, 10-membered heterocyclyl ring comprising from 1 up to 4 heteroatoms selected in the list consisting of N, O, S ;
- B^2 represents a saturated, partially saturated or unsaturated, monocyclic or fused bicyclic 3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-membered heterocyclyl ring comprising from 1 up to 4 heteroatoms selected in the list consisting of N, O, S, that can be substituted by up to 6 groups Y which can be the same or different ;

  with the proviso that B^2 does not represent a pyridyl ring when L represents a direct bond or CZ^6Z^7 or an oxygen atom or a sulfur atom or NZ^8 and A represents a 1-C_1-C_4-alkyl-3-(difluoro or dichloro)methyl-5-(chloro or fluoro)-4-pyrazolyl moiety;

- Z^1 represents a non-substituted C_3-C_7-cycloalkyl or a C_3-C_7-cycloalkyl substituted by up to 10 atoms or groups that can be the same or different and that can be selected in the list consisting of halogen atoms, cyano, C_1-C_8-alkyl, C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different, C_1-C_8-alkoxy, C_1-C_8-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different, C_1-C_8-alkoxycarbonyl, C_1-C_8-halogenoalkoxycarbonyl comprising up to 9 halogen atoms that can be the same or different, C_1-C_8-alkylaminocarbonyl and di-C_1-C_8-alkylaminocarbonyl ;

  with the proviso that Z^1 does not represent a non-substituted cyclopropyl when B^1 represents a 5-substituted (by B^2) pyridin-2-yl group or a 6-substituted (by B^2) pyridin-3-yl group or a 6-substituted (by B^2) pyridazin-3-yl group or a 5-substituted (by B^2) pyrimidin-2-yl group or a 2-substituted (by B^2) pyrimidin-5-yl group or a 5-substituted (by B^2) pyrazin-2-yl group and B^2 represents a 5-membered heterocyclyl group.

- Z^2, Z^3, Z^4 and Z^5 which can be the same or different, represent a hydrogen atom ; substituted or non-substituted C_1-C_8-alkyl ; substituted or non-substituted C_2-C_8-alkenyl ; substituted or non-substituted C_2-C_8-alkynyl ; cyano ; isonitrile ; nitro ; a halogen atom ; substituted or non-substituted C_1-C_8-alkoxy ; substituted or non-substituted C_2-C_8-alkenyloxy ; substituted or non-substituted C_2-C_8-alkynyloxy ; substituted or non-substituted C_3-C_7-cycloalkyl ; substituted or non-substituted C_1-C_8-alkylsulfanyl ; substituted or non-substituted C_1-C_8-alkylsulfonyl ; substituted or non-substituted C_1-C_8-alkylsulfinyl ; amino ; substituted or non-substituted C_1-C_8-alkylamino ; substituted or non-substituted di-C_1-C_8-alkylamino ; substituted or non-substituted C_1-C_8-alkoxycarbonyl ; substituted or non-substituted C_1-C_8-alkylcarbamoyl ; substituted or non-substituted di-C_1-C_8-alkylcarbamoyl ; or substituted or non-substituted N-C_1-C_8-alkyl-C_1-C_8-alkoxy-carbamoyl ; or
- Z^i and Z^{i+1} , i being an integer from 2 to 4, together with the carbon atom to which they are linked can form a substituted or non-substituted C_3-C_7 cycloalkyl ; or

- Z^5 and the substituent X vicinal to the point of attachment of the B^1 heterocyclic ring, together with the consecutive carbon atoms to which they are linked, can form a substituted or non-substituted 5-, 6- or 7-membered, partly saturated, carbo- or heterocycle comprising up to 3 heteroatoms and Z^4 is herein-described ;

- Z^6 and Z^7 independently represent a hydrogen atom ; a halogen atom ; cyano ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms ; substituted or non-substituted C_1-C_8-alkoxy; substituted or non-substituted C_1-C_8-alkylsulfanyl ; or substituted or non-substituted C_1-C_8-alkoxycarbonyl ; or
- Z^6 and Z^7 together with the carbon atom to which they are linked can form a C(=O) carbonyl group ;

- Z^8 represents a hydrogen atom ; a substituted or non-substituted C_1-C_8-alkyl ; a C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_2-C_8-alkenyl ; C_2-C_8-halogenoalkenyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_3-C_8-alkynyl ; C_3-C_8-halogenoalkynyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_3-C_7-cycloalkyl ; C_3-C_7-halogeno-cycloalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_3-C_7-cycloalkyl-C_1-C_8-alkyl ; formyl ; substituted or non-substituted C_1-C_8-alkylcarbonyl ; C_1-C_8-halogenoalkylcarbonyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_8-alkoxycarbonyl ; C_1-C_8-halogenoalkoxycarbonyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_8-alkylsulfonyl ; C_1-C_8-halogenoalkylsulfonyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted benzyl ; or substituted or non-substituted phenylsulfonyl;X independently represents a halogen atom ; nitro ; cyano ; isonitrile ; hydroxy ; amino ; sulfanyl ; pentafluoro-λ^6-sulfanyl ; formyl ; formyloxy ; formylamino ; substituted or non-substituted (hydroxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (C_1-C_8-alkoxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (C_2-C_8-alkenyloxyimino)-C_1-C_8-alkyl ; substituted or non-substituted

(C_2-C_8-alkynyloxyimino)-C_1-C_8-alkyl ; substituted or non-substituted (benzyloxyimino)-C_1-C_8-alkyl ; carboxy ; carbamoyl ; N-hydroxycarbamoyl ; carbamate ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl having 1 to 9 halogen atoms ; substituted or non-substituted C_2-C_8-alkenyl ; C_2-C_8-halogenoalkenyl having 1 to 9 halogen atoms ; substituted or non-substituted C_2-C_8-alkynyl ; C_2-C_8-halogenoalkynyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkoxy ; C_1-C_8-halogenoalkoxy having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylsulfanyl ; C_1-C_8-halogenoalkylsulfanyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylsulfinyl ; C_1-C_8-halogenoalkylsulfinyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylsulfonyl ; C_1-C_8-halogenoalkylsulfonyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylamino ; substituted or non-substituted di-C_1-C_8-alkylamino ; substituted or non-substituted C_2-C_8-alkenyloxy ; C_2-C_8-halogenoalkenyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_3-C_8-alkynyloxy ; C_2-C_8-halogenoalkynyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_3-C_7-cycloalkyl ; C_3-C_7-halogenocycloalkyl having 1 to 9 halogen atoms ; substituted or non-substituted (C_3-C_7-cycloalkyl)-C_1-C_8-alkyl ; substituted or non-substituted C_4-C_7-cycloalkenyl ; C_4-C_7-halogenocycloalkenyl having 1 to 9 halogen atoms ; substituted or non-substituted (C_3-C_7-cycloalkyl)-C_2-C_8-alkenyl ; substituted or non-substituted (C_3-C_7-cycloalkyl)-C_2-C_8-alkynyl ; substituted or non-substituted tri(C_1-C_8)alkylsilyl ; substituted or non-substituted tri(C_1-C_8)alkylsilyl-C_1-C_8-alkyl ; substituted or non-substituted C_1-C_8-alkylcarbonyl ; C_1-C_8-halogenoalkylcarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylcarbonyloxy ; C_1-C_8-halogenoalkylcarbonyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylcarbonylamino ; C_1-C_8-halogenoalkylcarbonylamino having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkoxycarbonyl ; C_1-C_8-halogenoalkoxycarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkyloxycarbonyloxy ; C_1-C_8-halogenoalkoxycarbonyloxy having 1 to 9 halogen atoms ; substituted or non-substituted C_1-C_8-alkylcarbamoyl ; substituted or non-substituted di-C_1-C_8-alkylcarbamoyl ; substituted or non-substituted C_1-C_8-alkylaminocarbonyloxy ; substituted or non-substituted di-C_1-C_8-alkylaminocarbonyloxy ; substituted or non-substituted N-(C_1-C_8-alkyl)hydroxy carbamoyl ; substituted or non-substituted C_1-C_8-alkoxycarbamoyl ; substituted or non-substituted N-(C_1-C_8-alkyl)-C_1-C_8-alkoxycarbamoyl ; aryl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkyl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_2-C_8-alkenyl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_2-C_8-alkynyl that can be substituted by up to 6 groups Q which can be the same or different ; aryloxy that can be substituted by up to 6 groups Q which can be the same or different ; arylsulfanyl that can be substituted by up to 6 groups Q which can be the same or different ; arylamino that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkyloxy that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkylsulfanyl that can be substituted by up to 6 groups Q which can be the same or different ; aryl-C_1-C_8-alkylamino that can be substituted by up to 6 groups Q which can be the same or different ;

- Y independently represents a halogen atom atom ; cyano ; hydroxy ; amino ; sulfanyl ; substituted or non-substituted C1-C8-alkyl ; C1-C8-halogenoalkyl having 1 to 9 halogen atoms ; substituted

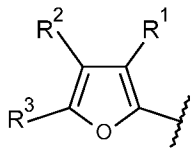
or non-substituted C1-C8-alkoxy ; C1-C8-halogenoalkoxy having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfanyl ; C1-C8-halogenoalkylsulfanyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfinyl ; C1-C8-halogenoalkylsulfinyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfonyl ; C1-C8-halogenoalkylsulfonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylamino ; substituted or non-substituted di-C1-C8-alkylamino ; substituted or non-substituted C1-C8-alkylcarbonyl ; C1-C8-halogenoalkylcarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxycarbonyl ; C1-C8-halogenoalkoxycarbonyl having 1 to 9 halogen atoms ; aryl that can be substituted by up to 6 groups Q which can be the same or different ;

- Q independently represents a halogen atom, cyano, nitro, substituted or non-substituted C1-C8-alkyl, C1-C8-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different, substituted or non-substituted C1-C8-alkoxy, C1-C8-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different, substituted or non-substituted C1-C8-alkylsulfanyl, C1-C8-halogenoalkylsulfanyl comprising up to 9 halogen atoms that can be the same or different, substituted or non-substituted tri(C1-C8)alkylsilyl, substituted or non-substituted tri(C1-C8)alkylsilyl-C1-C8-alkyl, substituted or non-substituted (C1-C8-alkoxyimino)-C1-C8-alkyl , or substituted or non-substituted (benzyloxyimino)-C1-C8-alkyl ;
- R independently represents hydrogen atom ; halogen atom ; nitro ; cyano ; hydroxy ; amino ; sulfanyl ; pentafluoro-λ6-sulfanyl ; substituted or non-substituted (C1-C8-alkoxyimino)-C1-C8-alkyl ; substituted or non-substituted (benzyloxyimino)-C1-C8-alkyl ; substituted or non-substituted C1-C8-alkyl ; C1-C8-halogenoalkyl having 1 to 9 halogen atoms ; substituted or non-substituted C2-C8-alkenyl ; C2-C8-halogenoalkenyl having 1 to 9 halogen atoms ; substituted or non-substituted C2-C8-alkynyl ; C2-C8-halogenoalkynyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxy ; C1-C8-halogenoalkoxy having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfanyl ; C1-C8-halogenoalkylsulfanyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfinyl ; C1-C8-halogenoalkylsulfinyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylsulfonyl ; C1-C8-halogenoalkylsulfonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylamino ; substituted or non-substituted di-C1-C8-alkylamino ; substituted or non-substituted C2-C8-alkenyloxy ; substituted or non-substituted C3-C8-alkynyloxy ; substituted or non-substituted C3-C7-cycloalkyl ; C3-C7-halogenocycloalkyl having 1 to 9 halogen atoms ; substituted or non-substituted tri(C1-C8)alkylsilyl ; substituted or non-substituted C1-C8-alkylcarbonyl ; C1-C8-halogenoalkylcarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkoxycarbonyl ; C1-C8-halogenoalkoxycarbonyl having 1 to 9 halogen atoms ; substituted or non-substituted C1-C8-alkylcarbamoyl ; substituted or non-substituted di-C1-C8-alkylcarbamoyl ; phenoxy ; phenylsulfanyl ; phenylamino ; benzyloxy ; benzylsulfanyl ; or benzylamino ;

as well as its salts, N-oxides, metal complexes, metalloid complexes and optically active isomers or geometric isomers.

2. A compound according to claim 1 wherein A is selected in the list consisting of:

- a heterocycle of formula (A^1)

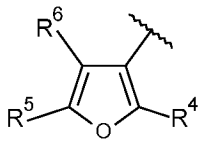


(A^1)

wherein :

R^1 to R^3 that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^2)

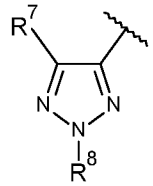


(A^2)

wherein :

R^4 to R^6 that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^3)



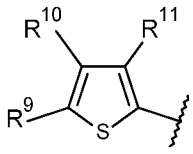
(A^3)

wherein :

R^7 represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^8 represents a hydrogen atom or a substituted or non-substituted C_1-C_5-alkyl ;

- a heterocycle of formula (A^4)

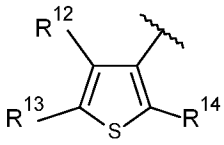


(A4)

wherein :

R^9 to R^{11} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; amino ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_1-C_5-alkylsulfanyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A5)



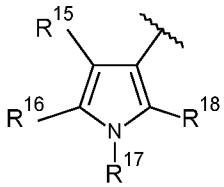
(A5)

wherein :

R^{12} and R^{13} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; amino ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^{14} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; amino ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A6)



(A6)

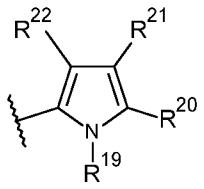
wherein :

R^{15} represents a hydrogen atom ; a halogen atom ; a cyano ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{16} and R^{18} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkoxycarbonyl ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{17} represent a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

- a heterocycle of formula (A^7)



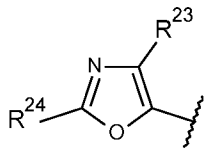
(A^7)

wherein :

R^{19} represents a hydrogen atom or a C_1-C_5-alkyl

R^{20} to R^{22} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^8)



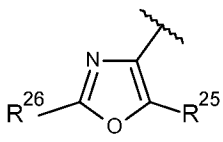
(A^8)

wherein :

R^{23} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{24} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different;

- a heterocycle of formula (A^9)



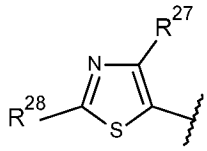
(A^9)

wherein :

R^{25} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{26} represents a hydrogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^{10})



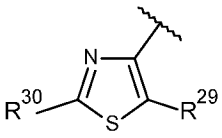
(A^{10})

wherein :

R^{27} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{28} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or substituted or non-substituted di(C_1-C_5-alkyl)amino ;

- a heterocycle of formula (A^{11})



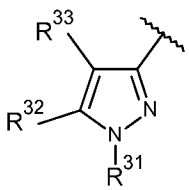
(A^{11})

wherein :

R^{29} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{30} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or substituted or non-substituted di(C_1-C_5-alkyl)amino ;

- a heterocycle of formula (A^{12})



(A^{12})

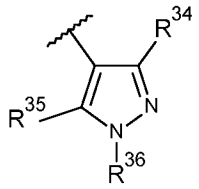
wherein :

R^{31} represents a hydrogen atom or a substituted or non-substituted C_1-C_5-alkyl

R^{32} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{33} represents a hydrogen atom ; a halogen atom ; a nitro ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^{13})



(A^{13})

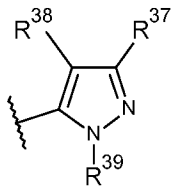
wherein :

R^{34} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_3-C_5-cycloalkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_2-C_5-alkynyloxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^{35} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; a cyano ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_1-C_5-alkylsulfanyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or substituted or non-substituted di(C_1-C_5-alkyl)amino;

R^{36} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{14})



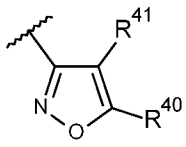
(A^{14})

wherein :

R^{37} and R^{38} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy or a substituted or non-substituted C_1-C_5-alkylsulfanyl ;

R^{39} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

- a heterocycle of formula (A^{15})

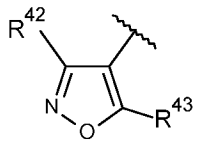


(A[15])

wherein :

R^{40} and R^{41} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A[16])

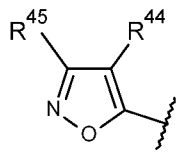


(A[16])

wherein :

R^{42} and R^{43} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or amino ;

-a heterocycle of formula (A[17])

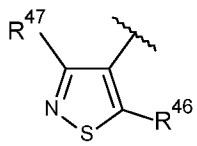


(A[17])

wherein :

R^{44} and R^{45} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A[18])



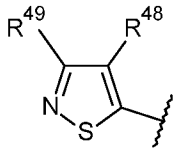
(A[18])

wherein :

R^{47} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{46} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different or substituted or non-substituted C_1-C_5-alkylsulfanyl ;

- a heterocycle of formula (A^{19})

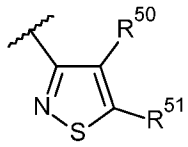


(A^{19})

wherein :

R^{49} and R^{48} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

- a heterocycle of formula (A^{20})

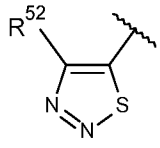


(A^{20})

wherein :

R^{50} and R^{51} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_1-C_5-alkoxy ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

-a heterocycle of formula (A^{21})



(A^{21})

wherein :

R^{52} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different.

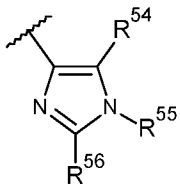
-a heterocycle of formula (A^{22})

(A22)

wherein :

R^{53} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different.

-a heterocycle of formula (A^{23})



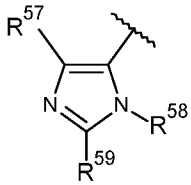
(A^{23})

wherein :

R^{54} and R^{56} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{55} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{24})



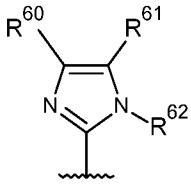
(A^{24})

wherein :

R^{57} and R^{59} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{58} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{25})



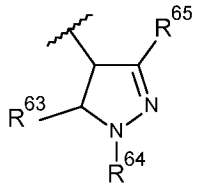
(A^{25})

wherein :

R^{60} and R^{61} that can be the same or different represent a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl or C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ;

R^{62} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl ;

-a heterocycle of formula (A^{26})



(A^{26})

wherein :

R^{65} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; substituted or non-substituted C_3-C_5-cycloalkyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_2-C_5-alkynyloxy or C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ;

R^{63} represents a hydrogen atom ; a halogen atom ; substituted or non-substituted C_1-C_5-alkyl ; a cyano ; substituted or non-substituted C_1-C_5-alkoxy ; substituted or non-substituted C_1-C_5-alkylsulfanyl ; C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; C_1-C_5-halogenoalkoxy comprising up to 9 halogen atoms that can be the same or different ; amino ; substituted or non-substituted C_1-C_5-alkylamino or di(C_1-C_5-alkyl)amino;

R^{64} represents a hydrogen atom or substituted or non-substituted C_1-C_5-alkyl.

3. A compound according to claim 2 wherein A is selected in the list consisting of A^2 ; A^3; A^5 ; A^6 ; A^{10} and A^{13}.

4. A compound according to claim 3 wherein A represents A^{13} wherein R^{34} represents a substituted or non-substituted C_1-C_5-alkyl, C_1-C_5-halogenoalkyl comprising up to 9 halogen atoms that can be the same or different ; substituted or non-substituted C_1-C_5-alkoxy ; R^{35} represents a hydrogen atom or a halogen atom and R^{36} represents a substituted or non-substituted C_1-C_5-alkyl.

5. A compound according to any one of claims 1 to 4 wherein T represents O.

6. A compound according to any one of claims 1 to 5 wherein Z^1 represents a non-substituted cyclopropyl or a 2-C_1-C_5-alkylcyclopropyl.

7. A compound according to any one of claims 1 to 6 wherein Z^2, Z^3, Z^4 and Z^5 independently represent a hydrogen atom or C_1-C_8-alkyl.

8. A compound according to any ones of claims 1 to 7 wherein L represents a direct bond, an oxygen atom, a methylene group or a carbonyl group.

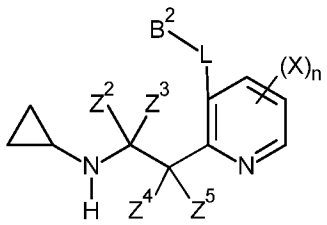
9. A compound according to any ones of claims 1 to 8 wherein B^1 represents a substituted or non-substituted thienyl ring; a substituted or non-substituted benzothiophenyl ring; a substituted or non-substituted pyridinyl ring; a substituted or non-substituted furyl ring; a substituted or non-substituted imidazo[1,2-a]pyridin-2-yl ring.; or a substituted or non-substituted benzofuranyl ring.

10. A compound according to any ones of claims 1 to 9 wherein B^2 represents a substituted or non-substituted thienyl ring; a substituted or non-substituted benzothiophenyl ring; a substituted or non-substituted pyridine ring; a substituted or non-substituted quinolinyl ring; a substituted or non-substituted furyl ring; or a substituted or non-substituted benzofuranyl ring; or a substituted or non-substituted pyrimidinyl ring.

11. A compound according to any ones of claims 1 to 10 wherein X independently, represents a halogen atom ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms which can be the same or different ; substituted or non-substituted C_3-C_7-cycloalkyl ; tri(C_1-C_8-alkyl)silyl; substituted or non-substituted C_1-C_8-alkoxy; or substituted or non-substituted C_1-C_8-alkylsulfanyl.

12. A compound according to any ones of claims 1 to 11 wherein Y independently, represents a halogen atom ; substituted or non-substituted C_1-C_8-alkyl ; C_1-C_8-halogenoalkyl comprising up to 9 halogen atoms which can be the same or different ; substituted or non-substituted C_1-C_8-alkoxy ; C_1-C_8-halogenoalkoxy comprising up to 9 halogen atoms which can be the same or different.

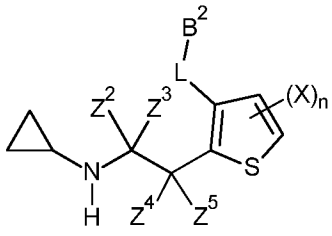
13. A compound or formula (IIa)



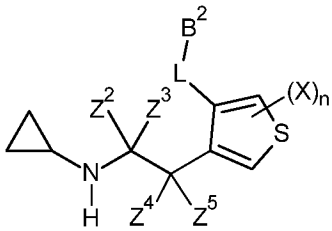
(IIa)

wherein n represents 0, 1, 2 or 3, L is a direct bond or CZ^6Z^7, and Z^2, Z^3, Z^4, Z^5, Z^6, Z^7, B^2 and X are as defined in any ones of claims 1 to 15; or

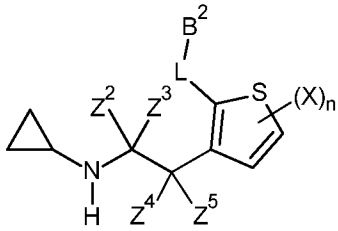
of formula (IIb), (IIc) or (IId)



(IIb)



(IIc)



(IId)

wherein n represents 0, 1 or 2, L is a direct bond or CZ^6Z^7, and Z^2, Z^3, Z^4, Z^5, Z^6, Z^7, B^2 and X are as defined in any ones of claims 1 to 15.

14. A fungicide composition comprising, as an active ingredient, an effective amount of a compound of formula (I) according to claims 1 to 12 and an agriculturally acceptable support, carrier or filler.

15. A method for controlling phytopathogenic fungi of crops, characterized in that an agronomically effective and substantially non-phytotoxic quantity of a compound according to any one of claims 1 to 12 or a composition according to claim 14 is applied to the soil where plants grow or are capable of growing, to the leaves and/or the fruit of plants or to the seeds of plants.

16. Use of compounds of the formula (I) according to any one of claims 1 to 12 or of a composition according to claim 14 for the control of phytopathogenic harmful fungi.

17. Process for producing compositions for controlling phytopathogenic harmful fungi, characterized in that derivatives of the formula (I) according to any one of claims 1 to 12 are mixed with extenders and/or surfactants.

18. Use of compounds of the formula (I) according to any one of claims 1 to 12 or a composition according to claim 14 for treatment of plants, seeds, transgenic plants or transgenic seeds..

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/057960

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-18(partially)
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/057960

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D401/14 C07D405/14 C07D409/14 C07D417/14 A01N43/56
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

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.
X	WO 2014/004064 A1 (DU PONT [US]) 3 January 2014 (2014-01-03) cited in the application claims 1,12	1-18
X	US 2014/005231 A1 (BEREZNAK JAMES FRANCIS [US] ET AL) 2 January 2014 (2014-01-02) cited in the application claims 1,12	1-18
X	WO 2011/151369 A1 (BAYER CROPSCIENCE AG [DE]; BENTING JUERGEN [DE]; BRAUN CHRISTOPH [DE];) 8 December 2011 (2011-12-08) cited in the application claims 1,17	1-18

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

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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

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

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 May 2016	24/05/2016

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	Gettins, Marc

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/057960

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2010/015681 A1 (BAYER CROPSCIENCE SA [FR]; BENNABI SAMIR [FR]; COQUERON PIERRE-YVES [F) 11 February 2010 (2010-02-11) cited in the application claims 1,16 -----	1-18

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/057960

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014004064 A1	03-01-2014	AU 2013280990 A1	22-01-2015
		CA 2877862 A1	03-01-2014
		CL 2014003498 A1	08-05-2015
		CN 104603128 A	06-05-2015
		CO 7170132 A2	28-01-2015
		EP 2867228 A1	06-05-2015
		JP 2015526408 A	10-09-2015
		KR 20150027769 A	12-03-2015
		PE 03392015 A1	10-03-2015
		PH 12014502866 A1	23-02-2015
		TW 201400462 A	01-01-2014
		WO 2014004064 A1	03-01-2014
US 2014005231 A1	02-01-2014	NONE	
WO 2011151369 A1	08-12-2011	AR 081573 A1	03-10-2012
		AU 2011260332 A1	08-11-2012
		BR 112012030580 A2	29-09-2015
		CA 2796191 A1	08-12-2011
		CL 2012003357 A1	25-01-2013
		CN 102933556 A	13-02-2013
		CO 6660482 A2	30-04-2013
		EP 2576516 A1	10-04-2013
		ES 2533026 T3	07-04-2015
		JP 5730992 B2	10-06-2015
		JP 2013528613 A	11-07-2013
		KR 20130109940 A	08-10-2013
		US 2013131119 A1	23-05-2013
		WO 2011151369 A1	08-12-2011
WO 2010015681 A1	11-02-2010	EP 2324011 A1	25-05-2011
		JP 2011529949 A	15-12-2011
		US 2011136874 A1	09-06-2011
		WO 2010015681 A1	11-02-2010

Continuation of Box II.2

Claims Nos.: 1-18(partially)

The current application claims the compounds (I) and the intermediates (IIa)-(IId). It can be seen that the scope of the intermediates is significantly smaller than that of the endproducts since both Z 1 and B1 are defined much more narrowly in the intermediates.
The present claim 1
relates to an extremely large number of possible fungicides (I). Support and disclosure within the meaning of Articles 84 and 83 EPC are to be found, however, for only a very small proportion of the compounds (I) claimed. In particular the examples all have the same small common structure which corresponds to the same features found in the intermediates (IIa). These exemplified groups appear to represent an essential technical feature. In the examples the A group is always A13 as in claim 5; T is always oxygen as in claim 6; Z1 is always cyclopropyl as in claim 7; B1 is always pyridyl which is a preferred group according to page 19, line 7.
Non-compliance with the substantive provisions is such
that a meaningful search of the whole claimed subject-matter of the claim could/can not be carried out (Rule 63 EPC and Guidelines B-VIII, 3). The search of claim 1 has therefore been limited to the particular forms specified above i.e. a combination of claims 5 and 6 and 7 with the further limitation that B 1 is limited to (substituted) pyridyl. Claims 2-14 have been searched with the same limitation. Claim 15 has been searched for compounds (IIa) only. Compounds (IIb)-(IId) have not been searched.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.