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CA 2685588 A1 2008/12/11

(21) 2 685 588

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(86) Date de dépôt PCT/PCT Filing Date: 2008/06/06
(87) Date publication PCT/PCT Publication Date: 2008/12/11
(85) Entrée phase nationale/National Entry: 2009/10/28
(86) N° demande PCT/PCT Application No.: EP 2008/057126
(87) N° publication PCT/PCT Publication No.: 2008/148889
(30) Priorité/Priority: 2007/06/08 (EP07356077.3)

(51) Cl.Int./Int.Cl. *C07D 401/14* (2006.01), *A01N 43/54* (2006.01), *C07D 405/14* (2006.01)

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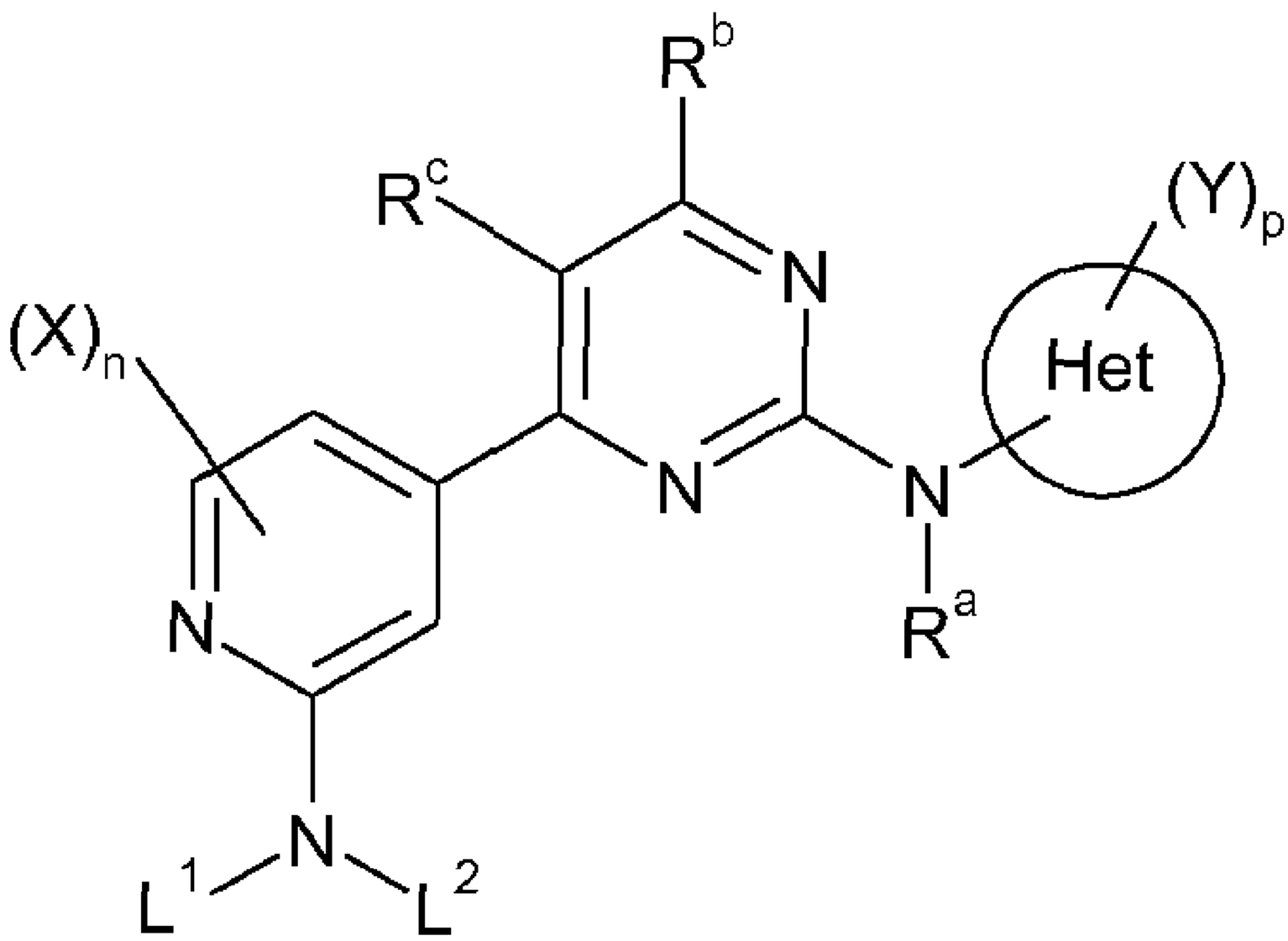
(54) Titre : DERIVES HETEROCYCLYL-PYRIMIDINYL-AMINO FONGICIDES
(54) Title: FUNGICIDE HETEROCYCLYL-PYRIMIDINYL-AMINO DERIVATIVES



(I)

(57) Abrégé/Abstract:
The present invention relates to heterocyclyl-pyrimidinyl-amino derivatives of formula (I), heterocyclyl-pyrimidinyl-amino derivatives of formula (I) wherein Het, Y, p, R^a, R^b, R^c, X, n, $L^1$and L^2 represent various substituents, their process of preparation, preparation

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(13) A1

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(57) Abrégé(suite)/Abstract(continued):
intermediate compounds, their use as fungicide active agents, particularly in the form of fungicide compositions, and methods for the control of phytopathogenic fungi, notably of plants, using these compounds or compositions.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
11 December 2008 (11.12.2008)

PCT

(10) International Publication Number
WO 2008/148889 A1

(51) International Patent Classification:
C07D 401/14 (2006.01) *A01N 43/54* (2006.01)
C07D 405/14 (2006.01)

(21) International Application Number:
PCT/EP2008/057126

(22) International Filing Date: 6 June 2008 (06.06.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
07356077.3 8 June 2007 (08.06.2007) EP

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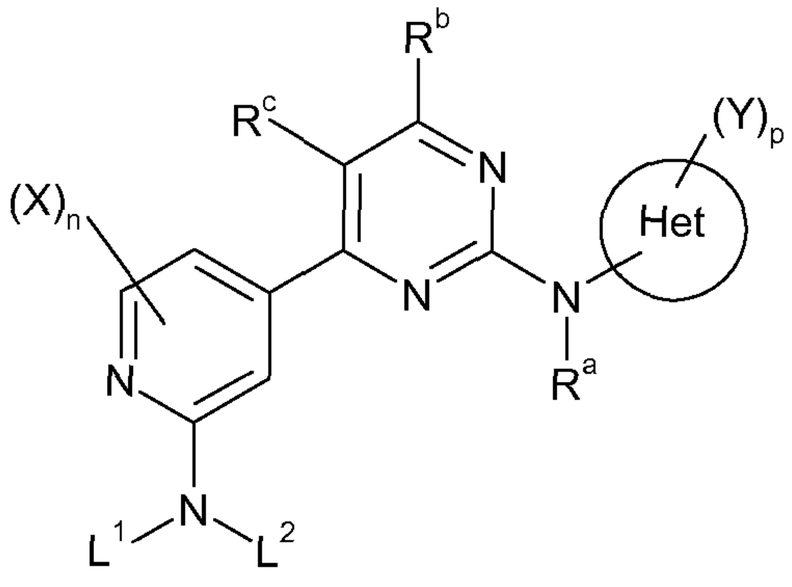
(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report*

(54) **Title:** FUNGICIDE HETEROCYCLYL-PYRIMIDINYL-AMINO DERIVATIVES



(I)

(57) **Abstract:** The present invention relates to heterocyclyl-pyrimidinyl-amino derivatives of formula (I), heterocyclyl-pyrimidinyl-amino derivatives of formula (I) wherein Het, Y, p, R^a, R^b, R^c, X, n, L^1 and L^2 represent various substituents, their process of preparation, preparation intermediate compounds, their use as fungicide active agents, particularly in the form of fungicide compositions, and methods for the control of phytopathogenic fungi, notably of plants, using these compounds or compositions.

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FUNGICIDE HETEROCYCLYL-PYRIMIDINYL-AMINO DERIVATIVES

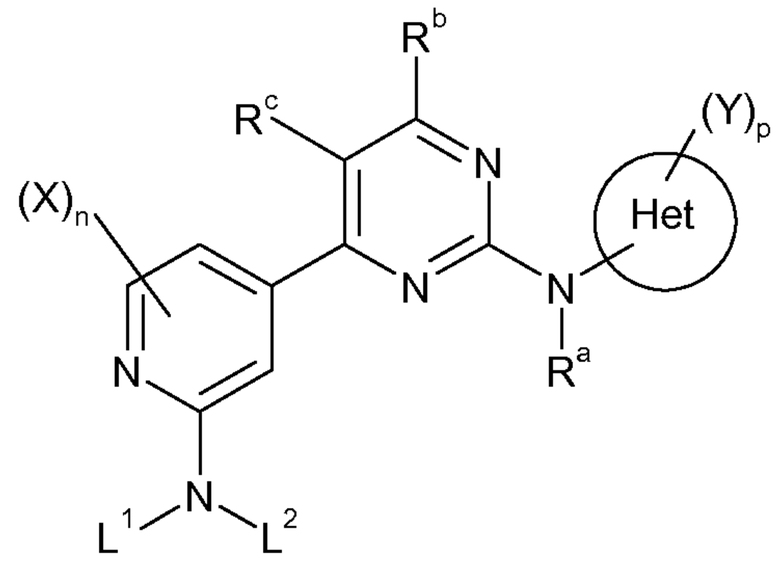
DESCRIPTION

The present invention relates to heterocyclyl-pyrimidinyl-amino derivatives, their process of preparation, preparation intermediate compounds, their use as fungicide active agents, particularly in the form of fungicide compositions, and methods for the control of phytopathogenic fungi, notably of plants, using these compounds or compositions.

In international patent application WO-2005/019211, there are described some compounds having both a biaryl moiety and a heterocyclic moiety that can be used as fungicide agents. Even if some of these compounds may possess structural similarities with the compounds according to the invention, this document does not disclose nor suggest the compounds according to the invention. Apart, 4-[2-(ethylamino)-4-pyridinyl]-N-[5-(1-piperazinyl)-2-pyridinyl]-2-pyrimidinamine has been disclosed in international patent application WO-2004/065378, it may be useful as inhibitor of the cellular proliferation. This compound has been excluded from the scope of the present invention.

It is always of high-interest in agriculture to use novel pesticide compounds in order to avoid or to control the development of resistant strains to the active ingredients. It is also of high-interest to use novel compounds being more active than those already known, with the aim of decreasing the amounts of active compound to be used, whilst at the same time maintaining effectiveness at least equivalent to the already known compounds. We have now found a new family of compounds which possess the above mentioned effects or advantages.

Accordingly, the present invention provides heterocyclyl-pyrimidinyl-amino derivatives of formula (I)



(I)

wherein

- Het represents a saturated or unsaturated, aromatic or non-aromatic 4-, 5-, 6- or 7-membered heterocycle comprising up to four heteroatoms which may be the same or different;
- Y independently represents a halogen atom, a nitro group, a hydroxy group, an oxo group, a cyano group, an amino group, a sulphenyl group, a pentafluoro-λ^6-sulphenyl group, a formyl group, a formyloxy group, a formylamino group, a carbamoyl group, a N-hydroxycarbamoyl group, a carbamate group, a (hydroxyimino)-C_1-C_6-alkyl group, a C_1-C_8-alkyl, a tri(C_1-C_8-alkyl)silyl, a substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-alkyl, substituted or non-substituted C_1-C_8-cycloalkyl, substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, a C_2-C_8-alkynyl, a C_2-C_8-alkenyloxy, a C_2-C_8-alkynyloxy, a C_1-C_8-alkylamino, a di-C_1-C_8-alkylamino, a C_1-C_8-alkoxy, a C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphenyl, a C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyloxy, a C_2-C_8-halogenoalkenyloxy having 1 to 5 halogen atoms, a C_3-C_8-alkynyloxy, a C_3-C_8-halogenoalkynyloxy having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyl, a C_1-C_8-halogenoalkylcarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbamoyl, a di-C_1-C_8-alkylcarbamoyl, a N-C_1-C_8-alkyloxycarbamoyl, a C_1-C_8-alkoxycarbamoyl, a N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, a C_1-C_8-alkoxycarbonyl, a C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyloxy, a C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonylamino, a C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, a C_1-C_8-alkylaminocarbonyloxy, a di-C_1-C_8-alkylaminocarbonyloxy, a C_1-C_8-alkyloxycarbonyloxy, a C_1-C_8-alkylsulphenyl, a C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphinyl, a C_1-C_8-halogenoalkylsulphinyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphonyl, a C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylaminosulfamoyl, a di-C_1-C_8-alkylaminosulfamoyl, a (C_1-C_6-alkoxyimino)-C_1-C_6-alkyl, a (C_1-C_6-alkenyloxyimino)-C_1-C_6-alkyl, a (C_1-C_6-alkynyloxyimino)-C_1-C_6-alkyl, a 2-oxopyrrolidin-1-yl, substituted or non-substituted (benzyloxyimino)-C_1-C_6-alkyl, substituted or non-substituted C_1-C_8-alkoxyalkyl, substituted or non-substituted C_1-C_8-halogenoalkoxyalkyl having 1 to 5 halogen atoms, substituted or non-substituted benzyloxy, substituted or non-substituted benzylsulphenyl, substituted or non-substituted benzylamino, substituted or non-substituted phenoxy,

substituted or non-substituted phenylsulphenyl, or substituted or non-substituted phenylamino ;

- p represents 0, 1, 2, 3, 4, 5 or 6;
- R^a represents a hydrogen atom, a cyano group, a formyl group, a formyloxy group, a C_1-C_8-alkoxycarbonyl, a C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyl, a C_1-C_8-halogenoalkylcarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphonyl, a C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, a C_1-C_8-alkyl, a C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, a C_2-C_8-alkynyl, a C_1-C_8-alkoxyalkyl, a C_1-C_8-halogenoalkoxyalkyl having 1 to 5 halogen atoms;
- R^b and R^c independently represent a hydrogen atom, a halogen atom, a cyano, a C_1-C_8-alkyl, a C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms ;
- X independently represents a C_1-C_{10}-alkyl, a C_1-C_{10}-halogenoalkyl, a halogen atom or a cyano;
- n represents 0, 1, 2 or 3;
- L^1 and L^2 independently represent a hydrogen atom, a cyano group, a hydroxy group, an amino group, a formyl group, a formyloxy group, a formylamino group, a carbamoyl group, a N-hydroxycarbamoyl group, a carbamate group, substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, substituted or non-substituted C_1-C_8-alkyl, tri(C_1-C_8-alkyl)silyl, substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-alkyl, substituted or non-substituted C_1-C_8-cycloalkyl, substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-cycloalkyl, substituted or non-substituted C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms a C_2-C_8-alkenyl, substituted or non-substituted C_2-C_8-alkynyl, 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-alkoxy, substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, substituted or non-substituted C_2-C_8-alkenyloxy, substituted or non-substituted C_2-C_8-alkynyloxy, substituted or non-substituted C_2-C_8-alkenyloxy, substituted or non-substituted C_2-C_8-halogenoalkenyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_3-C_8-alkynyloxy, substituted or non-substituted C_3-C_8-halogenoalkynyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyl, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyl having 1 to 5 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 N-C_1-C_8-alkyloxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbamoyl, substituted or non-substituted N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbonyl, substituted or non-substituted C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyloxy, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonylamino, substituted or non-substituted C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted di-C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted C_1-C_8-alkyloxycarbonyloxy, substituted or non-substituted C_1-C_8-alkylsulphenyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylsulphinyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphinyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylsulphonyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylaminosulfamoyl, substituted or non-substituted di-C_1-C_8-alkylaminosulfamoyl, substituted or non-substituted (C_1-C_6-alkoxyimino)-C_1-C_6-alkyl, substituted or non-substituted (C_1-C_6-alkenyloxyimino)-C_1-C_6-alkyl, substituted or non-substituted (C_1-C_6-alkynyloxyimino)-C_1-C_6-alkyl, (2-oxopyrrolidin-1-yl) C_1-C_8-alkyl, (2-oxopyrrolidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxopiperidin-1-yl) C_1-C_8-alkyl, (2-oxopiperidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxoazepan-1-yl) C_1-C_8-alkyl, (2-oxoazepan-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, substituted or non-substituted (benzyloxyimino)-C_1-C_6-alkyl;

- L^1 and L^2 can form together a saturated or unsaturated, aromatic or non-aromatic, substituted or non-substituted 4-, 5-, 6- or 7-membered, N-including heterocycle comprising up to 4 heteroatoms independently selected in the list consisting of N, O, S ;

as well as salts, N-oxides, metallic complexes, metalloidic complexes and optically active or geometric isomers thereof; provided that the following compound is excluded: 4-[2-(ethylamino)-4-pyridinyl]-N-[5-(-piperazinyl)-2-pyridinyl]-2-pyrimidinamine.

Any of the compounds according to the present invention may exist in one or more optical or chiral isomeric form depending on the number of asymmetric centres in the compound. The invention thus relates equally to all optical isomers and to any racemic or scalemic mixtures thereof (the term "scalemic" denotes a mixture of enantiomers in different proportions), and to the mixtures of any potential stereoisomers, in any proportion. Diastereoisomers or optical isomers can be separated according to any methods known *per se* by the man ordinary skilled in the art.

Any of the compounds according to the present invention may also exist in one or more geometric isomeric form depending on the number of double bond within the compound. The invention thus equally relates to any geometric isomer and to any possible mixtures thereof, in any proportion. Geometric isomers can be separated according to any method known *per se* by the man ordinary skilled in the art.

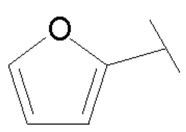
Any compound of formula (I) according to the invention wherein Y represents a hydroxy group, a sulphenyl group or an amino group can exist in a tautomeric form resulting from the shift of the proton of said hydroxy group, sulphenyl group or amino group respectively. Such tautomeric forms are also part of the present invention. Generally, any tautomeric form of a compound of formula (I) according to the invention wherein Y represents a hydroxy group, a sulphenyl group or an amino group, as well as the tautomeric forms of the compounds which can optionally be used as intermediates in the preparation processes according to the invention are also part of the present invention.

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

- halogen means fluorine, chlorine, bromine or iodine;
- heteroatom can be nitrogen, oxygen or sulphur;
- unless indicated otherwise, a group or a substituent that is substituted according to the invention can be linear or branched as well as substituted by one or more of the following groups or atoms: a halogen atom, a nitro group, a hydroxy group, a cyano group, an amino group, a sulphenyl group, a pentafluoro-λ^6-sulphenyl group, a formyl group, a formyloxy group, a formylamino group, a carbamoyl group, a N-hydroxycarbamoyl group, a carbamate group, a (hydroxyimino)-C_1-C_6-alkyl group, a C_1-C_8-alkyl, a tri(C_1-C_8-alkyl)silyl-C_1-C_8-alkyl, C_1-C_8-cycloalkyl, tri(C_1-C_8-alkyl)silyl-C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, a C_2-C_8-alkynyl, a C_2-C_8-alkenyloxy, a C_2-C_8-alkynyloxy, a C_1-C_8-alkylamino, a di-C_1-C_8-alkylamino, a C_1-C_8-alkoxy, a C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, a C_1-C_8-

alkylsulphenyl, a C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyloxy, a C_2-C_8-halogenoalkenyloxy having 1 to 5 halogen atoms, a C_3-C_8-alkynyloxy, a C_3-C_8-halogenoalkynyloxy having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyl, a C_1-C_8-halogenoalkylcarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbamoyl, a di-C_1-C_8-alkylcarbamoyl, a N-C_1-C_8-alkyloxycarbamoyl, a C_1-C_8-alkoxycarbamoyl, a N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, a C_1-C_8-alkoxycarbonyl, a C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyloxy, a C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonylamino, a C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, a C_1-C_8-alkylaminocarbonyloxy, a di-C_1-C_8-alkylaminocarbonyloxy, a C_1-C_8-alkyloxycarbonyloxy, a C_1-C_8-alkylsulphenyl, a C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphinyl, a C_1-C_8-halogenoalkylsulphinyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphonyl, a C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylaminosulfamoyl, a di-C_1-C_8-alkylaminosulfamoyl, a (C_1-C_6-alkoxyimino)-C_1-C_6-alkyl, a (C_1-C_6-alkenyloxyimino)-C_1-C_6-alkyl, a (C_1-C_6-alkynyloxyimino)-C_1-C_6-alkyl, a 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, benzylsulphenyl, benzylamino, phenoxy, phenylsulphenyl, or phenylamino.

Preferred compounds of formula (I) according to the invention are those wherein Het represents a saturated or unsaturated, aromatic or non-aromatic heterocycle selected in the list consisting of:



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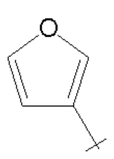

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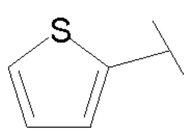

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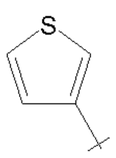

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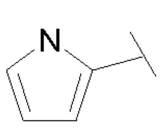
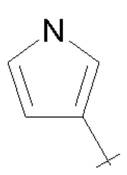


Het-5 ;



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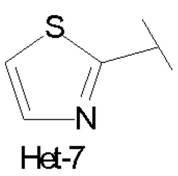
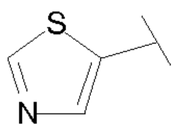
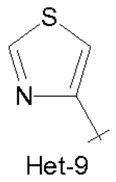


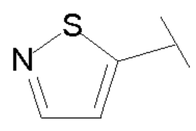
Het-7 ;



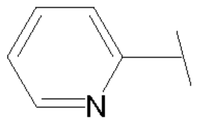
Het-8 ;



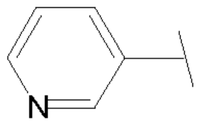
Het-9 ;



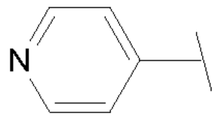
Het-10 ;



Het-11 ;



Het-12 ;



Het-13 .

Other preferred compounds of formula (I) according to the invention are those wherein Y represents a halogen atom, a cyano group, a formylamino group, a carbamoyl group, a substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, a substituted or non-substituted C_1-C_8-alkyl, a substituted or non-substituted tri(C_1-C_8-alkyl)silyl, a substituted or non-substituted C_1-C_8-cycloalkyl, a substituted or non-substituted C_1-C_8-alkoxy, a substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, a substituted or non-substituted a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a substituted or non-substituted C_1-C_8-alkylcarbonylamino. More preferably, Y represents a halogen atom, a cyano group, a formylamino group, a carbamoyl group, a substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, a substituted or non-substituted C_1-C_8-alkyl, a substituted or non-substituted tri(C_1-C_8-alkyl)silyl, a substituted or non-substituted C_1-C_8-cycloalkyl, a substituted or non-substituted C_1-C_8-alkoxy, a substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, a substituted or non-substituted a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms.

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

Other preferred compounds of formula (I) according to the invention are those wherein R^a represents a hydrogen atom.

Other preferred compounds of formula (I) according to the invention are those wherein R^b and R^c independently represent a hydrogen atom or a halogen atom. More preferably, R^b and R^c represent a hydrogen atom.

Other preferred compounds of formula (I) according to the invention are those wherein n represents 0.

Other preferred compounds of formula (I) according to the invention are those wherein L^1 and L^2 independently represent a hydrogen atom, a cyano group, a hydroxy group, an amino group, a formyl group, a formyloxy group, a formylamino group, substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, substituted or non-substituted C_1-C_8-alkyl, tri(C_1-C_8-alkyl)silyl, substituted or non-substituted C_1-C_8-cycloalkyl, substituted or non-substituted C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, substituted or non-substituted C_2-C_8-alkynyl, 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-alkoxy, substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyl, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyl having 1 to 5 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 N-C_1-C_8-alkyloxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbamoyl, substituted or non-substituted N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbonyl, substituted or non-substituted C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyloxy, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonylamino, substituted or non-substituted C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted di-C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted C_1-C_8-alkyloxycarbonyloxy, substituted or non-substituted C_1-C_8-alkylsulphonyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, (2-oxopyrrolidin-1-yl) C_1-C_8-alkyl, (2-oxopyrrolidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxopiperidin-1-yl) C_1-C_8-alkyl, (2-oxopiperidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxoazepan-1-yl) C_1-C_8-alkyl, (2-oxoazepan-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms;

when L^1 and L^2 form together a substituted or non-substituted, 4-, 5-, 6- or 7-membered heterocycle comprising up to 4 heteroatoms selected in the list consisting of N, O, S, L^1 and L^2 independently represent a substituted or non-substituted 2-oxopyrrolidin-1-yl or a substituted or non-substituted 2-oxo-1,3-oxazolidin-3-yl.

More preferred compounds of formula (I) according to the invention are those wherein L^1 and L^2 independently represent a hydrogen atom or a linear or branched, substituted or non-substituted C_1-C_8-alkyl, for example a (C_1-C_8-alkoxy)-C_1-C_8-alkyl.

The above mentioned preferences with regard to the substituents of the compounds of formula (I) according to the invention can be combined in various manners, either individually, partially or entirely. 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 can combine:

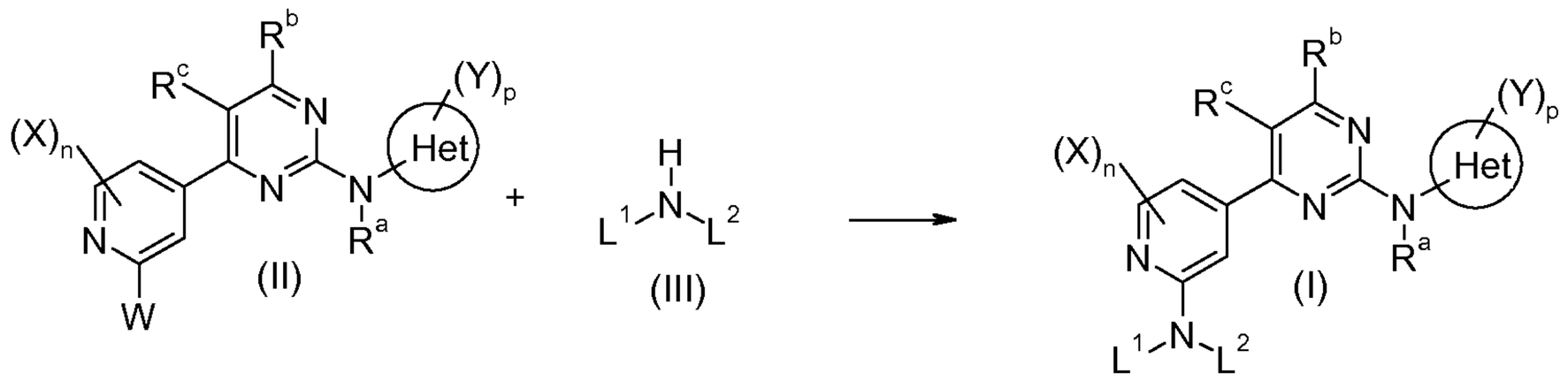
- preferred features of Het with preferred features of one or more of Y, p, R^a, R^b, R^c, X, n, L^1 and L^2 ;
- preferred features of Y with preferred features of one or more of Het, p, R^a, R^b, R^c, X, n, L^1 and L^2 ;
- preferred features of p with preferred features of one or more of Het, Y, R^a, R^b, R^c, X, n, L^1 and L^2 ;
- preferred features of R^a with preferred features of one or more of Het, Y, p, R^b, R^c, X, n, L^1 and L^2 ;
- preferred features of R^b with preferred features of one or more of Het, Y, p, R^a, R^c, X, n, L^1 and L^2 ;
- preferred features of R^c with preferred features of one or more of Het, Y, p, R^a, R^b, X, n, L^1 and L^2 ;
- preferred features of X with preferred features of one or more of Het, Y, p, R^a, R^b, R^c, n, L^1 and L^2 ;
- preferred features of n with preferred features of one or more of Het, Y, p, R^a, R^b, R^c, X, L^1 and L^2 ;
- preferred features of L^1 with preferred features of one or more of Het, Y, p, R^a, R^b, R^c, X, n and L^2 ;
- preferred features of L^2 with preferred features of one or more of Het, Y, p, R^a, R^b, R^c, X, n and L^1.

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 Het, Y, p, R^a, R^b, R^c, X, n, L^1 and L^2 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 compounds 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, as illustrated by the following reaction scheme:



Process P1

wherein

- W represents a leaving group such as a halogen atom, a C_1-C_6 alkylsulfonate, a C_1-C_6 haloalkylsulfonate ; a substituted or non-substitued phenylsulfonate and
- X, Y, n, p, R^a, R^b, R^c, L^1,L^2, Het, being as herein-defined; and that comprises
    - reacting a compound of formula (II) with an amino derivative of formula (III) in order to yield a compound of formula (I), optionally in the presence of a catalyst, preferably a transition metal catalyst, such as a copper salt, preferably a copper(I) salt for example copper(I) chloride, copper(I) cyanide, such as palladium salts or complexes for example palladium (II) chloride, palladium (II) acetate, tetrakis-(triphenylphosphine) palladium(0), bis-(triphenylphosphine) palladium dichloride (II), tris(dibenzylideneacetone) dipalladium(0), bis(dibenzylideneacetone) palladium(0), or 1,1'-bis(diphenylphosphino)ferrocene-palladium (II) chloride. As an alternative the palladium complex is directly generated in the reaction mixture by separately adding to the reaction mixture a palladium salt and a complex ligand such as a phosphine, for example triethylphosphine, tri-tert-butylphosphine, tricyclohexylphosphine, 2-(dicyclohexylphosphine)biphenyl, 2-(di-tert-butylphosphin)biphenyl, 2-(dicyclohexylphosphine)-2'-(N,N-dimethylamino)-biphenyl, triphenylphosphine, tris-(o-tolyl)phosphine, sodium 3-(diphenylphosphino)benzolsulfonate, tris-2-(methoxyphenyl)phosphine, 2,2'-bis-

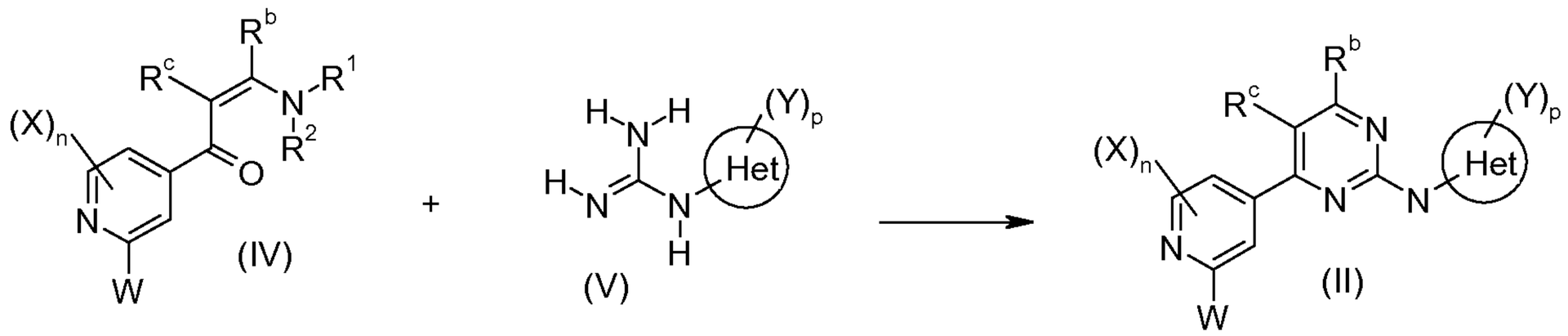
(diphenylphosphine)-1,1'-binaphthyl, 1,4-bis-(diphenylphosphine)butane, 1,2-bis-(diphenylphosphine)ethane, 1,4-bis-(dicyclohexylphosphine)butane, 1,2-bis-(dicyclohexylphosphine)ethane, 2-(dicyclohexylphosphine)-2'-(N,N-dimethylamino)-biphenyl, bis(diphenylphosphino)ferrocene, tris-(2,4-tert-butylphenyl)-phosphite, (R)-(-)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyldi-tert-butylphosphine, (S)-(+)-1-[(R)-2-(diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, (R)-(-)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, (S)-(+)-1-[(R)-2-(diphenylphosphino)ferrocenyl]ethyldi-t-butylphosphine, optionally in the presence of a base, such as an inorganic or an organic base; preferably an alkaline earth metal or alkali metal hydrides, hydroxides, amides, alcoholates, acetates, carbonates or hydrogen carbonates, such as sodium hydride, sodium amide, lithiium diisopropylamide, sodium methanolate, sodium ethanolate, potassium tert-butanolate, sodium acetate, potassium acetate, calcium acetate, sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate, cesium carbonate or ammonium carbonate; and also tertiary amines, such as trimethylamine, triethylamine (TEA), tributylamine, N,N-dimethylaniline, N,N-dimethyl-benzylamine, N,N-diisopropyl-ethylamine (DIPEA), pyridine, N-methylpiperidine, N-methylmorpholine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU);

Depending on the respective definitions of X, Y, n, p, R^a, R^b, R^c, Het, amino-pyrimidine derivatives of formula (II) may be prepared by various processes.

Accordingly, there is provided a process A according to the invention for the preparation of a compound of formula (II) wherein

- R^a represents a hydrogen atom;
- X, Y, n, p, R^b, R^c, Het being as herein-defined; and comprising

- a first step according to reaction scheme A-1 :



Scheme A-1

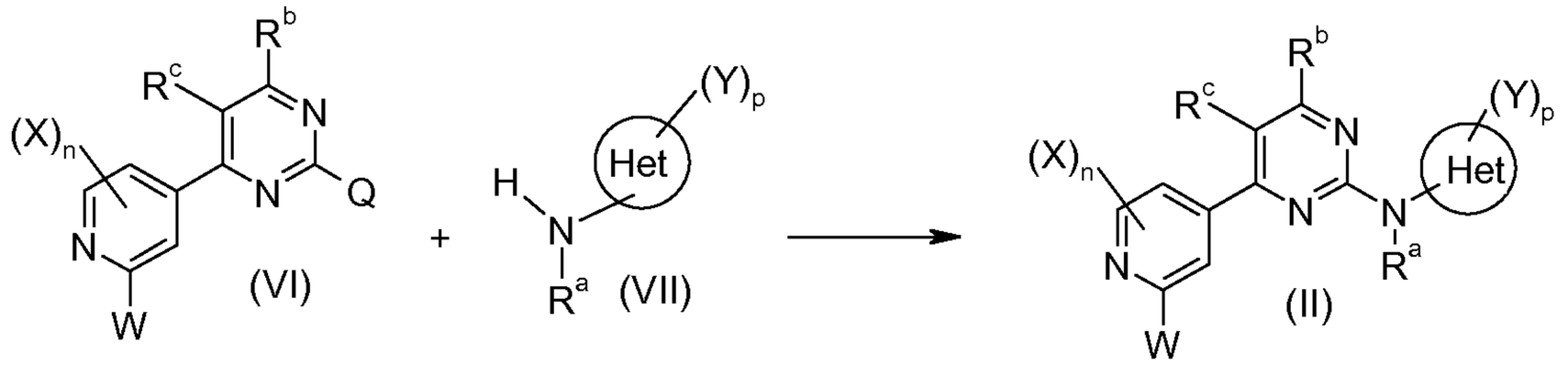
wherein

- W, X, Y, n, p, R^b, R^c, Het, being as herein-defined;
- R^1 and R^2 are independently a C_1-C_8-alkyl group, R^1 and R^2 can form together a substituted or non-substituted, 4-, 5-, 6- or 7-membered heterocycle comprising up to 4 heteroatoms selected in the list consisting of N, O, S;

that comprises the formation of the pyrimidine moiety by condensation, at a temperature of from -50°C to 200°C, of a compound of formula (IV), optionally in the presence of a base such as an inorganic or an organic base, preferably an alkaline earth metal or alkali metal hydrides, hydroxides, amides, alcoholates, acetates, carbonates or hydrogen carbonates, such as sodium hydride, sodium amide, lithiium diisopropylamide, sodium methanolate, sodium ethanolate, potassium tert-butanolate, sodium acetate, potassium acetate, calcium acetate, sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate, cesium carbonate or ammonium carbonate; and also tertiary amines, such as trimethylamine, triethylamine (TEA), tributylamine, N,N-dimethylaniline, N,N-dimethyl-benzylamine, N,N-diisopropyl-ethylamine (DIPEA), pyridine, N-methylpiperidine, N-methylmorpholine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU); with a guanidine or a guanidine salt derivative of formula (V) to yield a compound of formula (II).

Alternatively, there is provided a process B according to the invention for the preparation of a compound of formula (II) wherein W, X, Y, n, p, R^a, R^b, R^c, Het being as herein-defined; and comprising

- a first step according to reaction scheme B-1 :



Scheme B-1

wherein

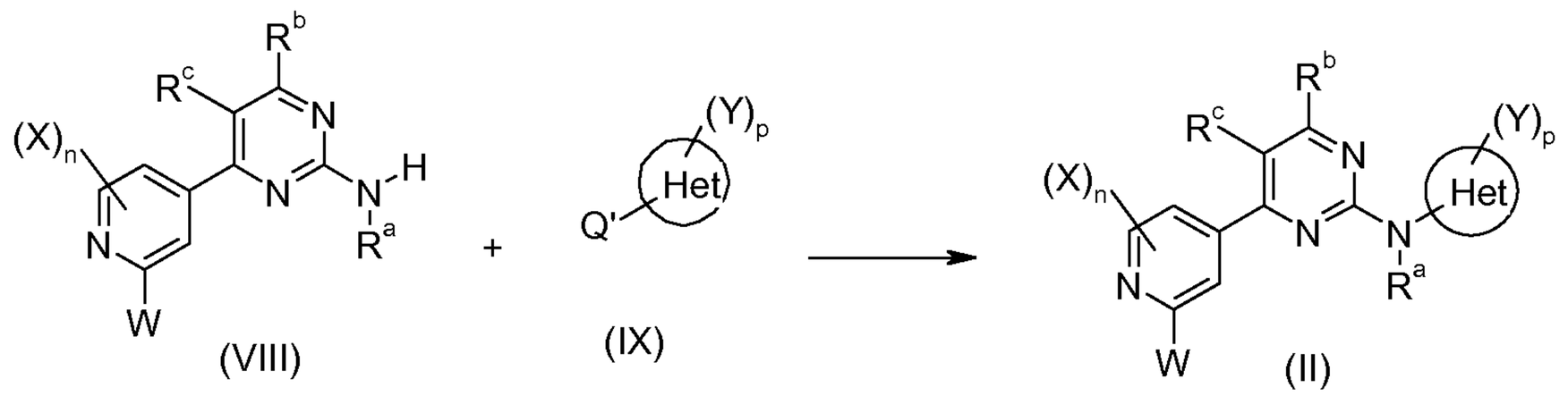
- W, X, Y, n, p, R^a, R^b, R^c, Het being as herein-defined;
- Q represents a hydrogen atom or a leaving group such as a halogen atom, a C_1-C_6 alkylsulphenyl, a C_1-C_6 haloalkylsulphenyl ; a substituted or non-substitued phenylsulphenyl, a C_1-C_6 alkylsulfonate, a C_1-C_6 haloalkylsulfonate ; a substituted or non-substitued phenylsulfonate and that comprises

reacting a compound of formula (VI) with an amino derivative of formula (VII) in order to yield a compound of formula (II), optionally in the presence of a catalyst, preferably a transition metal catalyst, such as palladium salts or complexes for example palladium (II) chloride, palladium (II) acetate, tetrakis-(triphenylphosphine) palladium(0), bis-(triphenylphosphine) palladium dichloride (II), tris(dibenzylideneacetone) dipalladium(0), bis(dibenzylideneacetone) palladium(0), or 1,1'-bis(diphenylphosphino)ferrocene-palladium (II) chloride. As an alternative the palladium complex is directly generated in the reaction mixture by separately adding to the reaction mixture a palladium salt and a complex ligand such as a phosphine, for example triethylphosphine, tri-tert-butylphosphine, tricyclohexylphosphine, 2-(dicyclohexylphosphine)biphenyl, 2-(di-tert-butylphosphin)biphenyl, 2-(dicyclohexylphosphine)-2'-(N,N-dimethylamino)-biphenyl, triphenylphosphine, tris-(o-tolyl)phosphine, sodium 3-(diphenylphosphino)benzolsulfonate, 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, bis(diphenylphosphino)ferrocene, tris-(2,4-tert-butylphenyl)-phosphite, (R)-(-)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyldi-tert-butylphosphine, (S)-(+)-1-[(R)-2-(diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, (R)-(-)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, (S)-(+)-1-[(R)-2-(diphenylphosphino)ferrocenyl]ethyldi-t-butylphosphine, optionally in the presence of an organo-metallic reagent such as an organo-lithium reagent, for example *n*-butyl lithium, methyl lithium,

phenyl lithium or an organo-magnesium halide reagent (Grignard reagent) such as isopropyl magnesium halide more preferably such as isopropyl magnesium chloride, optionally in the presence of a base, such as an inorganic or an organic base, preferably an alkaline earth metal or alkali metal hydrides, hydroxides, amides, alcoholates, acetates, carbonates or hydrogen carbonates, such as sodium hydride, sodium amide, lithiium diisopropylamide, 2,2,6,6-tetramethylpiperidylmagnesium chloride, lithium hexamethyldisilazide, sodium methanolate, sodium ethanolate, potassium tert-butanolate, sodium acetate, potassium acetate, calcium acetate, sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate, cesium carbonate or ammonium carbonate; and also tertiary amines, such as trimethylamine, triethylamine (TEA), tributylamine, N,N-dimethylaniline, N,N-dimethyl-benzylamine, N,N-diisopropyl-ethylamine (DIPEA), pyridine, N-methylpiperidine, N-methylmorpholine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU), optionally in the presence of a metallic salt such as an alkaline earth metal salt, an alkali metal salt, a transition metal salt such as a lithium salt, preferably a lithium halide, more preferably lithium chloride, such as a copper salt, preferably a copper(I) salt such as copper(I) chloride, copper(I) cyanide, in the presence of an oxidative agent such as oxygen, 3,3',5,5'-tetra-tert-butyldiphenoquinone, 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (DDQ), and 2,3,5,6-tetrachloro-1,4-benzoquinone (chloranil).

Alternatively, there is provided a process C according to the invention for the preparation of a compound of formula (II) wherein W, X, Y, n, p, R^a, R^b, R^c, Het, being as herein-defined; and comprising

- a first step according to reaction scheme C-1 :



Scheme C-1

wherein

- W, X, Y, n, p, R^a, R^b, R^c, Het, being as herein-defined;

- Q' represents a leaving group such as a halogen atom, a C_1-C_6 alkylsulphenyl, a C_1-C_6 haloalkylsulphenyl ; a substituted or non-substitued phenylsulphenyl a C_1-C_6 alkylsulfonate, a C_1-C_6 haloalkylsulfonate ; a substituted or non-substitued phenylsulfonate, and that comprises

reacting an amino derivative of formula (VIII) with a compound of formula (IX) in order to yield a compound of formula (II), optionally in the presence of a catalyst, preferably a transition metal catalyst, such as palladium salts or complexes for example palladium (II) chloride, palladium (II) acetate, tetrakis-(triphenylphosphine) palladium(0), bis-(triphenylphosphine) palladium dichloride (II), tris(dibenzylideneacetone) dipalladium(0), bis(dibenzylideneacetone) palladium(0), or 1,1'-bis(diphenylphosphino)ferrocene-palladium (II) chloride. As an alternative the palladium complex is directly generated in the reaction mixture by separately adding to the reaction mixture a palladium salt and a complex ligand such as a phosphine, for example triethylphosphine, tri-tert-butylphosphine, tricyclohexylphosphine, 2-(dicyclohexylphosphine)biphenyl, 2-(di-tert-butylphosphin)biphenyl, 2-(dicyclohexylphosphine)-2'-(N,N-dimethylamino)-biphenyl, triphenylphosphine, tris-(o-tolyl)phosphine, sodium 3-(diphenylphosphino)benzolsulfonate, 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, bis(diphenylphosphino)ferrocene, tris-(2,4-tert-butylphenyl)-phosphite, (R)-(-)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyldi-tert-butylphosphine, (S)-(+)-1-[(R)-2-(diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, (R)-(-)-1-[(S)-2-(diphenylphosphino)ferrocenyl]ethyldicyclohexylphosphine, (S)-(+)-1-[(R)-2-(diphenylphosphino)ferrocenyl]ethyldi-t-butylphosphine, optionally in the presence of an organo-metallic reagent such as an organo-lithium reagent for example *n*-butyl lithium, methyl lithium, phenyl lithium or an organo-magnesium halide reagent (Grignard reagent) such as isopropyl magnesium halide for example isopropyl magnesium chloride, optionally in the presence of a base, such as an inorganic or an organic base; preferably an alkaline earth metal or alkali metal hydrides, hydroxides, amides, alcoholates, acetates, carbonates or hydrogen carbonates, such as sodium hydride, sodium amide, lithiium diisopropylamide, 2,2,6,6-tetramethylpiperidylmagnesium chloride, lithium hexamethyldisilazide, sodium methanolate, sodium ethanolate, potassium tert-butanolate, sodium acetate, potassium acetate, calcium acetate, sodium hydroxide, potassium hydroxide, sodium carbonate, potassium carbonate, potassium bicarbonate, sodium bicarbonate, cesium carbonate or ammonium carbonate; and also tertiary amines, such as trimethylamine, triethylamine

(TEA), tributylamine, N,N-dimethylaniline, N,N-dimethyl-benzylamine, N,N-diisopropyl-ethylamine (DIPEA), pyridine, N-methylpiperidine, N-methylmorpholine, N,N-dimethylaminopyridine, diazabicyclooctane (DABCO), diazabicyclononene (DBN) or diazabicycloundecene (DBU), optionally in the presence of a metallic salt such as an alkaline earth metal salt, an alkali metal salt, a transition metal salt such as a lithium salt, preferably a lithium halide, more preferably lithium chloride, such as a copper salt, preferably a copper(I) salt such as copper(I) chloride, copper(I) cyanide, in the presence of an oxidative agent such as oxygen, 3,3',5,5'-tetra-tert-butyldiphenoquinone, 2,3-dichloro-5,6-dicyano-1,4-benzoquinone (DDQ), and 2,3,5,6-tetrachloro-1,4-benzoquinone (chloranil).

Suitable solvents for carrying out processes P1, A, B and C according to the invention are in each case all 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; esters, such as methyl acetate or ethyl acetate, sulphoxides, such as dimethyl sulphoxide, or sulphones, such as sulpholane.

When carrying out processes P1, A, B and C according to the invention, the reaction temperatures can independently be varied within a relatively wide range. Generally, processes according to the invention are carried out at temperatures between -80°C and 250°C.

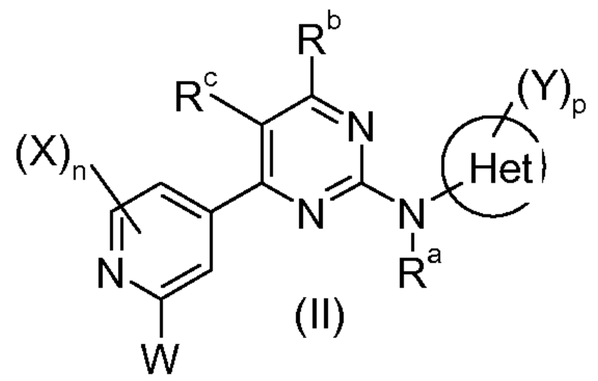
Processes P1, A, B and C according to the invention are generally independently carried out under atmospheric pressure. However, in each case, it is also possible to operate under elevated or reduced pressure.

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 or recrystallization, from any impurities that may still be present.

Compounds according to the invention can be prepared according to the above described process. 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 these processes according to the specifics of each of the compounds according to the invention that is desired to be synthesized.

Still in a further aspect, the present invention relates to compounds of formula (II) useful as intermediate compounds or materials for the process of preparation according to the invention.
The present invention thus provides compounds of formula (II)



(II)

wherein

- W represents a leaving group such as a halogen atom, a C_1-C_6 alkylsulfonate, a C_1-C_6 haloalkylsulfonate ; a substituted or non-substitued phenylsulfonate and
- X, Y, n, p, R^a, R^b, R^c, Het, being 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 which is sufficient to control or destroy the fungi present or liable to appear on the crops, and which 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, which 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 which 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 may 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 may also be used.

The composition according to the invention may also comprise additional components. In particular, the composition may 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 may be made, for example, of polyacrylic acid salts, lignosulphonic acid salts, phenolsulphonic or naphthalenesulphonic 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 sulphosuccinic acid esters, taurine derivatives (in particular alkyl taurates), phosphoric esters of polyoxyethylated alcohols or phenols, fatty acid esters of polyols, and derivatives of the above compounds containing sulphate, sulphonate 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 may be comprised from 5% to 40% by weight of the composition.

Optionally, additional components may 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, which complies with the usual formulation techniques.

In general, the composition according to the invention may 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 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 which 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 which must be diluted before application to the crop.

The compounds according to the invention can also be mixed with one or more insecticide, fungicide, bactericide, attractant, acaricide or pheromone active substance or other compounds with biological activity. The mixtures thus obtained have normally a broadened spectrum of activity. The mixtures with other fungicide compounds are particularly advantageous.

Examples of suitable fungicide mixing partners may be selected in the following lists:

B1) a compound capable to inhibit the nucleic acid synthesis like benalaxyl, benalaxyl-M, bupirimate, chiralaxyl, clozylacon, dimethirimol, ethirimol, furalaxyl, hymexazol, metalaxyl-M, ofurace, oxadixyl, oxolinic acid ;

B2) a compound capable to inhibit the mitosis and cell division like benomyl, carbendazim, diethofencarb, fuberidazole, pencycuron, thiabendazole thiophanate-methyl, zoxamide;

B3) a compound capable to inhibit the respiration for example

as CI-respiration inhibitor like diflumetorim;

as CII-respiration inhibitor like boscalid, carboxin, fenfuram, flutolanil, furametpyr, mepronil, oxycarboxine, penthiopyrad, thifluzamide;

as CIII-respiration inhibitor like azoxystrobin, cyazofamid, dimoxystrobin, enestrobin, famoxadone, fenamidone, fluoxastrobin, kresoxim-methyl, metominostrobin, orysastrobin, pyraclostrobin, picoxystrobin, trifloxystrobin;

B4) a compound capable of to act as an uncoupler like dinocap, fluazinam;

B5) a compound capable to inhibit ATP production like fentin acetate, fentin chloride, fentin hydroxide, silthiofam;

B6) a compound capable to inhibit AA and protein biosynthesis like andoprim, blasticidin-S, cyprodinil, kasugamycin, kasugamycin hydrochloride hydrate, mepanipyrim, pyrimethanil;

B7) a compound capable to inhibit the signal transduction like fenpiclonil, fludioxonil, quinoxyfen;

B8) a compound capable to inhibit lipid and membrane synthesis like chlozolinate, iprodione, procymidone, vinclozolin, pyrazophos, edifenphos, iprobenfos (IBP), isoprothiolane, tolclofos-methyl, biphenyl, iodocarb, propamocarb, propamocarb-hydrochloride;

B9) a compound capable to inhibit ergosterol biosynthesis like fenhexamid, azaconazole, bitertanol, bromuconazole, cyproconazole, diclobutrazole, difenoconazole, diniconazole, diniconazole-M, epoxiconazole, etaconazole, fenbuconazole, fluquinconazole, flusilazole, flutriafol, furconazole, furconazole-cis, hexaconazole, imibenconazole, ipconazole, metconazole, myclobutanil, paclobutrazol, penconazole, propiconazole, prothioconazole, simeconazole, tebuconazole, tetraconazole, triadimefon, triadimenol, triticonazole, uniconazole, voriconazole, imazalil, imazalil sulfate, oxpoconazole, fenarimol, flurprimidol, nuarimol, pyrifenox, triforine, pefurazoate, prochloraz, triflumizole, viniconazole, aldimorph, dodemorph, dodemorph acetate, fenpropimorph, tridemorph, fenpropidin, spiroxamine, naftifine, pyributicarb, terbinafine;

B10) a compound capable to inhibit cell wall synthesis like benthiavalicarb, bialaphos, dimethomorph, flumorph, iprovalicarb, polyoxins, polyoxorim, validamycin A;

B11) a compound capable to inhibit melanine biosynthesis like carpropamid, diclocymet, fenoxanil, phtalide, pyroquilon, tricyclazole;

B12) a compound capable to induce a host defence like acibenzolar-S-methyl, probenazole, tiadinil;

B13) a compound capable to have a multisite action like captafol, captan, chlorothalonil, copper preparations such as copper hydroxide, copper naphthenate, copper oxychloride, copper sulphate, copper oxide, oxine-copper and Bordeaux mixture, dichlofluanid, dithianon, dodine, dodine free base, ferbam, fluorofolpet, folpet, guazatine, guazatine acetate, iminoctadine, iminoctadine albesilate, iminoctadine triacetate, mancopper, mancozeb, maneb, metiram, metiram zinc, propineb, sulphur and sulphur preparations including calcium polysulphide, thiram, tolylfluanid, zineb, ziram;

B14) a compound selected in the list consisting of: amibromdole, benthiazole, bethoxazin, capsimycin, carvone, chinomethionat, chloropicrin, cufraneb, cyflufenamid, cymoxanil, dazomet,

debacarb, diclomezine, dichlorophen, dicloran, difenzoquat, difenzoquat methylsulphate, diphenylamine, ethaboxam, ferimzone, flumetover, flusulfamide, fosetyl-aluminium, fosetyl-calcium, fosetyl-sodium, fluopicolide, fluoroimide, hexachlorobenzene, 8-hydroxyquinoline sulfate, irumamycin, methasulphocarb, metrafenone, methyl isothiocyanate, mildiomycin, natamycin, nickel dimethyldithiocarbamate, nitrothal-isopropyl,octhilinone, oxamocarb, oxyfenthiin, pentachlorophenol and salts, 2-phenylphenol and salts, phosphorous acid and its salts, piperalin, propanosine–sodium, proquinazid, pyrrolnitrine, quintozene, tecloftalam, tecnazene, triazoxide, trichlamide, zarilamid and 2,3,5,6-tetrachloro-4-(methylsulfonyl)-pyridine, N-(4-Chloro-2-nitrophenyl)-N-ethyl-4-methyl-benzenesulfonamide, 2-amino-4-methyl-N-phenyl-5-thiazolecarboxamide, 2-chloro-N-(2,3-dihydro-1,1,3-trimethyl-1H-inden-4-yl)-3-pyridincarboxamide, 3-[5-(4-chlorophenyl)-2,3-dimethylisoxazolidin-3-yl]pyridine, cis-1-(4-chlorophenyl)-2-(1H-1,2,4-triazole-1-yl)-cycloheptanol, methyl 1-(2,3-dihydro-2,2-dimethyl-1H-inden-1-yl)-1H-imidazole-5-carboxylate, 3,4,5-trichloro-2,6-pyridinedicarbonitrile, Methyl 2-[[[cyclopropyl[(4-methoxyphenyl)imino]methyl]thio]methyl]-.alpha.-(methoxymethylene)-benzeneacetate, 4-Chloro-alpha-propynyloxy-N-[2-[3-methoxy-4-(2-propynyloxy)phenyl]ethyl]-benzeneacetamide, (2S)-N-[2-[4-[[3-(4-chlorophenyl)-2-propynyl]oxy]-3-methoxyphenyl]ethyl]- 3-methyl-2-[(methylsulfonyl)amino]-butanamide, 5-chloro-7-(4-methylpiperidin-1-yl)-6-(2,4,6-trifluorophenyl)[1,2,4]triazolo[1,5-a]pyrimidine, 5-chloro-6-(2,4,6-trifluorophenyl)-N-[(1R)-1,2,2-trimethylpropyl][1,2,4]triazolo[1,5-a]pyrimidin-7-amine, 5-chloro-N-[(1R)-1,2-dimethylpropyl]-6-(2,4,6-trifluorophenyl)[1,2,4]triazolo[1,5-a]pyrimidin-7-amine, N-[1-(5-bromo-3-chloropyridin-2-yl)ethyl]-2,4-dichloronicotinamide, N-(5-bromo-3-chloropyridin-2-yl)methyl-2,4-dichloronicotinamide, 2-butoxy-6-iodo-3-propyl-benzopyranon-4-one, N-{(Z)-[(cyclopropylmethoxy)imino][6-(difluoromethoxy)-2,3-difluorophenyl]methyl}-2-phenylacetamide, N-(3-ethyl-3,5,5-trimethyl-cyclohexyl)-3-formylamino-2-hydroxy-benzamide, 2-[[[[1-[3(1Fluoro-2-phenylethyl)oxy]phenyl]ethylidene]amino]oxy]methyl]-alpha-(methoxyimino)-N-methyl-alphaE-benzeneacetamide, N-{2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethyl}-2-(trifluoromethyl)benzamide, N-(3',4'-dichloro-5-fluorobiphenyl-2-yl)-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, 2-(2-{[6-(3-chloro-2-methylphenoxy)-5-fluoropyrimidin-4-yl]oxy}phenyl)-2-(methoxyimino)-N-methylacetamide , 1-[(4-methoxyphenoxy)methyl]-2,2-dimethylpropyl-1H-imidazole-1- carboxylic acid, O-[1-[(4-methoxyphenoxy)methyl]-2,2-dimethylpropyl]-1H-imidazole- 1- carbothioic acid.

The composition according to the invention comprising a mixture of a compound of formula (I) with a bactericide compound may also be particularly advantageous. Examples of suitable bactericide

mixing partners may be selected in the following list: bronopol, dichlorophen, nitrapyrin, nickel dimethyldithiocarbamate, kasugamycin, octhilinone, furancarboxylic acid, oxytetracycline, probenazole, streptomycin, tecloftalam, copper sulphate and other copper preparations.

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 may 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.

Among the plants that can be protected by the method according to the invention, mention may be made of cotton ; flax ; vine ; fruit or vegetable crops such as *Rosaceae sp*. (for instance pip fruit such as apples and pears, but also stone fruit such as apricots, almonds and peaches), *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 plantins), *Rubiaceae sp*., *Theaceae sp*., *Sterculiceae sp*., *Rutaceae sp*. (for instance lemons, oranges and grapefruit) ; *Solanaceae sp*. (for instance tomatoes), *Liliaceae sp*., *Asteraceae sp*. (for instance lettuces), *Umbelliferae sp*., *Cruciferae sp*., *Chenopodiaceae sp*., *Cucurbitaceae sp*., *Papilionaceae sp*. (for instance peas), *Rosaceae sp*. (for instance strawberries) ; major crops such as *Graminae sp*. (for instance maize, lawn or cereals such as wheat, rice, barley and triticale), *Asteraceae sp*. (for instance sunflower), *Cruciferae sp.* (for instance colza), Fabacae sp. (for instance peanuts), Papilionaceae sp. (for instance soybean), *Solanaceae sp.* (for instance potatoes), *Chenopodiaceae sp*. (for instance beetroots) ; horticultural and forest crops ; as well as genetically modified homologues of these crops.

Among the diseases of plants or crops that can be controlled by the method according to the invention, mention may 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 recondita* ;
  Uromyces diseases, caused for example by *Uromyces appendiculatus* ;
- Oomycete diseases such as :
  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 *Plasmopara 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* ;
  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* ;

Ramularia diseases, caused for example by *Ramularia collo-cygni* ;

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 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* ;

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* ;
  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 such as :
  Fusarium diseases, caused for example by *Fusarium culmorum* ;
  Phytophthora diseases, caused for example by *Phytophthora cactorum* ;
  Pythium diseases, caused for example by *Pythium ultimum* ;
  Rhizoctonia diseases, caused for example by *Rhizoctonia solani* ;
  Sclerotium diseases, caused for example by *Sclerotium rolfsii* ;
  Microdochium diseases, caused for example by *Microdochium nivale* ;
- 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 :
  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* ;
  Dutch elm disease, caused for example by *Ceratocystsc ulmi* ;
- 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*.

The fungicide 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 fungicide composition according to the invention may also be used in the treatment of genetically modified organisms with the compounds according to the invention or the agrochemical compositions according to the invention. Genetically modified plants are plants into genome of which a heterologous gene encoding a protein of interest has been stably integrated. The expression “heterologous gene encoding a protein of interest” essentially means genes which give the transformed plant new agronomic properties, or genes for improving the agronomic quality of the modified plant.

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

The following table illustrates in a non-limiting manner examples of compounds according to the invention.

In the following table, M+H (or M-H) means the molecular ion peak, plus or minus 1 a.m.u. (atomic mass unit) respectively, as observed in mass spectroscopy and M (ApcI+) means the molecular ion peak as it was found via positive atmospheric pressure chemical ionisation in mass spectroscopy.

In the following table, 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).

The lambda max values were determined in the maxima of the chromatographic signals using the UV spectra from 190nm to 400nm.

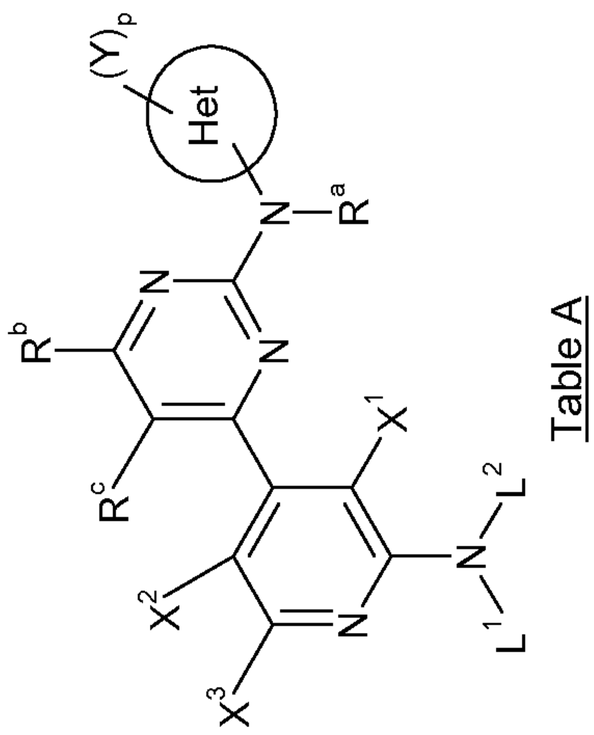
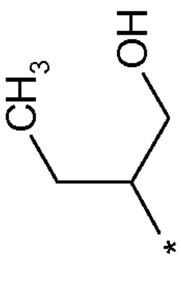
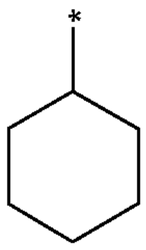
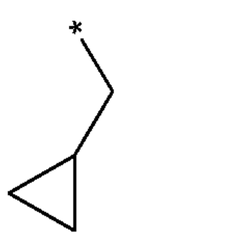
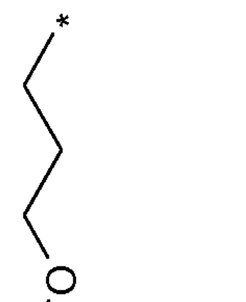
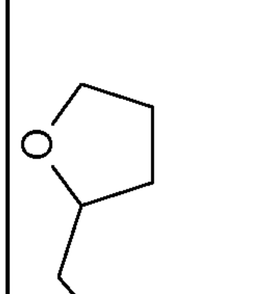
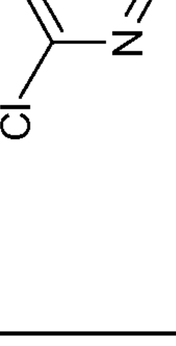
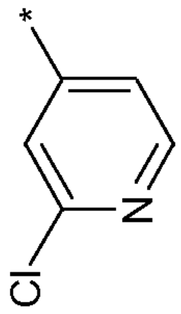
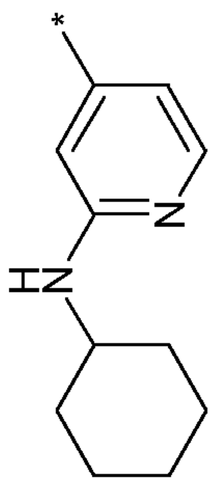
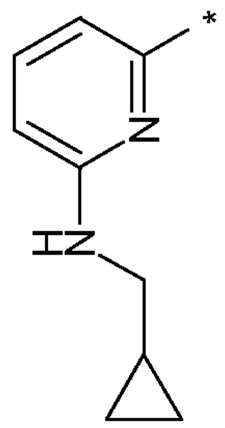
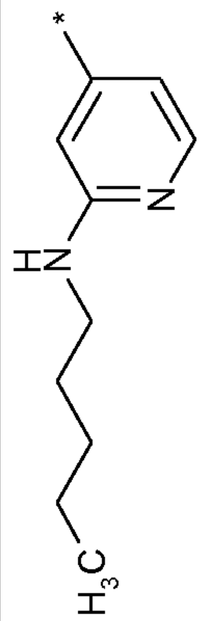
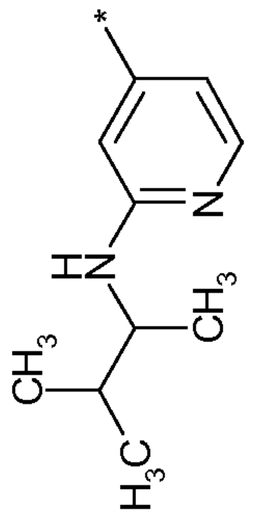


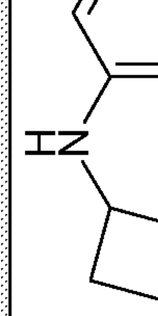
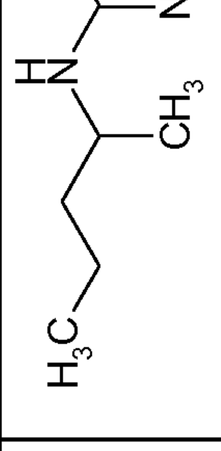
Table A

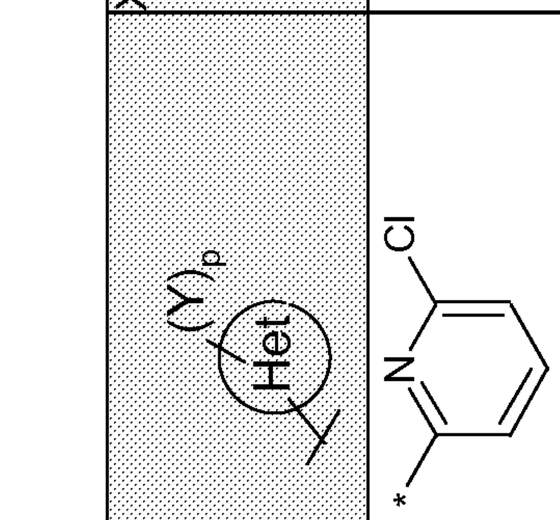
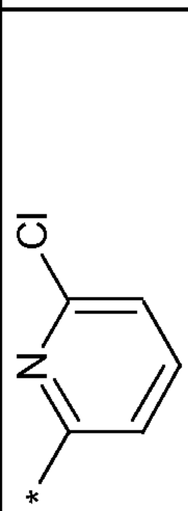
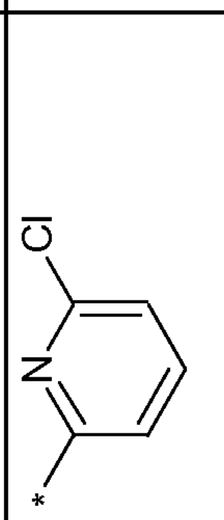
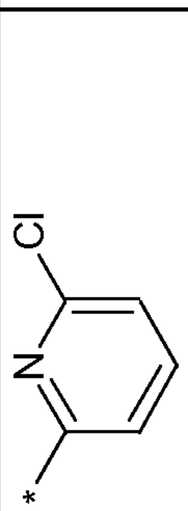
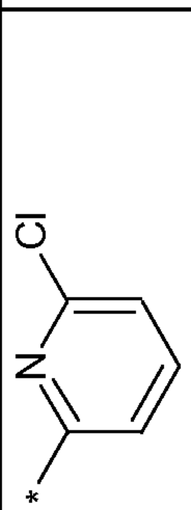
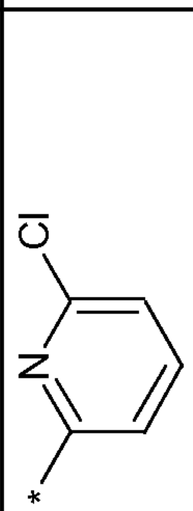
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured MW	log p HCOOH
1	H	H_3C—*	methyl	H	H	H	H	H		1.24
2	H		H	H	H	H	H	H		1.35

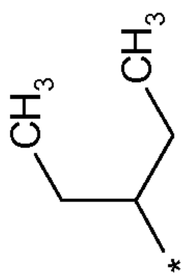
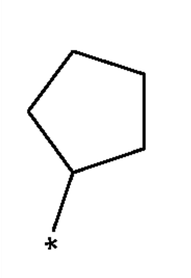
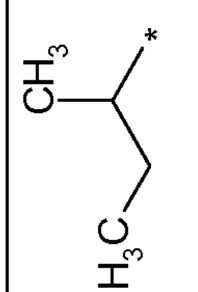
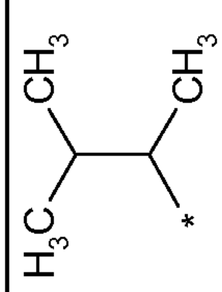
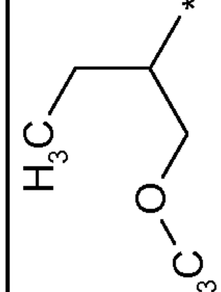
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured MW	log P HCOOH
3	H		H	H	H	H	H	H	194,5	1.12
4	H		H	H	H	H	H	H	444	1.70
5	H		H	H	H	H	H	H	388	0.97
6	H		H	H	H	H	H	H	424	0.83
7	H		H	H	H	H	H	H	225	0.86

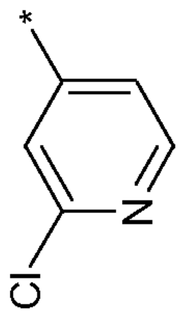
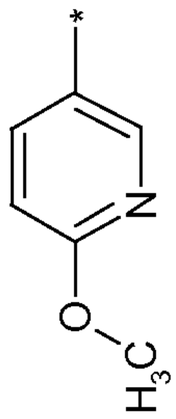
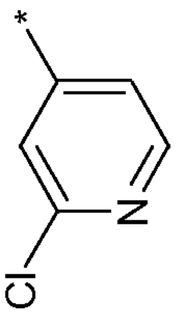
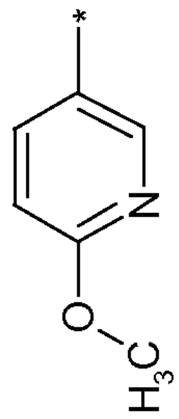
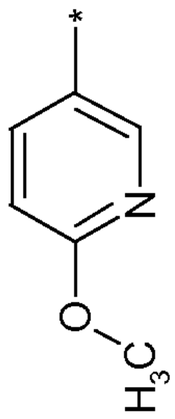
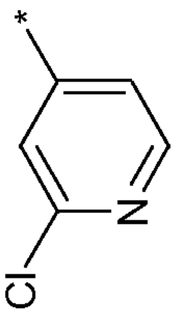
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
8	H		H	H	H		H	H	381	1.64
9	H		H	H	H		H	H	385	1.37
10	H		H	H	H		H	H	369	1.66
11	H		H	H	H		H	H	353	1.45
12	H		H	H	H		H	H	369	1.72
13	H		H	H	H		H	H	369	1.64

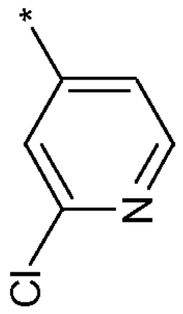
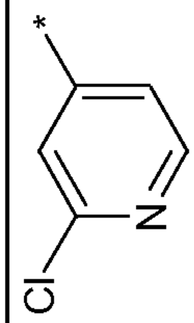
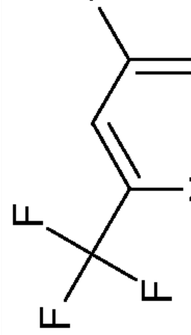
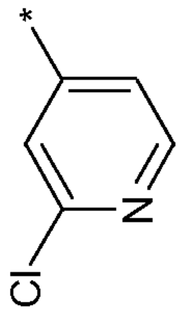
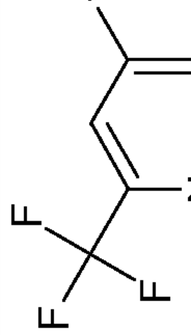
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured MW	log P HCOOH
14	H		H	H	H	H	H	H	367	1.58
15	H		H	H	H	H	H	H	444	1.52
16	H		H	H	H	H	H	H	388	0.96
17	H		H	H	H	H	H	H	418	1.57
18	H		H	H	H	H	H	H	420	1.34

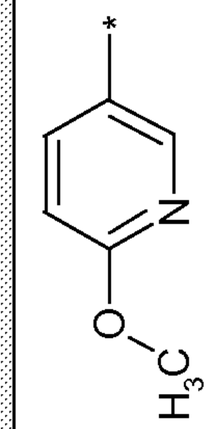
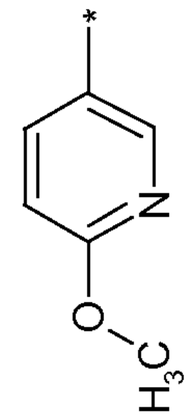
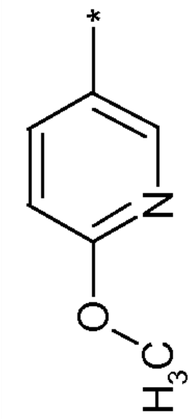
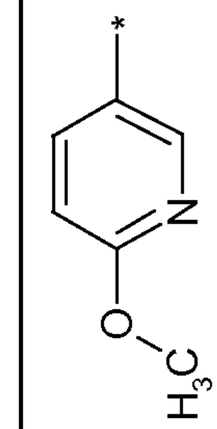
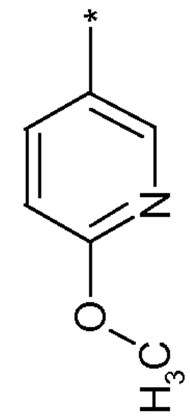
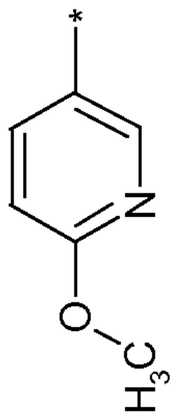
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
19	H		H	H	H	H	H	H	388	1.05
20	H		H	H	H	H	H	H	420	1.43
21	H		H	H	H	H	H	H	420	1.33
22	H		H	H	H	H	H	H	416	1.22
23	H		H	H	H	H	H	H	392	1.10

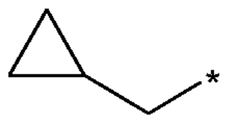
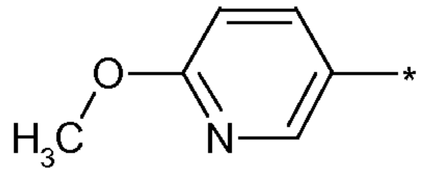
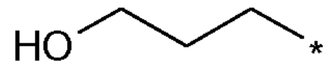
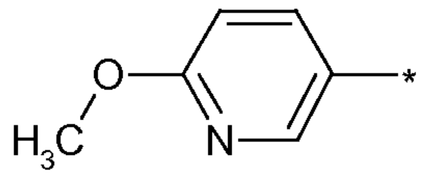
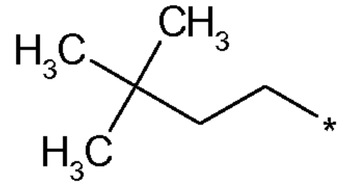
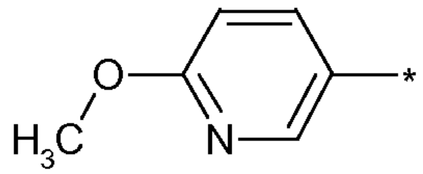
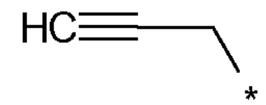
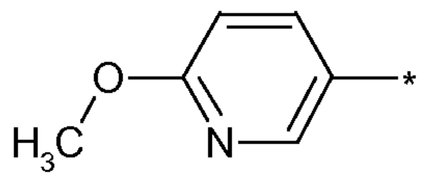
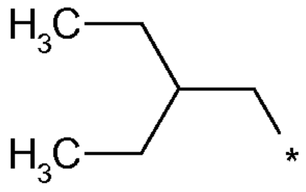
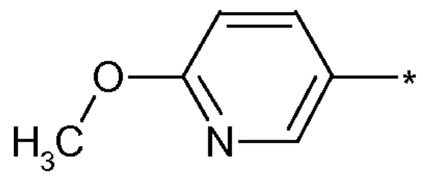
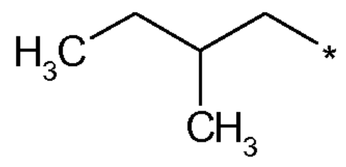
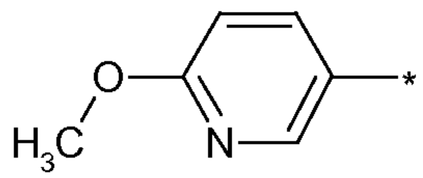
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log P HCOOH
24	H		H	H	H	H	H	H	369	2.09
25	H		H	H	H	H	H	H	355	2.00
26	H		H	H	H	H	H	H	369	2.15
27	H		H	H	H	H	H	H	383	1.64
28	H		H	H	H	H	H	H	384	1.42
29	H		H	H	H	H	H	H	385	1.85

Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured MW	log P HCOOH
30	H		H	H	H	H	H	H	420	1.47
31	H		H	H	H	H	H	H	208,5	1.23
32	H		H	H	H	H	H	H	196,5	1.23
33	H		H	H	H	H	H	H	420	1.43
34	H		H	H	H	H	H	H	452	1.10

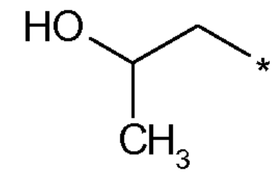
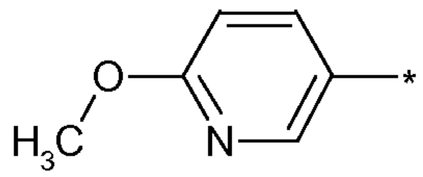
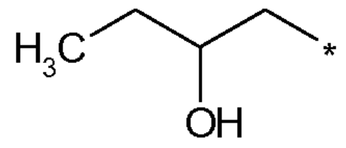
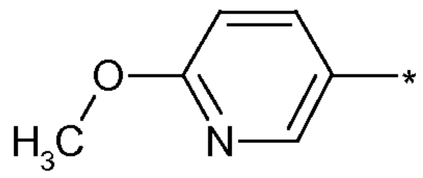
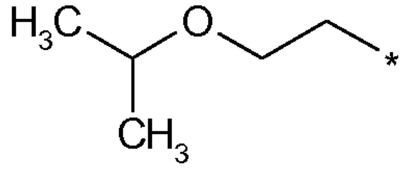
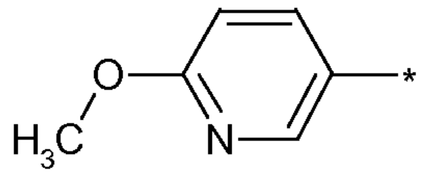
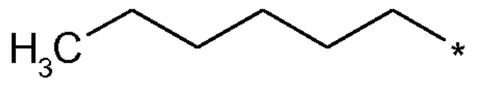
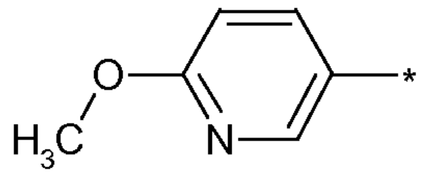
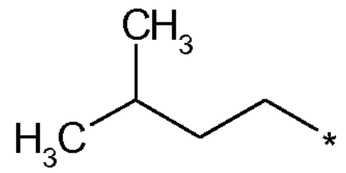
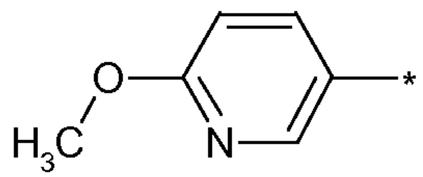
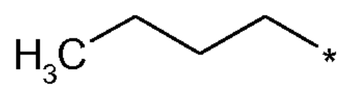
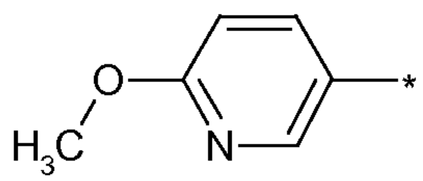
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
35	H		H	H	H	H	H	H	371	1.34
36	H		H	H	H	H	H	H	351,2	1.10
37* * hydro-chloride	H		H	H	H	H	H	H	385	1.49
38	H		H	H	H	H	H	H	367,2	1.29
39	H		H	H	H	H	H	H	351	1.48
40	H		H	H	H	H	H	H		

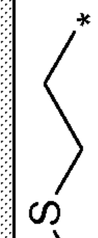
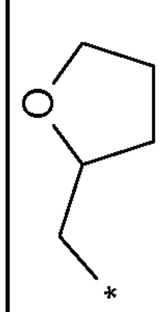
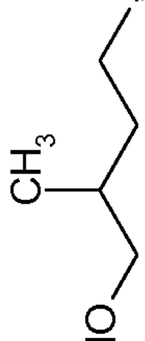
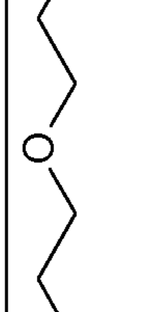
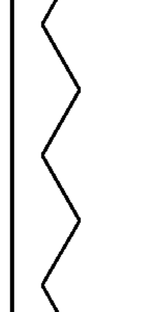
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log P HCOOH
41	H		H	H	H	H	H	H		
42	H		H	H	H	H	H	H	385	
43	H		H	H	H	H	H	H	405	
44	H		H	H	H	H	H	H	385	
45	H		H	H	H	H	H	H	419	

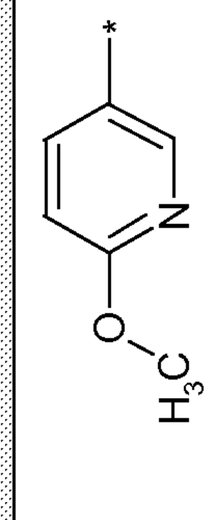
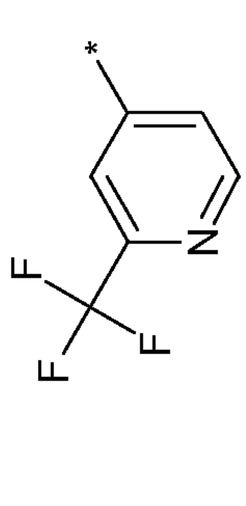
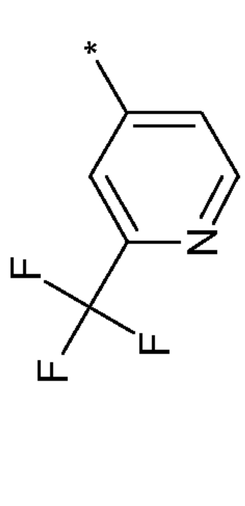
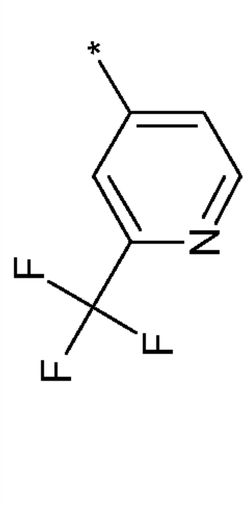
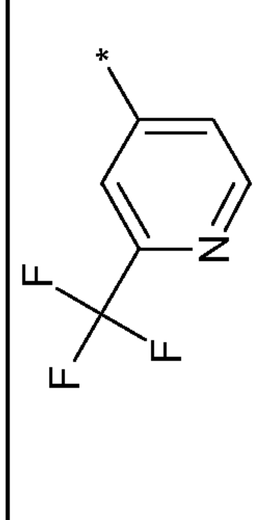
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
46	H		H	H	H	H	H	H	351	1.42
47	H		H	H	H	H	H	H	381	
48	H		H	H	H	H	H	H	434	
49	H		H	H	H	H	H	H	420	
50	H		H	H	H	H	H	H	367	
51	H		H	H	H	H	H	H	367	

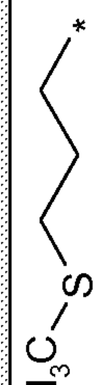
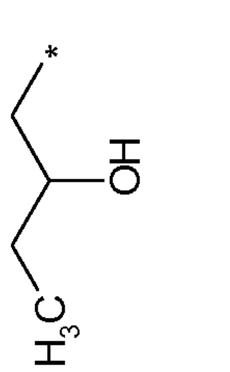
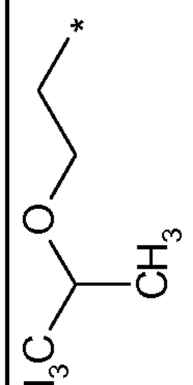
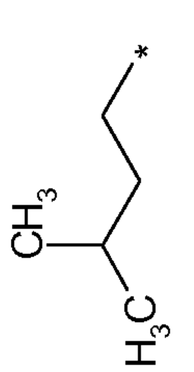
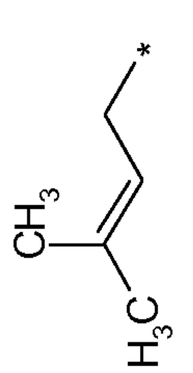
Example Number	R^a	L^1	L^2	R^b	R^c	$(Y)_p$-Het	X^1	X^2	X^3	Measured Mw	log p_{HCOOH}
52	H		H	H	H		H	H	H	349	
53	H		H	H	H		H	H	H	353	
54	H		H	H	H		H	H	H	379	
55	H		H	H	H		H	H	H	333	
56	H		H	H	H		H	H	H	379	
57	H		H	H	H		H	H	H	365	

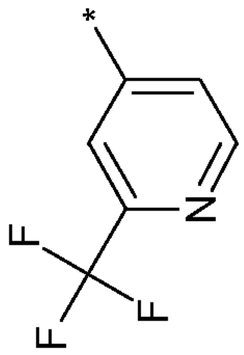
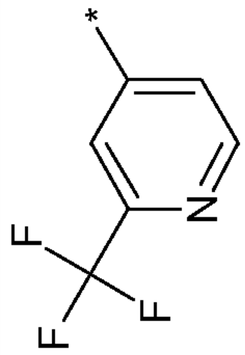
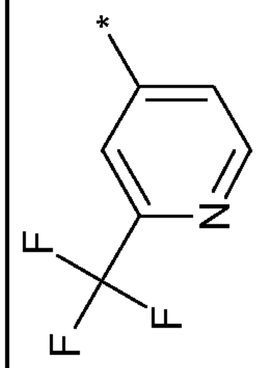
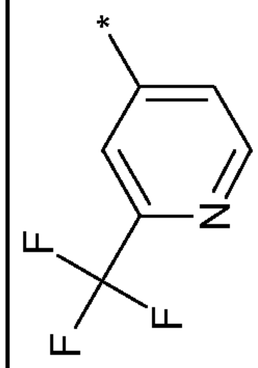
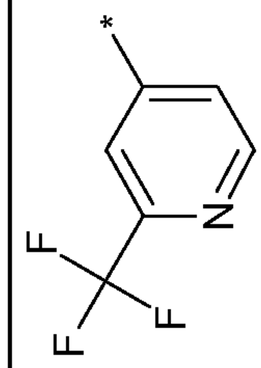
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log P HCOOH
58	H	H_3C–S–*	H	H	H	H	H	H	383	
59	H	H_3C–N(CH_3)–CH(CH_3)–*	H	H	H	H	H	H	380	
60	H	N≡C–*	H	H	H	H	H	H	348	
61	H	HO–C(CH_3)(CH_3)–*	H	H	H	H	H	H	381	
62	H	H_3C–C(=CH_2)–*	H	H	H	H	H	H	349	
63	H	H_3C–S–*	H	H	H	H	H	H	383	

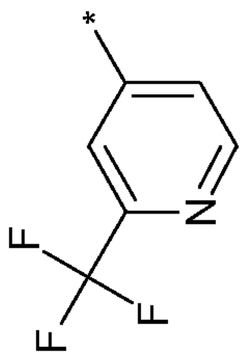
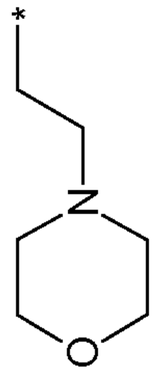
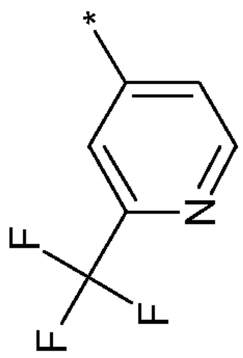
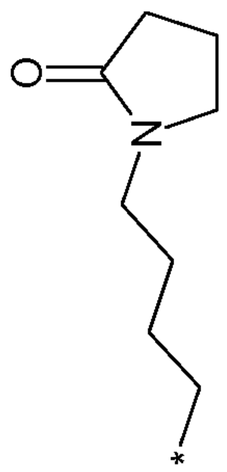
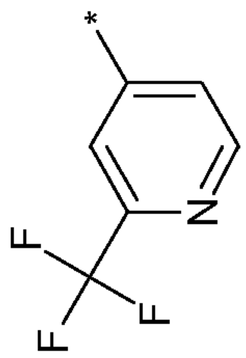
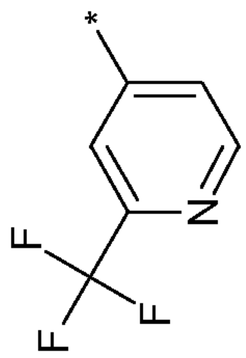
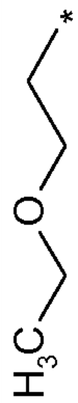
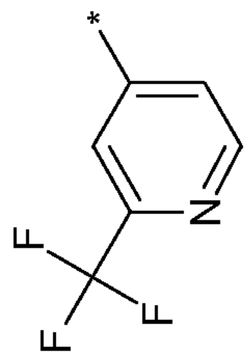
Example Number	R^a	L^1	L^2	R^b	R^c	$(Y)_p$-Het	X^1	X^2	X^3	Measured Mw	log p_{HCOOH}
64	H		H	H	H		H	H	H	353	
65	H		H	H	H		H	H	H	367	
66	H		H	H	H		H	H	H	381	
67	H		H	H	H		H	H	H	379	
68	H		H	H	H		H	H	H	365	
69	H		H	H	H		H	H	H	351	

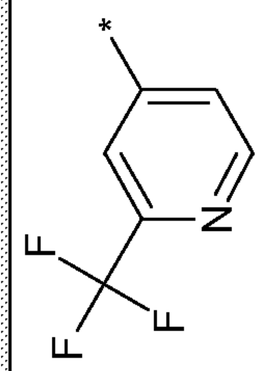
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured MW	log P HCOOH
70	H		H	H	H	H	H	H	369	
71	H		H	H	H	H	H	H	379	
72	H		H	H	H	H	H	H	367	
73	H		H	H	H	H	H	H	381	
74	H		H	H	H	H	H	H	381	
75	H		H	H	H	H	H	H	381	

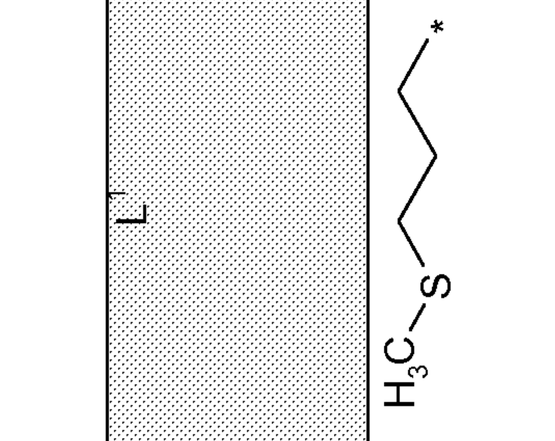
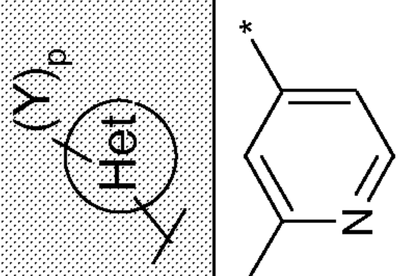
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
76	H		H	H	H	H	H	H	349	
77	H		H	H	H	H	H	H	389	
78	H		H	H	H	H	H	H	403	
79	H		H	H	H	H	H	H	421	
80	H		H	H	H	H	H	H	418	

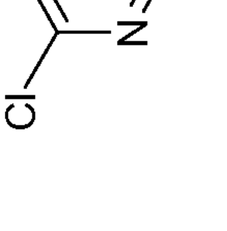
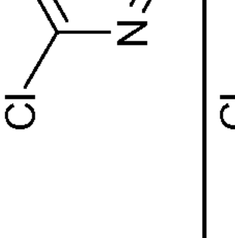
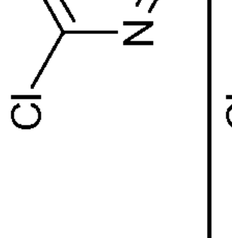
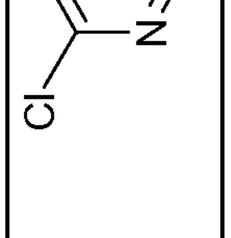
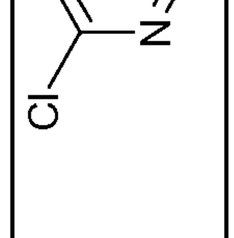
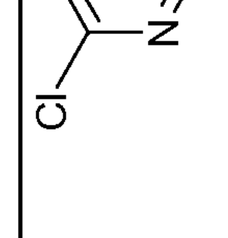
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log P HCOOH
81	H		H	H	H	H	H	H	421	
82	H		H	H	H	H	H	H	405	
83	H		H	H	H	H	H	H	419	
84	H		H	H	H	H	H	H	403	
85	H		H	H	H	H	H	H	401	

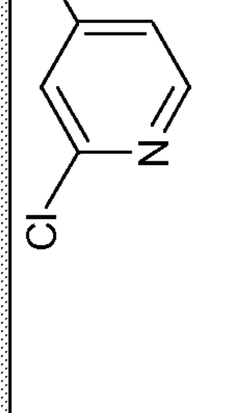
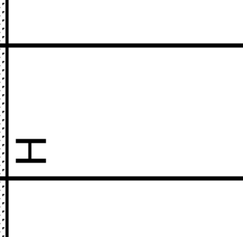
Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
86	H		H	H	H	H	H	H	401	
87	H		H	H	H	H	H	H	417	
88	H		H	H	H	H	H	H	405	
89	H		H	H	H	H	H	H	419	
90	H		H	H	H	H	H	H	417	

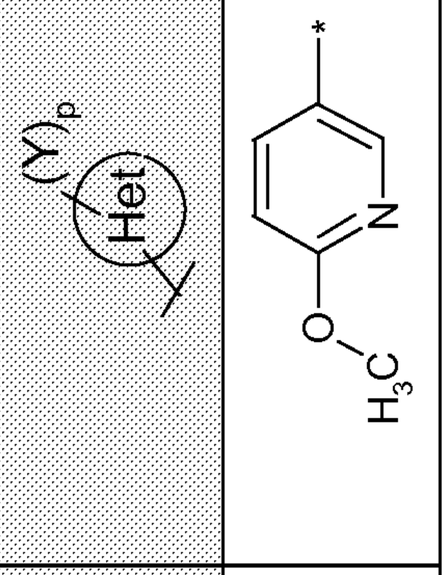
Example Number	R^a	L^1	L^2	R^b	R^c	$(Y)_p$ Het Y	X^1	X^2	X^3	Measured M/w	log p HCOOH
91	H		H	H	H		H	H	H	387	
92	H		H	H	H		H	H	H	446	
93	H		H	H	H		H	H	H	472	
94	H		H	H	H		H	H	H	405	
95	H		H	H	H		H	H	H	405	

Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
96	H		H	H	H	H	H	H	391	
97	H		H	H	H	H	H	H	417	
98	H		H	H	H	H	H	H	355	2.17
99	H		H	H	H	H	H	H	369	2.17
100	H		H	H	H	H	H	H	387	2.17
101	H		H	H	H	H	H	H	384	2.17

Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured MW	log P HCOOH
102	H		H	H	H		H	H	387	
103	H		H	H	H		H	H	371	
104	H		H	H	H		H	H	385	
105	H		H	H	H		H	H	383	
106	H		H	H	H		H	H	369	
107	H		H	H	H		H	H	367	

Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
108	H		H	H	H	H	H	H	367	
109	H		H	H	H	H	H	H	383	
110	H		H	H	H	H	H	H	371	
111	H		H	H	H	H	H	H	371	
112	H		H	H	H	H	H	H	353	
113	H		H	H	H	H	H	H	412	

Example Number	R^a	L^1	L^2	R^b	R^c	X^1	X^2	X^3	Measured M/w	log p HCOOH
114	H		H	H	H		H	H	438	
115	H		H	H	H		H	H	371	
116	H		H	H	H		H	H	357	
117	H		H	H	H		H	H	383	
118	H	-C(CH$_3$)=N-C(CH$_3$)=N-		H	H		H	H		2.11
119	H	-CH$_2$CH$_2$CH$_2$CH$_2$-		H	H		H	H	349,3	1.42

Example Number	120
R^a	H
L^1	-$COCH_2CH_2CH_2$-
L^2	
R^b	H
R^c	H
	
X^1	H
X^2	H
X^3	H
Measured MW	363
log p HCOOH	2.17

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

Preparation of N-(2-chloropyridin-4-yl)-4-(2-{[1-(methoxymethyl)propyl]amino}pyridin-4-yl)pyrimidin-2-amine (Compound 9) according to process P1

300 mg of N,4-bis(2-chloropyridin-4-yl)pyrimidin-2-amine (0.94 mmol), 486mg of 1-methoxybutan-2-amine (4.71mmol), were heated at 240°C for 90minutes under micro-waves irradiation in 0.6 ml of 1-Methyl-2-pyrrolidinone. After cooling, the reaction mixture was poured into 10 ml of dichloromethane, washed twice with 5ml of water. After drying over magnesium sulfate, filtration and concentration *in* vacuo, the crude product was chromatographed on silica (ethyl acetate / heptane) to yield 0.72g of N-(2-chloropyridin-4-yl)-4-(2-{[1-(methoxymethyl)propyl]amino}pyridin-4-yl)pyrimidin-2-amine (yield = 19%).

[M + 1] = 385

Preparation of N,4-bis(2-chloropyridin-4-yl)pyrimidin-2-amine (Compound of formula (II))

Preparation of di-tert-butyl {(Z)-[(2-chloropyridin-4-yl)amino]methylylidene}biscarbamate:

20.22g (0.157 mol) of 4-amino-2-chloropyridine were diluted in triethylamine (67ml) and dichloromethane(600ml) at 0-5°C. 47g of Mercury(II) chloride (0.173mol) and 50.24g (0.173 mol) of N,N'-bis(boc)-S-methyl-isothiourea were added to the reaction mixture, which was then stirred at room temperature for 4 days, filtered on a fritted funnel , concentrated *in vacuo* and chromatographed on silica (Heptane90/AcOEt10) to yield 43.67g of di-tert-butyl {(Z)-[(2-chloropyridin-4-yl)amino]methylylidene}biscarbamate (yield = 71%).

[M + 1] = 371

Preparation of 1-(2-chloropyridin-4-yl)guanidine bis(trifluoroacetate):

To a solution of 43.67 g (0.117mol) of di-tert-butyl {(Z)-[(2-chloropyridin-4-yl)amino]methylylidene}biscarbamate in dichloromethane (800ml) at room temperature were added 81.64ml of trifluoroacetic acid (1.06 mol). The reaction mixture was stirred at room temperature for 2 days, concentrated *in vacuo,* triturated with 100ml of pentane, and upon standing crystallized to yield 51.68g of 1-(2-chloropyridin-4-yl)guanidine bis(trifluoroacetate) (yield = 99%).

[M + 1-2*CF_3CO_2H] = 171

Preparation of N,4-bis(2-chloropyridin-4-yl)pyrimidin-2-amine:

To a solution of 6.32g of 1-(2-chloropyridin-4-yl)-3-(dimethylamino)prop-2-en-1-one (30 mmol) in 60ml of 2-Propanol was added 2.52g of sodium hydroxide (63mmol) and 11.96g of 1-(2-chloropyridin-4-yl)guanidine bis(trifluoroacetate) (30mmol). The reaction mixture was heated to reflux under stirring for 20h. After filtration, the precipitate was washed with 100ml of *n*-butanol

and 120ml of iPr_2O and then air-dried to yield 4.69g of N,4-bis(2-chloropyridin-4-yl)pyrimidin-2-amine (yield = 37%).

[M + 1] = 318

Biological Examples

Example A In vivo test on *Peronospora parasitica* (Crucifer downy mildew)

The active ingredients tested are prepared by homogenization in a mixture of acetone/Tween/DMSO, then diluted with water to obtain the desired active material concentration.

Cabbage plants (Eminence variety) in starter cups, sown on a 50/50 peat soil-pozzolana substrate and grown at 18-20°C, are treated at the cotyledon stage by spraying with the aqueous suspension described above.

Plants, used as controls, are treated with an aqueous solution not containing the active material.

After 24 hours, the plants are contaminated by spraying them with an aqueous suspension of *Peronospora parasitica* spores (50 000 spores per ml). The spores are collected from infected plant.

The contaminated cabbage plants are incubated for 5 days at 20°C, under a humid atmosphere.

Grading is carried out 5 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) or total protection is observed at a dose of 500 ppm with the following compounds: 9, 11, 13, 15, 18, 19, 20, 21, 22, 23, 28, 37, 49, 53, 64, 65, 92, 109, 110, 113 and 115.

Example B : in vivo test on *Botrytis cinerea* (Grey mould)

The active ingredients tested are prepared by homogenization in a mixture of acetone/Tween/DMSO, then diluted with water to obtain the desired active material

Gherkin plants (Vert petit de Paris variety), sown on a 50/50 peat soil-pozzolana substrate in starter cups and grown at 18- 20°C, are treated at the cotyledon Z11 stage by spraying with the active ingredient prepared as described above.

Plants, used as controls, are treated with an aqueous solution not containing the active material.

After 24 hours, the plants are contaminated by depositing drops of an aqueous suspension of *Botrytis cinerea* spores (150,000 spores per ml) on upper surface of the leaves. The spores are collected from a 15-day-old culture and are suspended in a nutrient solution composed of :

- 20 g/L of gelatine;
- 50 g/L of D-fructose;
- 2 g/L of NH_4NO_3;
- 1 g/L of KH_2PO_4.

The contaminated cucumber plants are settled for 5/7 days in a climatic room at 15-11°C (day/night) and at 80% relative humidity.

Grading is carried out 5/7 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) or total protection is observed at a dose of 500 ppm with the following compounds: 9, 11, 12, 13, 21, 37, 39, 42, 43, 44, 50, 51, 52, 69, 74, 76 and 106.

Example C : *in vivo* test on *Alternaria brassicae* (Leaf spot of crucifers)

The active ingredients tested are prepared by homogenization in a mixture of acetone/tween/DMSO, then diluted with water to obtain the desired active material.

Radish plants (Pernot variety), sown on a 50/50 peat soil-pozzolana substrate in starter cups and grown at 18-20°C, are treated at the cotyledon stage by spraying with the active ingredient prepared as described above.

Plants, used as controls, are treated with the mixture of acetone/tween/water not containing the active material.

After 24 hours, the plants are contaminated by spraying them with an aqueous suspension of *Alternaria brassicae* spores (40,000 spores per cm^3). The spores are collected from a 12 to 13 days-old culture.

The contaminated radish plants are incubated for 6-7 days at about 18°C, under a humid atmosphere.

Grading is carried out 6 to 7 days after the contamination, in comparison with the control plants.

Under these conditions, good protection (at least 70%) is observed at a dose of 500ppm with the following compounds: 9, 11, 13, 37, 43, 57, 110 and 115.

Example D : *in vivo* test on *Sphaerotheca fuliginea* (cucurbits powdery mildew).

The active ingredients tested are prepared by homogenization in a mixture of acetone/tween/DMSO, then diluted with water to obtain the desired active material.

Gherkin plants (Vert petit de Paris variety) in starter cups, sown on a 50/50 peat soil-pozzolana substrate and grown at 20°C/23°C, are treated at the cotyledon Z10 stage by spraying with the aqueous suspension described above. Plants, used as controls, are treated with an aqueous solution not containing the active material.

After 24 hours, the plants are contaminated by spraying them with an aqueous suspension of *Sphaerotheca fuliginea* spores (100 000 spores per ml). The spores are collected from a contaminated plants .The contaminated gherkin plants are incubated at about 20°C/25°C and at 60/70% relative humidity.

Grading (% of efficacy) is carried out 12 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) or total protection is observed at a dose of 500ppm with the following compounds: 9, 13, 37 and 39.

Example E : in vivo test on *Pyrenophora teres* (Barley Net blotch)

The active ingredients tested are prepared by homogenization in a mixture of acetone/Tween/DMSO, then diluted with water to obtain the desired active material concentration.

Barley plants (Express variety), sown on a 50/50 peat soil-pozzolana substrate in starter cups and grown at 12°C, are treated at the 1-leaf stage (10 cm tall) by spraying with the active ingredient prepared as described above.

Plants, used as controls, are treated with an aqueous solution not containing the active material.

After 24 hours, the plants are contaminated by spraying them with an aqueous suspension of *Pyrenophora teres* spores (12,000 spores per ml). The spores are collected from a 12-day-old culture. The contaminated barley plants are incubated for 24 hours at about 20°C and at 100% relative humidity, and then for 12 days at 80% relative humidity.

Grading is carried out 12 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) is observed at a dose of 500 ppm with the following compounds: 9, 10, 11, 12, 13, 21, 36, 37, 38, 39, 43, 44, 45, 46, 51, 52, 57, 60, 62, 64, 65, 66, 68, 69, 76 and 110.

Example F : *in vivo* test on *Puccinia recondita* (Brown rust)

The active ingredients tested are prepared by homogenization in a mixture of acetone/tween/DMSO, then diluted with water to obtain the desired active material.

Wheat plants (Scipion variety) sown on 50/50 peat soil-pozzolana substrate in starter cups and grown at 12°C, are treated at the 1-leaf stage (10 cm tall) by spraying with the aqueous suspension described above.

Plants, used as controls, are treated with an aqueous solution not containing the active material.

After 24 hours, the plants are contaminated by spraying the leaves with an aqueous suspension of *Puccinia recondita* spores (100,000 spores per ml). The spores are collected from a 10-day-old contaminated wheat and are suspended in water containing 2.5 ml/l of tween 80 10%. 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% relative humidity.

Grading is carried out 10 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) or total protection is observed at a dose of 500ppm with the following compounds: 9, 37 and 38.

Example G : *in vivo* test on *Mycosphaerella graminicola* (Wheat Leaf Spot)

The active ingredients tested are prepared by homogenization in a mixture of acetone/tween/DMSO, then diluted with water to obtain the desired active material concentration.

Wheat plants (Scipion variety), sown on a 50/50 peat soil-pozzolana substrate in starter cups and grown at 12°C, are treated at the 1-leaf stage (10 cm tall) by spraying with the aqueous suspension described above. Plants, used as controls, are treated with an aqueous solution not containing the active material.

After 24 hours, the plants are contaminated by spraying them with an aqueous suspension of *Mycosphaerella graminicola* spores (500 000 spores per ml). The spores are collected from a 7-day-old culture. The contaminated wheat plants are incubated for 72 hours at 18°C and at 100% relative humidity, and then for 21 to 28 days at 90% relative humidity.

Grading (% of efficacy) is carried out 21 to 28 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) or total protection is observed at a dose of 500ppm with the following compounds: 9, 13, 15, 21, 34, 37, 39, 51, 66 and 74.

Example H : *in vivo* test on *Pyricularia grisea* (Rice blast)

The active ingredients tested are prepared by homogenization in a mixture of acetone/tween/DMSO, then diluted with water to obtain the desired active material concentration.

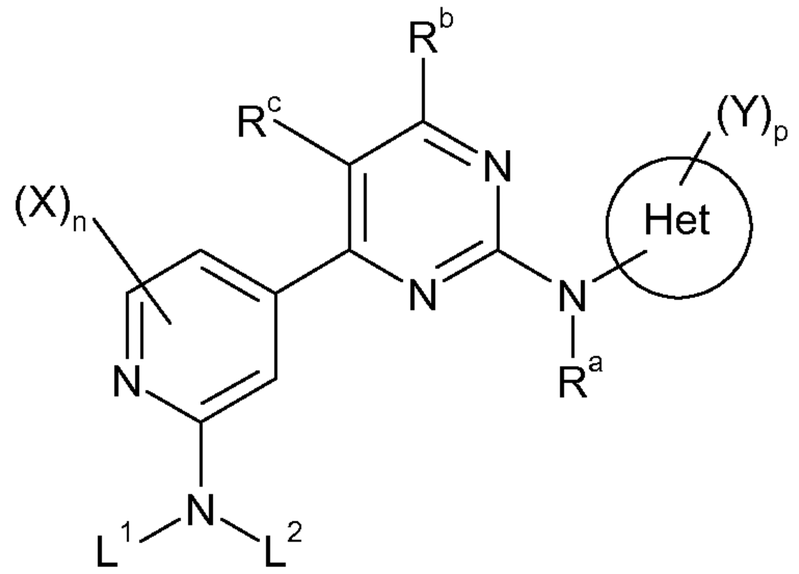
Rice plants (Koshihikari variety), sown on a 50/50 peat soil-pozzolana substrate in starter cups and grown at 25°C, are treated at the 2-leaf stage (13-15 cm tall) by spraying with the active ingredient prepared as described above. Plants, used as controls, are treated with the mixture of acetone/tween/DMSO/water not containing the active material.

After 24 hours, the plants are contaminated by spraying them with an aqueous suspension of *Pyricularia grisea* spores (30,000 spores per ml). The spores are collected from a 17-day-old culture and are suspended in water containing 2.5 g/l of gelatin. The contaminated Rice plants are incubated for 72 hours at about 25°C and at 100% relative humidity, and then for 3 days at 25°C at 80% relative humidity during the day and 20% relative humidity during the night.
Grading (% of efficacy) is carried out 6 days after the contamination, in comparison with the control plants.

Under these conditions, good (at least 70%) or total protection is observed at a dose of 500ppm with the following compounds: 9.

CLAIMS

1. A compound of formula (I)



(I)

wherein

- Het represents a saturated or unsaturated, aromatic or non-aromatic 4-, 5-, 6- or 7-membered heterocycle comprising up to four heteroatoms which may be the same or different;
- Y independently represents a halogen atom, a nitro group, a hydroxy group, an oxo group, a cyano group, an amino group, a sulphenyl group, a pentafluoro-λ^6-sulphenyl group, a formyl group, a formyloxy group, a formylamino group, a carbamoyl group, a N-hydroxycarbamoyl group, a carbamate group, a (hydroxyimino)-C_1-C_6-alkyl group, a C_1-C_8-alkyl, a tri(C_1-C_8-alkyl)silyl, a substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-alkyl, substituted or non-substituted C_1-C_8-cycloalkyl, substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, a C_2-C_8-alkynyl, a C_2-C_8-alkenyloxy, a C_2-C_8-alkynyloxy, a C_1-C_8-alkylamino, a di-C_1-C_8-alkylamino, a C_1-C_8-alkoxy, a C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphenyl, a C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyloxy, a C_2-C_8-halogenoalkenyloxy having 1 to 5 halogen atoms, a C_3-C_8-alkynyloxy, a C_3-C_8-halogenoalkynyloxy having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyl, a C_1-C_8-halogenoalkylcarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbamoyl, a di-C_1-C_8-alkylcarbamoyl, a N-C_1-C_8-alkyloxycarbamoyl, a C_1-C_8-alkoxycarbamoyl, a N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, a C_1-C_8-alkoxycarbonyl, a C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyloxy, a C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonylamino, a C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, a C_1-C_8-alkylaminocarbonyloxy, a di-C_1-C_8-alkylaminocarbonyloxy, a C_1-C_8-

alkyloxycarbonyloxy, a C_1-C_8-alkylsulphenyl, a C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphinyl, a C_1-C_8-halogenoalkylsulphinyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphonyl, a C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylaminosulfamoyl, a di-C_1-C_8-alkylaminosulfamoyl, a (C_1-C_6-alkoxyimino)-C_1-C_6-alkyl, a (C_1-C_6-alkenyloxyimino)-C_1-C_6-alkyl, a (C_1-C_6-alkynyloxyimino)-C_1-C_6-alkyl, a 2-oxopyrrolidin-1-yl, substituted or non-substituted (benzyloxyimino)-C_1-C_6-alkyl, substituted or non-substituted C_1-C_8-alkoxyalkyl, substituted or non-substituted C_1-C_8-halogenoalkoxyalkyl having 1 to 5 halogen atoms, substituted or non-substituted benzyloxy, substituted or non-substituted benzylsulphenyl, substituted or non-substituted benzylamino, substituted or non-substituted phenoxy, substituted or non-substituted phenylsulphenyl, or substituted or non-substituted phenylamino ;

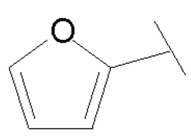
- p represents 0, 1, 2, 3, 4, 5 or 6;
- R^a represents a hydrogen atom, a cyano group, a formyl group, a formyloxy group, a C_1-C_8-alkoxycarbonyl, a C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylcarbonyl, a C_1-C_8-halogenoalkylcarbonyl having 1 to 5 halogen atoms, a C_1-C_8-alkylsulphonyl, a C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, a C_1-C_8-alkyl, a C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, a C_2-C_8-alkynyl, a C_1-C_8-alkoxyalkyl, a C_1-C_8-halogenoalkoxyalkyl having 1 to 5 halogen atoms;
- R^b and R^c independently represent a hydrogen atom, a halogen atom, a cyano, a C_1-C_8-alkyl, a C_1-C_8-cycloalkyl, a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms ;
- X independently represents a C_1-C_{10}-alkyl, a C_1-C_{10}-halogenoalkyl, a halogen atom or a cyano;
- n represents 0, 1, 2 or 3;
- L^1 and L^2 independently represent a hydrogen atom, a cyano group, a hydroxy group, an amino group, a formyl group, a formyloxy group, a formylamino group, a carbamoyl group, a N-hydroxycarbamoyl group, a carbamate group, substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, substituted or non-substituted C_1-C_8-alkyl, tri(C_1-C_8-alkyl)silyl, substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-alkyl, substituted or non-substituted C_1-C_8-cycloalkyl, substituted or non-substituted tri(C_1-C_8-alkyl)silyl-C_1-C_8-cycloalkyl, substituted or non-substituted C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms a C_2-C_8-alkenyl, substituted or non-substituted C_2-C_8-alkynyl, 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-alkoxy, substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, substituted or non-substituted C_2-C_8-alkenyloxy, substituted or non-substituted C_2-C_8-alkynyloxy, substituted or non-substituted C_2-C_8-alkenyloxy, substituted or non-substituted C_2-C_8-halogenoalkenyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_3-C_8-alkynyloxy, substituted or non-substituted C_3-C_8-halogenoalkynyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyl, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyl having 1 to 5 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 N-C_1-C_8-alkyloxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbamoyl, substituted or non-substituted N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbonyl, substituted or non-substituted C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyloxy, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonylamino, substituted or non-substituted C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted di-C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted C_1-C_8-alkyloxycarbonyloxy, substituted or non-substituted C_1-C_8-alkylsulphenyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphenyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylsulphinyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphinyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylsulphonyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylaminosulfamoyl, substituted or non-substituted di-C_1-C_8-alkylaminosulfamoyl, substituted or non-substituted (C_1-C_6-alkoxyimino)-C_1-C_6-alkyl, substituted or non-substituted (C_1-C_6-alkenyloxyimino)-C_1-C_6-alkyl, substituted or non-substituted (C_1-C_6-alkynyloxyimino)-C_1-C_6-alkyl, (2-oxopyrrolidin-1-yl) C_1-C_8-alkyl, (2-oxopyrrolidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxopiperidin-1-yl) C_1-C_8-alkyl, (2-oxopiperidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxoazepan-1-yl) C_1-C_8-alkyl, (2-oxoazepan-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, substituted or non-substituted (benzyloxyimino)-C_1-C_6-alkyl;

- L^1 and L^2 can form together a saturated or unsaturated, aromatic or non-aromatic, substituted or non-substituted 4-, 5-, 6- or 7-membered, N-including heterocycle comprising up to 4 heteroatoms independently selected in the list consisting of N, O, S ;

as well as salts, N-oxides, metallic complexes, metalloidic complexes and optically active or geometric isomers thereof; provided that the following compound is excluded: 4-[2-(ethylamino)-4-pyridinyl]-N-[5-(-piperazinyl)-2-pyridinyl]-2-pyrimidinamine.

2. A compound according to claim 1 wherein Het represents a saturated or unsaturated, aromatic or non-aromatic heterocycle selected in the list consisting of: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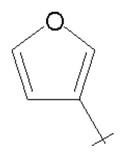
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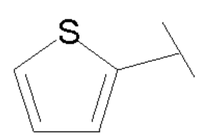
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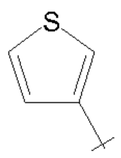
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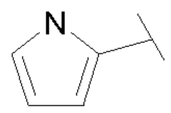
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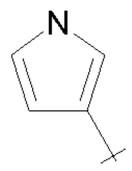
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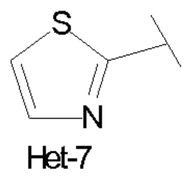
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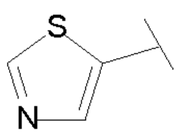
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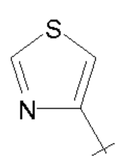
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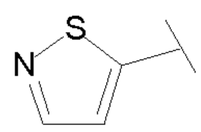
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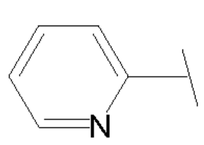
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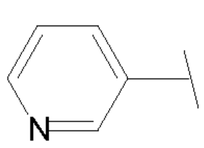
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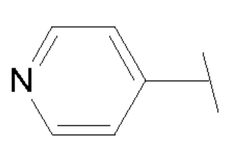

Het-13 .

3. A compound according to claims 1 or 2 wherein Y wherein Y represents a halogen atom, a cyano group, a formylamino group, a carbamoyl group, a substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, a substituted or non-substituted C_1-C_8-alkyl, a substituted or non-substituted tri(C_1-C_8-alkyl)silyl, a substituted or non-substituted C_1-C_8-cycloalkyl, a substituted or non-substituted C_1-C_8-alkoxy, a substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, a substituted or non-substituted a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, a substituted or non-substituted C_1-C_8-alkylcarbonylamino.

4. A compound according to claims 1 to 3 wherein Y represents a halogen atom, a cyano group, a formylamino group, a carbamoyl group, a substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, a substituted or non-substituted C_1-C_8-alkyl, a substituted or non-substituted tri(C_1-C_8-alkyl)silyl, a substituted or non-substituted C_1-C_8-cycloalkyl, a substituted or non-substituted C_1-C_8-alkoxy, a substituted or non-substituted C_1-C_8-

halogenoalkoxy having 1 to 5 halogen atoms, a substituted or non-substituted a C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms.

5. A compound according to claims 1 to 4 wherein p represents 0, 1 or 2.

6. A compound according to claims 1 to 5 wherein p represents 1.

7. A compound according to claims 1 to 6 wherein R^a represents a hydrogen atom.

8. A compound according to claims 1 to 7 wherein R^b and R^c independently represent a hydrogen atom or a halogen atom.

9. A compound according to claims 1 to 8 wherein R^b and R^c independently represent a hydrogen atom.

10. A compound according to claims 1 to 9 wherein n represents 0.

11. A compound according to claims 1 to 10 wherein L^1 and L^2 independently represent a hydrogen atom, a cyano group, a hydroxy group, an amino group, a formyl group, a formyloxy group, a formylamino group, substituted or non-substituted (hydroxyimino)-C_1-C_6-alkyl group, substituted or non-substituted C_1-C_8-alkyl, tri(C_1-C_8-alkyl)silyl, substituted or non-substituted C_1-C_8-cycloalkyl, substituted or non-substituted C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-halogenocycloalkyl having 1 to 5 halogen atoms, a C_2-C_8-alkenyl, substituted or non-substituted C_2-C_8-alkynyl, 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-alkoxy, substituted or non-substituted C_1-C_8-halogenoalkoxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyl, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyl having 1 to 5 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 N-C_1-C_8-alkyloxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbamoyl, substituted or non-substituted N-C_1-C_8-alkyl-C_1-C_8-alkoxycarbamoyl, substituted or non-substituted C_1-C_8-alkoxycarbonyl, substituted or non-substituted C_1-C_8-halogenoalkoxycarbonyl having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonyloxy, substituted or non-substituted C_1-C_8-halogenoalkylcarbonyloxy having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-alkylcarbonylamino, substituted or non-substituted C_1-C_8-halogenoalkylcarbonylamino having 1 to 5 halogen atoms, substituted or non-substituted C_1-C_8-

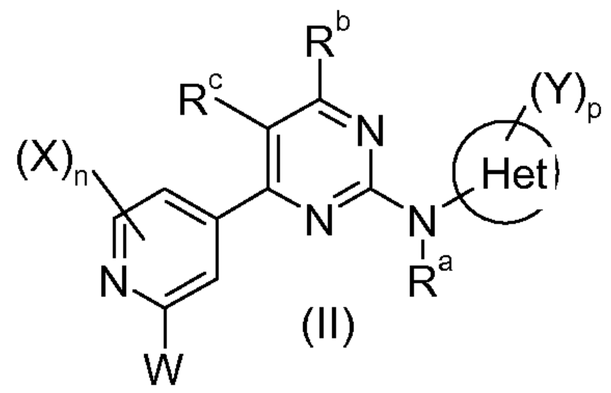
alkylaminocarbonyloxy, substituted or non-substituted di-C_1-C_8-alkylaminocarbonyloxy, substituted or non-substituted C_1-C_8-alkyloxycarbonyloxy, substituted or non-substituted C_1-C_8-alkylsulphonyl, substituted or non-substituted C_1-C_8-halogenoalkylsulphonyl having 1 to 5 halogen atoms, (2-oxopyrrolidin-1-yl) C_1-C_8-alkyl, (2-oxopyrrolidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxopiperidin-1-yl) C_1-C_8-alkyl, (2-oxopiperidin-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms, (2-oxoazepan-1-yl) C_1-C_8-alkyl, (2-oxoazepan-1-yl) C_1-C_8-halogenoalkyl having 1 to 5 halogen atoms;

when L^1 and L^2 form together a substituted or non-substituted, 4-, 5-, 6- or 7-membered heterocycle comprising up to 4 heteroatoms selected in the list consisting of N, O, S, L^1 and L^2 independently represent a substituted or non-substituted 2-oxopyrrolidin-1-yl or a substituted or non-substituted 2-oxo-1,3-oxazolidin-3-yl.

12. A compound according to claims 1 to 11 wherein L^1 and L^2 independently represent a hydrogen atom or a linear or branched, a substituted or non-substituted C_1-C_8-alkyl.

13. A compound according to claims 1 to 12 wherein L^1 and L^2 independently represent a hydrogen atom or a linear or branched, a substituted or non-substituted (C_1-C_8-alkoxy)-C_1-C_8-alkyl.

14. A compound of formula (II)



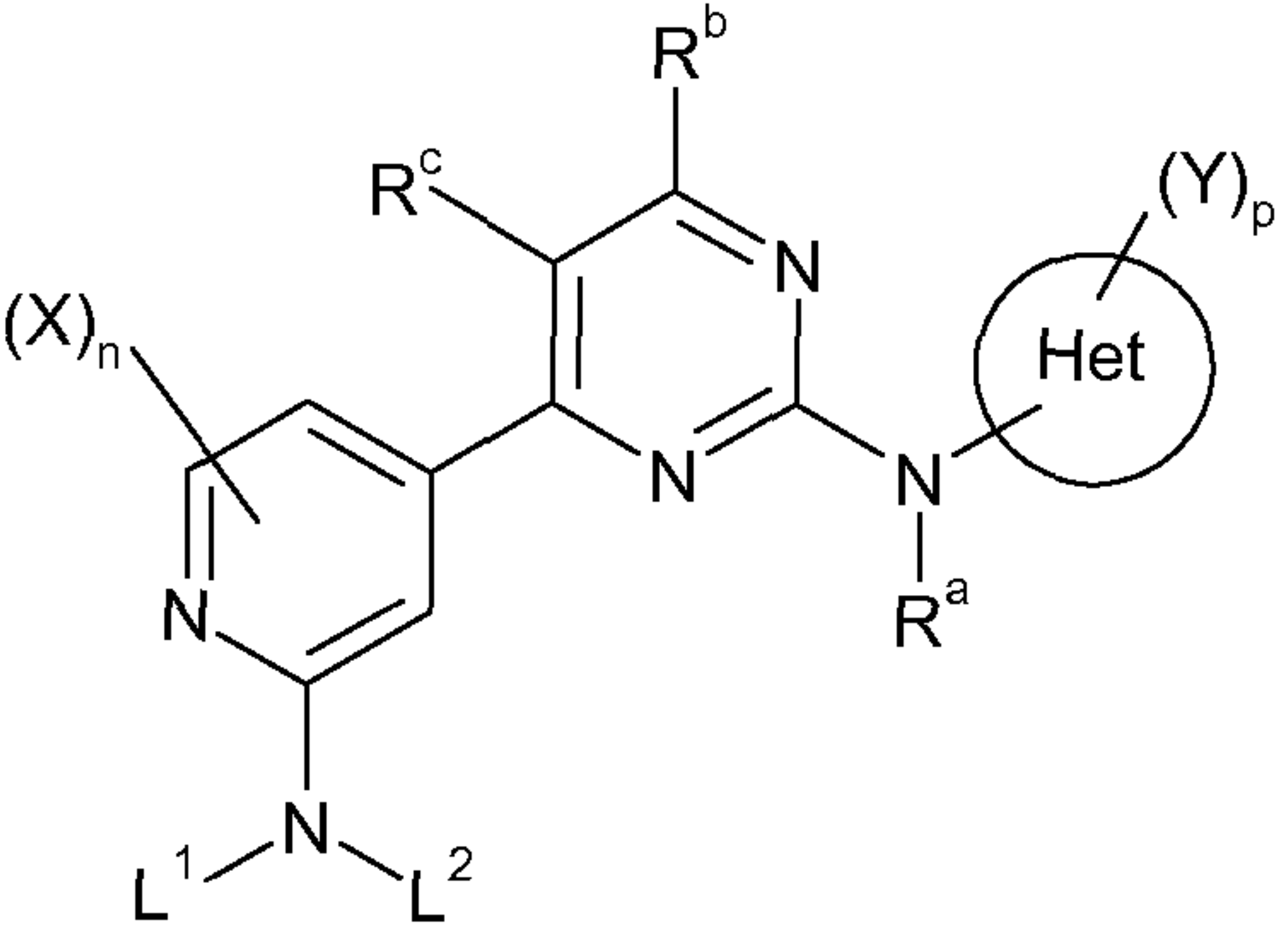
(II)

wherein

- W represents a leaving group such as a halogen atom, a C_1-C_6 alkylsulfonate, a C_1-C_6 haloalkylsulfonate ; a substituted or non-substitued phenylsulfonate and
- X, Y, n, p, R^a, R^b, R^c, Het, being as defined in claims 1 to 13.

15. A fungicide composition comprising, as an active ingredient, an effective amount of a compound of formula (I) according to claims 1 to 13 and an agriculturally acceptable support, carrier or filler.

16. A method for controlling phytopathogenic fungi of crops, characterized in that an agronomically effective and substantially non-phytotoxic quantity of a compound according to claims 1 to 13 or a composition according to claim 15 is applied to the soil where plants grow or are capable of growing, to the leaves or the fruit of plants or to the seeds of plants.



(I)