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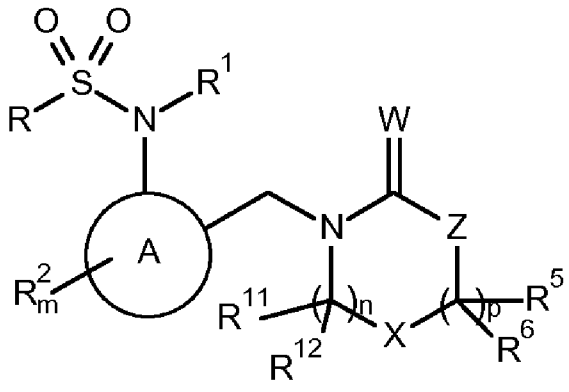
(54) **Title**: SULFONAMIDE-HETEROCYCLIC HERBICIDAL COMPOUNDS



(I)

(57) **Abstract**: The present invention relates sulfonanilide derivatives of the formula (I) wherein A, W, X, Z, m, n, p, R, R^1, R^2, R^5, R^6, R^{11} and R^{12} are as defined in the specification. Furthermore, the present invention relates to herbicidal compositions comprising these compounds and to methods of using these compounds to control plant growth.

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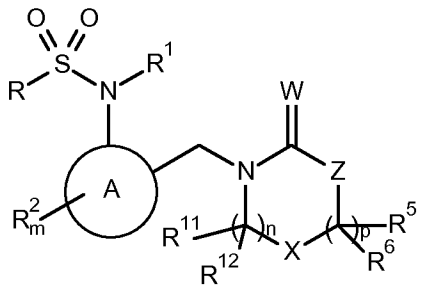
SULFONAMIDE-HETEROCYCLIC HERBICIDAL COMPOUNDS

The present invention relates to herbicidal sulfonanilide derivatives.

Some haloalkylsulfonanilide derivatives are known to have herbicidal activities – see EP 2 420 493 and EP 2 336 104.

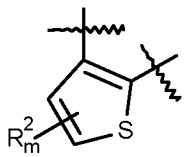
The object of the present invention is to provide new herbicides, which are highly effective against various weeds at low doses.

Accordingly, the present invention provides a compound of formula (I) or an agrochemically acceptable salt thereof:



wherein:

A is a 5- or 6-membered heteroaromatic ring containing 1, 2, 3 or 4 heteroatoms selected from oxygen, sulphur and nitrogen, with the proviso that A is not



;

m is an integer selected from 0, 1 or 2;

n is an integer selected from 0, 1, 2 or 3;

p is an integer selected from 0, 1, 2 or 3;

with the proviso that $0 \leq n + p \leq 3$;

W is oxygen or sulphur;

X is oxygen, sulphur, SO, SO_2 or CR^3R^4;

Z is oxygen, sulphur, CR^8R^9 or NR^{10};

R is C_{1-6}alkyl or C_{1-6}haloalkyl;

R^1 is H, C_{1-4}alkyl, C_{3-5}alkenyl, propargyl, C_{1-4}alkoxyC_{1-2}alkyl, C_{1-4}alkoxyC_{1-2}alkoxyC_{1-2}alkyl, C_{1-4}haloalkoxyC_{1-2}alkyl, C_{1-4}alkylthioC_{1-2}alkyl, cyanoC_{1-2}alkyl, C_{1-4}alkylcarbonylC_{1-2}alkyl, C_{1-4}alkoxycarbonylC_{1-2}alkyl, C_{1-4}alkylsulphonylC_{1-2}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, heteroarylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylthioC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkylthioC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylcarbonylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkylcarbonyloxyC_{1-2}alkyl, arylcarbonyloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkoxycarbonyloxyC_{1-2}alkyl, aryloxycarbonyloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-8}alkylcarbonyl, C_{2-5}alkenylcarbonyl, C_{1-4}haloalkylcarbonyl, C_{1-4}alkoxyC_{1-2}alkylcarbonyl, C_{3-6}cycloalkylcarbonyl, C_{1-4}alkoxycarbonylC_{1-2}alkylcarbonyl, arylcarbonyl optionally substituted by 1-3 groups R^{20}, aryloxyC_{1-2}alkylcarbonyl optionally substituted by 1-3 groups R^{20}, C_{1-10}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl, C_{3-5}alkenyloxycarbonyl, propargyloxycarbonyl, C_{1-4}alkoxyC_{1-2}alkoxycarbonyl, C_{1-4}alkylthiocarbonyl, aryloxycarbonyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxycarbonyl optionally substituted by 1-3 groups R^{20}, aminocarbonyl, C_{1-4}alkylaminocarbonyl, di(C_{1-4}alkyl)aminocarbonyl, C_{1-6}alkylsulphonyl, C_{1-6}haloalkylsulphonyl or arylsulphonyl optionally substituted by 1-3 groups R^{20}, and each R^{20} is, independently, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy;

R^2 is halogen, nitrile, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{3-6}cycloalkyl, C_{2-4}alkenyl, C_{2-4}alkynyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, C_{1-4}alkylcarbonyl, C_{1-4}alkylsulphonyl or phenyl or two R^2 groups together form $-OCH_2O-$ or $-OCH_2CH_2O-$;

R^3 and R^4 are, independently, H, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxycarbonyl or aryl optionally substituted by 1-3 groups R^{23} or R^3 and R^4 together form a C_{2-5}alkylene chain or an oxo group or R^3 together with one of R^5, R^8 or R^{11} forms a bond or R^3 and R^8 together form a C_{2-5}alkylene chain and each R^{23} is, independently, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy;

R^5 and R^6 are, independently, H, C_{1-5}alkyl, C_{1-4}haloalkyl, C_{3-6}cycloalkyl optionally substituted with 1-3 groups selected from halogen, C_{1-4}alkyl or phenyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-4}alkoxycarbonylaminoC_{1-4}alkyl, C_{1-4}alkylcarbonyloxyC_{1-2}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, aryloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, arylC_{1-2}alkoxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, C_{2-4}alkenyl, hydroxy, C_{1-4}alkoxy, C_{1-4}alkylthio, C_{1-4}alkylcarbonyloxy, aryl optionally substituted by 1-3 groups R^{21}, aryloxy optionally substituted by 1-3 groups R^{21}, arylthio optionally substituted by 1-3 groups R^{21}, heteroaryl optionally substituted by 1-3 groups R^{21} or R^5 and R^6 together form an oxo group or a C_{2-6}alkylene chain optionally containing an oxygen or sulphur atom and optionally substituted by 1-3 groups selected from halogen or C_{1-2}alkyl or R^5 together with together with one of R^3, R^8 or R^{11} forms a bond or R^5 and R^{11} together form a C_{2-5}alkylene chain and each R^{21} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy or two R^{21} groups together form OCH_2O or OCH_2CH_2O;

R^8 and R^9 are, independently, H, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{2-5}alkenyl, C_{2-5}alkynyl, C_{1-4}alkoxy, C_{1-4}alkylthio, C_{1-4}alkoxycarbonyl, aryl optionally substituted by 1-3 groups R^{24}, aryloxy

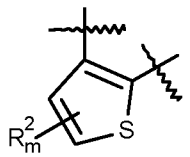
optionally substituted by 1-3 groups R^{24} or arylthio optionally substituted by 1-3 groups R^{24} or R^8 and R^9 together form a C_{2-5}alkylene chain or an oxo group or R^8 together with one of R^3 or R^5 forms a bond or R^8 and R^3 together form a C_{2-5}alkylene chain and each R^{24} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy;

R^{10} is H, C_{1-4}alkyl, C_{2-5}alkenyl, aryl optionally substituted by 1-3 groups R^{22}, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{22}, heteroaryl optionally substituted by 1-3 groups R^{22}, C_{1-4}alkylcarbonyl, C_{1-4}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl, C_{1-4}alkoxyC_{1-2}alkoxycarbonyl, C_{3-5}alkenyloxycarbonyl, aryloxycarbonyl optionally substituted by 1-3 groups R^{22}, arylC_{1-2}alkoxycarbonyl optionally substituted by 1-3 groups R^{22}, aminocarbonyl, C_{1-4}alkylaminocarbonyl, di(C_{1-4}alkyl)aminocarbonyl, C_{1-6}alkylsulphonyl or C_{1-6}haloalkylsulphonyl and each R^{22} is, independently, halogen, nitro, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, C_{1-4}alkylthio, C_{1-4}haloalkylthio, C_{1-4}alkylsulphonyl, C_{1-4}alkoxycarbonyl, phenyl or phenoxy;

R^{11} and R^{12} are, independently, H, halogen, hydroxy, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, carboxy, C_{1-4}alkoxycarbonyl or R^{11} and R^{12} together form an oxo group or R^{11} together with one of R^3 or R^5 forms a bond or R^{11} and R^5 together form a C_{2-5}alkylene chain.

In particularly preferred embodiments of the invention, the preferred groups for A, W, X, Z, m, n, p, R, R^1, R^2, R^3, R^4, R^5, R^6, R^8, R^9, R^{10}, R^{11}, R^{12}, R^{20}, R^{21}, R^{22} and R^{24}, in any combination thereof, are as set out below.

In one embodiment, A is a 5-membered heteroaromatic ring containing 1 to 4 heteroatoms selected from oxygen, sulphur and nitrogen, with the proviso that A is not



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Preferably, the 5-membered ring is a pyrrole, furan, thiophene (other than the thiophene above), pyrazole, imidazole, oxazole, isoxazole, thiazole, isothiazole, 1,2,3-triazole, 1,2,4-triazole, 1,2,3-oxadiazole, 1,2,5-oxadiazole, 1,2,3-thiadiazole, 1,2,5-thiadiazole or tetrazole ring. More preferably, the 5-membered ring is a thiophene (other than the thiophene above), pyrazole, thiazole, 1,2,4-triazole or tetrazole ring. Most preferably, the 5-membered ring is a thiophene ring (other than the thiophene above).

In another embodiment, A is a 6-membered heteroaromatic ring containing 1 to 3 nitrogen atoms. Preferably, the 6-membered ring is a pyridine, pyridazine, pyrimidine, pyrazine, 1,2,3-triazine or 1,2,4-triazine ring. More preferably, the 6-membered ring is a pyridazine, pyrimidine or pyrazine ring. Most preferably, the 6-membered ring is a pyrimidine ring.

Preferably, W is oxygen.

Preferably, X is oxygen or CR^3R^4.

Preferably, Z is oxygen, CR^8R^9 or NR^{10}.

Preferably, m is 0 or 1. Most preferably, m is 0.

Preferably, n is 0, 1 or 2 and p is 0, 1 or 2 with the proviso that $1 \leq n + p \leq 2$.

In one embodiment, R is C_1-C_6 alkyl.

In another embodiment, R is C_{1-4}haloalkyl. More preferably, R is trifluoromethyl.

Preferably, R^1 is H, C_{1-4}alkoxyC_{1-2}alkyl, C_{1-4}alkoxyC_{1-2}alkoxyC_{1-2}alkyl, C_{1-4}haloalkoxyC_{1-2}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkylcarbonyloxyC_{1-2}alkyl, arylcarbonyloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkoxycarbonyloxyC_{1-2}alkyl, C_{1-8}alkylcarbonyl, C_{1-4}haloalkylcarbonyl, C_{1-4}alkoxyC_{1-2}alkylcarbonyl, C_{1-10}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl, C_{1-4}alkoxyC_{1-2}alkoxycarbonyl, aryloxycarbonyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxycarbonyl optionally substituted by 1-3 groups R^{20}, C_{1-6}alkylsulphonyl or C_{1-6}haloalkylsulphonyl, and each R^{20} is, independently, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy. More preferably, R^1 is H, C_{1-5}alkylcarbonyl, C_{1-4}haloalkylcarbonyl, C_{1-5}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl or C_{1-4}haloalkylsulphonyl. Most preferably, R^1 is H, C_{1-5}alkylcarbonyl or C_{1-5}alkoxycarbonyl.

Preferably, R^2 is halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}alkylsulphonyl. Most preferably, R^2 is halogen or methyl.

Preferably, R^3 and R^4 are, independently, H, halogen or C_{1-4}alkyl. Most preferably, R^3 and R^4 are, independently, H or methyl.

Preferably, R^5 and R^6 are, independently, H, C_{1-5}alkyl, C_{1-4}haloalkyl, C_{3-6}cycloalkyl, C_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, C_{2-4}alkenyl, C_{1-4}alkoxy, C_{1-4}alkylthio, aryl optionally substituted by 1-3 groups R^{21}, aryloxy optionally substituted by 1-3 groups R^{21}, arylthio optionally substituted by 1-3 groups R^{21}, heteroaryl optionally substituted by 1-3 groups R^{21} or R^5 and R^6 together form a C_{2-5}alkylene chain optionally containing an oxygen atom, and each R^{21} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy. More preferably, R^5 and R^6 are, independently, H, C_{1-4}alkyl, C_{1-3}haloalkyl, cyclopropyl, C_{1-3}alkoxy, C_{1-3}alkylthio, aryl optionally substituted by 1-3 groups R^{21}, aryloxy optionally substituted by 1-3 groups R^{21}, arylthio optionally substituted by 1-3 groups R^{21}, heteroaryl optionally substituted by 1-3 groups R^{21} or R^5 and R^6 together form a C_{3-5}alkylene chain, and each R^{21} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy. Most preferably, R^5 and R^6 are, independently, H, C_{1-3}alkyl, trifluoromethyl, cyclopropyl, C_{1-3}alkoxy, aryl optionally substituted by 1-2 groups R^{21} or R^5 and R^6 together form a C_{3-5}alkylene chain, and each R^{21} is, independently, halogen, methyl or methoxy.

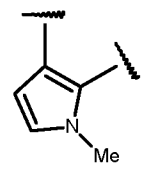
Preferably, R^8 and R^9 are, independently, H, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}alkylthio, aryl optionally substituted by 1-3 groups R^{24}, aryloxy optionally substituted by 1-3 groups R^{24} or arylthio optionally substituted by 1-3 groups R^{24}, and each R^{24} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy. More preferably, R^8 and R^9 are, independently, H, halogen,

C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}alkylthio, aryl optionally substituted by 1-2 groups R^{24}, and each R^{24} is, independently, halogen, methyl or methoxy. Most preferably, R^8 and R^9 are, independently, H, halogen, C_{1-3}alkyl, C_{1-3}alkoxy or C_{1-3}alkylthio.

Preferably, R^{10} is H, C_{1-4}alkyl, aryl optionally substituted by 1-3 groups R^{22}, heteroaryl optionally substituted by 1-3 groups R^{22}, C_{1-4}alkylcarbonyl, C_{1-4}alkoxycarbonyl, C_{1-4}alkylsulphonyl or C_{1-4}haloalkylsulphonyl, and each R^{22} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy or C_{1-4}alkylsulphonyl. Most preferably, R^{10} is H, C_{1-3}alkyl or aryl optionally substituted by 1-3 groups R^{22}, and each R^{22} is, independently, halogen, methyl or methoxy.

Preferably, R^{11} and R^{12} are, independently, H, hydroxy, C_{1-4}alkyl, C_{1-4}alkoxy, carboxy, C_{1-4}alkoxycarbonyl or R^{11} and R^{12} together form an oxo group. Most preferably, R^{11} and R^{12} are each H.

The compounds described below are illustrative of compounds of the invention. In the tables the different values of ring A are as follows:



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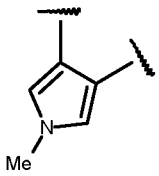

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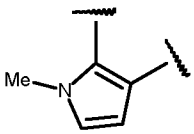

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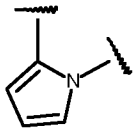

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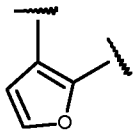

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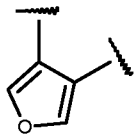

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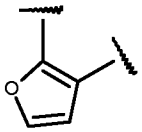

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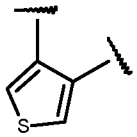

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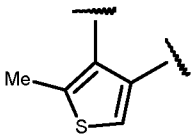

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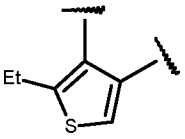

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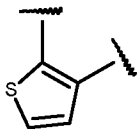

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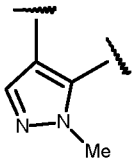

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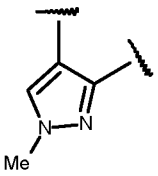

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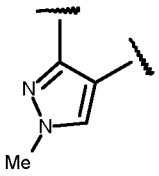

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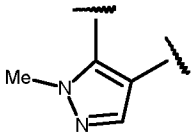

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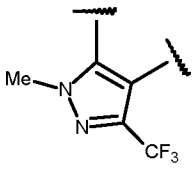

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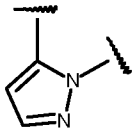

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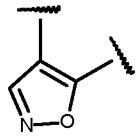

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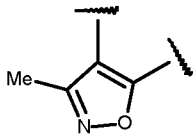

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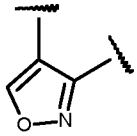

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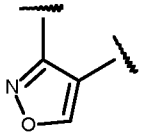

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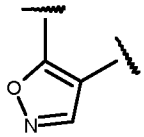

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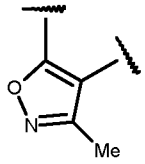

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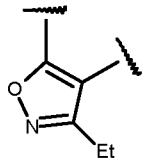

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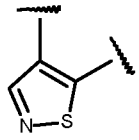

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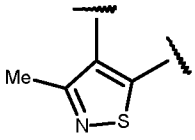

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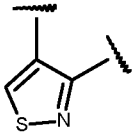

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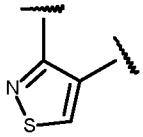

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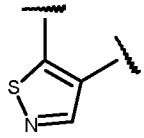

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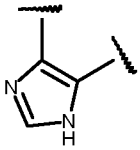

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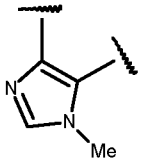

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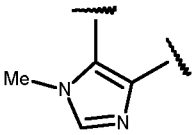

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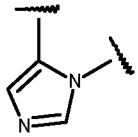

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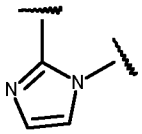

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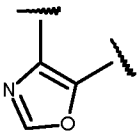

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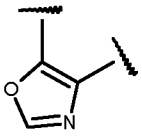

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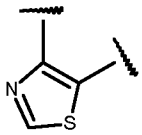

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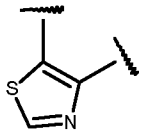

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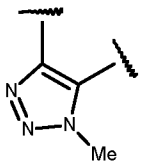

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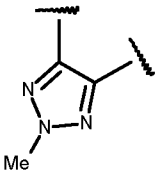

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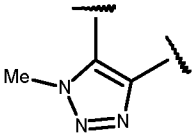

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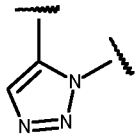

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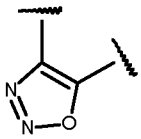

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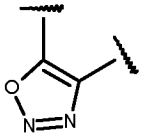

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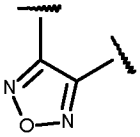

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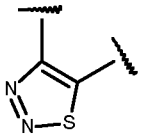

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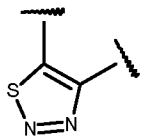

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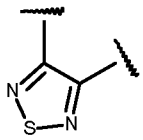

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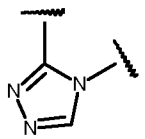
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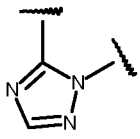
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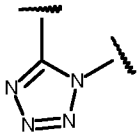
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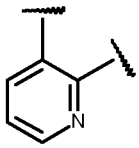
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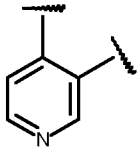
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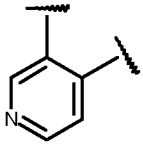
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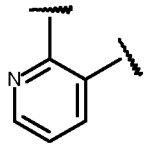
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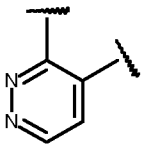
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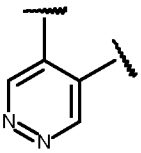
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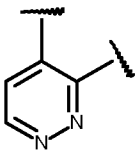
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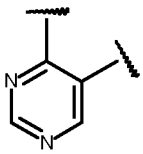
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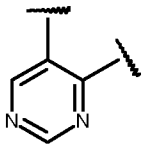
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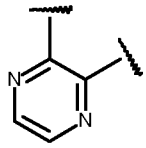
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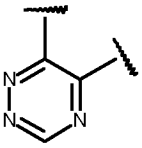
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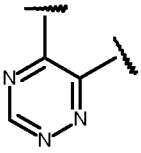
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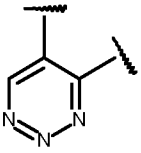
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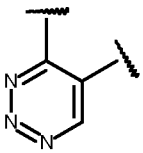
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Table 1 below provides 801 compounds designated compounds 1-1 to 1-801 respectively, of formula (I), wherein ring A is A1.

TABLE 1

Cpd No	R	R^1	W	$(CR^{11}R^{12})_n$	X	$(CR^5R^6)_p$	Z
1	Me	H	O	-	CH_2	CH_2	CH_2
2	Me	COEt	O	-	CH_2	CH_2	CH_2
3	Me	CO_2Et	O	-	CH_2	CH_2	CH_2
4	Me	SO_2Me	O	-	CH_2	CH_2	CH_2
5	CF_3	H	O	-	CH_2	CH_2	CH_2
6	CF_3	COEt	O	-	CH_2	CH_2	CH_2
7	CF_3	CO_2Et	O	-	CH_2	CH_2	CH_2
8	CF_3	SO_2CF_3	O	-	CH_2	CH_2	CH_2
9	CF_3	SO_2Me	O	-	CH_2	CH_2	CH_2
10	Me	H	O	-	CH_2	CHMe	CH_2
11	Me	COEt	O	-	CH_2	CHMe	CH_2
12	Me	CO_2Et	O	-	CH_2	CHMe	CH_2
13	Me	SO_2Me	O	-	CH_2	CHMe	CH_2
14	CF_3	H	O	-	CH_2	CHMe	CH_2
15	CF_3	COEt	O	-	CH_2	CHMe	CH_2
16	CF_3	CO_2Et	O	-	CH_2	CHMe	CH_2

17	CF_3	SO_2CF_3	O	-	CH_2	CHMe	CH_2
18	CF_3	SO_2Me	O	-	CH_2	CHMe	CH_2
19	Me	H	O	-	CH_2	CMe_2	CH_2
20	Me	COEt	O	-	CH_2	CMe_2	CH_2
21	Me	CO_2Et	O	-	CH_2	CMe_2	CH_2
22	Me	SO_2Me	O	-	CH_2	CMe_2	CH_2
23	CF_3	H	O	-	CH_2	CMe_2	CH_2
24	CF_3	COEt	O	-	CH_2	CMe_2	CH_2
25	CF_3	CO_2Et	O	-	CH_2	CMe_2	CH_2
26	CF_3	SO_2CF_3	O	-	CH_2	CMe_2	CH_2
27	CF_3	SO_2Me	O	-	CH_2	CMe_2	CH_2
28	Me	H	O	-	CH_2	CHPh	CH_2
29	Me	COEt	O	-	CH_2	CHPh	CH_2
30	Me	CO_2Et	O	-	CH_2	CHPh	CH_2
31	Me	SO_2Me	O	-	CH_2	CHPh	CH_2
32	CF_3	H	O	-	CH_2	CHPh	CH_2
33	CF_3	COEt	O	-	CH_2	CHPh	CH_2
34	CF_3	CO_2Et	O	-	CH_2	CHPh	CH_2
35	CF_3	SO_2CF_3	O	-	CH_2	CHPh	CH_2
36	CF_3	SO_2Me	O	-	CH_2	CHPh	CH_2
37	Me	H	O	-	CHMe	CH_2	CH_2
38	Me	COEt	O	-	CHMe	CH_2	CH_2
39	Me	CO_2Et	O	-	CHMe	CH_2	CH_2
40	Me	SO_2Me	O	-	CHMe	CH_2	CH_2
41	CF_3	H	O	-	CHMe	CH_2	CH_2
42	CF_3	COEt	O	-	CHMe	CH_2	CH_2
43	CF_3	CO_2Et	O	-	CHMe	CH_2	CH_2
44	CF_3	SO_2CF_3	O	-	CHMe	CH_2	CH_2
45	CF_3	SO_2Me	O	-	CHMe	CH_2	CH_2
46	Me	H	O	-	CMe_2	CH_2	CH_2
47	Me	COEt	O	-	CMe_2	CH_2	CH_2
48	Me	CO_2Et	O	-	CMe_2	CH_2	CH_2
49	Me	SO_2Me	O	-	CMe_2	CH_2	CH_2
50	CF_3	H	O	-	CMe_2	CH_2	CH_2
51	CF_3	COEt	O	-	CMe_2	CH_2	CH_2

52	CF_3	CO_2Et	O	-	CMe_2	CH_2	CH_2
53	CF_3	SO_2CF_3	O	-	CMe_2	CH_2	CH_2
54	CF_3	SO_2Me	O	-	CMe_2	CH_2	CH_2
55	Me	H	O	CH_2	CH_2	CH_2	CH_2
56	Me	COEt	O	CH_2	CH_2	CH_2	CH_2
57	Me	CO_2Et	O	CH_2	CH_2	CH_2	CH_2
58	Me	SO_2Me	O	CH_2	CH_2	CH_2	CH_2
59	CF_3	H	O	CH_2	CH_2	CH_2	CH_2
60	CF_3	COEt	O	CH_2	CH_2	CH_2	CH_2
61	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	CH_2
62	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	CH_2
63	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	CH_2
64	Me	H	O	CH_2	CH_2	CHMe	CH_2
65	Me	COEt	O	CH_2	CH_2	CHMe	CH_2
66	Me	CO_2Et	O	CH_2	CH_2	CHMe	CH_2
67	Me	SO_2Me	O	CH_2	CH_2	CHMe	CH_2
68	CF_3	H	O	CH_2	CH_2	CHMe	CH_2
69	CF_3	COEt	O	CH_2	CH_2	CHMe	CH_2
70	CF_3	CO_2Et	O	CH_2	CH_2	CHMe	CH_2
71	CF_3	SO_2CF_3	O	CH_2	CH_2	CHMe	CH_2
72	CF_3	SO_2Me	O	CH_2	CH_2	CHMe	CH_2
73	Me	H	O	CH_2	CH_2	CMe_2	CH_2
74	Me	COEt	O	CH_2	CH_2	CMe_2	CH_2
75	Me	CO_2Et	O	CH_2	CH_2	CMe_2	CH_2
76	Me	SO_2Me	O	CH_2	CH_2	CMe_2	CH_2
77	CF_3	H	O	CH_2	CH_2	CMe_2	CH_2
78	CF_3	COEt	O	CH_2	CH_2	CMe_2	CH_2
79	CF_3	CO_2Et	O	CH_2	CH_2	CMe_2	CH_2
80	CF_3	SO_2CF_3	O	CH_2	CH_2	CMe_2	CH_2
81	CF_3	SO_2Me	O	CH_2	CH_2	CMe_2	CH_2
82	Me	H	O	CH_2	CH_2	C(Me)(Et)	CH_2
83	Me	COEt	O	CH_2	CH_2	C(Me)(Et)	CH_2
84	Me	CO_2Et	O	CH_2	CH_2	C(Me)(Et)	CH_2
85	Me	SO_2Me	O	CH_2	CH_2	C(Me)(Et)	CH_2
86	CF_3	H	O	CH_2	CH_2	C(Me)(Et)	CH_2

87	CF_3	COEt	O	CH_2	CH_2	C(Me)(Et)	CH_2
88	CF_3	CO_2Et	O	CH_2	CH_2	C(Me)(Et)	CH_2
89	CF_3	SO_2CF_3	O	CH_2	CH_2	C(Me)(Et)	CH_2
90	CF_3	SO_2Me	O	CH_2	CH_2	C(Me)(Et)	CH_2
91	Me	H	O	CH_2	CH_2	CH_2	CHSMe
92	Me	COEt	O	CH_2	CH_2	CH_2	CHSMe
93	Me	CO_2Et	O	CH_2	CH_2	CH_2	CHSMe
94	Me	SO_2Me	O	CH_2	CH_2	CH_2	CHSMe
95	CF_3	H	O	CH_2	CH_2	CH_2	CHSMe
96	CF_3	COEt	O	CH_2	CH_2	CH_2	CHSMe
97	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	CHSMe
98	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	CHSMe
99	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	CHSMe
100	Me	H	O	CHMe	CH_2	CH_2	CH_2
101	Me	COEt	O	CHMe	CH_2	CH_2	CH_2
102	Me	CO_2Et	O	CHMe	CH_2	CH_2	CH_2
103	Me	SO_2Me	O	CHMe	CH_2	CH_2	CH_2
104	CF_3	H	O	CHMe	CH_2	CH_2	CH_2
105	CF_3	COEt	O	CHMe	CH_2	CH_2	CH_2
106	CF_3	CO_2Et	O	CHMe	CH_2	CH_2	CH_2
107	CF_3	SO_2CF_3	O	CHMe	CH_2	CH_2	CH_2
108	CF_3	SO_2Me	O	CHMe	CH_2	CH_2	CH_2
109	Me	H	O	CHMe	CH_2	CMe_2	CH_2
110	Me	COEt	O	CHMe	CH_2	CMe_2	CH_2
111	Me	CO_2Et	O	CHMe	CH_2	CMe_2	CH_2
112	Me	SO_2Me	O	CHMe	CH_2	CMe_2	CH_2
113	CF_3	H	O	CHMe	CH_2	CMe_2	CH_2
114	CF_3	COEt	O	CHMe	CH_2	CMe_2	CH_2
115	CF_3	CO_2Et	O	CHMe	CH_2	CMe_2	CH_2
116	CF_3	SO_2CF_3	O	CHMe	CH_2	CMe_2	CH_2
117	CF_3	SO_2Me	O	CHMe	CH_2	CMe_2	CH_2
118	Me	H	O	CMe_2	CH_2	CH_2	CH_2
119	Me	COEt	O	CMe_2	CH_2	CH_2	CH_2
120	Me	CO_2Et	O	CMe_2	CH_2	CH_2	CH_2
121	Me	SO_2Me	O	CMe_2	CH_2	CH_2	CH_2

122	CF_3	H	O	CMe_2	CH_2	CH_2	CH_2
123	CF_3	COEt	O	CMe_2	CH_2	CH_2	CH_2
124	CF_3	CO_2Et	O	CMe_2	CH_2	CH_2	CH_2
125	CF_3	SO_2CF_3	O	CMe_2	CH_2	CH_2	CH_2
126	CF_3	SO_2Me	O	CMe_2	CH_2	CH_2	CH_2
127	Me	H	O	CMe_2	CH_2	CHMe	CH_2
128	Me	COEt	O	CMe_2	CH_2	CHMe	CH_2
129	Me	CO_2Et	O	CMe_2	CH_2	CHMe	CH_2
130	Me	SO_2Me	O	CMe_2	CH_2	CHMe	CH_2
131	CF_3	H	O	CMe_2	CH_2	CHMe	CH_2
132	CF_3	COEt	O	CMe_2	CH_2	CHMe	CH_2
133	CF_3	CO_2Et	O	CMe_2	CH_2	CHMe	CH_2
134	CF_3	SO_2CF_3	O	CMe_2	CH_2	CHMe	CH_2
135	CF_3	SO_2Me	O	CMe_2	CH_2	CHMe	CH_2
136	Me	H	O	CH_2	CH_2	CHEt	CH_2
137	Me	COEt	O	CH_2	CH_2	CHEt	CH_2
138	Me	CO_2Et	O	CH_2	CH_2	CHEt	CH_2
139	Me	SO_2Me	O	CH_2	CH_2	CHEt	CH_2
140	CF_3	H	O	CH_2	CH_2	CHEt	CH_2
141	CF_3	COEt	O	CH_2	CH_2	CHEt	CH_2
142	CF_3	CO_2Et	O	CH_2	CH_2	CHEt	CH_2
143	CF_3	SO_2CF_3	O	CH_2	CH_2	CHEt	CH_2
144	CF_3	SO_2Me	O	CH_2	CH_2	CHEt	CH_2
145	Me	H	O	CH_2	CH_2	CH^nPr	CH_2
146	Me	COEt	O	CH_2	CH_2	CH^nPr	CH_2
147	Me	CO_2Et	O	CH_2	CH_2	CH^nPr	CH_2
148	Me	SO_2Me	O	CH_2	CH_2	CH^nPr	CH_2
149	CF_3	H	O	CH_2	CH_2	CH^nPr	CH_2
150	CF_3	COEt	O	CH_2	CH_2	CH^nPr	CH_2
151	CF_3	CO_2Et	O	CH_2	CH_2	CH^nPr	CH_2
152	CF_3	SO_2CF_3	O	CH_2	CH_2	CH^nPr	CH_2
153	CF_3	SO_2Me	O	CH_2	CH_2	CH^nPr	CH_2
154	Me	H	O	CH_2	CH_2	CH^cPr	CH_2
155	Me	COEt	O	CH_2	CH_2	CH^cPr	CH_2
156	Me	CO_2Et	O	CH_2	CH_2	CH^cPr	CH_2

157	Me	SO_2Me	O	CH_2	CH_2	CH^cPr	CH_2
158	CF_3	H	O	CH_2	CH_2	CH^cPr	CH_2
159	CF_3	COEt	O	CH_2	CH_2	CH^cPr	CH_2
160	CF_3	CO_2Et	O	CH_2	CH_2	CH^cPr	CH_2
161	CF_3	SO_2CF_3	O	CH_2	CH_2	CH^cPr	CH_2
162	CF_3	SO_2Me	O	CH_2	CH_2	CH^cPr	CH_2
163	Me	H	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
164	Me	COEt	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
165	Me	CO_2Et	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
166	Me	SO_2Me	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
167	CF_3	H	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
168	CF_3	COEt	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
169	CF_3	CO_2Et	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
170	CF_3	SO_2CF_3	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
171	CF_3	SO_2Me	O	CH_2	CH_2	$C(CH_2)_4$	CH_2
172	Me	H	O	CHMe	CH_2	CHMe	CH_2
173	Me	COEt	O	CHMe	CH_2	CHMe	CH_2
174	Me	CO_2Et	O	CHMe	CH_2	CHMe	CH_2
175	Me	SO_2Me	O	CHMe	CH_2	CHMe	CH_2
176	CF_3	H	O	CHMe	CH_2	CHMe	CH_2
177	CF_3	COEt	O	CHMe	CH_2	CHMe	CH_2
178	CF_3	CO_2Et	O	CHMe	CH_2	CHMe	CH_2
179	CF_3	SO_2CF_3	O	CHMe	CH_2	CHMe	CH_2
180	CF_3	SO_2Me	O	CHMe	CH_2	CHMe	CH_2
181	Me	H	O	CH_2	CHMe	CH_2	CH_2
182	Me	COEt	O	CH_2	CHMe	CH_2	CH_2
183	Me	CO_2Et	O	CH_2	CHMe	CH_2	CH_2
184	Me	SO_2Me	O	CH_2	CHMe	CH_2	CH_2
185	CF_3	H	O	CH_2	CHMe	CH_2	CH_2
186	CF_3	COEt	O	CH_2	CHMe	CH_2	CH_2
187	CF_3	CO_2Et	O	CH_2	CHMe	CH_2	CH_2
188	CF_3	SO_2CF_3	O	CH_2	CHMe	CH_2	CH_2
189	CF_3	SO_2Me	O	CH_2	CHMe	CH_2	CH_2
190	Me	H	O	CH_2	CHEt	CH_2	CH_2
191	Me	COEt	O	CH_2	CHEt	CH_2	CH_2

192	Me	CO_2Et	O	CH_2	CHEt	CH_2	CH_2
193	Me	SO_2Me	O	CH_2	CHEt	CH_2	CH_2
194	CF_3	H	O	CH_2	CHEt	CH_2	CH_2
195	CF_3	COEt	O	CH_2	CHEt	CH_2	CH_2
196	CF_3	CO_2Et	O	CH_2	CHEt	CH_2	CH_2
197	CF_3	SO_2CF_3	O	CH_2	CHEt	CH_2	CH_2
198	CF_3	SO_2Me	O	CH_2	CHEt	CH_2	CH_2
199	Me	H	O	CH_2	CMe_2	CH_2	CH_2
200	Me	COEt	O	CH_2	CMe_2	CH_2	CH_2
201	Me	CO_2Et	O	CH_2	CMe_2	CH_2	CH_2
202	Me	SO_2Me	O	CH_2	CMe_2	CH_2	CH_2
203	CF_3	H	O	CH_2	CMe_2	CH_2	CH_2
204	CF_3	COEt	O	CH_2	CMe_2	CH_2	CH_2
205	CF_3	CO_2Et	O	CH_2	CMe_2	CH_2	CH_2
206	CF_3	SO_2CF_3	O	CH_2	CMe_2	CH_2	CH_2
207	CF_3	SO_2Me	O	CH_2	CMe_2	CH_2	CH_2
208	Me	H	O	CH_2	CMe_2	CH_2	CHMe
209	Me	COEt	O	CH_2	CMe_2	CH_2	CHMe
210	Me	CO_2Et	O	CH_2	CMe_2	CH_2	CHMe
211	Me	SO_2Me	O	CH_2	CMe_2	CH_2	CHMe
212	CF_3	H	O	CH_2	CMe_2	CH_2	CHMe
213	CF_3	COEt	O	CH_2	CMe_2	CH_2	CHMe
214	CF_3	CO_2Et	O	CH_2	CMe_2	CH_2	CHMe
215	CF_3	SO_2CF_3	O	CH_2	CMe_2	CH_2	CHMe
216	CF_3	SO_2Me	O	CH_2	CMe_2	CH_2	CHMe
217	Me	H	O	CH_2	CH_2	CH_2	CHMe
218	Me	COEt	O	CH_2	CH_2	CH_2	CHMe
219	Me	CO_2Et	O	CH_2	CH_2	CH_2	CHMe
220	Me	SO_2Me	O	CH_2	CH_2	CH_2	CHMe
221	CF_3	H	O	CH_2	CH_2	CH_2	CHMe
222	CF_3	COEt	O	CH_2	CH_2	CH_2	CHMe
223	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	CHMe
224	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	CHMe
225	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	CHMe
226	Me	H	O	CH_2	CH_2	CH_2	CMe_2

227	Me	COEt	O	CH_2	CH_2	CH_2	CMe_2
228	Me	CO_2Et	O	CH_2	CH_2	CH_2	CMe_2
229	Me	SO_2Me	O	CH_2	CH_2	CH_2	CMe_2
230	CF_3	H	O	CH_2	CH_2	CH_2	CMe_2
231	CF_3	COEt	O	CH_2	CH_2	CH_2	CMe_2
232	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	CMe_2
233	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	CMe_2
234	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	CMe_2
235	Me	H	O	CH_2	CHMe	CH_2	CMe_2
236	Me	COEt	O	CH_2	CHMe	CH_2	CMe_2
237	Me	CO_2Et	O	CH_2	CHMe	CH_2	CMe_2
238	Me	SO_2Me	O	CH_2	CHMe	CH_2	CMe_2
239	CF_3	H	O	CH_2	CHMe	CH_2	CMe_2
240	CF_3	COEt	O	CH_2	CHMe	CH_2	CMe_2
241	CF_3	CO_2Et	O	CH_2	CHMe	CH_2	CMe_2
242	CF_3	SO_2CF_3	O	CH_2	CHMe	CH_2	CMe_2
243	CF_3	SO_2Me	O	CH_2	CHMe	CH_2	CMe_2
244	Me	H	O	CH_2	CH_2	CH_2	CHEt
245	Me	COEt	O	CH_2	CH_2	CH_2	CHEt
246	Me	CO_2Et	O	CH_2	CH_2	CH_2	CHEt
247	Me	SO_2Me	O	CH_2	CH_2	CH_2	CHEt
248	CF_3	H	O	CH_2	CH_2	CH_2	CHEt
249	CF_3	COEt	O	CH_2	CH_2	CH_2	CHEt
250	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	CHEt
251	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	CHEt
252	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	CHEt
253	Me	H	O	CH_2	CH_2	CHPh	CH_2
254	Me	COEt	O	CH_2	CH_2	CHPh	CH_2
255	Me	CO_2Et	O	CH_2	CH_2	CHPh	CH_2
256	Me	SO_2Me	O	CH_2	CH_2	CHPh	CH_2
257	CF_3	H	O	CH_2	CH_2	CHPh	CH_2
258	CF_3	COEt	O	CH_2	CH_2	CHPh	CH_2
259	CF_3	CO_2Et	O	CH_2	CH_2	CHPh	CH_2
260	CF_3	SO_2CF_3	O	CH_2	CH_2	CHPh	CH_2
261	CF_3	SO_2Me	O	CH_2	CH_2	CHPh	CH_2

262	Me	H	O	CH_2	CH_2	CH_2	CHPh
263	Me	COEt	O	CH_2	CH_2	CH_2	CHPh
264	Me	CO_2Et	O	CH_2	CH_2	CH_2	CHPh
265	Me	SO_2Me	O	CH_2	CH_2	CH_2	CHPh
266	CF_3	H	O	CH_2	CH_2	CH_2	CHPh
267	CF_3	COEt	O	CH_2	CH_2	CH_2	CHPh
268	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	CHPh
269	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	CHPh
270	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	CHPh
271	Me	H	O	CH_2CH_2	CH_2	CH_2	CH_2
272	Me	COEt	O	CH_2CH_2	CH_2	CH_2	CH_2
273	Me	CO_2Et	O	CH_2CH_2	CH_2	CH_2	CH_2
274	Me	SO_2Me	O	CH_2CH_2	CH_2	CH_2	CH_2
275	CF_3	H	O	CH_2CH_2	CH_2	CH_2	CH_2
276	CF_3	COEt	O	CH_2CH_2	CH_2	CH_2	CH_2
277	CF_3	CO_2Et	O	CH_2CH_2	CH_2	CH_2	CH_2
278	CF_3	SO_2CF_3	O	CH_2CH_2	CH_2	CH_2	CH_2
279	CF_3	SO_2Me	O	CH_2CH_2	CH_2	CH_2	CH_2
280	Me	H	O	CH_2CH_2	CH_2	CHMe	CH_2
281	Me	COEt	O	CH_2CH_2	CH_2	CHMe	CH_2
282	Me	CO_2Et	O	CH_2CH_2	CH_2	CHMe	CH_2
283	Me	SO_2Me	O	CH_2CH_2	CH_2	CHMe	CH_2
284	CF_3	H	O	CH_2CH_2	CH_2	CHMe	CH_2
285	CF_3	COEt	O	CH_2CH_2	CH_2	CHMe	CH_2
286	CF_3	CO_2Et	O	CH_2CH_2	CH_2	CHMe	CH_2
287	CF_3	SO_2CF_3	O	CH_2CH_2	CH_2	CHMe	CH_2
288	CF_3	SO_2Me	O	CH_2CH_2	CH_2	CHMe	CH_2
289	Me	H	O	CH_2CH_2	CHMe	CH_2	CH_2
290	Me	COEt	O	CH_2CH_2	CHMe	CH_2	CH_2
291	Me	CO_2Et	O	CH_2CH_2	CHMe	CH_2	CH_2
292	Me	SO_2Me	O	CH_2CH_2	CHMe	CH_2	CH_2
293	CF_3	H	O	CH_2CH_2	CHMe	CH_2	CH_2
294	CF_3	COEt	O	CH_2CH_2	CHMe	CH_2	CH_2
295	CF_3	CO_2Et	O	CH_2CH_2	CHMe	CH_2	CH_2
296	CF_3	SO_2CF_3	O	CH_2CH_2	CHMe	CH_2	CH_2

297	CF_3	SO_2Me	O	CH_2CH_2	CHMe	CH_2	CH_2
298	Me	H	O	CH_2CH_2	CMe_2	CH_2	CH_2
299	Me	COEt	O	CH_2CH_2	CMe_2	CH_2	CH_2
300	Me	CO_2Et	O	CH_2CH_2	CMe_2	CH_2	CH_2
301	Me	SO_2Me	O	CH_2CH_2	CMe_2	CH_2	CH_2
302	CF_3	H	O	CH_2CH_2	CMe_2	CH_2	CH_2
303	CF_3	COEt	O	CH_2CH_2	CMe_2	CH_2	CH_2
304	CF_3	CO_2Et	O	CH_2CH_2	CMe_2	CH_2	CH_2
305	CF_3	SO_2CF_3	O	CH_2CH_2	CMe_2	CH_2	CH_2
306	CF_3	SO_2Me	O	CH_2CH_2	CMe_2	CH_2	CH_2
307	Me	H	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
308	Me	COEt	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
309	Me	CO_2Et	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
310	Me	SO_2Me	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
311	CF_3	H	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
312	CF_3	COEt	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
313	CF_3	CO_2Et	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
314	CF_3	SO_2CF_3	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
315	CF_3	SO_2Me	O	-	CH_2	CH_2	N(2,6-dichlorophenyl)
316	Me	H	O	CH_2	CH_2	CH_2	NH
317	Me	COEt	O	CH_2	CH_2	CH_2	NH
318	Me	CO_2Et	O	CH_2	CH_2	CH_2	NH
319	Me	SO_2Me	O	CH_2	CH_2	CH_2	NH
320	CF_3	H	O	CH_2	CH_2	CH_2	NH
321	CF_3	COEt	O	CH_2	CH_2	CH_2	NH
322	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	NH
323	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	NH
324	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	NH
325	Me	H	O	CH_2	CH_2	CH_2	NMe
326	Me	COEt	O	CH_2	CH_2	CH_2	NMe
327	Me	CO_2Et	O	CH_2	CH_2	CH_2	NMe
328	Me	SO_2Me	O	CH_2	CH_2	CH_2	NMe
329	CF_3	H	O	CH_2	CH_2	CH_2	NMe
330	CF_3	COEt	O	CH_2	CH_2	CH_2	NMe
331	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	NMe

332	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	NMe
333	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	NMe
334	Me	H	O	CH_2	CH_2	CH_2	NCO_2Et
335	Me	COEt	O	CH_2	CH_2	CH_2	NCO_2Et
336	Me	CO_2Et	O	CH_2	CH_2	CH_2	NCO_2Et
337	Me	SO_2Me	O	CH_2	CH_2	CH_2	NCO_2Et
338	CF_3	H	O	CH_2	CH_2	CH_2	NCO_2Et
339	CF_3	COEt	O	CH_2	CH_2	CH_2	NCO_2Et
340	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	NCO_2Et
341	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	NCO_2Et
342	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	NCO_2Et
343	Me	H	O	CH_2	CH_2	CMe_2	NH
344	Me	COEt	O	CH_2	CH_2	CMe_2	NH
345	Me	CO_2Et	O	CH_2	CH_2	CMe_2	NH
346	Me	SO_2Me	O	CH_2	CH_2	CMe_2	NH
347	CF_3	H	O	CH_2	CH_2	CMe_2	NH
348	CF_3	COEt	O	CH_2	CH_2	CMe_2	NH
349	CF_3	CO_2Et	O	CH_2	CH_2	CMe_2	NH
350	CF_3	SO_2CF_3	O	CH_2	CH_2	CMe_2	NH
351	CF_3	SO_2Me	O	CH_2	CH_2	CMe_2	NH
352	Me	H	O	CH_2	CH_2	CMe_2	NMe
353	Me	COEt	O	CH_2	CH_2	CMe_2	NMe
354	Me	CO_2Et	O	CH_2	CH_2	CMe_2	NMe
355	Me	SO_2Me	O	CH_2	CH_2	CMe_2	NMe
356	CF_3	H	O	CH_2	CH_2	CMe_2	NMe
357	CF_3	COEt	O	CH_2	CH_2	CMe_2	NMe
358	CF_3	CO_2Et	O	CH_2	CH_2	CMe_2	NMe
359	CF_3	SO_2CF_3	O	CH_2	CH_2	CMe_2	NMe
360	CF_3	SO_2Me	O	CH_2	CH_2	CMe_2	NMe
361	Me	H	O	CH_2	CH_2	CMe_2	NCO_2Et
362	Me	COEt	O	CH_2	CH_2	CMe_2	NCO_2Et
363	Me	CO_2Et	O	CH_2	CH_2	CMe_2	NCO_2Et
364	Me	SO_2Me	O	CH_2	CH_2	CMe_2	NCO_2Et
365	CF_3	H	O	CH_2	CH_2	CMe_2	NCO_2Et
366	CF_3	COEt	O	CH_2	CH_2	CMe_2	NCO_2Et

367	CF_3	CO_2Et	O	CH_2	CH_2	CMe_2	NCO_2Et
368	CF_3	SO_2CF_3	O	CH_2	CH_2	CMe_2	NCO_2Et
369	CF_3	SO_2Me	O	CH_2	CH_2	CMe_2	NCO_2Et
370	Me	H	O	CH_2CH_2	CH_2	CH_2	NH
371	Me	COEt	O	CH_2CH_2	CH_2	CH_2	NH
372	Me	CO_2Et	O	CH_2CH_2	CH_2	CH_2	NH
373	Me	SO_2Me	O	CH_2CH_2	CH_2	CH_2	NH
374	CF_3	H	O	CH_2CH_2	CH_2	CH_2	NH
375	CF_3	COEt	O	CH_2CH_2	CH_2	CH_2	NH
376	CF_3	CO_2Et	O	CH_2CH_2	CH_2	CH_2	NH
377	CF_3	SO_2CF_3	O	CH_2CH_2	CH_2	CH_2	NH
378	CF_3	SO_2Me	O	CH_2CH_2	CH_2	CH_2	NH
379	Me	H	O	CH_2	O	CH_2	NMe
380	Me	COEt	O	CH_2	O	CH_2	NMe
381	Me	CO_2Et	O	CH_2	O	CH_2	NMe
382	Me	SO_2Me	O	CH_2	O	CH_2	NMe
383	CF_3	H	O	CH_2	O	CH_2	NMe
384	CF_3	COEt	O	CH_2	O	CH_2	NMe
385	CF_3	CO_2Et	O	CH_2	O	CH_2	NMe
386	CF_3	SO_2CF_3	O	CH_2	O	CH_2	NMe
387	CF_3	SO_2Me	O	CH_2	O	CH_2	NMe
388	Me	H	O	-	CH_2	CH_2	O
389	Me	COEt	O	-	CH_2	CH_2	O
390	Me	CO_2Et	O	-	CH_2	CH_2	O
391	Me	SO_2Me	O	-	CH_2	CH_2	O
392	CF_3	H	O	-	CH_2	CH_2	O
393	CF_3	COEt	O	-	CH_2	CH_2	O
394	CF_3	CO_2Et	O	-	CH_2	CH_2	O
395	CF_3	SO_2CF_3	O	-	CH_2	CH_2	O
396	CF_3	SO_2Me	O	-	CH_2	CH_2	O
397	Me	H	O	-	CH_2	CMe_2	O
398	Me	COEt	O	-	CH_2	CMe_2	O
399	Me	CO_2Et	O	-	CH_2	CMe_2	O
400	Me	SO_2Me	O	-	CH_2	CMe_2	O
401	CF_3	H	O	-	CH_2	CMe_2	O

402	CF_3	COEt	O	-	CH_2	CMe_2	O
403	CF_3	CO_2Et	O	-	CH_2	CMe_2	O
404	CF_3	SO_2CF_3	O	-	CH_2	CMe_2	O
405	CF_3	SO_2Me	O	-	CH_2	CMe_2	O
406	Me	H	O	-	CH_2	C(Me)(^{c}Pr)	O
407	Me	COEt	O	-	CH_2	C(Me)(^{c}Pr)	O
408	Me	CO_2Et	O	-	CH_2	C(Me)(^{c}Pr)	O
409	Me	SO_2Me	O	-	CH_2	C(Me)(^{c}Pr)	O
410	CF_3	H	O	-	CH_2	C(Me)(^{c}Pr)	O
411	CF_3	COEt	O	-	CH_2	C(Me)(^{c}Pr)	O
412	CF_3	CO_2Et	O	-	CH_2	C(Me)(^{c}Pr)	O
413	CF_3	SO_2CF_3	O	-	CH_2	C(Me)(^{c}Pr)	O
414	CF_3	SO_2Me	O	-	CH_2	C(Me)(^{c}Pr)	O
415	Me	H	O	-	CH_2	C(Me)(CF_3)	O
416	Me	COEt	O	-	CH_2	C(Me)(CF_3)	O
417	Me	CO_2Et	O	-	CH_2	C(Me)(CF_3)	O
418	Me	SO_2Me	O	-	CH_2	C(Me)(CF_3)	O
419	CF_3	H	O	-	CH_2	C(Me)(CF_3)	O
420	CF_3	COEt	O	-	CH_2	C(Me)(CF_3)	O
421	CF_3	CO_2Et	O	-	CH_2	C(Me)(CF_3)	O
422	CF_3	SO_2CF_3	O	-	CH_2	C(Me)(CF_3)	O
423	CF_3	SO_2Me	O	-	CH_2	C(Me)(CF_3)	O
424	Me	H	O	-	CH_2	C(Me)(2-fluorophenyl)	O
425	Me	COEt	O	-	CH_2	C(Me)(2-fluorophenyl)	O
426	Me	CO_2Et	O	-	CH_2	C(Me)(2-fluorophenyl)	O
427	Me	SO_2Me	O	-	CH_2	C(Me)(2-fluorophenyl)	O
428	CF_3	H	O	-	CH_2	C(Me)(2-fluorophenyl)	O
429	CF_3	COEt	O	-	CH_2	C(Me)(2-fluorophenyl)	O
430	CF_3	CO_2Et	O	-	CH_2	C(Me)(2-fluorophenyl)	O
431	CF_3	SO_2CF_3	O	-	CH_2	C(Me)(2-fluorophenyl)	O
432	CF_3	SO_2Me	O	-	CH_2	C(Me)(2-fluorophenyl)	O
433	Me	H	O	-	CMe_2	CH_2	O
434	Me	COEt	O	-	CMe_2	CH_2	O
435	Me	CO_2Et	O	-	CMe_2	CH_2	O

436	Me	SO_2Me	O	-	CMe_2	CH_2	O
437	CF_3	H	O	-	CMe_2	CH_2	O
438	CF_3	COEt	O	-	CMe_2	CH_2	O
439	CF_3	CO_2Et	O	-	CMe_2	CH_2	O
440	CF_3	SO_2CF_3	O	-	CMe_2	CH_2	O
441	CF_3	SO_2Me	O	-	CMe_2	CH_2	O
442	Me	H	O	CH_2	CH_2	CH_2	O
443	Me	COEt	O	CH_2	CH_2	CH_2	O
444	Me	CO_2Et	O	CH_2	CH_2	CH_2	O
445	Me	SO_2Me	O	CH_2	CH_2	CH_2	O
446	CF_3	H	O	CH_2	CH_2	CH_2	O
447	CF_3	COEt	O	CH_2	CH_2	CH_2	O
448	CF_3	CO_2Et	O	CH_2	CH_2	CH_2	O
449	CF_3	SO_2CF_3	O	CH_2	CH_2	CH_2	O
450	CF_3	SO_2Me	O	CH_2	CH_2	CH_2	O
451	Me	H	O	CH_2	CH_2	CHMe	O
452	Me	COEt	O	CH_2	CH_2	CHMe	O
453	Me	CO_2Et	O	CH_2	CH_2	CHMe	O
454	Me	SO_2Me	O	CH_2	CH_2	CHMe	O
455	CF_3	H	O	CH_2	CH_2	CHMe	O
456	CF_3	COEt	O	CH_2	CH_2	CHMe	O
457	CF_3	CO_2Et	O	CH_2	CH_2	CHMe	O
458	CF_3	SO_2CF_3	O	CH_2	CH_2	CHMe	O
459	CF_3	SO_2Me	O	CH_2	CH_2	CHMe	O
460	Me	H	O	CH_2	CH_2	CHEt	O
461	Me	COEt	O	CH_2	CH_2	CHEt	O
462	Me	CO_2Et	O	CH_2	CH_2	CHEt	O
463	Me	SO_2Me	O	CH_2	CH_2	CHEt	O
464	CF_3	H	O	CH_2	CH_2	CHEt	O
465	CF_3	COEt	O	CH_2	CH_2	CHEt	O
466	CF_3	CO_2Et	O	CH_2	CH_2	CHEt	O
467	CF_3	SO_2CF_3	O	CH_2	CH_2	CHEt	O
468	CF_3	SO_2Me	O	CH_2	CH_2	CHEt	O
469	Me	H	O	CH_2	CH_2	CH^nPr	O
470	Me	COEt	O	CH_2	CH_2	CH^nPr	O

471	Me	CO_2Et	O	CH_2	CH_2	CH^nPr	O
472	Me	SO_2Me	O	CH_2	CH_2	CH^nPr	O
473	CF_3	H	O	CH_2	CH_2	CH^nPr	O
474	CF_3	COEt	O	CH_2	CH_2	CH^nPr	O
475	CF_3	CO_2Et	O	CH_2	CH_2	CH^nPr	O
476	CF_3	SO_2CF_3	O	CH_2	CH_2	CH^nPr	O
477	CF_3	SO_2Me	O	CH_2	CH_2	CH^nPr	O
478	Me	H	O	CH_2	CH_2	CMe_2	O
479	Me	COEt	O	CH_2	CH_2	CMe_2	O
480	Me	CO_2Et	O	CH_2	CH_2	CMe_2	O
481	Me	SO_2Me	O	CH_2	CH_2	CMe_2	O
482	CF_3	H	O	CH_2	CH_2	CMe_2	O
483	CF_3	COEt	O	CH_2	CH_2	CMe_2	O
484	CF_3	CO_2Et	O	CH_2	CH_2	CMe_2	O
485	CF_3	SO_2CF_3	O	CH_2	CH_2	CMe_2	O
486	CF_3	SO_2Me	O	CH_2	CH_2	CMe_2	O
487	Me	H	O	CH_2	CH_2	$C(Me)(CF_3)$	O
488	Me	COEt	O	CH_2	CH_2	$C(Me)(CF_3)$	O
489	Me	CO_2Et	O	CH_2	CH_2	$C(Me)(CF_3)$	O
490	Me	SO_2Me	O	CH_2	CH_2	$C(Me)(CF_3)$	O
491	CF_3	H	O	CH_2	CH_2	$C(Me)(CF_3)$	O
492	CF_3	COEt	O	CH_2	CH_2	$C(Me)(CF_3)$	O
493	CF_3	CO_2Et	O	CH_2	CH_2	$C(Me)(CF_3)$	O
494	CF_3	SO_2CF_3	O	CH_2	CH_2	$C(Me)(CF_3)$	O
495	CF_3	SO_2Me	O	CH_2	CH_2	$C(Me)(CF_3)$	O
496	Me	H	O	CH_2	CH_2	$C(Et)(CF_3)$	O
497	Me	COEt	O	CH_2	CH_2	$C(Et)(CF_3)$	O
498	Me	CO_2Et	O	CH_2	CH_2	$C(Et)(CF_3)$	O
499	Me	SO_2Me	O	CH_2	CH_2	$C(Et)(CF_3)$	O
500	CF_3	H	O	CH_2	CH_2	$C(Et)(CF_3)$	O
501	CF_3	COEt	O	CH_2	CH_2	$C(Et)(CF_3)$	O
502	CF_3	CO_2Et	O	CH_2	CH_2	$C(Et)(CF_3)$	O
503	CF_3	SO_2CF_3	O	CH_2	CH_2	$C(Et)(CF_3)$	O
504	CF_3	SO_2Me	O	CH_2	CH_2	$C(Et)(CF_3)$	O
505	Me	H	O	CH_2	CH_2	CEt_2	O

506	Me	COEt	O	CH_2	CH_2	CEt_2	O
507	Me	CO_2Et	O	CH_2	CH_2	CEt_2	O
508	Me	SO_2Me	O	CH_2	CH_2	CEt_2	O
509	CF_3	H	O	CH_2	CH_2	CEt_2	O
510	CF_3	COEt	O	CH_2	CH_2	CEt_2	O
511	CF_3	CO_2Et	O	CH_2	CH_2	CEt_2	O
512	CF_3	SO_2CF_3	O	CH_2	CH_2	CEt_2	O
513	CF_3	SO_2Me	O	CH_2	CH_2	CEt_2	O
514	Me	H	O	CH_2	CH_2	$C(^cPr)(Me)$	O
515	Me	COEt	O	CH_2	CH_2	$C(^cPr)(Me)$	O
516	Me	CO_2Et	O	CH_2	CH_2	$C(^cPr)(Me)$	O
517	Me	SO_2Me	O	CH_2	CH_2	$C(^cPr)(Me)$	O
518	CF_3	H	O	CH_2	CH_2	$C(^cPr)(Me)$	O
519	CF_3	COEt	O	CH_2	CH_2	$C(^cPr)(Me)$	O
520	CF_3	CO_2Et	O	CH_2	CH_2	$C(^cPr)(Me)$	O
521	CF_3	SO_2CF_3	O	CH_2	CH_2	$C(^cPr)(Me)$	O
522	CF_3	SO_2Me	O	CH_2	CH_2	$C(^cPr)(Me)$	O
523	Me	H	O	CH_2	CH_2	$C(CH_2)_4$	O
524	Me	COEt	O	CH_2	CH_2	$C(CH_2)_4$	O
525	Me	CO_2Et	O	CH_2	CH_2	$C(CH_2)_4$	O
526	Me	SO_2Me	O	CH_2	CH_2	$C(CH_2)_4$	O
527	CF_3	H	O	CH_2	CH_2	$C(CH_2)_4$	O
528	CF_3	COEt	O	CH_2	CH_2	$C(CH_2)_4$	O
529	CF_3	CO_2Et	O	CH_2	CH_2	$C(CH_2)_4$	O
530	CF_3	SO_2CF_3	O	CH_2	CH_2	$C(CH_2)_4$	O
531	CF_3	SO_2Me	O	CH_2	CH_2	$C(CH_2)_4$	O
532	Me	H	O	CH_2	CH_2	CH(2-fluorophenyl)	O
533	Me	COEt	O	CH_2	CH_2	CH(2-fluorophenyl)	O
534	Me	CO_2Et	O	CH_2	CH_2	CH(2-fluorophenyl)	O
535	Me	SO_2Me	O	CH_2	CH_2	CH(2-fluorophenyl)	O
536	CF_3	H	O	CH_2	CH_2	CH(2-fluorophenyl)	O
537	CF_3	COEt	O	CH_2	CH_2	CH(2-fluorophenyl)	O
538	CF_3	CO_2Et	O	CH_2	CH_2	CH(2-fluorophenyl)	O
539	CF_3	SO_2CF_3	O	CH_2	CH_2	CH(2-fluorophenyl)	O
540	CF_3	SO_2Me	O	CH_2	CH_2	CH(2-fluorophenyl)	O

541	Me	H	O	CH_2	CHMe	CH_2	O
542	Me	COEt	O	CH_2	CHMe	CH_2	O
543	Me	CO_2Et	O	CH_2	CHMe	CH_2	O
544	Me	SO_2Me	O	CH_2	CHMe	CH_2	O
545	CF_3	H	O	CH_2	CHMe	CH_2	O
546	CF_3	COEt	O	CH_2	CHMe	CH_2	O
547	CF_3	CO_2Et	O	CH_2	CHMe	CH_2	O
548	CF_3	SO_2CF_3	O	CH_2	CHMe	CH_2	O
549	CF_3	SO_2Me	O	CH_2	CHMe	CH_2	O
550	Me	H	O	CH_2	CMe_2	CH_2	O
551	Me	COEt	O	CH_2	CMe_2	CH_2	O
552	Me	CO_2Et	O	CH_2	CMe_2	CH_2	O
553	Me	SO_2Me	O	CH_2	CMe_2	CH_2	O
554	CF_3	H	O	CH_2	CMe_2	CH_2	O
555	CF_3	COEt	O	CH_2	CMe_2	CH_2	O
556	CF_3	CO_2Et	O	CH_2	CMe_2	CH_2	O
557	CF_3	SO_2CF_3	O	CH_2	CMe_2	CH_2	O
558	CF_3	SO_2Me	O	CH_2	CMe_2	CH_2	O
559	Me	H	O	CHMe	CH_2	CH_2	O
560	Me	COEt	O	CHMe	CH_2	CH_2	O
561	Me	CO_2Et	O	CHMe	CH_2	CH_2	O
562	Me	SO_2Me	O	CHMe	CH_2	CH_2	O
563	CF_3	H	O	CHMe	CH_2	CH_2	O
564	CF_3	COEt	O	CHMe	CH_2	CH_2	O
565	CF_3	CO_2Et	O	CHMe	CH_2	CH_2	O
566	CF_3	SO_2CF_3	O	CHMe	CH_2	CH_2	O
567	CF_3	SO_2Me	O	CHMe	CH_2	CH_2	O
568	Me	H	O	CMe_2	CH_2	CH_2	O
569	Me	COEt	O	CMe_2	CH_2	CH_2	O
570	Me	CO_2Et	O	CMe_2	CH_2	CH_2	O
571	Me	SO_2Me	O	CMe_2	CH_2	CH_2	O
572	CF_3	H	O	CMe_2	CH_2	CH_2	O
573	CF_3	COEt	O	CMe_2	CH_2	CH_2	O
574	CF_3	CO_2Et	O	CMe_2	CH_2	CH_2	O
575	CF_3	SO_2CF_3	O	CMe_2	CH_2	CH_2	O

576	CF_3	SO_2Me	O	CMe_2	CH_2	CH_2	O
577	Me	H	O	CH_2CH_2	CH_2	CH_2	O
578	Me	COEt	O	CH_2CH_2	CH_2	CH_2	O
579	Me	CO_2Et	O	CH_2CH_2	CH_2	CH_2	O
580	Me	SO_2Me	O	CH_2CH_2	CH_2	CH_2	O
581	CF_3	H	O	CH_2CH_2	CH_2	CH_2	O
582	CF_3	COEt	O	CH_2CH_2	CH_2	CH_2	O
583	CF_3	CO_2Et	O	CH_2CH_2	CH_2	CH_2	O
584	CF_3	SO_2CF_3	O	CH_2CH_2	CH_2	CH_2	O
585	CF_3	SO_2Me	O	CH_2CH_2	CH_2	CH_2	O
586	Me	H	O	CH_2CH_2	CHMe	CH_2	O
587	Me	COEt	O	CH_2CH_2	CHMe	CH_2	O
588	Me	CO_2Et	O	CH_2CH_2	CHMe	CH_2	O
589	Me	SO_2Me	O	CH_2CH_2	CHMe	CH_2	O
590	CF_3	H	O	CH_2CH_2	CHMe	CH_2	O
591	CF_3	COEt	O	CH_2CH_2	CHMe	CH_2	O
592	CF_3	CO_2Et	O	CH_2CH_2	CHMe	CH_2	O
593	CF_3	SO_2CF_3	O	CH_2CH_2	CHMe	CH_2	O
594	CF_3	SO_2Me	O	CH_2CH_2	CHMe	CH_2	O
595	Me	H	O	CH_2CH_2	CMe_2	CH_2	O
596	Me	COEt	O	CH_2CH_2	CMe_2	CH_2	O
597	Me	CO_2Et	O	CH_2CH_2	CMe_2	CH_2	O
598	Me	SO_2Me	O	CH_2CH_2	CMe_2	CH_2	O
599	CF_3	H	O	CH_2CH_2	CMe_2	CH_2	O
600	CF_3	COEt	O	CH_2CH_2	CMe_2	CH_2	O
601	CF_3	CO_2Et	O	CH_2CH_2	CMe_2	CH_2	O
602	CF_3	SO_2CF_3	O	CH_2CH_2	CMe_2	CH_2	O
603	CF_3	SO_2Me	O	CH_2CH_2	CMe_2	CH_2	O
604	Me	H	O	CH_2	O	CH_2	CH_2
605	Me	COEt	O	CH_2	O	CH_2	CH_2
606	Me	CO_2Et	O	CH_2	O	CH_2	CH_2
607	Me	SO_2Me	O	CH_2	O	CH_2	CH_2
608	CF_3	H	O	CH_2	O	CH_2	CH_2
609	CF_3	COEt	O	CH_2	O	CH_2	CH_2
610	CF_3	CO_2Et	O	CH_2	O	CH_2	CH_2

611	CF_3	SO_2CF_3	O	CH_2	O	CH_2	CH_2
612	CF_3	SO_2Me	O	CH_2	O	CH_2	CH_2
613	Me	H	O	CH_2	O	CHMe	CH_2
614	Me	COEt	O	CH_2	O	CHMe	CH_2
615	Me	CO_2Et	O	CH_2	O	CHMe	CH_2
616	Me	SO_2Me	O	CH_2	O	CHMe	CH_2
617	CF_3	H	O	CH_2	O	CHMe	CH_2
618	CF_3	COEt	O	CH_2	O	CHMe	CH_2
619	CF_3	CO_2Et	O	CH_2	O	CHMe	CH_2
620	CF_3	SO_2CF_3	O	CH_2	O	CHMe	CH_2
621	CF_3	SO_2Me	O	CH_2	O	CHMe	CH_2
622	Me	H	O	CH_2	O	CMe_2	CH_2
623	Me	COEt	O	CH_2	O	CMe_2	CH_2
624	Me	CO_2Et	O	CH_2	O	CMe_2	CH_2
625	Me	SO_2Me	O	CH_2	O	CMe_2	CH_2
626	CF_3	H	O	CH_2	O	CMe_2	CH_2
627	CF_3	COEt	O	CH_2	O	CMe_2	CH_2
628	CF_3	CO_2Et	O	CH_2	O	CMe_2	CH_2
629	CF_3	SO_2CF_3	O	CH_2	O	CMe_2	CH_2
630	CF_3	SO_2Me	O	CH_2	O	CMe_2	CH_2
631	Me	H	O	CH_2	O	$C(Me)(CF_3)$	CH_2
632	Me	COEt	O	CH_2	O	$C(Me)(CF_3)$	CH_2
633	Me	CO_2Et	O	CH_2	O	$C(Me)(CF_3)$	CH_2
634	Me	SO_2Me	O	CH_2	O	$C(Me)(CF_3)$	CH_2
635	CF_3	H	O	CH_2	O	$C(Me)(CF_3)$	CH_2
636	CF_3	COEt	O	CH_2	O	$C(Me)(CF_3)$	CH_2
637	CF_3	CO_2Et	O	CH_2	O	$C(Me)(CF_3)$	CH_2
638	CF_3	SO_2CF_3	O	CH_2	O	$C(Me)(CF_3)$	CH_2
639	CF_3	SO_2Me	O	CH_2	O	$C(Me)(CF_3)$	CH_2
640	Me	H	O	CH_2	O	$C(CH_2)_3$	CH_2
641	Me	COEt	O	CH_2	O	$C(CH_2)_3$	CH_2
642	Me	CO_2Et	O	CH_2	O	$C(CH_2)_3$	CH_2
643	Me	SO_2Me	O	CH_2	O	$C(CH_2)_3$	CH_2
644	CF_3	H	O	CH_2	O	$C(CH_2)_3$	CH_2
645	CF_3	COEt	O	CH_2	O	$C(CH_2)_3$	CH_2

646	CF_3	CO_2Et	O	CH_2	O	$C(CH_2)_3$	CH_2
647	CF_3	SO_2CF_3	O	CH_2	O	$C(CH_2)_3$	CH_2
648	CF_3	SO_2Me	O	CH_2	O	$C(CH_2)_3$	CH_2
649	Me	H	O	CH_2	O	$C(CH_2)_4$	CH_2
650	Me	COEt	O	CH_2	O	$C(CH_2)_4$	CH_2
651	Me	CO_2Et	O	CH_2	O	$C(CH_2)_4$	CH_2
652	Me	SO_2Me	O	CH_2	O	$C(CH_2)_4$	CH_2
653	CF_3	H	O	CH_2	O	$C(CH_2)_4$	CH_2
654	CF_3	COEt	O	CH_2	O	$C(CH_2)_4$	CH_2
655	CF_3	CO_2Et	O	CH_2	O	$C(CH_2)_4$	CH_2
656	CF_3	SO_2CF_3	O	CH_2	O	$C(CH_2)_4$	CH_2
657	CF_3	SO_2Me	O	CH_2	O	$C(CH_2)_4$	CH_2
658	Me	H	O	CHMe	O	CH_2	CH_2
659	Me	COEt	O	CHMe	O	CH_2	CH_2
660	Me	CO_2Et	O	CHMe	O	CH_2	CH_2
661	Me	SO_2Me	O	CHMe	O	CH_2	CH_2
662	CF_3	H	O	CHMe	O	CH_2	CH_2
663	CF_3	COEt	O	CHMe	O	CH_2	CH_2
664	CF_3	CO_2Et	O	CHMe	O	CH_2	CH_2
665	CF_3	SO_2CF_3	O	CHMe	O	CH_2	CH_2
666	CF_3	SO_2Me	O	CHMe	O	CH_2	CH_2
667	Me	H	O	CHMe	O	CMe_2	CH_2
668	Me	COEt	O	CHMe	O	CMe_2	CH_2
669	Me	CO_2Et	O	CHMe	O	CMe_2	CH_2
670	Me	SO_2Me	O	CHMe	O	CMe_2	CH_2
671	CF_3	H	O	CHMe	O	CMe_2	CH_2
672	CF_3	COEt	O	CHMe	O	CMe_2	CH_2
673	CF_3	CO_2Et	O	CHMe	O	CMe_2	CH_2
674	CF_3	SO_2CF_3	O	CHMe	O	CMe_2	CH_2
675	CF_3	SO_2Me	O	CHMe	O	CMe_2	CH_2
676	Me	H	O	CH_2CH_2	O	-	CH_2
677	Me	COEt	O	CH_2CH_2	O	-	CH_2
678	Me	CO_2Et	O	CH_2CH_2	O	-	CH_2
679	Me	SO_2Me	O	CH_2CH_2	O	-	CH_2
680	CF_3	H	O	CH_2CH_2	O	-	CH_2

681	CF_3	COEt	O	CH_2CH_2	O	-	CH_2
682	CF_3	CO_2Et	O	CH_2CH_2	O	-	CH_2
683	CF_3	SO_2CF_3	O	CH_2CH_2	O	-	CH_2
684	CF_3	SO_2Me	O	CH_2CH_2	O	-	CH_2
685	Me	H	O	CH_2CHMe	O	-	CH_2
686	Me	COEt	O	CH_2CHMe	O	-	CH_2
687	Me	CO_2Et	O	CH_2CHMe	O	-	CH_2
688	Me	SO_2Me	O	CH_2CHMe	O	-	CH_2
689	CF_3	H	O	CH_2CHMe	O	-	CH_2
690	CF_3	COEt	O	CH_2CHMe	O	-	CH_2
691	CF_3	CO_2Et	O	CH_2CHMe	O	-	CH_2
692	CF_3	SO_2CF_3	O	CH_2CHMe	O	-	CH_2
693	CF_3	SO_2Me	O	CH_2CHMe	O	-	CH_2
694	Me	H	O	CH_2CHEt	O	-	CH_2
695	Me	COEt	O	CH_2CHEt	O	-	CH_2
696	Me	CO_2Et	O	CH_2CHEt	O	-	CH_2
697	Me	SO_2Me	O	CH_2CHEt	O	-	CH_2
698	CF_3	H	O	CH_2CHEt	O	-	CH_2
699	CF_3	COEt	O	CH_2CHEt	O	-	CH_2
700	CF_3	CO_2Et	O	CH_2CHEt	O	-	CH_2
701	CF_3	SO_2CF_3	O	CH_2CHEt	O	-	CH_2
702	CF_3	SO_2Me	O	CH_2CHEt	O	-	CH_2
703	Me	H	O	CH_2CMe_2	O	-	CH_2
704	Me	COEt	O	CH_2CMe_2	O	-	CH_2
705	Me	CO_2Et	O	CH_2CMe_2	O	-	CH_2
706	Me	SO_2Me	O	CH_2CMe_2	O	-	CH_2
707	CF_3	H	O	CH_2CMe_2	O	-	CH_2
708	CF_3	COEt	O	CH_2CMe_2	O	-	CH_2
709	CF_3	CO_2Et	O	CH_2CMe_2	O	-	CH_2
710	CF_3	SO_2CF_3	O	CH_2CMe_2	O	-	CH_2
711	CF_3	SO_2Me	O	CH_2CMe_2	O	-	CH_2
712	Me	H	O	$CHMeCH_2$	O	-	CH_2
713	Me	COEt	O	$CHMeCH_2$	O	-	CH_2
714	Me	CO_2Et	O	$CHMeCH_2$	O	-	CH_2
715	Me	SO_2Me	O	$CHMeCH_2$	O	-	CH_2

716	CF_3	H	O	$CHMeCH_2$	O	-	CH_2
717	CF_3	COEt	O	$CHMeCH_2$	O	-	CH_2
718	CF_3	CO_2Et	O	$CHMeCH_2$	O	-	CH_2
719	CF_3	SO_2CF_3	O	$CHMeCH_2$	O	-	CH_2
720	CF_3	SO_2Me	O	$CHMeCH_2$	O	-	CH_2
721	Me	H	O	CH_2CH_2	O	-	CHMe
722	Me	COEt	O	CH_2CH_2	O	-	CHMe
723	Me	CO_2Et	O	CH_2CH_2	O	-	CHMe
724	Me	SO_2Me	O	CH_2CH_2	O	-	CHMe
725	CF_3	H	O	CH_2CH_2	O	-	CHMe
726	CF_3	COEt	O	CH_2CH_2	O	-	CHMe
727	CF_3	CO_2Et	O	CH_2CH_2	O	-	CHMe
728	CF_3	SO_2CF_3	O	CH_2CH_2	O	-	CHMe
729	CF_3	SO_2Me	O	CH_2CH_2	O	-	CHMe
730	Me	H	O	CH_2CH_2	O	-	CMe_2
731	Me	COEt	O	CH_2CH_2	O	-	CMe_2
732	Me	CO_2Et	O	CH_2CH_2	O	-	CMe_2
733	Me	SO_2Me	O	CH_2CH_2	O	-	CMe_2
734	CF_3	H	O	CH_2CH_2	O	-	CMe_2
735	CF_3	COEt	O	CH_2CH_2	O	-	CMe_2
736	CF_3	CO_2Et	O	CH_2CH_2	O	-	CMe_2
737	CF_3	SO_2CF_3	O	CH_2CH_2	O	-	CMe_2
738	CF_3	SO_2Me	O	CH_2CH_2	O	-	CMe_2
739	Me	H	O	CH_2CH_2	O	-	CHPh
740	Me	COEt	O	CH_2CH_2	O	-	CHPh
741	Me	CO_2Et	O	CH_2CH_2	O	-	CHPh
742	Me	SO_2Me	O	CH_2CH_2	O	-	CHPh
743	CF_3	H	O	CH_2CH_2	O	-	CHPh
744	CF_3	COEt	O	CH_2CH_2	O	-	CHPh
745	CF_3	CO_2Et	O	CH_2CH_2	O	-	CHPh
746	CF_3	SO_2CF_3	O	CH_2CH_2	O	-	CHPh
747	CF_3	SO_2Me	O	CH_2CH_2	O	-	CHPh
748	Me	H	O	CH_2CH_2	S	-	CH_2
749	Me	COEt	O	CH_2CH_2	S	-	CH_2
750	Me	CO_2Et	O	CH_2CH_2	S	-	CH_2

751	Me	SO_2Me	O	CH_2CH_2	S	-	CH_2
752	CF_3	H	O	CH_2CH_2	S	-	CH_2
753	CF_3	COEt	O	CH_2CH_2	S	-	CH_2
754	CF_3	CO_2Et	O	CH_2CH_2	S	-	CH_2
755	CF_3	SO_2CF_3	O	CH_2CH_2	S	-	CH_2
756	CF_3	SO_2Me	O	CH_2CH_2	S	-	CH_2
757	Me	H	O	CH_2CH_2	O	CH_2	CH_2
758	Me	COEt	O	CH_2CH_2	O	CH_2	CH_2
759	Me	CO_2Et	O	CH_2CH_2	O	CH_2	CH_2
760	Me	SO_2Me	O	CH_2CH_2	O	CH_2	CH_2
761	CF_3	H	O	CH_2CH_2	O	CH_2	CH_2
762	CF_3	COEt	O	CH_2CH_2	O	CH_2	CH_2
763	CF_3	CO_2Et	O	CH_2CH_2	O	CH_2	CH_2
764	CF_3	SO_2CF_3	O	CH_2CH_2	O	CH_2	CH_2
765	CF_3	SO_2Me	O	CH_2CH_2	O	CH_2	CH_2
766	Me	H	O	-	O	CMe_2	CH_2
767	Me	COEt	O	-	O	CMe_2	CH_2
768	Me	CO_2Et	O	-	O	CMe_2	CH_2
769	Me	SO_2Me	O	-	O	CMe_2	CH_2
770	CF_3	H	O	-	O	CMe_2	CH_2
771	CF_3	COEt	O	-	O	CMe_2	CH_2
772	CF_3	CO_2Et	O	-	O	CMe_2	CH_2
773	CF_3	SO_2CF_3	O	-	O	CMe_2	CH_2
774	CF_3	SO_2Me	O	-	O	CMe_2	CH_2
775	Me	H	O	-	O	CH_2CH_2	CH_2
776	Me	COEt	O	-	O	CH_2CH_2	CH_2
777	Me	CO_2Et	O	-	O	CH_2CH_2	CH_2
778	Me	SO_2Me	O	-	O	CH_2CH_2	CH_2
779	CF_3	H	O	-	O	CH_2CH_2	CH_2
780	CF_3	COEt	O	-	O	CH_2CH_2	CH_2
781	CF_3	CO_2Et	O	-	O	CH_2CH_2	CH_2
782	CF_3	SO_2CF_3	O	-	O	CH_2CH_2	CH_2
783	CF_3	SO_2Me	O	-	O	CH_2CH_2	CH_2
784	Me	H	O	-	O	CH_2CHEt	O
785	Me	COEt	O	-	O	CH_2CHEt	O

786	Me	CO_2Et	O	-	O	CH_2CHEt	O
787	Me	SO_2Me	O	-	O	CH_2CHEt	O
788	CF_3	H	O	-	O	CH_2CHEt	O
789	CF_3	COEt	O	-	O	CH_2CHEt	O
790	CF_3	CO_2Et	O	-	O	CH_2CHEt	O
791	CF_3	SO_2CF_3	O	-	O	CH_2CHEt	O
792	CF_3	SO_2Me	O	-	O	CH_2CHEt	O
793	Me	H	O	-	O	$CH_2CH_2CMe_2$	CH_2
794	Me	COEt	O	-	O	$CH_2CH_2CMe_2$	CH_2
795	Me	CO_2Et	O	-	O	$CH_2CH_2CMe_2$	CH_2
796	Me	SO_2Me	O	-	O	$CH_2CH_2CMe_2$	CH_2
797	CF_3	H	O	-	O	$CH_2CH_2CMe_2$	CH_2
798	CF_3	COEt	O	-	O	$CH_2CH_2CMe_2$	CH_2
799	CF_3	CO_2Et	O	-	O	$CH_2CH_2CMe_2$	CH_2
800	CF_3	SO_2CF_3	O	-	O	$CH_2CH_2CMe_2$	CH_2
801	CF_3	SO_2Me	O	-	O	$CH_2CH_2CMe_2$	CH_2

801 compounds are described, designated compounds 2-1 to 2-801 respectively, of formula (I) wherein ring A is A2, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 3-1 to 3-801 respectively, of formula (I) wherein ring A is A3, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 4-1 to 4-801 respectively, of formula (I) wherein ring A is A4, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 5-1 to 5-801 respectively, of formula (I) wherein ring A is A5, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 6-1 to 6-801 respectively, of formula (I) wherein ring A is A6, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 7-1 to 7-801 respectively, of formula (I) wherein ring A is A7, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 8-1 to 8-801 respectively, of formula (I) wherein ring A is A8, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 9-1 to 9-801 respectively, of formula (I) wherein ring A is A9, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 10-1 to 10-801 respectively, of formula (I)

wherein ring A is A10, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 11-1 to 11-801 respectively, of formula (I) wherein ring A is A11, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 12-1 to 12-801 respectively, of formula (I) wherein ring A is A12, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 13-1 to 13-801 respectively, of formula (I) wherein ring A is A13, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 14-1 to 14-801 respectively, of formula (I) wherein ring A is A14, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 15-1 to 15-801 respectively, of formula (I) wherein ring A is A15, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 16-1 to 16-801 respectively, of formula (I) wherein ring A is A16, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 17-1 to 17-801 respectively, of formula (I) wherein ring A is A17, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 18-1 to 18-801 respectively, of formula (I) wherein ring A is A18, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 19-1 to 19-801 respectively, of formula (I) wherein ring A is A19, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 20-1 to 20-801 respectively, of formula (I) wherein ring A is A20, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 21-1 to 21-801 respectively, of formula (I) wherein ring A is A21, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 22-1 to 22-801 respectively, of formula (I) wherein ring A is A22, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 23-1 to 23-801 respectively, of formula (I) wherein ring A is A23, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 24-1 to 24-801 respectively, of formula (I) wherein ring A is A24, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 25-1 to 25-801 respectively, of formula (I) wherein ring A is A25, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 26-1 to 26-801 respectively, of formula (I)

wherein ring A is A26, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 27-1 to 27-801 respectively, of formula (I) wherein ring A is A27, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 28-1 to 28-801 respectively, of formula (I) wherein ring A is A28, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 29-1 to 29-801 respectively, of formula (I) wherein ring A is A29, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 30-1 to 30-801 respectively, of formula (I) wherein ring A is A30, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 31-1 to 31-801 respectively, of formula (I) wherein ring A is A31, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 32-1 to 32-801 respectively, of formula (I) wherein ring A is A32, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 33-1 to 33-801 respectively, of formula (I) wherein ring A is A33, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 34-1 to 34-801 respectively, of formula (I) wherein ring A is A34, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 35-1 to 35-801 respectively, of formula (I) wherein ring A is A35, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 36-1 to 36-801 respectively, of formula (I) wherein ring A is A36, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 37-1 to 37-801 respectively, of formula (I) wherein ring A is A37, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 38-1 to 38-801 respectively, of formula (I) wherein ring A is A38, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 39-1 to 39-801 respectively, of formula (I) wherein ring A is A39, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 40-1 to 40-801 respectively, of formula (I) wherein ring A is A40, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 41-1 to 41-801 respectively, of formula (I) wherein ring A is A41, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 42-1 to 42-801 respectively, of formula (I)

wherein ring A is A42, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 43-1 to 43-801 respectively, of formula (I) wherein ring A is A43, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 44-1 to 44-801 respectively, of formula (I) wherein ring A is A44, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 45-1 to 45-801 respectively, of formula (I) wherein ring A is A45, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 46-1 to 46-801 respectively, of formula (I) wherein ring A is A46, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 47-1 to 47-801 respectively, of formula (I) wherein ring A is A47, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 48-1 to 48-801 respectively, of formula (I) wherein ring A is A48, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 49-1 to 49-801 respectively, of formula (I) wherein ring A is A49, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 50-1 to 50-801 respectively, of formula (I) wherein ring A is A50, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 51-1 to 51-801 respectively, of formula (I) wherein ring A is A51, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 52-1 to 52-801 respectively, of formula (I) wherein ring A is A52, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 53-1 to 53-801 respectively, of formula (I) wherein ring A is A53, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 54-1 to 54-801 respectively, of formula (I) wherein ring A is A54, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 55-1 to 55-801 respectively, of formula (I) wherein ring A is A55, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 56-1 to 56-801 respectively, of formula (I) wherein ring A is A56, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 57-1 to 57-801 respectively, of formula (I) wherein ring A is A57, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 58-1 to 58-801 respectively, of formula (I)

wherein ring A is A58, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 59-1 to 59-801 respectively, of formula (I) wherein ring A is A59, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 60-1 to 60-801 respectively, of formula (I) wherein ring A is A60, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 61-1 to 61-801 respectively, of formula (I) wherein ring A is A61, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 62-1 to 62-801 respectively, of formula (I) wherein ring A is A62, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 63-1 to 63-801 respectively, of formula (I) wherein ring A is A63, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 64-1 to 64-801 respectively, of formula (I) wherein ring A is A64, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

801 compounds are described, designated compounds 65-1 to 65-801 respectively, of formula (I) wherein ring A is A65, and the values of R, R^1, W, $(CR^{11}R^{12})_n$, X, $(CR^5R^6)_p$ and Z are as defined in Table 1.

The herbicidal compounds of formula (I) may exist as different geometric isomers, or in different tautomeric forms. This invention covers all such isomers and tautomers, and mixtures thereof in all proportions, as well as isotopic forms such as deuterated compounds.

The herbicidal compounds of this invention may contain an asymmetric carbon atom and some of the compounds of this invention may contain one or more asymmetric centers and may thus give rise to optical isomers and diastereomers. While shown without respect to stereochemistry, the present invention includes such optical isomers and diastereomers; as well as the racemic mixture and resolved, enantiomerically pure R and S stereoisomers; as well as other mixtures of the R and S stereoisomers and agrochemically acceptable salts thereof. It is recognized that one optical isomer, including diastereomer and enantiomer, or stereoisomer may have favorable properties over the other. Thus when disclosing and claiming the invention, when one racemic mixture is disclosed, it is clearly contemplated that both optical isomers, including diastereomers and enantiomers, or stereoisomers substantially free of the other are disclosed and claimed as well.

Hydroxy or hydroxyl, as used herein, refers to the group –OH.

Cyano, or nitrile, as used herein, refers to the group –CN.

Nitro, as used herein, refers to the group $–NO_2$.

Oxo, as used herein, refers to the group =O.

Carboxy, as used herein, refers to the group –C(O)OH.

Alkyl, as used herein, refers to an aliphatic hydrocarbon chain and includes straight and branched chains e. g. of 1 to 6 carbon atoms such as methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, sec-butyl, t-butyl, n-pentyl, isopentyl, neo-pentyl, n-hexyl, and isohexyl.

Alkenyl, as used herein, refers to an aliphatic hydrocarbon chain having at least one double bond, and preferably one double bond, and includes straight and branched chains e. g. of 2 to 6 carbon atoms such as ethenyl (vinyl), prop-1-enyl, prop-2-enyl (allyl), isopropenyl, but-1-enyl, but-2-enyl, but-3-enyl, 2-methypropenyl.

Alkynyl, as used herein, refers to an aliphatic hydrocarbon chain having at least one triple bond, and preferably one triple bond, and includes straight and branched chains e. g. of 2 to 6 carbon atoms such as ethynyl, prop-1-ynyl, prop-2-ynyl (propargyl) but-1-ynyl, but-2-ynyl and but-3-ynyl.

Alkylene, as used herein, means a branched or linear divalent hydrocarbon radical. Examples of alkylene are methylene, 1,1-ethylene, 1,2-ethylene, 1,1-propylene, 1,2-propylene, 1,3-propylene and 2,2-propylene etc.

Cycloalkyl, as used herein, refers to a cyclic, saturated hydrocarbon group having from 3 to 6 ring carbon atoms. Examples of cycloalkyl groups are cyclopropyl, cyclobutyl, cyclopentyl and cyclohexyl.

Alkylthio, as used herein, refers to the group –SR, wherein R is alkyl as defined above. Alkylthio groups include, but are not limited to, methylthio, ethylthio, propylthio, tert-butylthio, and the like.

Cyanoalkyl, as used herein, refers to an alkyl group substituted with one or more cyano groups.

Alkoxy, as used herein, refers to the group -OR, wherein R is alkyl as defined above. Examples of alkoxy groups include methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy, t-butoxy, n-pentoxy, isopentoxy, neo-pentoxy, n-hexyloxy, and isohexyloxy.

Alkoxyalkyl, as used herein, refers to the group –ROR, wherein each R is independently alkyl group as defined herein.

Alkoxyalkoxy, as used herein, refers to the group –ORORR, wherein each R is independently alkyl as defined herein.

Alkoxyalkoxyalkyl, as used herein, refers to the group –RORORR, wherein each R is independently alkyl as defined herein.

Alkylthioalkyl, as used herein, refers to the group –RSR, wherein each R is independently alkyl as defined herein.

Halogen, halide and halo refer to iodine, bromine, chlorine and fluorine.

Haloalkyl, as used herein, refers to an alkyl group as defined herein wherein at least one hydrogen atom has been replaced with a halogen atom as defined above. Examples of haloalkyl groups include chloromethyl, dichloromethyl, trichloromethyl, fluoromethyl, difluoromethyl and trifluoromethyl.

Haloalkylthio, as used herein, refers to the group –SR, wherein R is haloalkyl as defined herein.

Haloalkoxy, as used herein, refers to the group –OR, wherein R is haloalkyl as defined herein.

Haloalkoxyalkyl, as used herein, refers to the group –ROR', wherein R is alkyl as defined herein and R' is haloalkyl as defined herein.

Alkylcarbonyl, as used herein, refers to the group –C(O)R, wherein R is alkyl as defined herein. Examples of alkylcarbonyl groups include ethanoyl, propanoyl, n-butanoyl, etc.

Alkenylcarbonyl, as used herein, refers to the group –C(O)R, wherein R is alkenyl as defined herein.

Cycloalkylcarbonyl, as used herein, refers to the group –C(O)R, wherein R is cycloalkyl as defined herein.

Haloalkylcarbonyl, as used herein, refers to the group –C(O)R, wherein R is haloalkyl as defined herein.

Alkoxycarbonyl, as used herein, refers to the group –C(O)OR, wherein R is alkyl as defined herein.

Alkenyloxycarbonyl, as used herein, refers to the group –C(O)OR, wherein R is alkenyl as defined herein.

Propargyloxycarbonyl, as used herein, refers to the group $–C(O)OCH_2C{\equiv}CH$.

Haloalkoxycarbonyl, as used herein, refers to the group –C(O)OR, wherein R is haloalkyl as defined herein.

Alkylcarbonylalkyl, as used herein, refers to the group –RC(O)R, wherein each R is independently alkyl as defined herein.

Alkoxycarbonylalkyl, as used herein, refers to the group –RC(O)OR, wherein each R is independently alkyl as defined herein.

Alkoxyalkylcarbonyl, as used herein, refers to the group –C(O)ROR, wherein each R is independently alkyl as defined herein.

Alkoxyalkoxycarbonyl, as used herein, refers to the group –C(O)ORoR, wherein each R is independently alkyl as defined herein.

Alkoxycarbonylalkylcarbonyl, as used herein, refers to the group –C(O)RC(O)OR, wherein each R is independently alkyl as defined herein.

Aminocarbonyl, as used herein, refers to the group $–C(O)NH_2$.

Alkylaminocarbonyl, as used herein, refers to the group –C(O)NHR, wherein R is alkyl as defined herein.

Dialkylaminocarbonyl, as used herein, refers to the group –C(O)NRR, wherein each R is independently alkyl as defined herein.

Alkylthiocarbonyl, as used herein, refers to the group –C(O)SR, wherein R is alkyl as defined herein.

Alkoxycarbonylaminoalkyl, as used herein, refers to the group –RNHC(O)OR, wherein each R is independently alkyl as defined herein.

Alkylcarbonyloxy, as used herein, refers to the group –OC(O)R, wherein R is alkyl as defined herein.

Alkylcarbonyloxyalkyl, as used herein, refers to the group –ROC(O)R, wherein each R is independently alkyl as defined herein.

Alkoxycarbonyloxyalkyl, as used herein, refers to the group –ROC(O)OR, wherein each R is independently alkyl as defined herein.

Alkylsulfonyl, as used herein, refers to the group $–S(O)_2R$, wherein R is alkyl as defined herein.

Haloalkylsulphonyl, as used herein, refers to the group $–S(O)_2R$, wherein R is haloalkyl as defined herein.

Alkylsulphonylalkyl, as used herein, refers to the group $–RS(O)_2R$, wherein each R is independently alkyl as defined herein.

Aryl, as used herein, refers to an unsaturated aromatic carbocyclic group of from 6 to 10 carbon atoms having a single ring (e. g., phenyl) or multiple condensed (fused) rings, at least one of which is aromatic (e.g., indanyl, naphthyl). Preferred aryl groups include phenyl, naphthyl and the like. Most preferably, an aryl group is a phenyl group.

Aryloxy, as used herein, refers to the group -OAr, wherein Ar is aryl as defined herein. Preferred aryloxy groups include phenoxy, naphthyloxy and the like.

Arylalkyl, as used herein, refers to the group –RAr, wherein R is alkyl as defined herein and Ar is aryl as defined herein. Preferred arylalkyl groups include phenylmethyl (benzyl).

Aryloxyalkyl, as used herein, refers to the group –ROAr, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Arylthio, as used herein, refers to the group –SAr, wherein Ar is aryl as defined herein.

Arylthioalkyl, as used herein, refers to the group –RSAr, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Arylalkylthioalkyl, as used herein, refers to the group –RSRAr, wherein each R is independently alkyl as defined herein and Ar is aryl as defined herein.

Arylalkoxyalkyl, as used herein, refers to the group –RORAr, wherein each R is independently alkyl as defined herein and Ar is aryl as defined herein.

Arylcarbonyl, as used herein, refers to the group –C(O)Ar, wherein Ar is aryl as defined herein.

Arylcarbonylalkyl, as used herein, refers to the group –RC(O)Ar, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Aryloxycarbonyl, as used herein, refers to the group –C(O)OAr, wherein Ar is aryl as defined herein.

Aryloxyalkylcarbonyl, as used herein, refers to the group –C(O)ROAr, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Arylalkoxycarbonyl, as used herein, refers to the group –C(O)ORAr, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Arylcarbonyloxyalkyl, as used herein, refers to the group –ROC(O)Ar, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Aryloxycarbonyloxyalkyl, as used herein, refers to the group –ROC(O)OAr, wherein R is alkyl as defined herein and Ar is aryl as defined herein.

Arylsulphonyl as used herein refers to the group $–S(O)_2Ar$, wherein Ar is aryl as defined herein.

Heteroaryl/heteroaromatic ring, as used herein, refers to a ring system containing 5 to 10 ring atoms, 1 to 4 ring heteroatoms and consisting either of a single aromatic ring or of two or more fused rings, at least one of which is aromatic. Preferably, single rings will contain up to three and bicyclic systems up to four heteroatoms which will preferably be independently chosen from nitrogen, oxygen and sulfur. When a ring system contains a sulphur atom, the sulphur atom may be present in any one of its oxidation states e.g. -S-, -S(=O)- or $-S(=O)_2-$. Examples of such groups include pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, triazinyl, furanyl, thiophenyl, oxazolyl, isoxazolyl, oxadiazolyl, thiazolyl, isothiazolyl, thiadiazolyl, pyrrolyl, pyrazolyl, imidazolyl, triazolyl and tetrazolyl. Examples of bicyclic groups are benzothiophenyl, benzimidazolyl, benzothiadiazolyl, quinolinyl, cinnolinyl, quinoxalinyl and pyrazolo[1,5-a]pyrimidinyl.

Heteroarylalkyl, as used herein, refers to the group –RHet, wherein R is alkyl as defined herein and Het is heteroaryl as defined herein.

'Optionally substituted' as used herein means the group referred to can be substituted at one or more positions by any one or any combination of the radicals listed thereafter. For most groups, one or more hydrogen atoms are replaced by the radicals listed thereafter. For halogenated groups, for example, haloalkyl groups, one or more halogen atoms are replaced by the radicals listed thereafter.

Suitable salts include those derived from alkali or alkaline earth metals and those derived from ammonia and amines. Preferred cations include sodium, potassium, magnesium, and ammonium cations of the formula $N^+(R^{29}R^{30}R^{31}R^{32})$ wherein R^{29}, R^{30}, R^{31} and R^{32} are independently selected from hydrogen, C_1-C_6 alkyl and C_1-C_6 hydroxyalkyl. Salts of the compounds of formula (I) can be prepared by treatment

of compounds of formula (I) with a metal hydroxide, such as sodium hydroxide, or an amine, such as ammonia, trimethylamine, diethanolamine, 2-methylthiopropylamine, bisallylamine, 2-butoxyethylamine, morpholine, cyclododecylamine, or benzylamine. Amine salts are often preferred forms of the compounds of formula (I) because they are water-soluble and lend themselves to the preparation of desirable aqueous based herbicidal compositions.

Acceptable salts can be formed from organic and inorganic acids, for example, acetic, propionic, lactic, citric, tartaric, succinic, fumaric, maleic, malonic, mandelic, malic, phthalic, hydrochloric, hydrobromic, phosphoric, nitric, sulfuric, methanesulfonic, naphthalenesulfonic, benzenesulfonic, toluenesulfonic, camphorsulfonic, and similarly known acceptable acids when a compound of this invention contains a basic moiety.

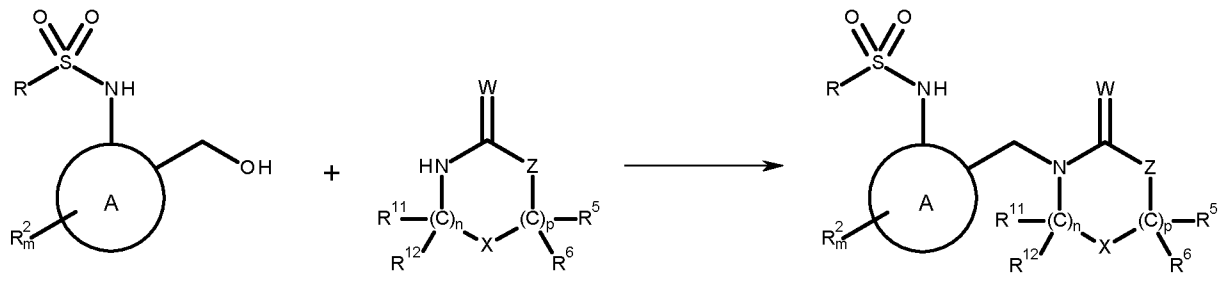
The sulphonanilide derivatives of the present invention may be made as the skilled person will appreciate by applying and/or adapting, as appropriate, the methods described in the prior art (see for example, EP2336104 and WO 2010/119906).

In addition, general methods for the production of compounds of formula (I) are described below. Unless otherwise stated in the text, the substituents R, R^1, R^2, R^5, R^6, R^{11}, R^{12}, m, n, p, A, W, X and Z are as defined hereinbefore. The abbreviations LG and LG' as used herein refer to any suitable leaving group, and includes halogen and sulphonate groups. The abbreviation R' as used herein refers to an alkyl group, typically a methyl or ethyl group.

The starting materials used for the preparation of the compounds of the invention may be purchased from usual commercial suppliers or may be prepared by known methods. The starting materials as well as the intermediates may be purified before use in the next step by state of the art methodologies such as chromatography, crystallization, distillation and filtration.

Compounds of formula (I) in which R^1 is H may be prepared from compounds of formula (A) and compounds of formula (B) as shown in reaction scheme 1.

Reaction scheme 1



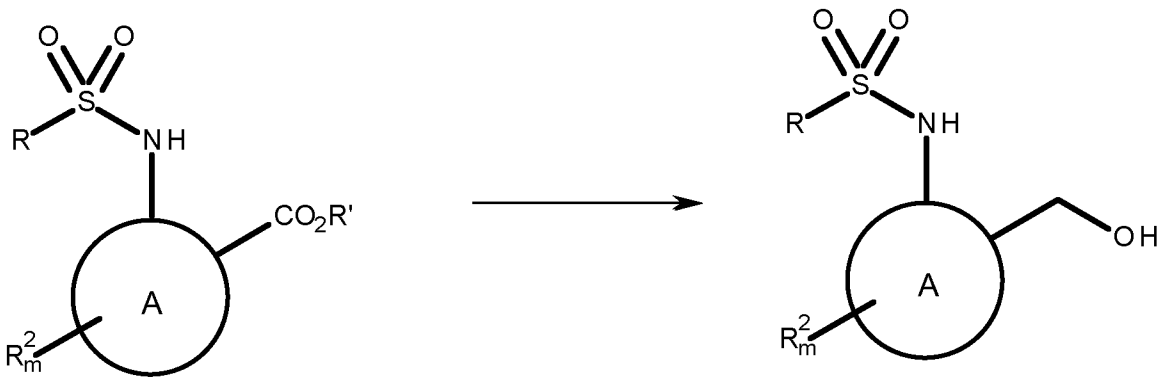
(A) (B) (I)

For example, A compound of formula (A) may be heated with a compound of formula (B) in the presence of a catalyst, for example an acid, such as para-toluene sulphonic acid, in a suitable solvent, for example toluene or chlorobenzene. The process may conveniently be carried out using microwave heating or conventional heating in an apparatus for the removal of water, for example a Dean-Stark trap.

Compounds of formula (B) are commercially available or can be made by standard methods well known in the chemical literature.

Compounds of formula (A) may be prepared from compounds of formula (C) as shown in reaction scheme 2.

Reaction scheme 2

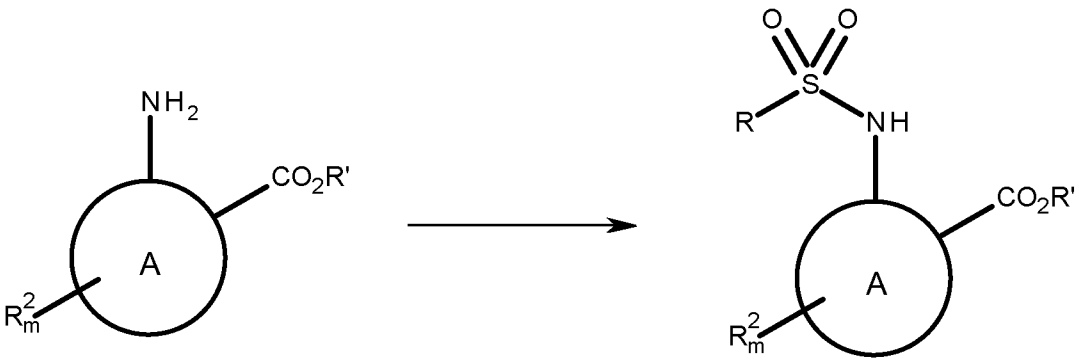


(C) (A)

For example, a compound of formula (C) may be treated with a reducing agent such as lithium aluminium hydride in a suitable solvent such as tetrahydrofuran.

Compounds of formula (C) may be prepared from compounds of formula (D) as shown in reaction scheme 3.

Reaction scheme 3



(D) (C)

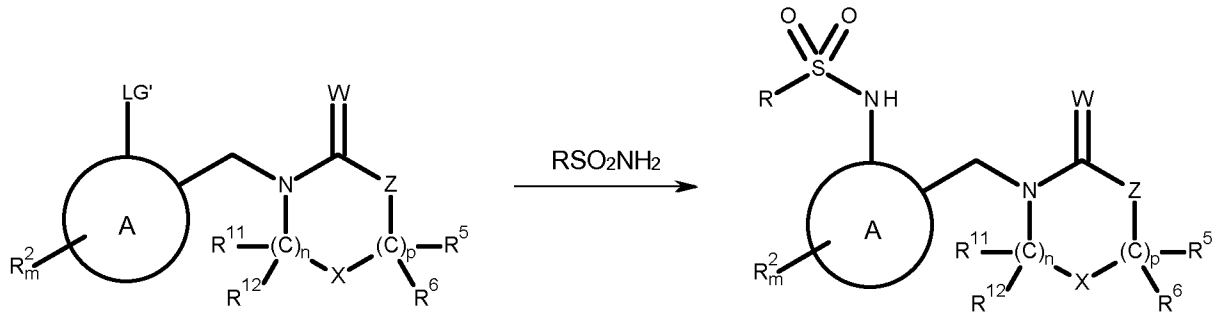
For example, a compound of formula (D) may be treated with a sulphonylating reagent, for example a sulphonic anhydride such as trifluoromethanesulphonic anhydride or a sulphonyl halide such as methanesulphonyl chloride, in the presence of a base, for example an organic base such as triethylamine, in a suitable solvent, for example dichloromethane.

Compounds of formula (D) are commercially available or can be made by standard methods well

known in the chemical literature.

Compounds of formula (I) in which R^1 is H may alternatively be prepared from compounds of formula (E) as shown in reaction scheme 4.

Reaction scheme 4

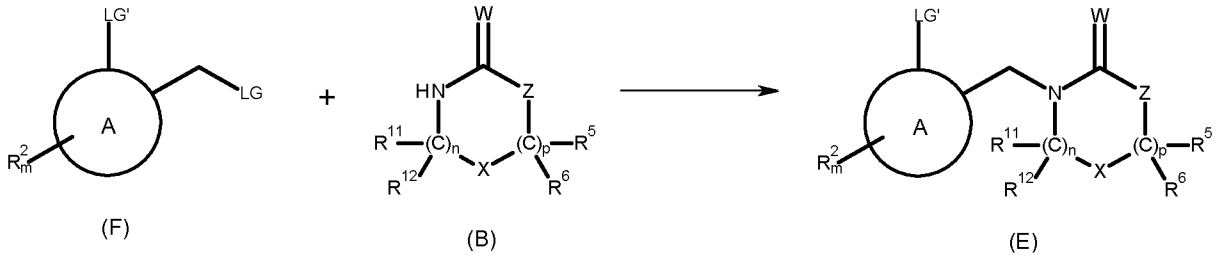


(E) (I)

For example, a compound of formula (E) in which LG' is a halogen, for example a chlorine atom, may be treated with a sulphonamide RSO_2NH_2 in the presence of a base, for example an inorganic base such as caesium carbonate or sodium hydride, in a suitable solvent such as dioxane. Optionally the reaction may be performed in the presence of a suitable catalyst, for example a metal catalyst such as a palladium dibenzylidene acetone complex, and optionally a ligand, for example a phosphine ligand such as XantPhos.

Compounds of formula (E) may be prepared from compounds of formula (F) and compounds of formula (B) as shown in reaction scheme 5.

Reaction scheme 5

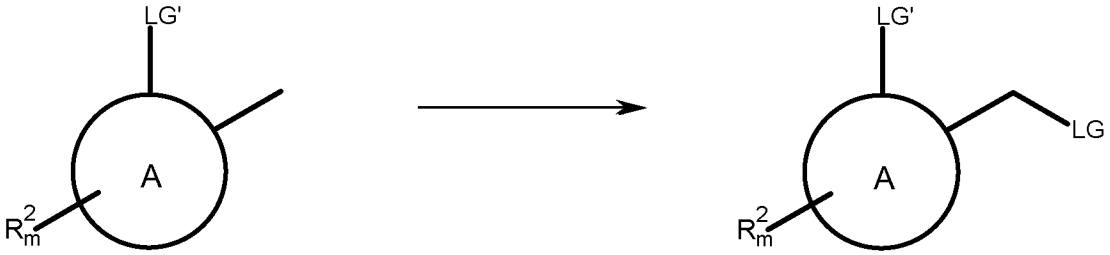


(F) (B) (E)

For example, a compound of formula (F) in which LG and LG' are halogens, for example chlorine atoms, may be reacted with a compound of formula (B) in the presence of a base, for example an inorganic base such as sodium hydride, in a suitable solvent, for example tetrahydrofuran.

Compounds of formula (F) are commercially available or can be made by standard methods well known in the chemical literature. For example, compounds of formula (F) may be prepared from compounds of formula (G) as shown in reaction scheme 6.

Reaction scheme 6

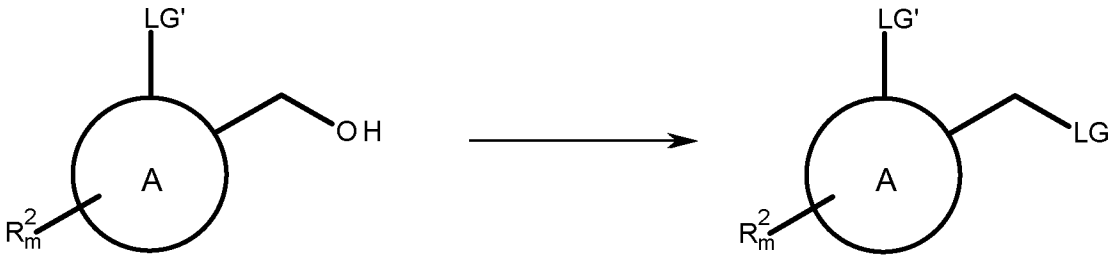


(G) (F)

For example, a compound of formula (G) may be treated with a halogenating agent, for example *N*-bromosuccinimide, in a suitable solvent, for example carbon tetrachloride, optionally in the presence of a reaction initiator, for example a radical initiator such as azobisisobutyronitrile or irradiation with UV or visible light.

Alternatively, compounds of formula (F) may be prepared from compounds of formula (H) as shown in reaction scheme 7.

Reaction scheme 7

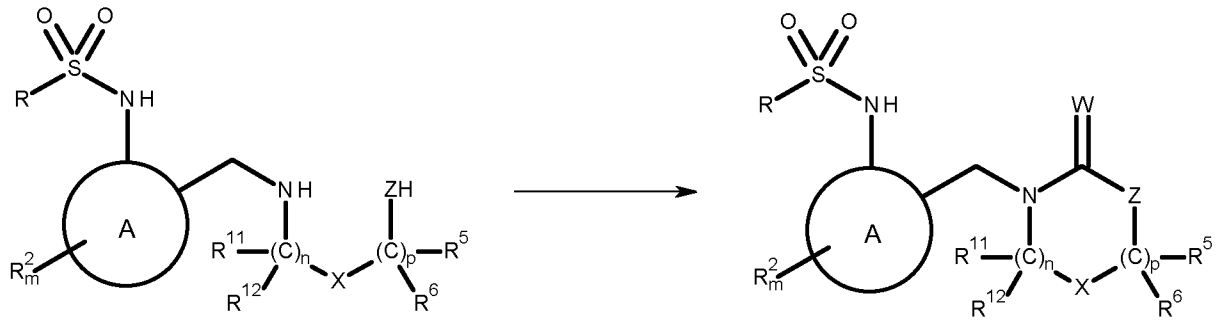


(H) (F)

For example, a compound of formula (H) may be treated with a halogenating agent, for example, thionyl chloride, in a suitable solvent, for example dichloromethane.

Compounds of formula (I) in which R^1 is H may alternatively be prepared from compounds of formula (J) as shown in reaction scheme 8.

Reaction scheme 8

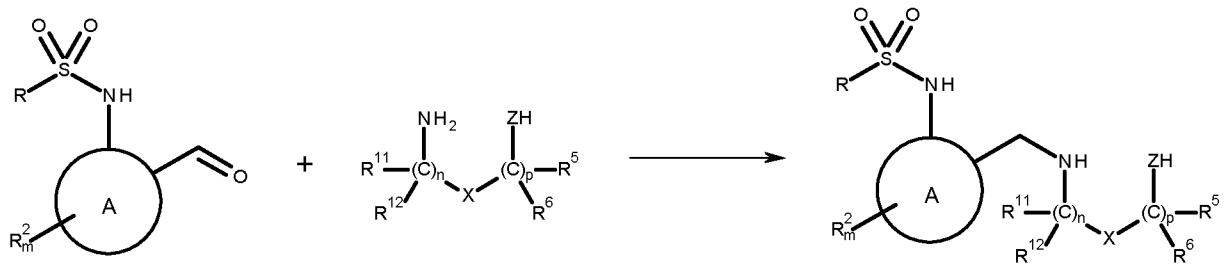


(J) (I)

For example, a compound of formula (J) may be treated with a carbonylating agent such as triphosgene, in the presence of a base, for example an organic base such as 2-tert-butyl-1,1,3,3-tetramethylguanidine (Barton's base), in a suitable solvent, for example dichloromethane.

Compounds of formula (J) may be prepared from aldehydes of formula (K) and amines of formula (L) as shown in reaction scheme 9.

Reaction scheme 9



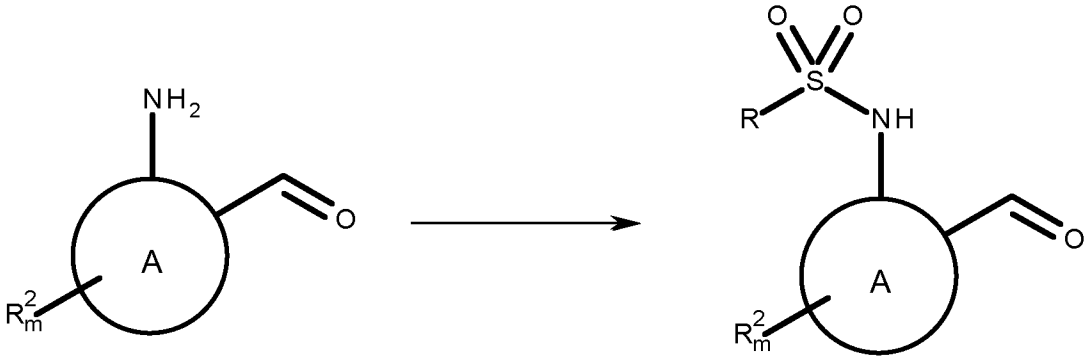
(K) (L) (J)

For example, a compound of formula (J) may be formed by the reaction of an aldehyde of formula (K) with an amine of formula (L) in the presence of a reducing agent, for example a hydride reducing agent such as sodium borohydride, in a suitable solvent, for example an alcohol such as ethanol.

Amines of formula (L) are commercially available or can be made by standard methods well known in the chemical literature.

Aldehydes of formula (K) may be prepared from compounds of formula (M), as shown in reaction scheme 10.

Reaction scheme 10



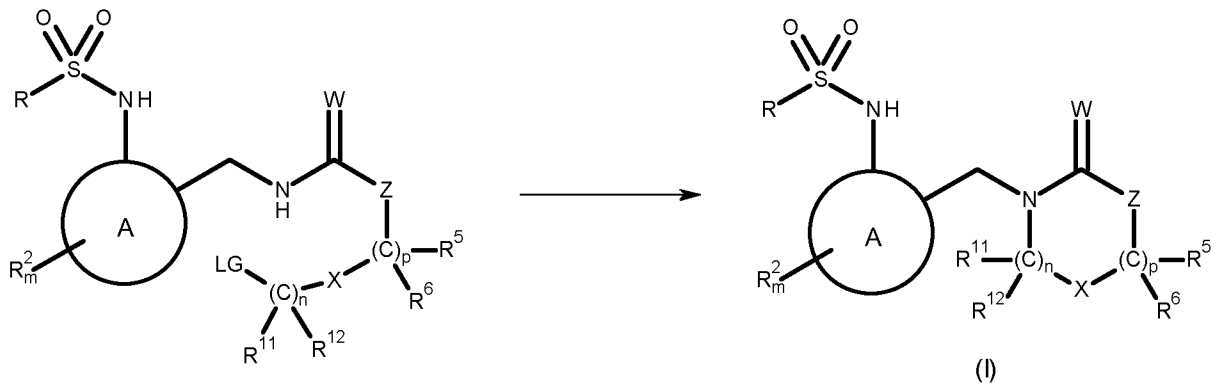
(M) (K)

For example, an aldehyde of formula (M) may be treated with a sulphonylating reagent, for example a sulphonic anhydride such as trifluoromethanesulphonic anhydride or a sulphonyl halide such as methanesulphonyl chloride, in the presence of a base, for example an organic base such as triethylamine, in a suitable solvent, for example dichloromethane.

Aldehydes of formula (M) are commercially available or can be made by standard methods well known in the chemical literature.

Compounds of formula (I) in which R^1 is H may alternatively be prepared from compounds of formula (N) as shown in reaction scheme 11.

Reaction scheme 11

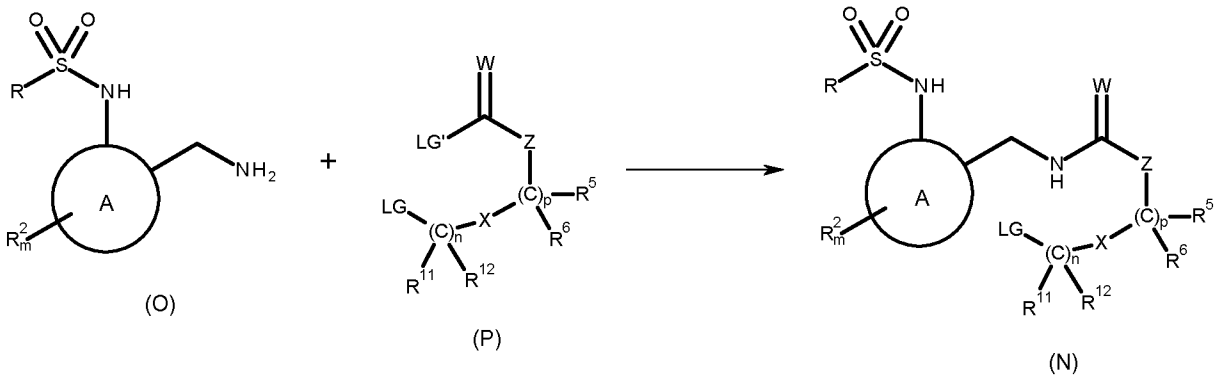


(N) (I)

For example, a compound of formula (N) in which LG is a halogen atom, for example a chlorine atom, may be treated with a base, for example an inorganic base such as sodium hydride, in a suitable solvent, such as dimethylformamide.

Compounds of formula (N) may be made from amines of formula (O) and acylating agents of compound (P), as shown in reaction scheme 12.

Reaction scheme 12



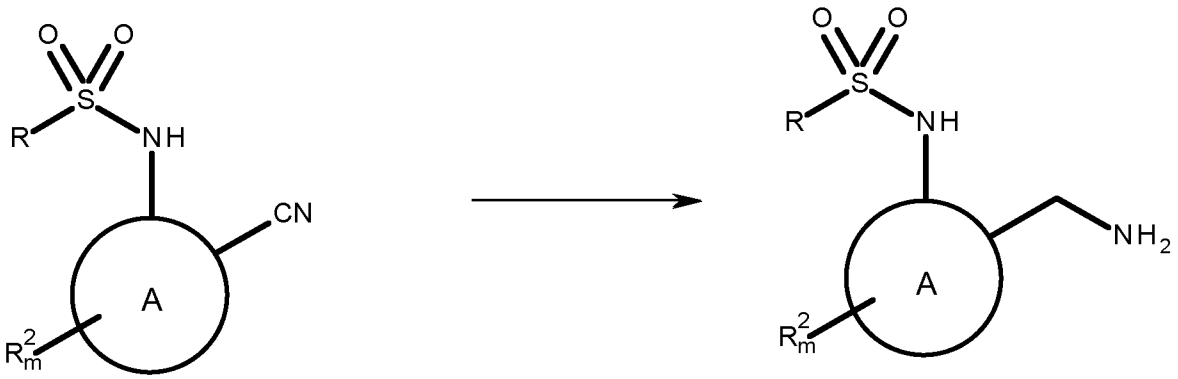
(O) (P) (N)

For example, an amine of formula (O) may be reacted with an acylating agent of formula (P) in which LG and LG' are halogen atom, for example chlorine atoms, in the presence of a suitable base, for example an organic base such as pyridine, in a suitable solvent, for example dichloromethane.

Compounds of formula (P) are commercially available or can be made by standard methods well known in the chemical literature.

Amines of formula (O) may be prepared from nitriles of formula (P) as shown in reaction scheme 13.

Reaction scheme 13

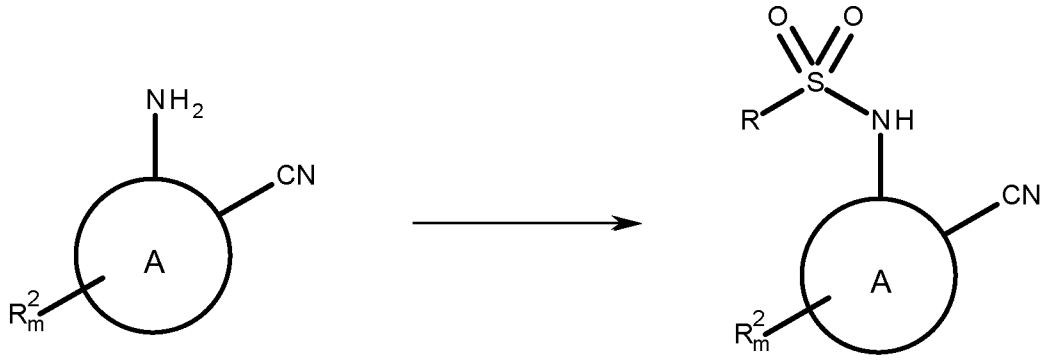


(Q) (O)

For example, a nitrile of formula (Q) may be treated with a reducing agent, for example a hydride reducing agent such as lithium aluminium hydride, in a suitable solvent, for example tetrahydrofuran.

Nitriles of formula (Q) may be prepared from compounds of formula (R), as shown in reaction scheme 14.

Reaction scheme 14



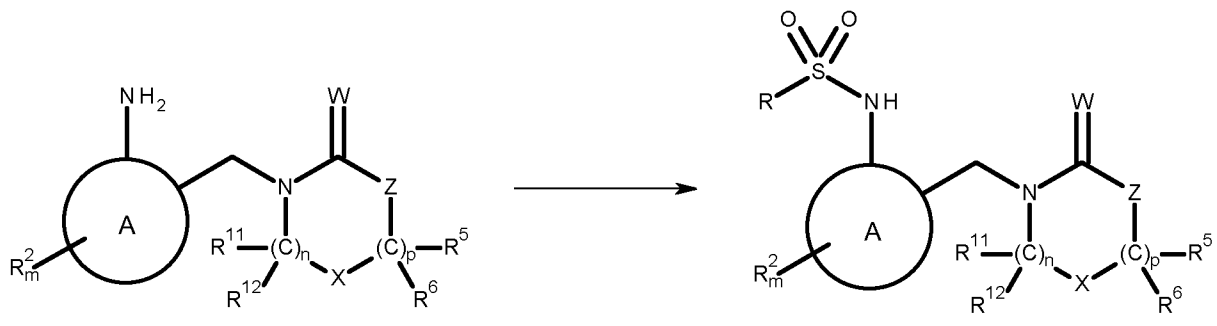
(R) (Q)

For example, a nitrile of formula (R) may be treated with a sulphonylating reagent, for example a sulphonic anhydride such as trifluoromethanesulphonic anhydride or a sulphonyl halide such as methanesulphonyl chloride, in the presence of a base, for example an organic base such as triethylamine, in a suitable solvent, for example dichloromethane.

Compounds of formula (R) are commercially available or can be made by standard methods well known in the chemical literature.

Compounds of formula (I) in which R^1 is H may alternatively be prepared from compounds of formula (S) as shown in reaction scheme 15

Reaction scheme 15

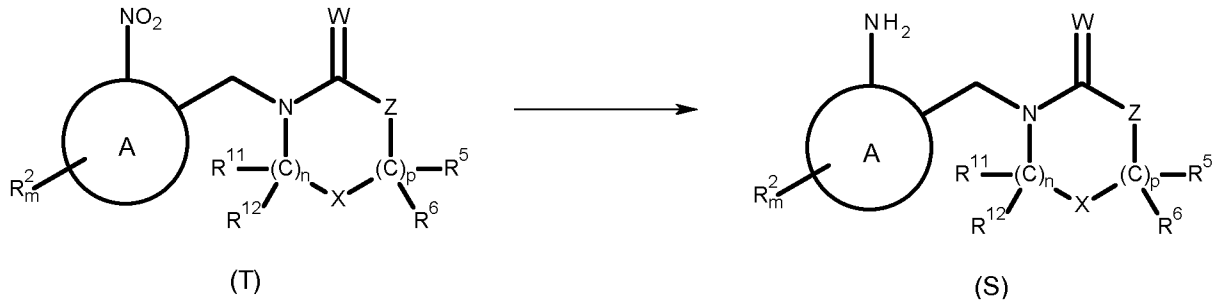


(S) (I)

For example, a compound of formula (S) may be treated with a sulphonylating reagent, for example a sulphonic anhydride such as trifluoromethanesulphonic anhydride or a sulphonyl halide such as methanesulphonyl chloride, in the presence of a base, for example an organic base such as triethylamine, in a suitable solvent, for example dichloromethane.

Compounds of formula (S) may be prepared from compounds of formula (T) as shown in reaction scheme 16.

Reaction scheme 16

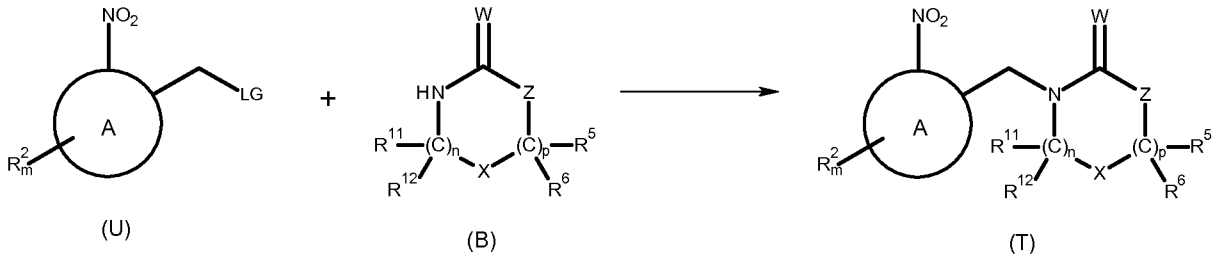


(T) (S)

For example, a compound of formula (T) may be treated with a reducing agent, for example a dissolving metal such as iron and ammonium chloride, in a suitable solvent, for example a mixture of water and ethanol.

Compounds of formula (T) may be made from compounds of formula (U) and compounds of formula (B), as shown in reaction scheme 17.

Reaction scheme 17



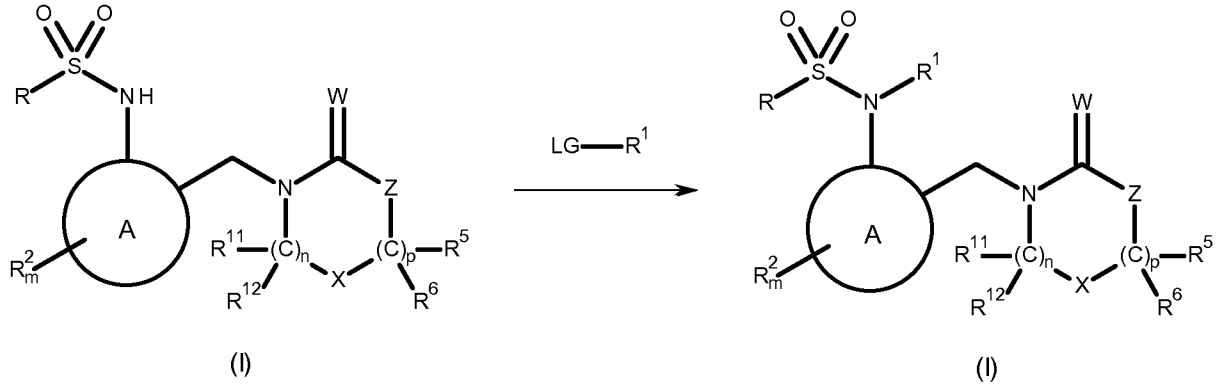
(U) (B) (T)

For example, a compound of formula (U) in which LG is a halogen, for example a bromine atom, may be reacted with a compound of formula (B) in the presence of a base, for example an inorganic base such as sodium hydride or caesium carbonate, in a suitable solvent, for example dimethylformamide.

Compounds of formula (U) are commercially available or can be made by standard methods well known in the chemical literature.

Compounds of formula (I) in which R^1 is not H may be prepared from compounds of formula (I) in which R^1 is H as shown in reaction scheme 18.

Reaction scheme 18



(I) (I)

For example, a compound of formula (I) in which R^1 is H may be treated with a base, for example an inorganic base such as sodium hydride or an organic base such as triethylamine, and an electrophilic reagent LG-R^1, in a suitable solvent, for example dichloromethane.

One skilled in the art will realise that it is often possible to alter the order in which the transformations described above are conducted, or to combine them in alternative ways to prepare a wide range of compounds of formula (I). Multiple steps may also be combined in a single reaction. All such variations are contemplated within the scope of the invention.

The skilled man will also be aware that some reagents will be incompatible with certain values or combinations of the substituents R, R^1, R^2, R^5, R^6, R^{11}, R^{12}, m, n, p, A, W, X and Z as defined herein, and any additional steps, such as protection and/or deprotection steps, which are necessary to achieve the desired transformation will be clear to the skilled man.

The compounds of formula (I) according to the invention can be used as herbicides in unmodified form, as obtained in the synthesis, but they are generally formulated into herbicidal compositions in various ways using formulation adjuvants, such as carriers, solvents and surface-active substances. Therefore, the invention also relates to a herbicidal composition which comprises a herbicidally effective amount of a compound of formula (I) in addition to formulation adjuvants. The formulations can be in various physical forms, e.g. in the form of dusting powders, gels, wettable powders, water-dispersible granules, water-dispersible tablets, effervescent pellets, emulsifiable concentrates, microemulsifiable concentrates, oil-in-water emulsions, oil-flowables, aqueous dispersions, oily dispersions, suspo-emulsions, capsule suspensions, emulsifiable granules, soluble liquids, water-soluble concentrates (with water or a water-miscible organic solvent as carrier), impregnated polymer films or in other forms known e.g. from the Manual on Development and Use of FAO Specifications for Plant Protection Products, 5th Edition, 1999. Such formulations can either be used directly or they are diluted prior to use. The dilutions can be made, for example, with water, liquid fertilizers, micronutrients, biological organisms, oil or solvents.

The formulations can be prepared e.g. by mixing the active ingredient with the formulation adjuvants in order to obtain compositions in the form of finely divided solids, granules, solutions, dispersions or emulsions. The active ingredients can also be formulated with other adjuvants, such as finely divided solids, mineral oils, oils of vegetable or animal origin, modified oils of vegetable or animal

origin, organic solvents, water, surface-active substances or combinations thereof. The active ingredients can also be contained in very fine microcapsules consisting of a polymer. Microcapsules contain the active ingredients in a porous carrier. This enables the active ingredients to be released into the environment in controlled amounts (e.g. slow-release). Microcapsules usually have a diameter of from 0.1 to 500 microns. They contain active ingredients in an amount of about from 25 to 95 % by weight of the capsule weight. The active ingredients can be in the form of a monolithic solid, in the form of fine particles in solid or liquid dispersion or in the form of a suitable solution. The encapsulating membranes comprise, for example, natural or synthetic rubbers, cellulose, styrene/butadiene copolymers, polyacrylonitrile, polyacrylate, polyesters, polyamides, polyureas, polyurethane or chemically modified polymers and starch xanthates or other polymers that are known to the person skilled in the art in this connection. Alternatively, very fine microcapsules can be formed in which the active ingredient is contained in the form of finely divided particles in a solid matrix of base substance, but the microcapsules are not themselves encapsulated.

The formulation adjuvants that are suitable for the preparation of the compositions according to the invention are known per se. As liquid carriers there may be used: water, toluene, xylene, petroleum ether, vegetable oils, acetone, methyl ethyl ketone, cyclohexanone, acid anhydrides, acetonitrile, acetophenone, amyl acetate, 2-butanone, butylene carbonate, chlorobenzene, cyclohexane, cyclohexanol, alkyl esters of acetic acid, diacetone alcohol, 1,2-dichloropropane, diethanolamine, p-diethylbenzene, diethylene glycol, diethylene glycol abietate, diethylene glycol butyl ether, diethylene glycol ethyl ether, diethylene glycol methyl ether, N,N-dimethylformamide, dimethyl sulfoxide, 1,4-dioxane, dipropylene glycol, dipropylene glycol methyl ether, dipropylene glycol dibenzoate, diproxitol, alkylpyrrolidone, ethyl acetate, 2-ethyl-hexanol, ethylene carbonate, 1,1,1-trichloroethane, 2-heptanone, alpha-pinene, d-limonene, ethyl lactate, ethylene glycol, ethylene glycol butyl ether, ethylene glycol methyl ether, gamma-butyrolactone, glycerol, glycerol acetate, glycerol diacetate, glycerol triacetate, hexadecane, hexylene glycol, isoamyl acetate, isobornyl acetate, isooctane, isophorone, isopropylbenzene, isopropyl myristate, lactic acid, laurylamine, mesityl oxide, methoxypropanol, methyl isoamyl ketone, methyl isobutyl ketone, methyl laurate, methyl octanoate, methyl oleate, methylene chloride, m-xylene, n-hexane, n-octylamine, octadecanoic acid, octylamine acetate, oleic acid, oleylamine, o-xylene, phenol, polyethylene glycol (PEG400), propionic acid, propyl lactate, propylene carbonate, propylene glycol, propylene glycol methyl ether, p-xylene, toluene, triethyl phosphate, triethylene glycol, xylenesulfonic acid, paraffin, mineral oil, trichloroethylene, perchloroethylene, ethyl acetate, amyl acetate, butyl acetate, propylene glycol methyl ether, diethylene glycol methyl ether, methanol, ethanol, isopropanol, and alcohols of higher molecular weight, such as amyl alcohol, tetrahydrofurfuryl alcohol, hexanol, octanol, ethylene glycol, propylene glycol, glycerol, N-methyl-2-pyrrolidone and the like. Water is generally the carrier of choice for diluting the concentrates. Suitable solid carriers are, for example, talc, titanium dioxide, pyrophyllite clay, silica, attapulgite clay, kieselguhr, limestone, calcium carbonate, bentonite, calcium montmorillonite, cottonseed husks, wheat flour, soybean flour, pumice, wood flour, ground walnut shells, lignin and similar substances, as described, for example, in CFR 180.1001. (c) & (d).

A large number of surface-active substances can advantageously be used in both solid and liquid formulations, especially in those formulations which can be diluted with a carrier prior to use. Surface-

active substances may be anionic, cationic, non-ionic or polymeric and they can be used as emulsifiers, wetting agents or suspending agents or for other purposes. Typical surface-active substances include, for example, salts of alkyl sulfates, such as diethanolammonium lauryl sulfate; salts of alkylarylsulfonates, such as calcium dodecylbenzenesulfonate; alkylphenol/alkylene oxide addition products, such as nonylphenol ethoxylate; alcohol/alkylene oxide addition products, such as tridecylalcohol ethoxylate; soaps, such as sodium stearate; salts of alkylnaphthalenesulfonates, such as sodium dibutylnaphthalenesulfonate; dialkyl esters of sulfosuccinate salts, such as sodium di(2-ethylhexyl)sulfosuccinate; sorbitol esters, such as sorbitol oleate; quaternary amines, such as lauryltrimethylammonium chloride, polyethylene glycol esters of fatty acids, such as polyethylene glycol stearate; block copolymers of ethylene oxide and propylene oxide; and salts of mono- and di-alkylphosphate esters; and also further substances described e.g. in "McCutcheon's Detergents and Emulsifiers Annual" MC Publishing Corp., Ridgewood New Jersey, 1981.

Further adjuvants that can usually be used in pesticidal formulations include crystallization inhibitors, viscosity modifiers, suspending agents, dyes, anti-oxidants, foaming agents, light absorbers, mixing auxiliaries, antifoams, complexing agents, neutralizing or pH-modifying substances and buffers, corrosion inhibitors, fragrances, wetting agents, take-up enhancers, micronutrients, plasticisers, glidants, lubricants, dispersants, thickeners, antifreezes, microbicides, and also liquid and solid fertilizers.

The compositions according to the invention can additionally include an additive comprising an oil of vegetable or animal origin, a mineral oil, alkyl esters of such oils or mixtures of such oils and oil derivatives. The amount of oil additive in the composition according to the invention is generally from 0.01 to 10 %, based on the spray mixture. For example, the oil additive can be added to the spray tank in the desired concentration after the spray mixture has been prepared. Preferred oil additives comprise mineral oils or an oil of vegetable origin, for example rapeseed oil, olive oil or sunflower oil, emulsified vegetable oil, such as AMIGO® (Rhône-Poulenc Canada Inc.), alkyl esters of oils of vegetable origin, for example the methyl derivatives, or an oil of animal origin, such as fish oil or beef tallow. A preferred additive contains, for example, as active components essentially 80 % by weight alkyl esters of fish oils and 15 % by weight methylated rapeseed oil, and also 5 % by weight of customary emulsifiers and pH modifiers. Especially preferred oil additives comprise alkyl esters of C_8-C_{22} fatty acids, especially the methyl derivatives of C_{12}-C_{18} fatty acids, for example the methyl esters of lauric acid, palmitic acid and oleic acid, being of importance. Those esters are known as methyl laurate (CAS-111-82-0), methyl palmitate (CAS-112-39-0) and methyl oleate (CAS-112-62-9). A preferred fatty acid methyl ester derivative is Emery® 2230 and 2231 (Cognis GmbH). Those and other oil derivatives are also known from the Compendium of Herbicide Adjuvants, 5th Edition, Southern Illinois University, 2000.

The application and action of the oil additives can be further improved by combination with surface-active substances, such as non-ionic, anionic or cationic surfactants. Examples of suitable anionic, non-ionic and cationic surfactants are listed on pages 7 and 8 of WO 97/34485. Preferred surface-active substances are anionic surfactants of the dodecylbenzylsulfonate type, especially the calcium salts thereof, and also non-ionic surfactants of the fatty alcohol ethoxylate type. Special preference is given to ethoxylated C_{12}-C_{22} fatty alcohols having a degree of ethoxylation of from 5 to 40. Examples of commercially available surfactants are the Genapol types (Clariant AG). Also preferred are silicone

surfactants, especially polyalkyl-oxide-modified heptamethyltriloxanes which are commercially available e.g. as Silwet L-77®, and also perfluorinated surfactants. The concentration of the surface-active substances in relation to the total additive is generally from 1 to 30 % by weight. Examples of oil additives consisting of mixtures of oil or mineral oils or derivatives thereof with surfactants are Edenor ME SU®, Turbocharge® (Syngenta AG, CH) or ActipronC (BP Oil UK Limited, GB).

If desired, it is also possible for the mentioned surface-active substances to be used in the formulations on their own, that is to say, without oil additives.

Furthermore, the addition of an organic solvent to the oil additive/surfactant mixture may contribute to an additional enhancement of action. Suitable solvents are, for example, Solvesso® (ESSO) or Aromatic Solvent® (Exxon Corporation). The concentration of such solvents can be from 10 to 80 % by weight of the total weight. Oil additives that are present in admixture with solvents are described, for example, in US-A-4,834,908. A commercially available oil additive disclosed therein is known by the name MERGE® (BASF Corporation). A further oil additive that is preferred according to the invention is SCORE® (Syngenta Crop Protection Canada).

In addition to the oil additives listed above, for the purpose of enhancing the action of the compositions according to the invention it is also possible for formulations of alkylpyrrolidones (e.g. Agrimax®) to be added to the spray mixture. Formulations of synthetic lattices, e.g. polyacrylamide, polyvinyl compounds or poly-1-p-menthene (e.g. Bond®, Courier® or Emerald®) may also be used. It is also possible for solutions that contain propionic acid, for example Eurogkem Pen-e-trate®, to be added to the spray mixture as action-enhancing agent.

The herbicidal compositions generally comprise from 0.1 to 99 % by weight, especially from 0.1 to 95 % by weight, compounds of formula (I) and from 1 to 99.9 % by weight of a formulation adjuvant which preferably includes from 0 to 25 % by weight of a surface-active substance. Whereas commercial products will preferably be formulated as concentrates, the end user will normally employ dilute formulations.

The rates of application of compounds of formula (I) may vary within wide limits and depend on the nature of the soil, the method of application (pre- or post-emergence; seed dressing; application to the seed furrow; no tillage application etc.), the crop plant, the grass or weed to be controlled, the prevailing climatic conditions, and other factors governed by the method of application, the time of application and the target crop. The compounds of formula (I) according to the invention are generally applied at a rate of from 10 to 2000 g/ha, especially from 50 to 1000 g/ha.

Preferred formulations have especially the following compositions (% = percent by weight):

Emulsifiable concentrates:

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

Dusts:

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

Suspension concentrates:

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

Wettable powders:

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

Granules:

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

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

Formulation Examples for herbicides of formula (I) (% = % by weight)

F1. Emulsifiable concentrates	a)	b)	c)	d)
active ingredient	5 %	10 %	25 %	50 %
calcium dodecylbenzenesulfonate	6 %	8 %	6 %	8 %
castor oil polyglycol ether (36 mol of ethylene oxide)	4 %	-	4 %	4 %
octylphenol polyglycol ether (7-8 mol of ethylene oxide)	-	4 %	-	2 %
NMP	-	-	10 %	20 %
arom. hydrocarbon mixture	85 %	78 %	55 %	16 %

C_9-C_{12}

Emulsions of any desired concentration can be obtained from such concentrates by dilution with water.

F2. Solutions	a)	b)	c)	d)
active ingredient	5 %	10 %	50 %	90 %
1-methoxy-3-(3-methoxy-propoxy)-propane	-	20 %	20 %	-
polyethylene glycol MW 400	20 %	10 %	-	-
NMP	-	-	30 %	10 %
arom. hydrocarbon mixture C_9-C_{12}	75 %	60 %	-	-

The solutions are suitable for use in the form of microdrops.

F3. Wettable powders	a)	b)	c)	d)
active ingredient	5 %	25 %	50 %	80 %
sodium lignosulfonate	4 %	-	3 %	-
sodium lauryl sulfate	2 %	3 %	-	4 %
sodium diisobutylnaphthalene-sulfonate	-	6 %	5 %	6 %
octylphenol polyglycol ether (7-8 mol of ethylene oxide)	-	1 %	2 %	-
highly dispersed silicic acid	1 %	3 %	5 %	10 %
kaolin	88 %	62 %	35 %	-

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

F4. Coated granules	a)	b)	c)
active ingredient	0.1 %	5 %	15 %
highly dispersed silicic acid	0.9 %	2 %	2 %
inorganic carrier (diameter 0.1 - 1 mm) e.g. $CaCO_3$ or SiO_2	99.0 %	93 %	83 %

The active ingredient is dissolved in methylene chloride and applied to the carrier by spraying, and the solvent is then evaporated off in vacuo.

F5. Coated granules	a)	b)	c)
active ingredient	0.1 %	5 %	15 %
polyethylene glycol MW 200	1.0 %	2 %	3 %
highly dispersed silicic acid	0.9 %	1 %	2 %
inorganic carrier	98.0 %	92 %	80 %
(diameter 0.1 - 1 mm)			
e.g. $CaCO_3$ or SiO_2			

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

F6. Extruder granules	a)	b)	c)	d)
active ingredient	0.1 %	3 %	5 %	15 %
sodium lignosulfonate	1.5 %	2 %	3 %	4 %
carboxymethylcellulose	1.4 %	2 %	2 %	2 %
kaolin	97.0 %	93 %	90 %	79 %

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

F7. Dusts	a)	b)	c)
active ingredient	0.1 %	1 %	5 %
talcum	39.9 %	49 %	35 %
kaolin	60.0 %	50 %	60 %

Ready-to-use dusts are obtained by mixing the active ingredient with the carriers and grinding the mixture in a suitable mill.

F8. Suspension concentrates	a)	b)	c)	d)
active ingredient	3 %	10 %	25 %	50 %
ethylene glycol	5 %	5 %	5 %	5 %
nonylphenol polyglycol ether	-	1 %	2 %	-
(15 mol of ethylene oxide)				
sodium lignosulfonate	3 %	3 %	4 %	5 %

carboxymethylcellulose	1 %	1 %	1 %	1 %
37 % aqueous formaldehyde solution	0.2 %	0.2 %	0.2 %	0.2 %
silicone oil emulsion	0.8 %	0.8 %	0.8 %	0.8 %
water	87 %	79 %	62 %	38 %

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

The invention also provides a method of controlling plants which comprises applying to the plants or to the locus thereof a herbicidally effective amount of a compound of formula (I).

The invention also provides a method of inhibiting plant growth which comprises applying to the plants or to the locus thereof a herbicidally effective amount of a compound of formula (I).

The invention also provides a method of controlling weeds in crops of useful plants, comprising applying to said weeds or to the locus of said weeds, or to said useful crop plants, a compound or a composition of the invention.

The invention also provides a method of selectively controlling grasses and/or weeds in crops of useful plants which comprises applying to the useful plants or locus thereof or to the area of cultivation a herbicidally effective amount of a compound of formula (I).

The term “herbicide” as used herein means a compound that controls or modifies the growth of plants. The term “herbicidally effective amount” means the quantity of such a compound or combination of such compounds that is capable of producing a controlling or modifying effect on the growth of plants. Controlling or modifying effects include all deviation from natural development, for example: killing, retardation, leaf burn, albinism, dwarfing and the like. The term “plants” refers to all physical parts of a plant, including seeds, seedlings, saplings, roots, tubers, stems, stalks, foliage, and fruits. The term “locus” is intended to include soil, seeds, and seedlings, as well as established vegetation and includes not only areas where weeds may already be growing, but also areas where weeds have yet to emerge, and also to areas under cultivation with respect to crops of useful plants. “Areas under cultivation” include land on which the crop plants are already growing and land intended for cultivation with such crop plants. The term “weeds” as used herein means any undesired plant, and thus includes not only agronomically important weeds as described below, but also volunteer crop plants.

The compounds of the invention can be applied before or after planting of the crops, before weeds emerge (pre-emergence application) or after weeds emerge (post-emergence application), and are particularly effective when applied pre-emergence.

Crops of useful plants in which the composition according to the invention can be used include, but are not limited to, perennial crops, such as citrus fruit, grapevines, nuts, oil palms, olives, pome fruit, stone fruit and rubber, and annual arable crops, such as cereals, for example barley and wheat, cotton, oilseed rape, maize, rice, soy beans, sugar beet, sugar cane, sunflowers, ornamentals, switchgrass, turf

and vegetables, especially cereals, maize, rice and soy beans.

The grasses and weeds to be controlled may be both monocotyledonous species, for example Agrostis, Alopecurus, Avena, Brachiaria, Bromus, Cenchrus, Cyperus, Digitaria, Echinochloa, Eriochloa, Lolium, Monochoria, Panicum, Poa, Rottboellia, Sagittaria, Scirpus, Setaria, Sida and Sorghum, and dicotyledonous species, for example Abutilon, Amaranthus, Chenopodium, Chrysanthemum, Euphorbia, Galium, Ipomoea, Kochia, Nasturtium, Polygonum, Sida, Sinapis, Solanum, Stellaria, Veronica, Viola and Xanthium.

Crops are to be understood as also including those crops which have been rendered tolerant to herbicides or classes of herbicides (e.g. auxins or ALS-, EPSPS-, PPO- and HPPD-inhibitors) by conventional methods of breeding or by genetic engineering. An example of a crop that has been rendered tolerant to imidazolinones, e.g. imazamox, by conventional methods of breeding is Clearfield® summer rape (canola). Examples of crops that have been rendered tolerant to herbicides by genetic engineering methods include e.g. glyphosate- and glufosinate-resistant maize varieties commercially available under the trade names RoundupReady® and LibertyLink®, respectively.

Crops are also to be understood as being those which have been rendered resistant to harmful insects by genetic engineering methods, for example Bt maize (resistant to European corn borer), Bt cotton (resistant to cotton boll weevil) and also Bt potatoes (resistant to Colorado beetle). Examples of Bt maize are the Bt 176 maize hybrids of NK® (Syngenta Seeds). The Bt toxin is a protein that is formed naturally by Bacillus thuringiensis soil bacteria. Examples of toxins, or transgenic plants able to synthesize such toxins, are described in EP-A-451 878, EP-A-374 753, WO 93/07278, WO 95/34656, WO 03/052073 and EP-A-427 529. Examples of transgenic plants comprising one or more genes that code for an insecticidal resistance and express one or more toxins are KnockOut® (maize), Yield Gard® (maize), NuCOTIN33B® (cotton), Bollgard® (cotton), NewLeaf® (potatoes), NatureGard® and Protexcta®. Plant crops or seed material thereof can be both resistant to herbicides and, at the same time, resistant to insect feeding ("stacked" transgenic events). For example, seed can have the ability to express an insecticidal Cry3 protein while at the same time being tolerant to glyphosate.

Crops are also to be understood as being those which are obtained by conventional methods of breeding or genetic engineering and contain so-called output traits (e.g. improved storage stability, higher nutritional value and improved flavor).

Any method of application to weeds/crop of useful plant, or locus thereof, which is routinely used in agriculture may be used, for example application by spray or broadcast method typically after suitable dilution of a compound of formula (I) (whether said compound is formulated and/or in combination with one or more further active ingredients and/or safeners, as described herein).

The compounds of formula (I) according to the invention can also be used in combination with other active ingredients, e.g. other herbicides, and/or insecticides, and/or acaricides, and/or nematocides, and/or molluscicides, and/or fungicides, and/or plant growth regulators. Such mixtures, and the use of such mixtures to control weeds and/or undesired plant growth, form yet further aspects of the invention. For the avoidance of doubt, mixtures of invention also include mixtures of two or more different

compounds of formula (I). In particular, the present invention also relates to a composition of the invention which comprises at least one further herbicide in addition to the compound of formula (I).

When a compound of formula (I) is combined with at least one additional herbicide, the following mixtures of the compound of formula (I) are preferred: compound of formula (I) + acetochlor, compound of formula (I) + acifluorfen, compound of formula (I) + acifluorfen-sodium, compound of formula (I) + aclonifen, compound of formula (I) + acrolein, compound of formula (I) + alachlor, compound of formula (I) + alloxydim, compound of formula (I) + allyl alcohol, compound of formula (I) + ametryn, compound of formula (I) + amicarbazone, compound of formula (I) + amidosulfuron, compound of formula (I) + aminocyclopyrachlor, compound of formula (I) + aminopyralid, compound of formula (I) + amitrole, compound of formula (I) + ammonium sulfamate, compound of formula (I) + anilofos, compound of formula (I) + asulam, compound of formula (I) + atrazine, compound of formula (I) + aviglycine, compound of formula (I) + azafenidin, compound of formula (I) + azimsulfuron, compound of formula (I) + BCPC, compound of formula (I) + beflubutamid, compound of formula (I) + benazolin, compound of formula (I) + bencarbazone, compound of formula (I) + benfluralin, compound of formula (I) + benfuresate, compound of formula (I) + bensulfuron, compound of formula (I) + bensulfuron-methyl, compound of formula (I) + bensulide, compound of formula (I) + bentazone, compound of formula (I) + benzfendizone, compound of formula (I) + benzobicyclon, compound of formula (I) + benzofenap, compound of formula (I) + bicyclopyrone, compound of formula (I) + bifenox, compound of formula (I) + bilanafos, compound of formula (I) + bispyribac, compound of formula (I) + bispyribac-sodium, compound of formula (I) + borax, compound of formula (I) + bromacil, compound of formula (I) + bromobutide, compound of formula (I) + bromophenoxim, compound of formula (I) + bromoxynil, compound of formula (I) + butachlor, compound of formula (I) + butafenacil, compound of formula (I) + butamifos, compound of formula (I) + butralin, compound of formula (I) + butroxydim, compound of formula (I) + butylate, compound of formula (I) + cacodylic acid, compound of formula (I) + calcium chlorate, compound of formula (I) + cafenstrole, compound of formula (I) + carbetamide, compound of formula (I) + carfentrazone, compound of formula (I) + carfentrazone-ethyl, compound of formula (I) + CDEA, compound of formula (I) + CEPC, compound of formula (I) + chlorflurenol, compound of formula (I) + chlorflurenol-methyl, compound of formula (I) + chloridazon, compound of formula (I) + chlorimuron, compound of formula (I) + chlorimuron-ethyl, compound of formula (I) + chloroacetic acid, compound of formula (I) + chlorotoluron, compound of formula (I) + chlorpropham, compound of formula (I) + chlorsulfuron, compound of formula (I) + chlorthal, compound of formula (I) + chlorthal-dimethyl, compound of formula (I) + cinidon-ethyl, compound of formula (I) + cinmethylin, compound of formula (I) + cinosulfuron, compound of formula (I) + cisanilide, compound of formula (I) + clethodim, compound of formula (I) + clodinafop, compound of formula (I) + clodinafop-propargyl, compound of formula (I) + clomazone, compound of formula (I) + clomeprop, compound of formula (I) + clopyralid, compound of formula (I) + cloransulam, compound of formula (I) + cloransulam-methyl, compound of formula (I) + CMA, compound of formula (I) + 4-CPB, compound of formula (I) + CPMF, compound of formula (I) + 4-CPP, compound of formula (I) + CPPC, compound of formula (I) + cresol, compound of formula (I) + cumyluron, compound of formula (I) + cyanamide, compound of formula (I) + cyanazine, compound of formula (I) + cycloate, compound of formula (I) + cyclosulfamuron, compound of formula (I) + cycloxydim, compound of formula (I) + cyhalofop, compound of formula (I) + cyhalofop-butyl, compound of formula (I) + 2,4-D, compound of formula (I) + 3,4-DA,

compound of formula (I) + daimuron, compound of formula (I) + dalapon, compound of formula (I) + dazomet, compound of formula (I) + 2,4-DB, compound of formula (I) + 3,4-DB, compound of formula (I) + 2,4-DEB, compound of formula (I) + desmedipham, formula (I) + desmetryn, compound of formula (I) + dicamba, compound of formula (I) + dichlobenil, compound of formula (I) + ortho-dichlorobenzene, compound of formula (I) + para-dichlorobenzene, compound of formula (I) + dichlorprop, compound of formula (I) + dichlorprop-P, compound of formula (I) + diclofop, compound of formula (I) + diclofop-methyl, compound of formula (I) + diclosulam, compound of formula (I) + difenzoquat, compound of formula (I) + difenzoquat metilsulfate, compound of formula (I) + diflufenican, compound of formula (I) + diflufenzopyr, compound of formula (I) + dimefuron, compound of formula (I) + dimepiperate, compound of formula (I) + dimethachlor, compound of formula (I) + dimethametryn, compound of formula (I) + dimethenamid, compound of formula (I) + dimethenamid-P, compound of formula (I) + dimethipin, compound of formula (I) + dimethylarsinic acid, compound of formula (I) + dinitramine, compound of formula (I) + dinoterb, compound of formula (I) + diphenamid, formula (I) + dipropetryn, compound of formula (I) + diquat, compound of formula (I) + diquat dibromide, compound of formula (I) + dithiopyr, compound of formula (I) + diuron, compound of formula (I) + DNOC, compound of formula (I) + 3,4-DP, compound of formula (I) + DSMA, compound of formula (I) + EBEP, compound of formula (I) + endothal, compound of formula (I) + EPTC, compound of formula (I) + esprocarb, compound of formula (I) + ethalfluralin, compound of formula (I) + ethametsulfuron, compound of formula (I) + ethametsulfuron-methyl, compound of formula (I) + ethephon, compound of formula (I) + ethofumesate, compound of formula (I) + ethoxyfen, compound of formula (I) + ethoxysulfuron, compound of formula (I) + etobenzanid, compound of formula (I) + fenoxaprop, compound of formula (I) + fenoxaprop-P, compound of formula (I) + fenoxaprop-ethyl, compound of formula (I) + fenoxaprop-P-ethyl, compound of formula (I) + fenoxasulfone, compound of formula (I) + fentrazamide, compound of formula (I) + ferrous sulfate, compound of formula (I) + flamprop-M, compound of formula (I) + flazasulfuron, compound of formula (I) + florasulam, compound of formula (I) + fluazifop, compound of formula (I) + fluazifop-butyl, compound of formula (I) + fluazifop-P, compound of formula (I) + fluazifop-P-butyl, formula (I) + fluazolate, compound of formula (I) + flucarbazone, compound of formula (I) + flucarbazone-sodium, compound of formula (I) + flucetosulfuron, compound of formula (I) + fluchloralin, compound of formula (I) + flufenacet, compound of formula (I) + flufenpyr, compound of formula (I) + flufenpyr-ethyl, compound of formula (I) + flumetralin, compound of formula (I) + flumetsulam, compound of formula (I) + flumiclorac, compound of formula (I) + flumiclorac-pentyl, compound of formula (I) + flumioxazin, compound of formula (I) + flumipropin, compound of formula (I) + fluometuron, compound of formula (I) + fluoroglycofen, compound of formula (I) + fluoroglycofen-ethyl, formula (I) + fluoxaprop, compound of formula (I) + flupoxam, compound of formula (I) + flupropacil, compound of formula (I) + flupropanate, compound of formula (I) + flupyrsulfuron, compound of formula (I) + flupyrsulfuron-methyl-sodium, compound of formula (I) + flurenol, compound of formula (I) + fluridone, compound of formula (I) + flurochloridone, compound of formula (I) + fluroxypyr, compound of formula (I) + flurtamone, compound of formula (I) + fluthiacet, compound of formula (I) + fluthiacet-methyl, compound of formula (I) + fomesafen, compound of formula (I) + foramsulfuron, compound of formula (I) + fosamine, compound of formula (I) + glufosinate, compound of formula (I) + glufosinate-ammonium, compound of formula (I) + glyphosate, compound of formula (I) + halauxifen, compound of formula (I) + haloauxifen-methyl, compound of formula (I) + halosulfuron, compound of formula (I) + halosulfuron-methyl,

compound of formula (I) + haloxyfop, compound of formula (I) + haloxyfop-P, compound of formula (I) + HC-252, compound of formula (I) + hexazinone, compound of formula (I) + imazamethabenz, compound of formula (I) + imazamethabenz-methyl, compound of formula (I) + imazamox, compound of formula (I) + imazapic, compound of formula (I) + imazapyr, compound of formula (I) + imazaquin, compound of formula (I) + imazethapyr, compound of formula (I) + imazosulfuron, compound of formula (I) + indanofan, compound of formula (I) and indaziflam, compound of formula (I) + iodomethane, compound of formula (I) + iodosulfuron, compound of formula (I) + iodosulfuron-methyl-sodium, compound of formula (I) + iofensulfuron, compound of formula (I) + ioxynil, compound of formula (I) and ipfencarbazone, compound of formula (I) + isoproturon, compound of formula (I) + isouron, compound of formula (I) + isoxaben, compound of formula (I) + isoxachlortole, compound of formula (I) + isoxaflutole, formula (I) + isoxapyrifop, compound of formula (I) + karbutilate, compound of formula (I) + lactofen, compound of formula (I) + lenacil, compound of formula (I) + linuron, compound of formula (I) + MAA, compound of formula (I) + MAMA, compound of formula (I) + MCPA, compound of formula (I) + MCPA-thioethyl, compound of formula (I) + MCPB, compound of formula (I) + mecoprop, compound of formula (I) + mecoprop-P, compound of formula (I) + mefenacet, compound of formula (I) + mefluidide, compound of formula (I) + mesosulfuron, compound of formula (I) + mesosulfuron-methyl, compound of formula (I) + mesotrione, compound of formula (I) + metam, compound of formula (I) + metamifop, compound of formula (I) + metamitron, compound of formula (I) + metazachlor, compound of formula (I) and metazosulfuron, compound of formula (I) + methabenzthiazuron, compound of formula (I) + methazole, compound of formula (I) + methiozolin, compound of formula (I) + methylarsonic acid, compound of formula (I) + methyldymron, compound of formula (I) + methyl isothiocyanate, compound of formula (I) + metobenzuron, compound of formula (I) + metobromuron, compound of formula (I) + metolachlor, compound of formula (I) + S-metolachlor, compound of formula (I) + metosulam, compound of formula (I) + metoxuron, compound of formula (I) + metribuzin, compound of formula (I) + metsulfuron, compound of formula (I) + metsulfuron-methyl, compound of formula (I) + MK-616, compound of formula (I) + molinate, compound of formula (I) + monolinuron, a compound of formula (I) +monosulfuron, compound of formula (I) + monosulfuron-ester, compound of formula (I) + MSMA, compound of formula (I) + naproanilide, compound of formula (I) + napropamide, compound of formula (I) + naptalam, compound of formula (I) + NDA-402989, compound of formula (I) + neburon, compound of formula (I) + nicosulfuron, compound of formula (I) + nipyraclofen, compound of formula (I) + n-methyl glyphosate, compound of formula (I) + nonanoic acid, compound of formula (I) + norflurazon, compound of formula (I) + oleic acid (fatty acids), compound of formula (I) + orbencarb, compound of formula (I) + orthosulfamuron, compound of formula (I) + oryzalin, compound of formula (I) + oxadiargyl, compound of formula (I) + oxadiazon, compound of formula (I) + oxasulfuron, compound of formula (I) + oxaziclomefone, compound of formula (I) + oxyfluorfen, compound of formula (I) + paraquat, compound of formula (I) + paraquat dichloride, compound of formula (I) + pebulate, compound of formula (I) + pendimethalin, compound of formula (I) + penoxsulam, compound of formula (I) + pentachlorophenol, compound of formula (I) + pentanochlor, compound of formula (I) + pentoxazone, compound of formula (I) + pethoxamid, compound of formula (I) + petroleum oils, compound of formula (I) + phenmedipham, compound of formula (I) + phenmedipham-ethyl, compound of formula (I) + picloram, compound of formula (I) + picolinafen, compound of formula (I) + pinoxaden, compound of formula (I) + piperophos, compound of formula (I) + potassium arsenite,

compound of formula (I) + potassium azide, compound of formula (I) + pretilachlor, compound of formula (I) + primisulfuron, compound of formula (I) + primisulfuron-methyl, compound of formula (I) + prodiamine, compound of formula (I) + profluazol, compound of formula (I) + profoxydim, compound of formula (I) + prohexadione-calcium, compound of formula (I) + prometon, compound of formula (I) + prometryn, compound of formula (I) + propachlor, compound of formula (I) + propanil, compound of formula (I) + propaquizafop, compound of formula (I) + propazine, compound of formula (I) + propham, compound of formula (I) + propisochlor, compound of formula (I) + propoxycarbazone, compound of formula (I) + propoxycarbazone-sodium, compound of formula (I) + propyzamide, compound of formula (I) + prosulfocarb, compound of formula (I) + prosulfuron, compound of formula (I) + pyraclonil, compound of formula (I) + pyraflufen, compound of formula (I) + pyraflufen-ethyl, compound of formula (I) + pyrasulfotole, compound of formula (I) + pyrazolynate, compound of formula (I) + pyrazosulfuron, compound of formula (I) + pyrazosulfuron-ethyl, compound of formula (I) + pyrazoxyfen, compound of formula (I) + pyribenzoxim, compound of formula (I) + pyributicarb, compound of formula (I) + pyridafol, compound of formula (I) + pyridate, compound of formula (I) + pyriftalid, compound of formula (I) + pyriminobac, compound of formula (I) + pyriminobac-methyl, compound of formula (I) + pyrimisulfan, compound of formula (I) + pyrithiobac, compound of formula (I) + pyrithiobac-sodium, compound of formula (I) + pyroxasulfone, compound of formula (I) + pyroxulam, compound of formula (I) + quinclorac, compound of formula (I) + quinmerac, compound of formula (I) + quinoclamine, compound of formula (I) + quizalofop, compound of formula (I) + quizalofop-P, compound of formula (I) + quizalofop-ethyl, compound of formula (I) + quizalofop-P-ethyl, compound of formula (I) + rimsulfuron, compound of formula (I) + saflufenacil, compound of formula (I) + sethoxydim, compound of formula (I) + siduron, compound of formula (I) + simazine, compound of formula (I) + simetryn, compound of formula (I) + SMA, compound of formula (I) + sodium arsenite, compound of formula (I) + sodium azide, compound of formula (I) + sodium chlorate, compound of formula (I) + sulcotrione, compound of formula (I) + sulfentrazone, compound of formula (I) + sulfometuron, compound of formula (I) + sulfometuron-methyl, compound of formula (I) + sulfosate, compound of formula (I) + sulfosulfuron, compound of formula (I) + sulfuric acid, compound of formula (I) + tar oils, compound of formula (I) + 2,3,6-TBA, compound of formula (I) + TCA, compound of formula (I) + TCA-sodium, compound of formula (I) + tebutam, compound of formula (I) + tebuthiuron, compound of formula (I) + tefuryltrione, compound of formula (I) + tembotrione, compound of formula (I) + tepraloxydim, compound of formula (I) + terbacil, compound of formula (I) + terbumeton, compound of formula (I) + terbuthylazine, compound of formula (I) + terbutryn, compound of formula (I) + thenylchlor, compound of formula (I) + thiazafluron, compound of formula (I) + thiazopyr, compound of formula (I) + thifensulfuron, compound of formula (I) + thiencarbazone, compound of formula (I) + thifensulfuron-methyl, compound of formula (I) + thiobencarb, compound of formula (I) + tiocarbazil, compound of formula (I) + topramezone, compound of formula (I) + tralkoxydim, a compound of formula (I) and triafamone, compound of formula (I) + tri-allate, compound of formula (I) + triasulfuron, compound of formula (I) + triaziflam, compound of formula (I) + tribenuron, compound of formula (I) + tribenuron-methyl, compound of formula (I) + tricamba, compound of formula (I) + triclopyr, compound of formula (I) + trietazine, compound of formula (I) + trifloxysulfuron, compound of formula (I) + trifloxysulfuron-sodium, compound of formula (I) + trifluralin, compound of formula (I) + triflusulfuron, compound of formula (I) + triflusulfuron-methyl, compound of formula (I) + trifop, compound of formula (I)

+ trifop-methyl, compound of formula (I) + trihydroxytriazine, compound of formula (I) + trinexapac-ethyl, compound of formula (I) + tritosulfuron, compound of formula (I) + [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetic acid ethyl ester (CAS RN 353292-31-6), compound of formula (I) + 2-[[8-chloro-3,4-dihydro-4-(4-methoxyphenyl)-3-oxo-2-quinoxalinyl]carbonyl]1,3-cyclohexanedione and the compound of formula (I) + VX-573.

In particular, the following mixtures are important:

Mixtures of a compound of the formula (I) with a triazine (e.g. compound of formula (I) + ametryn, compound of formula (I) + atrazine, compound of formula (I) + cyanazine, compound of formula (I) + dimethametryn, compound of formula (I) + metribuzin, compound of formula (I) + prometon, compound of formula (I) + prometryn, compound of formula (I) + propazine, compound of formula (I) + simazine, compound of formula (I) + simetryn, compound of formula (I) + terbumeton, compound of formula (I) + terbuthylazine, compound of formula (I) + terbutryn, compound of formula (I) + trietazine).

Mixtures of a compound of formula (I) with an HPPD inhibitor (e.g. compound of formula (I) + isoxaflutole, compound of formula (I) + mesotrione, compound of formula (I) + pyrasulfotole, compound of formula (I) + sulcotrione, compound of formula (I) + tembotrione, compound of formula (I) + topramezone, compound of formula (I) + bicyclopyrone, compound of formula (I) + benzobicyclon or compound of formula (I) + 2-[[8-chloro-3,4-dihydro-4-(4-methoxyphenyl)-3-oxo-2-quinoxalinyl]carbonyl]1,3-cyclohexanedione (CAS RN 1342891-70-6)).

Mixtures of a compound of formula (I) with an auxin (e.g.compound of formula (I) + dicamba, compound of formula (I) + 2,4-D, compound of formula (I) + 2,4-DB, compound of formula (I) + MCPA, compound of formula (I) + fluroxypyr, compound of formula (I) + picloram, compound of formula (I) + triclopyr, compound of formula (I) + quinclorac, compound of formula (I) + clopyralid, compound of formula (I) + aminopyralid, compound of formula (I) + aminocyclopyrachlor, compound of formula (I) + halauxifen, compound of formula (I) + halauxifen-methyl).

Mixtures of a compound of formula (I) with a VLCFA inhibitor (e.g. compound of formula (I) + metolachlor, compound of formula (I) + S-metolachlor, compound of formula (I) + acetochlor, compound of formula (I) + dimethenamid-P, compound of formula (I) + pyroxasulfone, compound of formula (I) + dimethachlor, compound of formula (I) + flufenacet, compound of formula (I) + metazachlor, compound of formula (I) + napropamide, compound of formula (I) + pretilachlor).

Mixtures of a compound of formula (I) with a triazolinone (e.g. compound of formula (I) + amicarbazone).

Mixtures of a compound of formula (I) with an ALS inhibitor (e.g. compound of formula (I) + chlorsulfuron, compound of formula (I) + cinosulfuron, compound of formula (I) + cloransulam, compound of formula (I) + ethametsulfuron, compound of formula (I) + flazasulfuron, compound of formula (I) + foramsulfuron, compound of formula (I) + flumetsulam, compound of formula (I) + imazamethabenz, compound of formula (I) + imazamox, compound of formula (I) + imazapic, compound of formula (I) + imazapyr, compound of formula (I) + imazethapyr, compound of formula (I) + iodosulfuron, compound of

formula (I) + iofensulfuron, compound of formula (I) + metsulfuron, compound of formula (I) + nicosulfuron, compound of formula (I) + oxasulfuron, compound of formula (I) + primisulfuron, compound of formula (I) + prosulfuron, compound of formula (I) + pyrithiobac, compound of formula (I) + pyroxsulam, compound of formula (I) + rimsulfuron, compound of formula (I) + sulfosulfuron, compound of formula (I) + thifensulfuron, compound of formula (I) + triasulfuron, compound of formula (I) + tribenuron, compound of formula (I) + trifloxysulfuron, compound of formula (I) + thiencarbazone, compound of formula (I) + tritosulfuron, compound of formula (I) + bispyribac-sodium, compound of formula (I) + pyribenzoxim, compound of formula (I) + pyriftalid, compound of formula (I) +flucarbazone-sodium, compound of formula (I) +bensulfuron-methyl, compound of formula (I) + chlorimuron-ethyl, compound of formula (I) + sulfometuron-methyl, compound of formula (I) + diclosulam, compound of formula (I) + florasulam, compound of formula (I) + penoxsulam).

Mixtures of a compound of formula (I) with a PPO inhibitor (e.g. compound of formula (I) + fomesafen, compound of formula (I) + flumioxazin, compound of formula (I) + sulfentrazone, compound of formula (I) + acifluorfen-sodium, compound of formula (I) + lactofen, compound of formula (I) + oxyfluorfen, compound of formula (I) + oxadiazon, compound of formula (I) + butafenacil, compound of formula (I) + carfentrazone-ethyl, compound of formula (I) + [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoro-methyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetic acid ethyl ester).

Mixtures of a compound of formula (I) with and ACCase inhibitor (i.e. compound of formula (I) + clodinafop, compound of formula (I) + fluazifop, compound of formula (I) + fenoxaprop, compound of formula (I) + clethodim, compound of formula (I) + quizalofop, compound of formula (I) + haloxyfop, compound of formula (I) + pinoxaden, compound of formula (I) + cycloxydim, compound of formula (I) + sethoxydim).

In addition, the following mixtures are also preferred: compound of formula (I) + glyphosate, compound of formula (I) + glufosinate, compound of formula (I) + paraquat, compound of formula (I) + diquat, compound of formula (I) + pendimethalin, compound of formula (I) + trifluralin, compound of formula (I) + metamitron, compound of formula (I) + clomazone, compound of formula (I) + prodiamine, compound of formula (I) + saflufenacil, compound of formula (I) + prosulfocarb, compound of formula (I) + diflufenican, compound of formula (I) + isoxaben, compound of formula (I) + beflubutamide, compound of formula (I) + flurtamone, compound of formula (I) + benfluralin, compound of formula (I) + chlorotoluron, compound of formula (I) +linuron, compound of formula (I) + isoproturon, compound of formula (I) + triallate, compound of formula (I) + hexazinone, compound of formula (I) + diuron, compound of formula (I) + propanil, compound of formula (I) + indaziflam.

Thus, in particular, the following mixtures are preferred: compound of formula (I) + ametryn, compound of formula (I) + atrazine,compound of formula (I) + cyanazine, compound of formula (I) + dimethametryn, compound of formula (I) + metribuzin, compound of formula (I) + prometon, compound of formula (I) + prometryn, compound of formula (I) + propazine, compound of formula (I) + simazine, compound of formula (I) + simetryn, compound of formula (I) + terbumeton, compound of formula (I) + terbuthylazine, compound of formula (I) + terbutryn, compound of formula (I) + trietazine, compound of formula (I) + isoxaflutole, compound of formula (I) + mesotrione, compound of formula (I) + pyrasulfotole,

compound of formula (I) + sulcotrione, compound of formula (I) + tembotrione, compound of formula (I) + topramezone, compound of formula (I) + bicyclopyrone, compound of formula (I) + benzobicyclon compound of formula (I) + 2-[[8-chloro-3,4-dihydro-4-(4-methoxyphenyl)-3-oxo-2-quinoxalinyl]carbonyl]1,3-cyclohexanedione (CAS RN 1342891-70-6), compound of formula (I) + dicamba, compound of formula (I) + 2,4-D, compound of formula (I) + 2,4-DB, compound of formula (I) + MCPA, compound of formula (I) + fluroxypyr, compound of formula (I) + picloram, compound of formula (I) + triclopyr, compound of formula (I) + quinclorac, compound of formula (I) + clopyralid, compound of formula (I) + aminopyralid, compound of formula (I) + aminocyclopyrachlor, compound of formula (I) + halauxifen, compound of formula (I) + halauxifen-methyl, compound of formula (I) + metolachlor, compound of formula (I) + S-metolachlor, compound of formula (I) + acetochlor, compound of formula (I) + dimethenamid-P, compound of formula (I) + pyroxasulfone, compound of formula (I) + dimethachlor, compound of formula (I) + flufenacet, compound of formula (I) + metazachlor, compound of formula (I) + napropamide, compound of formula (I) + pretilachlor, compound of formula (I) + amicarbazone, compound of formula (I) + chlorsulfuron, compound of formula (I) + cinosulfuron, compound of formula (I) + cloransulam, compound of formula (I) + ethametsulfuron, compound of formula (I) + flazasulfuron, compound of formula (I) + foramsulfuron, compound of formula (I) + flumetsulam, compound of formula (I) + imazamethabenz, compound of formula (I) + imazamox, compound of formula (I) + imazapic, compound of formula (I) + imazapyr, compound of formula (I) + imazethapyr, compound of formula (I) + iodosulfuron, compound of formula (I) + iofensulfuron, compound of formula (I) + metsulfuron, compound of formula (I) + nicosulfuron, compound of formula (I) + oxasulfuron, compound of formula (I) + primisulfuron, compound of formula (I) + prosulfuron, compound of formula (I) + pyrithiobac, compound of formula (I) + pyroxsulam, compound of formula (I) + rimsulfuron, compound of formula (I) + sulfosulfuron, compound of formula (I) + thifensulfuron, compound of formula (I) + triasulfuron, compound of formula (I) + tribenuron, compound of formula (I) + trifloxysulfuron, compound of formula (I) + thiencarbazone, compound of formula (I) + tritosulfuron, compound of formula (I) + bispyribac-sodium, compound of formula (I) + pyribenzoxim, compound of formula (I) + pyriftalid, compound of formula (I) +flucarbazone-sodium, compound of formula (I) +bensulfuron-methyl, compound of formula (I) + chlorimuron-ethyl, compound of formula (I) + sulfometuron-methyl, compound of formula (I) + diclosulam, compound of formula (I) + florasulam, compound of formula (I) + penoxsulam, compound of formula (I) + fomesafen, compound of formula (I) + flumioxazin, compound of formula (I) + sulfentrazone, compound of formula (I) + acifluorfen-sodium, compound of formula (I) + lactofen, compound of formula (I) + oxyfluorfen, compound of formula (I) + oxadiazon, compound of formula (I) + butafenacil, compound of formula (I) + carfentrazone-ethyl, compound of formula (I) + [3-[2-chloro-4-fluoro-5-(1-methyl-6-trifluoromethyl-2,4-dioxo-1,2,3,4-tetrahydropyrimidin-3-yl)phenoxy]-2-pyridyloxy]acetic acid ethyl ester, compound of formula (I) + clodinafop, compound of formula (I) + fluazifop, compound of formula (I) + fenoxaprop, compound of formula (I) + clethodim, compound of formula (I) + quizalofop, compound of formula (I) + haloxyfop, compound of formula (I) + pinoxaden, compound of formula (I) + cycloxydim, compound of formula (I) + sethoxydim, compound of formula (I) + glyphosate, compound of formula (I) + glufosinate, compound of formula (I) + paraquat, compound of formula (I) + diquat, compound of formula (I) + pendimethalin, compound of formula (I) + trifluralin, compound of formula (I) + metamitron, compound of formula (I) + clomazone, compound of formula (I) + prodiamine, compound of formula (I) + saflufenacil, compound of

formula (I) + prosulfocarb, compound of formula (I) + diflufenican, compound of formula (I) + isoxaben, compound of formula (I) + beflubutamide, compound of formula (I) + flurtamone, compound of formula (I) + benfluralin, compound of formula (I) + chlorotoluron, compound of formula (I) +linuron, compound of formula (I) + isoproturon, compound of formula (I) + triallate, compound of formula (I) + hexazinone, compound of formula (I) + diuron, compound of formula (I) + propanil, compound of formula (I) + indaziflam.

The following mixtures are particularly preferred: compound of formula (I) + atrazine, compound of formula (I) + terbuthylazine, compound of formula (I) + isoxaflutole, compound of formula (I) + mesotrione, compound of formula (I) + S-metolachlor, compound of formula (I) + acetochlor, compound of formula (I) + pyroxasulfone, compound of formula (I) + dimethachlor, compound of formula (I) + flufenacet, compound of formula (I) + nicosulfuron, compound of formula (I) + fomesafen, compound of formula (I) + glyphosate, compound of formula (I) + glufosinate, compound of formula (I) + paraquat, compound of formula (I) + saflufenacil, compound of formula (I) + prosulfocarb.

For the avoidance of doubt, the present invention also includes three-way mixtures of a compound of formula (I), a herbicide as defined above and a further herbicide. In particular, the following three-way mixtures are preferred: compound of formula (I) + atrazine + mesotrione, compound of formula (I) + atrazine + S-metolachlor, compound of formula (I) + S-metolachlor + mesotrione, compound of formula (I) + glyphosate + mesotrione, compound of formula (I) + glufosinate + mesotrione, compound of formula (I) + atrazine + isoxaflutole, compound of formula (I) + S-metolachlor + isoxaflutole, compound of formula (I) + glyphosate + isoxaflutole, compound of formula (I) + glufosinate + isoxaflutole, compound of formula (I) + glyphosate + fomesafen.

In addition, the present invention also includes four-way mixtures of a compound of formula (I), a herbicide as defined above and two further herbicides. In particular, the following four-way mixtures is preferred: the compound of formula (I) + atrazine + mesotrione + S-metolachlor.

The mixing partners of the compound of formula (I) may also be in the form of esters or salts, as mentioned e.g. in The Pesticide Manual, 14th Edition (BCPC), 2006. The reference to acifluorfen-sodium also applies to acifluorfen, the reference to dimethenamid also applies to dimethenamid-P, the reference to glufosinate-ammonium also applies to glufosinate, the reference to bensulfuron-methyl also applies to bensulfuron, the reference to cloransulam-methyl also applies to cloransulam, the reference to flamprop-M also applies to flamprop, and the reference to pyrithiobac-sodium also applies to pyrithiobac, etc.

The mixing ratio of the compound of formula (I) to the mixing partner is preferably from 1: 100 to 1000:1.

The mixtures can advantageously be used in the above-mentioned formulations (in which case "active ingredient" relates to the respective mixture of compound of formula (I) with the mixing partner).

The mixtures according to the invention can also be used in combination with further active ingredients, e.g. further herbicides and/or insecticides and/or acaricides and/or nematocides and/or molluscicides and/or fungicides and/or plant growth regulators. Such mixtures, and the use of such

mixtures to control weeds and/or undesired plant growth, form yet further aspects of the invention. For the avoidance of doubt, mixtures of invention also include mixtures of two or more different compounds of formula (I).

The compounds of formula (I) according to the invention can also be used in combination with one or more safeners. Likewise, mixtures of a compound of formula (I) according to the invention with one or more further active ingredients, in particular with one or more further herbicides, can also be used in combination with one or more safeners. The term “safener” as used herein means a chemical that when used in combination with a herbicide reduces the undesirable effects of the herbicide on non-target organisms, for example, a safener protects crops from injury by herbicides but does not prevent the herbicide from killing the weeds. Where a compound of formula (I) is combined with a safener, the following combinations of the compound of formula (I) and the safener are particularly preferred. Compound of formula (I) + AD 67 (MON 4660), compound of formula (I) + benoxacor, compound of formula (I) + cloquintocet-mexyl, compound of formula (I) + cyometrinil and a compound of formula (I) + the corresponding (Z) isomer of cyometrinil, compound of formula (I) + cyprosulfamide (CAS RN 221667-31-8), compound of formula (I) + dichlormid, compound of formula (I) and dicyclonon, compound of formula (I) and dietholate, compound of formula (I) + fenchlorazole-ethyl, compound of formula (I) + fenclorim, compound of formula (I) + flurazole, compound of formula (I) + fluxofenim, compound of formula (I) + furilazole and a compound of formula (I) + the corresponding R isomer or furilazome, compound of formula (I) + isoxadifen-ethyl, compound of formula (I) + mefenpyr-diethyl, compound of formula (I) and mephenate, compound of formula (I) + oxabetrinil, compound of formula (I) + naphthalic anhydride (CAS RN 81-84-5), compound of formula (I) and TI-35, compound of formula (I) + N-isopropyl-4-(2-methoxy-benzoylsulfamoyl)-benzamide (CAS RN 221668-34-4) and a compound of formula (I) + N-(2-methoxybenzoyl)-4-[(methylaminocarbonyl)amino]benzenesulfonamide.

In particular, the following compound/safener combinations are preferred: compound of formula (I) + cloquintocet-mexyl, compound of formula (I) + cyprosulfamide, compound of formula (I) + N-(2-methoxybenzoyl)-4-[(methylaminocarbonyl)amino]benzenesulfonamide, compound of formula (I) + isoxadifen-ethyl, compound of formula (I) + benoxacor, compound of formula (I) + dichlormid and the compound of formula (I) + fluxofenim .

The safeners of the compound of formula (I) may also be in the form of esters or salts, as mentioned e.g. in The Pesticide Manual, 14th Edition (BCPC), 2006. The reference to cloquintocet-mexyl also applies to cloquintocet and to a lithium, sodium, potassium, calcium, magnesium, aluminium, iron, ammonium, quaternary ammonium, sulfonium or phosphonium salt thereof as disclosed in WO02/34048 and the reference to fenchlorazole-ethyl also applies to fenchlorazole, etc.

Preferably the mixing ratio of compound of formula (I) to safener is from 100:1 to 1:10, especially from 20:1 to 1:1.

The mixtures can advantageously be used in the above-mentioned formulations (in which case "active ingredient" relates to the respective mixture of compound of formula (I) and any further active ingredient, in particular a further herbicide, with the safener).

It is possible that the safener and a compound of formula (I) and one or more additional herbicide(s), if any, are applied simultaneously. For example, the safener, a compound of formula (I) and one or more additional herbicide(s), if any, might be applied to the locus pre-emergence or might be applied to the crop post-emergence. It is also possible that the safener and a compound of formula (I) and one or more additional herbicide(s), if any, are applied sequentially. For example, the safener might be applied before sowing the seeds as a seed treatment and a compound of formula (I) and one or more additional herbicides, if any, might be applied to the locus pre-emergence or might be applied to the crop post-emergence.

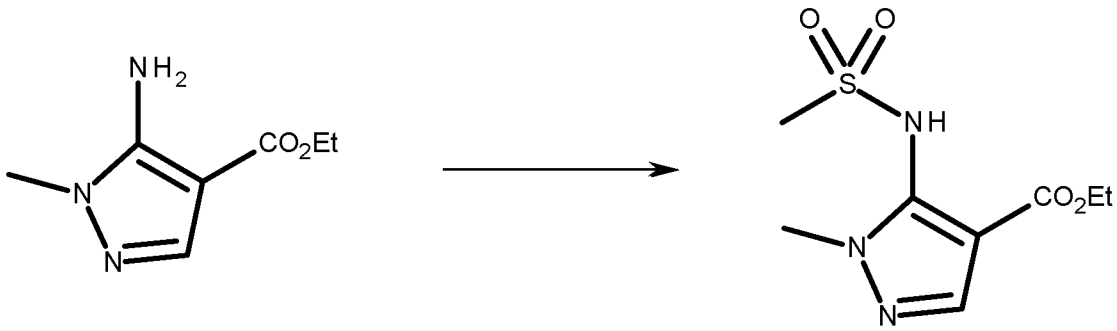
For the avoidance of doubt, where a literary reference, patent application, or patent, is cited within the text of this application, the entire text of said citation is herein incorporated by reference.

Various aspects and embodiments of the present invention will now be illustrated in more detail by way of example. It will be appreciated that modification of detail may be made without departing from the scope of the invention.

EXAMPLES

Example 1: Synthesis of *N*-{2-methyl-4-[(2-oxo-1-piperidyl)-methyl]-pyrazol-3-yl}-methanesulfonamide (Compound 15-55)

Step 1.1 Synthesis of ethyl 5-(methanesulfonamido)-1-methyl-pyrazole-4-carboxylate



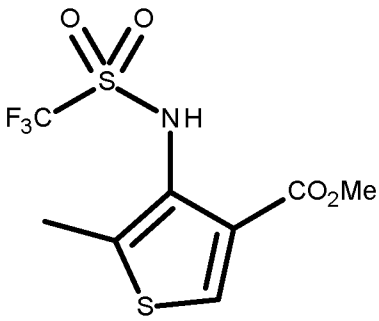
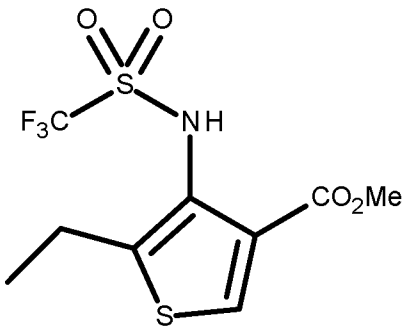
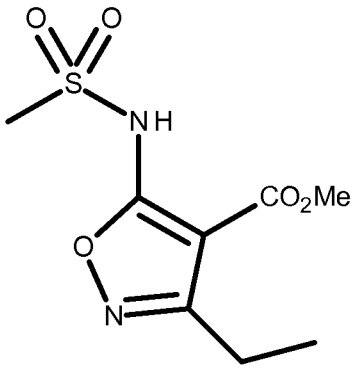
Triethylamine (0.49 ml, 3.5 mmol) was added to a stirred solution of ethyl 5-amino-1-methyl-pyrazole-4-carboxylate (0.50 g, 3.0 mmol) in dichloromethane (30 ml) at 0°C. After 5 minutes methanesulfonyl chloride (0.23 ml, 3.0 mmol) was added dropwise. The resulting mixture was allowed to warm to room temperature over 18 hours and then partitioned between 1M hydrochloric acid and dichloromethane. The phases were separated and the aqueous extracted with further dichloromethane. The combined organic phases were passed through a PhaseSep® cartridge and concentrated under reduced pressure to leave ethyl 5-(methanesulfonamido)-1-methyl-pyrazole-4-carboxylate, which was used without further purification.

Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (s, 1H), 4.34 (t,

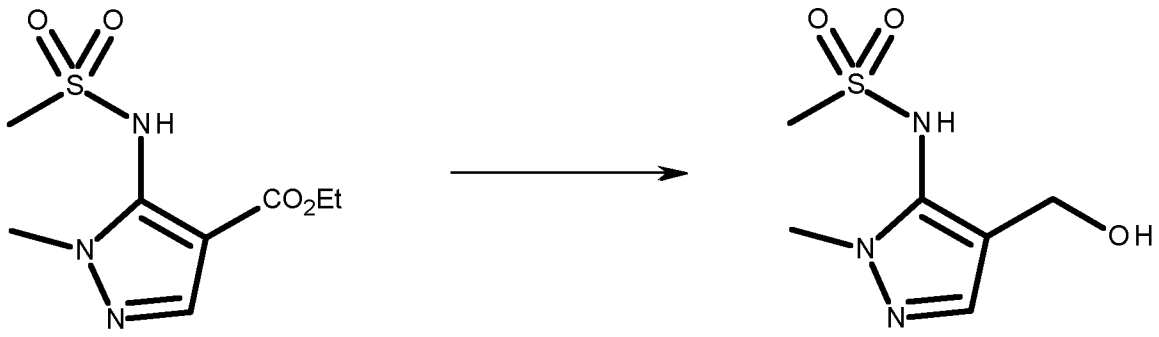
2H), 3.92 (s, 3H), 3.51 (s, 3H) and 1.36 (t, 3H) ppm.

Other compounds made using this general method are listed in Table 2 below.

TABLE 2 Compounds made according to the general method described in Step 1.1.

Name	Structure	^{1}H nmr data (400 MHz, $CDCl_3$) δ_H ppm
Methyl 5-methyl-4-(trifluoromethylsulfonylamino)-thiophene-3-carboxylate		7.89 (s, 1H), 3.89 (s, 3H), 2.53 (s, 3H)
Methyl 5-ethyl-4-(trifluoromethylsulfonylamino)-thiophene-3-carboxylate		7.92 (s, 1H), 3.89 (s, 3H), 2.99 (q, 2H), 1.32 (t, 3H)
Methyl 3-ethyl-5-(methanesulfonamido)- isoxazole-4-carboxylate		3.91 (s, 3H), 3.68 (s, 3H), 2.93 (q, 2H), 1.33 (t, 3H)

Step 1.2 Synthesis of *N*-[4-(hydroxymethyl)-2-methyl-pyrazol-3-yl]-methanesulfonamide

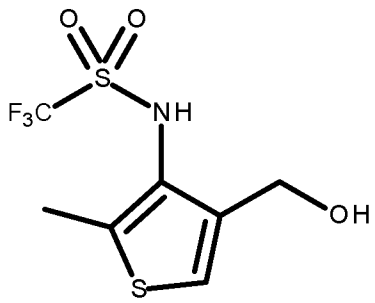
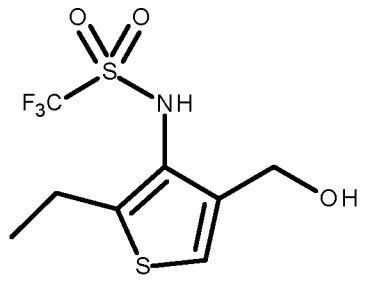


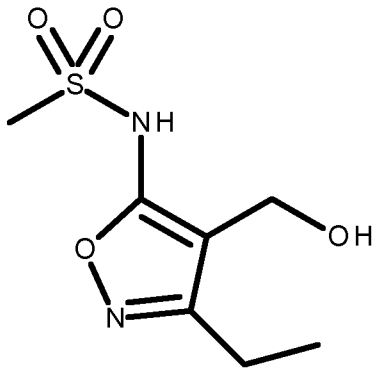
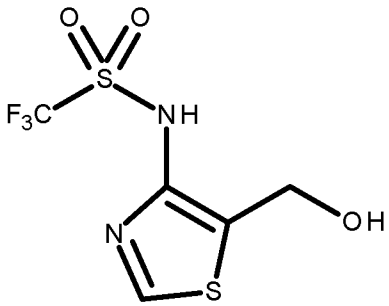
A solution of ethyl 5-(methanesulfonamido)-1-methyl-pyrazole-4-carboxylate (0.55 g, 2.2 mmol) in tetrahydrofuran (6.7 ml) was added to a stirred suspension of lithium aluminium hydride (1M solution in tetrahydrofuran; 5.6 ml, 5.6 mmol) at -20°C. The resulting mixture was allowed to warm to room temperature, stirred for 1 hour, then water added. The mixture was adjusted to pH 4 and extracted twice with ether. The aqueous phase was then further acidified to pH1 and extracted with ethyl acetate. The combined organic extracts were dried over magnesium sulphate and concentrated under reduced pressure to provide *N*-[4-(hydroxymethyl)-2-methyl-pyrazol-3-yl]-methanesulfonamide (0.121 g, 27%).

Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, d6-DMSO) δ 7.02 (s, 1 H), 4.09 (s, 2 H) and 3.46 (s, 6 H) ppm.

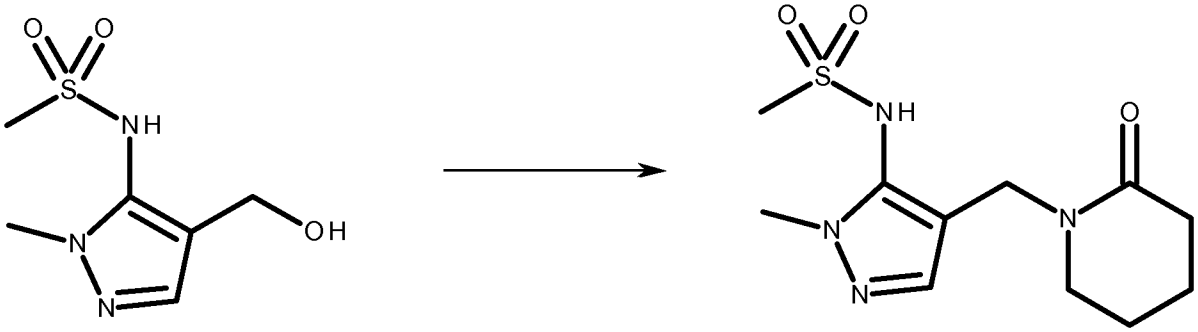
Other compounds made using this general method are listed in Table 3 below.

TABLE 3 Compounds made according to the general method described in Step 1.2.

Name	Structure	^{1}H nmr data (400 MHz, $CDCl_3$) δ_H ppm
1,1,1-Trifluoro-*N*-[4-(hydroxymethyl)-2-methyl-3-thienyl]-methanesulfonamide		7.02 (s, 1H), 4.64 (s, 2H), 2.45 (s, 3H)
N-[2-Ethyl-4-(hydroxymethyl)-3-thienyl]-1,1,1-trifluoro-methanesulfonamide		7.00 (s, 1H), 4.56 (s, 2H), 2.81 (d, 2H), 1.22 (t, 3H)

N-[3-Ethyl-4-(hydroxymethyl)-isoxazol-5-yl]-methanesulfonamide		Used without characterisation
1,1,1-Trifluoro-*N*-[5-(hydroxymethyl)-thiazol-4-yl]-methanesulfonamide		Used without characterisation

Step 1.3 Synthesis of *N*-{2-methyl-4-[(2-oxo-1-piperidyl)-methyl]-pyrazol-3-yl}-methanesulfonamide (Compound 15-55)



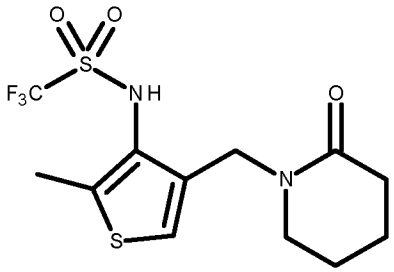
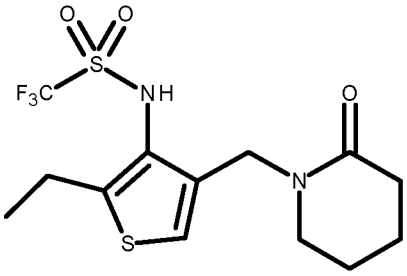
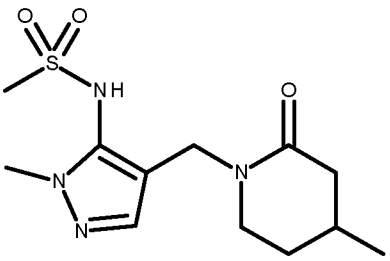
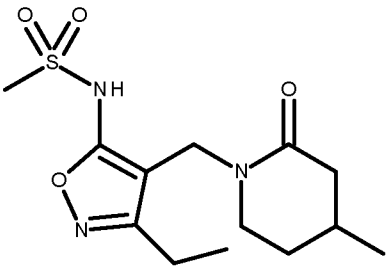
A mixture of *N*-[4-(hydroxymethyl)-2-methyl-pyrazol-3-yl]-methanesulfonamide (0.121 g, 0.590 mmol), 4-methylbenzenesulfonic acid hydrate (0.112 g, 0.590 mmol), piperidin-2-one (0.058 g, 0.590 mmol) and toluene (2.95 ml) was heated at 140°C under microwave irradiation for 30 minutes. The mixture was allowed to cool, water and ethyl acetate added and the phases separated. The aqueous phase was acidified with dilute hydrochloric acid and extracted with ethyl acetate. The combined organic phases were dried over magnesium sulphate and concentrated under reduced pressure. The residue was purified by reverse phase preparative HPLC, using FractionLynx (X Bridge column, ammonium acetate buffer) to give *N*-{2-methyl-4-[(2-oxo-1-piperidyl)-methyl]-pyrazol-3-yl}-methanesulfonamide (43 mg, 25%).

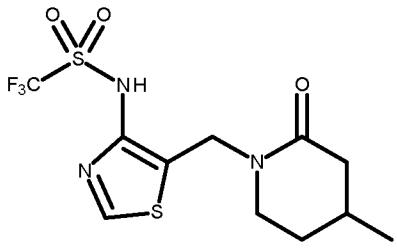
Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.17 (br s, 1H), 7.36

(s, 1H), 4.13 (s, 2H), 3.67 (s, 3H), 3.13 (m, 2H), 2.99 (s, 3H), 2.17 (t, 2H) and 1.64 (m, 4H) ppm.

Other compounds made using this general method are listed in Table 4 below.

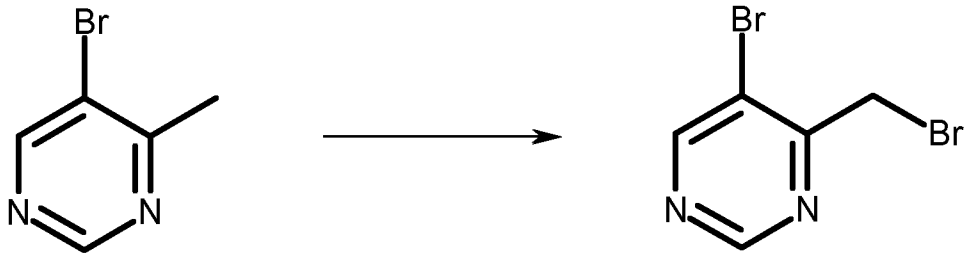
TABLE 4 **Compounds made according to the general method described in Step 1.3. Characteristic data is melting point (°C) or ^{1}H nmr data (400 MHz, $CDCl_3$ unless otherwise stated) δH ppm.**

Compound Number	Structure	Characteristic Data
9-59		168-169
10-59		10.69 (br s, 1H), 7.03 (s, 1H), 4.28 (s, 2H), 3.44 (t, 2H), 2.96 (q, 2H), 2.38 (t, 2H), 1.86 - 1.72 (m, 4H), 1.30 (t, 3H)
15-64		(CD_3CN) 8.99 (br s, 1H), 7.50 (s, 1H), 4.27 (ABq, 2H), 3.79 (s, 3H), 3.49 - 3.34 (m, 2H), 3.11 (s, 3H), 2.41 (dd, 1H), 1.93 - 1.80 (m, 3H), 1.49 - 1.33 (m, 1H), 0.96 (d, 3H)
24-64		(CD_3CN) 10.64 (br s 1H), 4.16 (ABq, 2H), 3.44 - 3.33 (m, 2H), 3.23 (s, 3H), 2.69 (q, 2H), 2.42 (dd, 1H), 1.94 - 1.82 (m, 3H), 1.51 - 1.37 (m, 1H), 1.28 (t, 3H), 0.98 (d, 3H)

37-68		8.69 (s, 1H), 4.57 (ABq, 2H), 3.51 - 3.41 (m, 2H), 2.60 - 2.48 (m, 1H), 2.11 - 1.84 (m, 3H), 1.50 (m, 1H), 1.01 (d, 3H)

Example 2: Synthesis of *N*-{4-[(4-methyl-2-oxo-1-piperidyl)-methyl]-pyrimidin-5-yl}-methanesulfonamide (Compound 60-64)

Step 2.1 Synthesis of 5-bromo-4-bromomethylpyrimidine

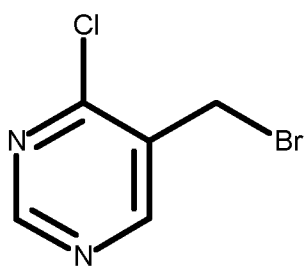


N-Bromosuccinimide (5.96 g, 31.8 mmol) and azobisisobutyronitrile (0.50 g, 2.9 mmol) were added to a solution of 5-bromo-4-methyl-pyrimidine (5 g, 29 mmol) in carbon tetrachloride (72 ml). The resulting mixture was heated at reflux for 16 hours, then allowed to cool and filtered. The solid was washed with dichloromethane and the filtrate concentrated under reduced pressure to leave a residue which was purified by silica gel chromatography (gradient elution: 5 - 100% ethyl acetate in *iso*-hexane) to provide 5-bromo-4-bromomethylpyrimidine (4.22 g, 58%).

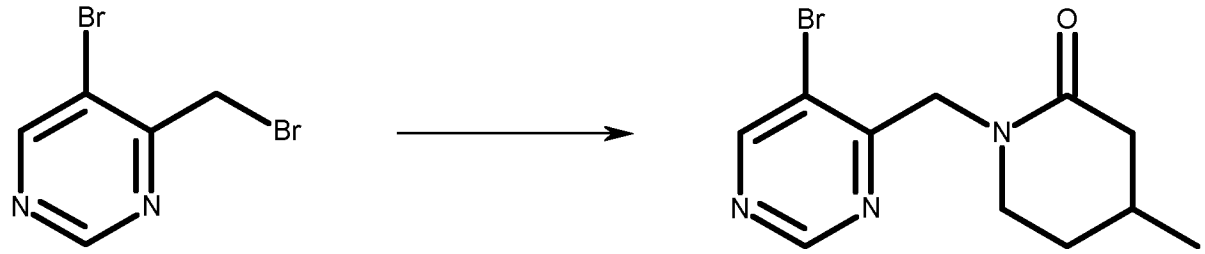
Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.10 (s, 1H), 8.84 (s, 1H) and 4.57 (s, 2H) ppm.

Other compounds made using this general method are listed in Table 5 below.

TABLE 5 Compounds made according to the general method described in Step 2.1.

Name	Structure	^{1}H nmr data (400 MHz, $CDCl_3$) δ_H ppm
5-Bromomethyl-4-chloropyrimidine		8.95 (s, 1H), 8.77 (s, 1H), 4.53 (s, 2H)

Step 2.2 Synthesis of 1-[(5-bromopyrimidin-4-yl)-methyl]-4-methyl-piperidin-2-one

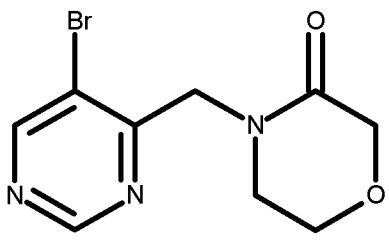
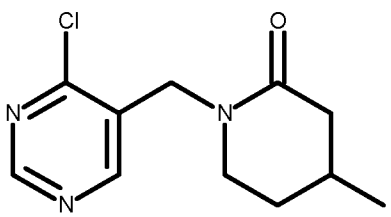


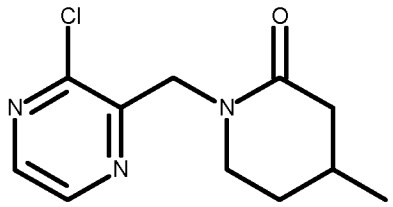
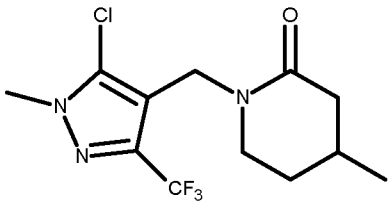
Sodium hydride (0.543 g, 13.6 mmol) was added to a stirred solution of 4-methylpiperidin-2-one (1.23 g, 10.9 mmol) in tetrahydrofuran (27 ml) at 0°C. After 1 hour a solution of 5-bromo-4-(bromomethyl)-pyrimidine (4.22 g, 9.04 mmol) in tetrahydrofuran (13 ml) was added and the mixture stirred for 15 minutes at 0°C then allowed to slowly warm to ambient temperature over 20 hours. Dilute hydrochloric acid and ethyl acetate were added and the phases separated. The aqueous phase was extracted with ethyl acetate and the combined organic phases were washed with brine, dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure to leave a residue that was purified by silica gel chromatography (gradient elution: 25 - 100% ethyl acetate in *iso*-hexane) to provide 1-[(5-bromopyrimidin-4-yl)-methyl]-4-methyl-piperidin-2-one (1.08 g, 42%).

Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.00 (s, 1H), 8.71 (s, 1H), 4.73 (ABq, 2H), 3.49 (m, 1H), 3.40 (m, 1H), 2.59 (m, 1H), 2.11 (m, 2H), 1.90 (m, 1H), 1.60 (m, 1H) and 1.09 (d, 3H) ppm.

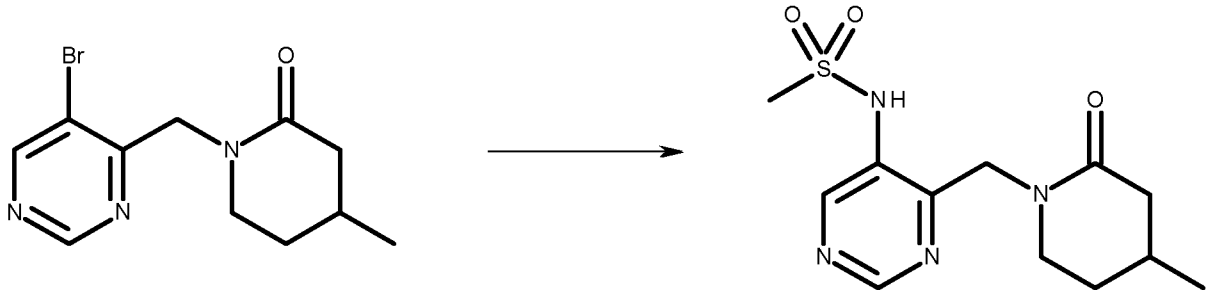
Other compounds made using this general method are listed in Table 6 below.

TABLE 6 Compounds made according to the general method described in Step 2.2.

Name	Structure	^{1}H nmr data (400 MHz, $CDCl_3$) δ_H ppm
4-[(5-Bromopyrimidin-4-yl)-methyl]-morpholin-3-one		9.05 (s, 1H), 8.77 (s, 1H), 4.79 (s, 2H), 4.30 (s, 2H), 4.00 (t, 2H), 3.55 (t, 2H)
1-[(4-Chloropyrimidin-5-yl)-methyl]-4-methyl-piperidin-2-one		8.90 (s, 1H), 8.59 (s, 1H), 4.70 (ABq, 2H), 3.40 (m, 2H), 2.60 (br d, 1H), 2.04 (m, 3H), 1.56 (m, 1H), 1.08 (d, 3H)

1-[(3-Chloropyrazin-2-yl)-methyl]-4-methyl-piperidin-2-one		8.45 (s, 1H), 8.28 (s, 1H), 4.82 (ABq, 2H), 3.47 (m, 1H), 3.35 (m, 1H), 2.58 (m, 1H), 2.10 (m, 2H), 1.91 (m, 1H), 1.61 (m, 1H), 1.08 (d, 3H)
1-{[5-Chloro-1-methyl-3-(trifluoromethyl)-pyrazol-4-yl]-methyl}-4-methyl-piperidin-2-one		4.62 (ABq, 2H), 3.90 (s, 3H), 3.12 (m, 2H), 2.54 (m, 1H), 1.98 (m, 2H), 1.84 (m, 1H), 1.42 (m, 1H), 1.00 (d, 3H)

Step 2.3 Synthesis of *N*-{4-[(4-methyl-2-oxo-1-piperidyl)-methyl]-pyrimidin-5-yl}-methanesulfonamide (Compound 60-64)

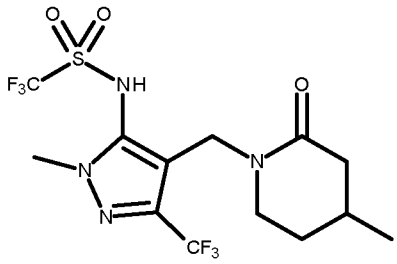
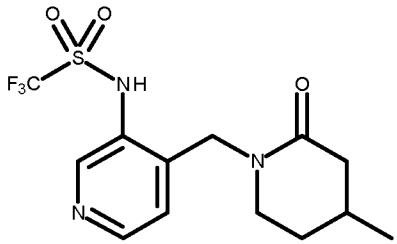
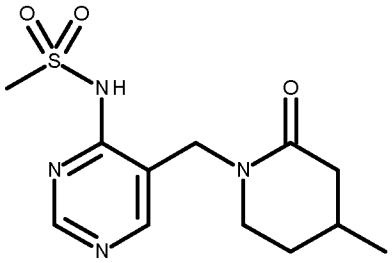
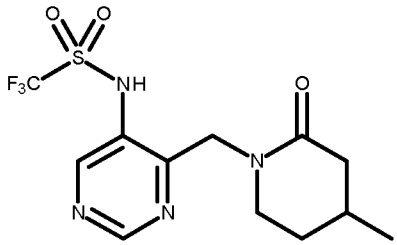
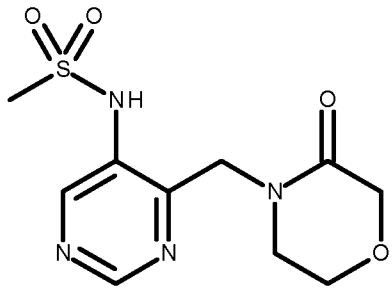


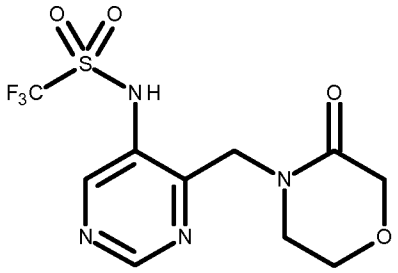
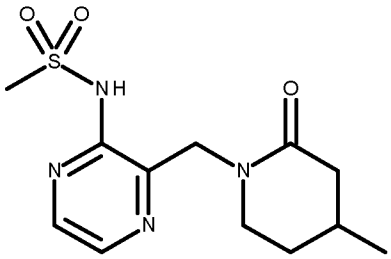
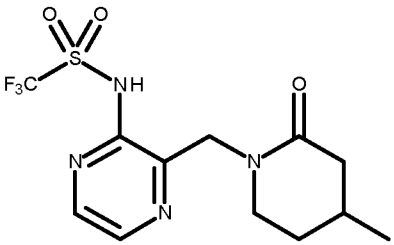
A mixture of 1-[(5-bromopyrimidin-4-yl)-methyl]-4-methyl-piperidin-2-one (0.5 g, 1.76 mmol), methanesulfonamide (0.184 g, 1.94 mmol), caesium carbonate (1.72 g, 5.28 mmol), XantPhos (0.157 g, 0.264 mmol), tris(dibenzylideneacetone)dipalladium(0) (0.083 g, 0.088 mmol) and 1,4-dioxane (8.8 ml) was at 140°C under microwave irradiation for 2 hours. The reaction mixture was allowed to cool, then dilute hydrochloric acid added and the mixture extracted with ethyl acetate. The combined organic extracts were washed with brine, dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure to provide a residue that was purified by silica gel chromatography (gradient elution: 30 - 100% ethyl acetate in *iso*-hexane) to provide *N*-{4-[(4-methyl-2-oxo-1-piperidyl)-methyl]-pyrimidin-5-yl}-methanesulfonamide (280 mg, 53%).

Characterising data for the compound are as follows: melting point 117-121 °C; ^{1}H NMR (400MHz, $CDCl_3$) δ = 10.40 (br s, 1H), 8.96 (s, 1H), 8.89 (s, 1H), 4.72 (d, 1H), 4.58 (d, 1H), 3.66 (ddd, 1H), 3.52 (dt, 1H), 3.15 (s, 3H), 2.61 - 2.50 (m, 1H), 2.06 - 1.86 (m, 3H), 1.52 - 1.39 (m, 1H) and 1.01 (d, 3H) ppm.

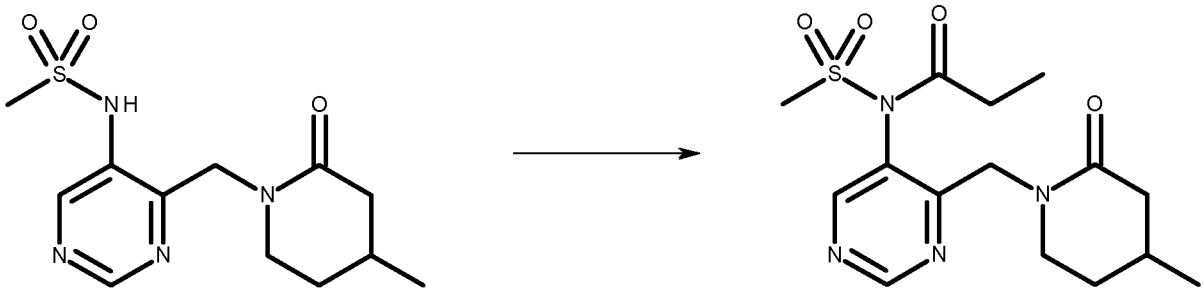
Other compounds made using this general method are listed in Table 7 below.

TABLE 7 Compounds made according to the general method described in Step 2.3. Characteristic data is melting point (°C) or ^{1}H nmr data (400 MHz, $CDCl_3$ unless otherwise stated) δH ppm.

Compound Number	Structure	Characteristic Data
16-68		4.29 (ABq, 2H), 3.93 (s, 3H), 3.50 (dd, 2H), 2.54 - 2.42 (m, 1H), 2.05 - 1.85 (m, 3H), 1.53 - 1.40 (m, 1H), 1.00 (d, 3H)
54-68		8.87 (m, 1H), 8.48 (m, 1H), 7.21 (m, 1H), 4.47 (ABq, 2H), 3.53 - 3.38 (m, 1H), 3.32 - 3.22 (m, 1H), 2.61-2.47 (m, 1H), 2.11 - 1.81 (m, 3H), 1.45 (m, 1H), 1.02 (d, 3H)
59-64		8.79 (s, 1H), 8.31 (s, 1H), 4.57 (d, 1H), 4.20 (d, 1H), 3.42 (s, 3H), 3.38 - 3.27 (m, 2H), 2.57 (ddd, 1H), 2.06 - 1.84 (m, 3H), 1.53 - 1.37 (m, 1H), 0.99 (d, 3H)
60-68		140-143
60-676		9.90 (br s, 1H), 8.97 (s, 1H), 8.92 (s, 1H), 4.62 (s, 2H), 4.23 (s, 2H), 3.88 (t, 2H), 3.69 (t, 2H), 3.17 (s, 3H)

60-680		9.02 (s, 1H), 8.97 (s, 1H), 4.60 (s, 2H), 4.22 (s, 2H), 3.88 (t, 2H), 3.76 (t, 2H)
61-64		11.21 (br s, 1H), 8.29 (d, 1H), 8.16 (d, 1H), 4.79 (d, 1H), 4.43 (d, 1H), 3.61 - 3.54 (m, 1H), 3.48 - 3.40 (m, 1H), 3.40 (s, 3H), 2.63 - 2.55 (m, 1H), 2.08 - 1.84 (m, 3H), 1.52 - 1.38 (m, 1H), 1.01 (d, 3H)
61-68		55-58

Example 3: Synthesis of *N*-{4-[(4-methyl-2-oxo-1-piperidyl)-methyl]-pyrimidin-5-yl}-*N*-methylsulfonyl-propanamide (Compound 60-65)

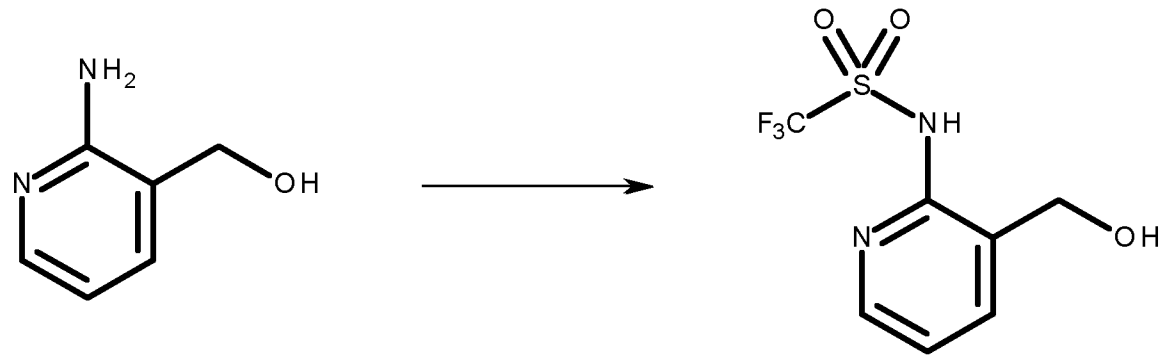


Sodium hydride (0.032 g, 0.80 mmol) was added to a stirred solution of *N*-[4-[(4-methyl-2-oxo-1-piperidyl)-methyl]-pyrimidin-5-yl]-methanesulfonamide (0.08 g, 0.27 mmol) in tetrahydrofuran (2.7 ml) at 0°C. The resulting mixture was stirred for 30 min then propanoyl chloride (0.070 ml, 0.80 mmol) was added. The reaction mixture was allowed to warm to ambient temperature and stirred for 3.5 hours. Water, followed by dilute hydrochloric acid, was added and the resulting mixture extracted with ethyl acetate. The combined organic extracts were washed with aqueous sodium hydroxide and brine, dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure. The residue was purified by silica gel chromatography (gradient elution: 25 - 100% ethyl acetate in *iso*-hexane) to provide *N*-{4-[(4-methyl-2-oxo-1-piperidyl)-methyl]-pyrimidin-5-yl}-*N*-methylsulfonyl-propanamide (77 mg, 81%).

Characterising data for the compound are as follows: melting point 187-190°C; ^{1}H NMR (400MHz, $CDCl_3$) δ = 9.14 (d, 1H), 8.52 (d, 1H), 5.17 (dd, 1H), 3.96 (dd, 1H), 3.91 - 3.74 (m, 1H), 3.57 (s, 3H), 3.55 - 3.48 (m, 1H), 2.64 - 2.43 (m, 2H), 2.19 - 1.91 (m, 4H), 1.73 - 1.52 (m, 1H), 1.16 (t, 3H), 1.04 (d, 3H) ppm.

Example 4: Synthesis of 1,1,1-trifluoro-*N*-{3-[(2-oxo-1-piperidyl)-methyl]-2-pyridyl}-methanesulfonamide (Compound 55-59)

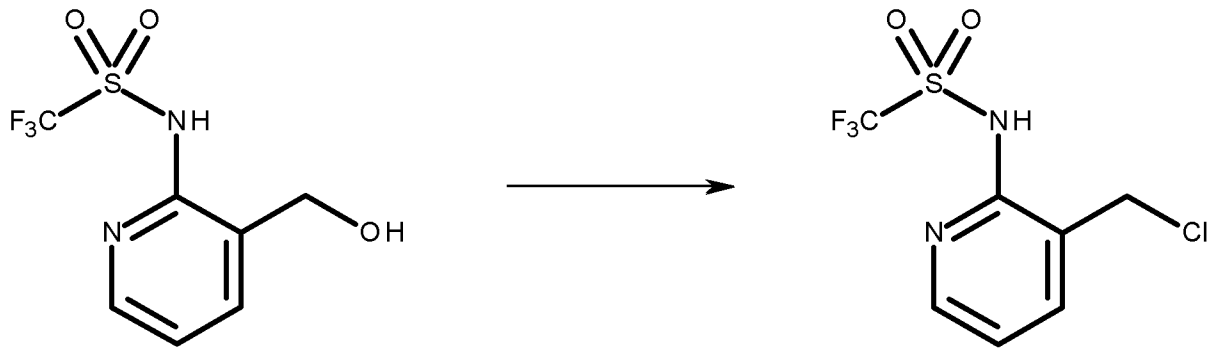
Step 4.1 Synthesis of 1,1,1-trifluoro-*N*-[3-(hydroxymethyl)-2-pyridyl]-methanesulfonamide



Triethylamine (4.67 ml, 33.5 mmol) was added to a stirred solution of (2-amino-3-pyridyl)-methanol (3.33 g, 26.8 mmol) in dichloromethane (233 ml) at 0°C. After 5 minutes a solution of trifluoromethanesulfonic anhydride (5.76 ml, 33.5 mmol) in dichloromethane (6.7 ml) was added dropwise. The resulting mixture was stirred for 30 minutes, and then partitioned between water and dichloromethane. The phases were separated and the aqueous extracted with further dichloromethane. The combined organic phases were dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure. The residue was purified by silica gel chromatography (gradient elution: 5 - 100% ethyl acetate in *iso*-hexane) to provide 1,1,1-trifluoro-*N*-[3-(hydroxymethyl)-2-pyridyl]-methanesulfonamide (2.37 g, 34%) as an orange solid.

Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.45 (br s, 1H), 8.01 (d, 1H), 7.73 (d, 1H), 7.02 (t, 1H), 4.70 (s, 2H) and 2.88 (br s, 1H) ppm.

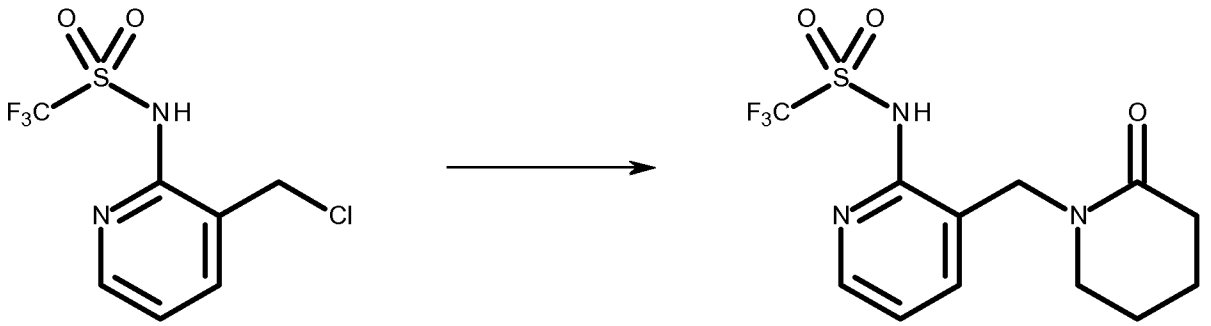
Step 4.2 Synthesis of *N*-[3-(chloromethyl)-2-pyridyl]-1,1,1-trifluoro-methanesulfonamide



Thionyl chloride (0.57 ml, 7.8 mmol) was added to a solution of 1,1,1-trifluoro-*N*-[3-(hydroxymethyl)-2-pyridyl]-methanesulfonamide (1.00 g, 3.90 mmol) in chloroform (19.5 ml). The resulting mixture was stirred at 50°C for 2 hours, allowed to cool and concentrated under reduced pressure to provide *N*-[3-(chloromethyl)-2-pyridyl]-1,1,1-trifluoro-methanesulfonamide (1.07 g, 100%) as a brown oil that was used without further purification.

Characterising data for the compound are as follows: ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.50 (br s, 1H), 8.12 (d, 1H), 7.81 (d, 1H), 7.04 (t, 1H) and 4.64 (s, 2H) ppm.

Step 4.3 Synthesis of 1,1,1-trifluoro-*N*-{3-[(2-oxo-1-piperidyl)-methyl]-2-pyridyl}-methanesulfonamide (Compound 55-59)

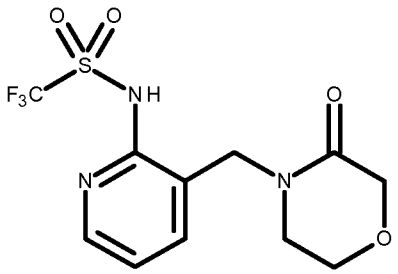


Sodium hydride (0.463 g, 11.6 mmol) was added to a stirred solution of piperidin-2-one (0.383 g, 3.86 mmol) in tetrahydrofuran (19 ml) at 0°C under nitrogen. After stirring for 30 minutes a solution of *N*-[3-(chloromethyl)-2-pyridyl]-1,1,1-trifluoromethanesulfonamide (1.06 g, 3.86 mmol) in tetrahydrofuran (9.6 ml) was added and the resulting mixture was stirred at ambient temperature for 115 hours. Saturated aqueous ammonium chloride was added and the mixture extracted with ethyl acetate. The combined organic extracts were washed with water and brine, dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure. The residue was purified by reverse phase preparative HPLC, using FractionLynx (X Bridge column, ammonium acetate buffer) to give 1,1,1-trifluoro-*N*-{3-[(2-oxo-1-piperidyl)-methyl]-2-pyridyl}-methanesulfonamide (50 mg, 11%) as a white solid.

Characterising data for the compound are as follows: ^{1}H NMR (400MHz, $CDCl_3$) δ = 12.46 (br s, 1H), 8.02 (d, 1H), 7.66-7.58 (m, 1H), 6.95 (t, 1H), 4.52 (s, 2H), 3.54 - 3.44 (m, 2H), 2.47-2.36 (m, 2H) and 1.89 - 1.76 (m, 4H) ppm.

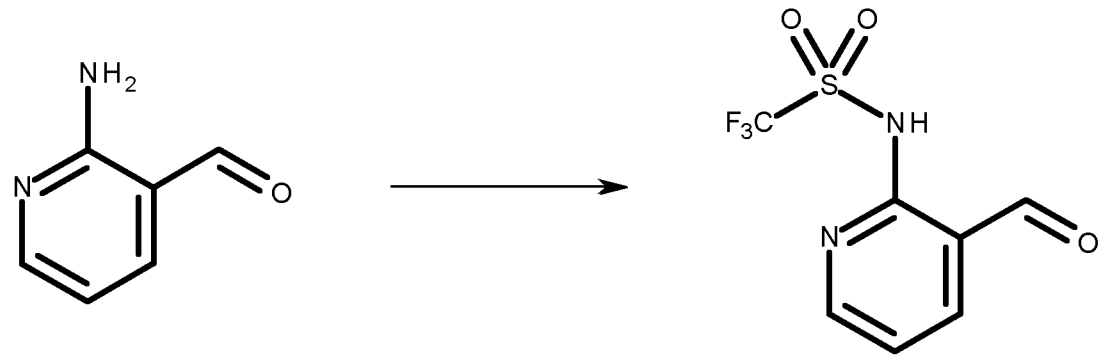
Other compounds made using this general method are listed in Table 8 below.

TABLE 8 Compounds made according to the general method described in Step 4.3.

Compound Number	Structure	^{1}H nmr data (400 MHz, $CDCl_3$) δ_H ppm
55-680		8.11 (dd, 1H), 7.72 (dd, 1H), 7.00 (t, 1H), 4.57 (s, 2H), 4.20 (s, 2H), 3.90 (t, 2H), 3.66 (t, 2H)

Example 5: Synthesis of 1,1,1-trifluoro-*N*-[3-{[6-(2-fluorophenyl)-2-oxo-1,3-oxazinan-3-yl]-methyl}-2-pyridyl]-methanesulfonamide (Compound 55-536)

Step 5.1 Synthesis of 1,1,1-trifluoro-*N*-(3-formyl-2-pyridyl)-methanesulfonamide

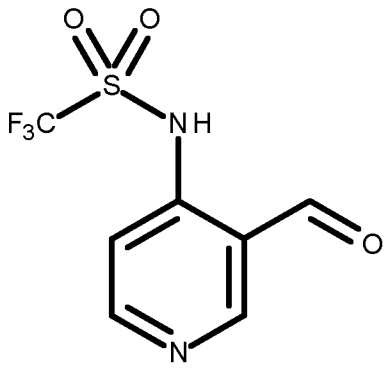


A solution of trifluoromethanesulfonic anhydride (1.5 ml, 8.9 mmol) in dichloromethane (20 ml) was added dropwise to a stirred solution of 2-aminopyridine-3-carbaldehyde (1.0 g, 8.2 mmol) and diisopropylethyl amine (1.57 ml, 9.0 mmol) in dichloromethane (50 ml) at 0°C. The resulting mixture was stirred for 2 hours at 0°C, then allowed to warm to ambient temperature and stirred for a further 1 hour. Water was added and the solid removed by filtration. The filtrate was extracted with dichloromethane and the combined organic extracts evaporated under reduced pressure to leave a sticky solid which was triturated with dichloromethane to provide a solid that was removed by filtration. The solids were combined to provide 1,1,1-trifluoro-*N*-(3-formyl-2-pyridyl)-methanesulfonamide (0.87 g, 42%).

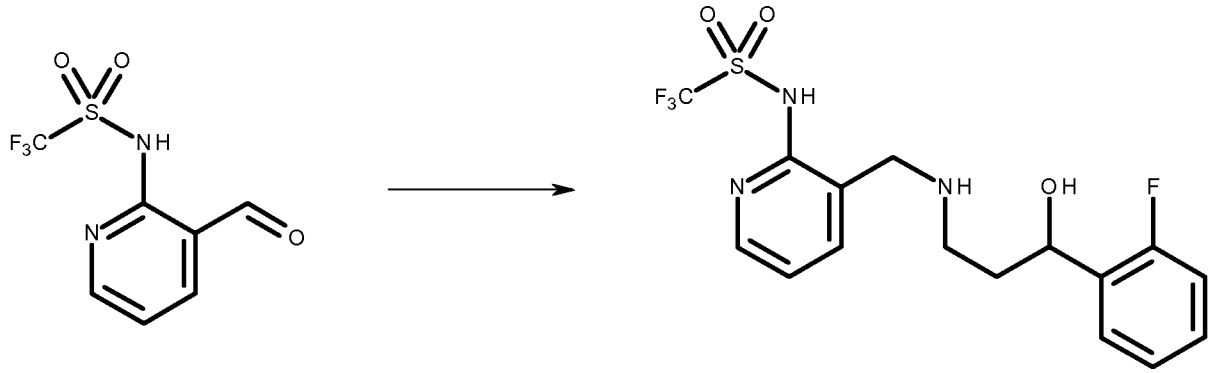
Characterising data for the compound are as follows: ^{1}H NMR (400MHz, d6-DMSO) δ = 10.2 (s, 1H), 8.49 (d, 1H), 8.45 (d, 1H) and 7.39 (t, 1H) ppm.

Other compounds made using this general method are listed in Table 9 below.

TABLE 9 Compounds made according to the general method described in Step 5.1.

Name	Structure	^{1}H nmr data (400 MHz, d6-DMSO) δ_H ppm
1,1,1-Trifluoro-*N*-(3-formyl-4-pyridyl)-methanesulfonamide		10.25 (s, 1H), 8.59 (s, 1H), 8.29 (d, 1H), 7.68 (d, 1H)

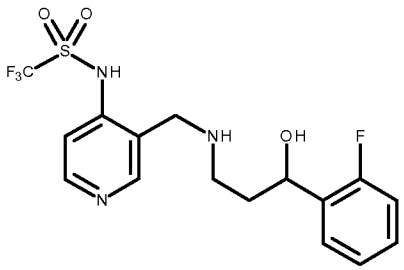
Step 5.2 Synthesis of 1,1,1-trifluoro-*N*-{3-[{[3-(2-fluorophenyl)-3-hydroxy-propyl]-amino}-methyl]-2-pyridyl}-methanesulfonamide



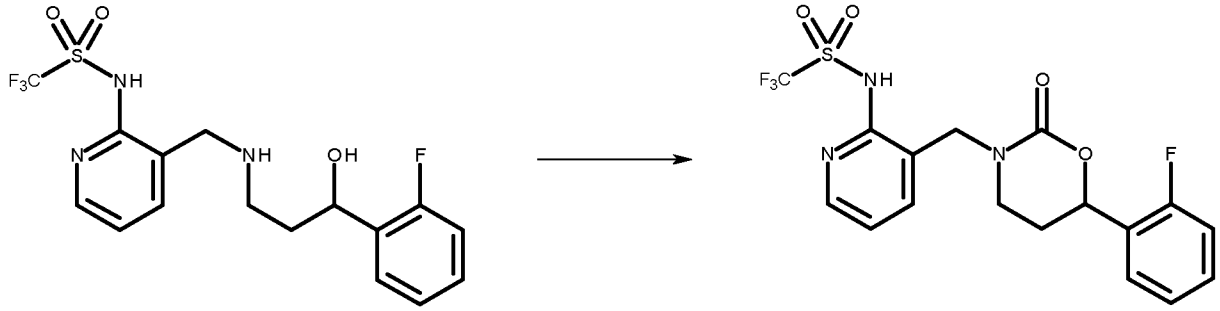
A solution of 3-amino-1-(2-fluorophenyl)-propan-1-ol (prepared as described in Example 6.3; 146 mg, 0.87 mmol) in ethanol (2 ml) was added slowly to a stirred solution of 1,1,1-trifluoro-*N*-(3-formyl-2-pyridyl)-methanesulfonamide (200 mg, 0.79 mmol) in ethanol (3 ml). A few activated molecular sieves were added, the mixture stirred at ambient temperature for 17 hours and then filtered. The filtrate was cooled to 0°C and sodium borohydride (33 mg, 0.87 mmol) added portionwise. The resulting mixture was stirred for 3 hours at ambient temperature, then methanol (3 ml) added and stirring continued for a further hour. Water and ethyl acetate were added, the phases separated and the aqueous extracted with ethyl acetate. The combined organic phases were dried over anhydrous magnesium sulphate, filtered and evaporated under reduced pressure to provide 1,1,1-trifluoro-*N*-{3-[{[3-(2-fluorophenyl)-3-hydroxy-propyl]-amino}-methyl]-2-pyridyl}-methanesulfonamide (445 mg) as a brown gum which was used without further purification.

Other compounds made using this general method are listed in Table 10 below.

TABLE 10 Compounds made according to the general method described in Step 5.2.

Name	Structure	Characteristic Data
1,1,1-Trifluoro-*N*-{3-[{[3-(2-fluorophenyl)-3-hydroxy-propyl]-amino}methyl]-4-pyridyl}-methanesulfonamide		Used without characterisation

Step 5.3 Synthesis of 1,1,1-trifluoro-*N*-[3-{[6-(2-fluorophenyl)-2-oxo-1,3-oxazinan-3-yl]-methyl}-2-pyridyl]-methanesulfonamide (Compound 55-536)



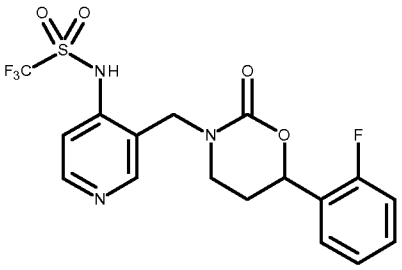
2-*tert*-Butyl-1,1,3,3-tetramethylguanidine (0.75 ml, 3.18 mmol), followed by triphosgene (156 mg, 0.53 mmol), was added to a stirred solution of 1,1,1-trifluoro-*N*-{3-[{[3-(2-fluorophenyl)-3-hydroxy-propyl]-amino}-methyl]-2-pyridyl}-methanesulfonamide (215 mg, 0.53 mmol) in dichloromethane (5 ml) at 0°C. The resulting mixture was allowed to warm to ambient temperature, stirred for 17 hours, and then poured into iced dilute hydrochloric acid. The resulting mixture was extracted with dichloromethane and the combined organic extracts dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure to provide a brown gum which was purified by reverse phase preparative HPLC, using FractionLynx (X Bridge column, ammonium acetate buffer) to provide 1,1,1-trifluoro-*N*-[3-{[6-(2-fluorophenyl)-2-oxo-1,3-oxazinan-3-yl]-methyl}-2-pyridyl]-methanesulfonamide as a brown solid.

Characterising data for the compound are as follows: ^{1}H NMR (400MHz, d6-DMSO) δ = 13.45 (br s, 1H), 8.00 (t, 2H), 7.49 (d, 1H), 7.38 (m, 1H), 7.19 (m, 3H), 5.67 (m, 1H), 4.37 (ABq, 2H), 3.58 (m, 1H), 3.28 (m, 1H) and 2.19 (m, 2H) ppm.

Other compounds made using this general method are listed in Table 11 below.

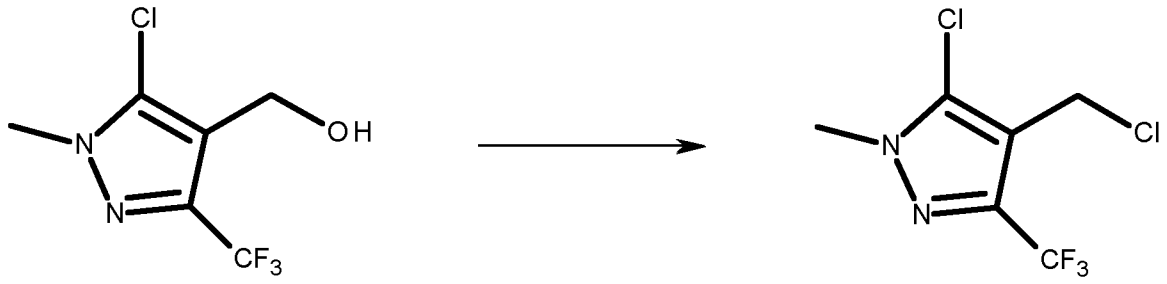
TABLE 11 Compounds made according to the general method described in Step 5.3.

Compound Number	Structure	^{1}H nmr data (400 MHz, d6-DMSO) δ_H ppm

53-536		8.20 (m, 2H), 7.59 (d, 1H), 7.44 (m, 1H), 7.38 (m, 1H), 7.20 (m, 2H), 5.60 (t, 1H), 4.30 (ABq, 2H), 3.60 (m, 1H), 3.27 (m, 1H) and 2.16 (m, 2H)

Example 6: Synthesis of starting materials

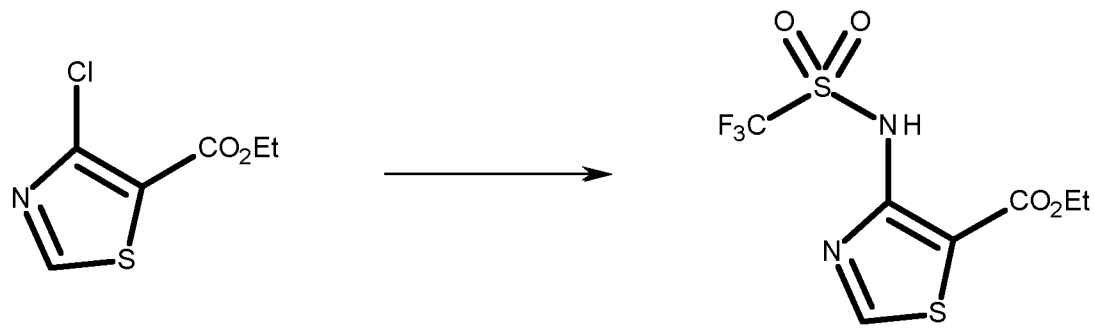
Example 6.1 Synthesis of 5-chloro-4-(chloromethyl)-1-methyl-3-(trifluoromethyl)-pyrazole



Thionyl chloride (1.0 ml, 14.0 mmol) was added dropwise to a solution of [5-chloro-1-methyl-3-(trifluoromethyl)-pyrazol-4-yl]-methanol (2.50 g, 11.7 mmol) in dichloromethane (58 ml). The resulting mixture was stirred at room temperature for 30 minutes, then concentrated under reduced pressure to provide 5-chloro-4-(chloromethyl)-1-methyl-3-(trifluoromethyl)-pyrazole (2.66 g, 98%).

Characterising data for the compound are as follows: ^{1}H NMR (400MHz, $CDCl_3$) δ = 4.53 (s, 2H) and 3.90 (s, 3H) ppm.

Example 6.2 Synthesis of ethyl 4-(trifluoromethylsulfonylamino)-thiazole-5-carboxylate

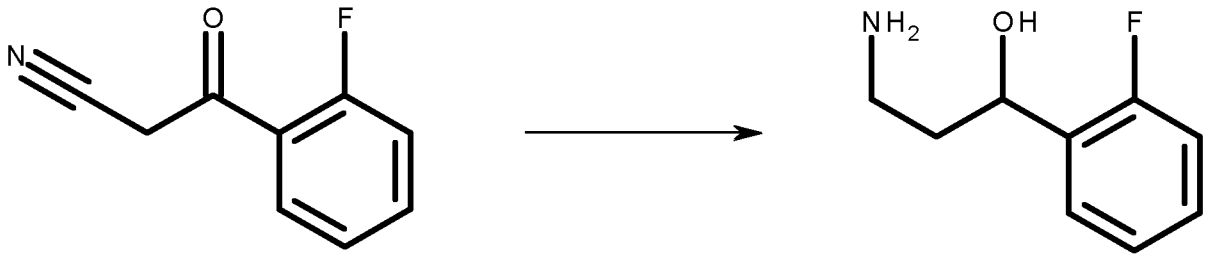


A mixture of ethyl 4-chlorothiazole-5-carboxylate (0.5 g, 2.6 mmol), trifluoromethanesulfonamide (0.43 g, 2.9 mmol), caesium carbonate (2.6 g, 7.8 mmol), XantPhos (0.23 g, 0.39 mmol), tris(dibenzylideneacetone)dipalladium(0) (0.12 g, 0.13 mmol) and 1,4-dioxane (13 ml) was heated at 140°C under microwave irradiation for 1 hour. The reaction mixture was allowed to cool, dilute hydrochloric acid added and the mixture extracted with ethyl acetate. The combined organic extracts

were washed with brine, dried over anhydrous magnesium sulphate, filtered and concentrated under reduced pressure to provide a residue that was purified by silica gel chromatography to provide ethyl 4-(trifluoromethylsulfonylamino)-thiazole-5-carboxylate (270 mg, 34%).

Characterising data for the compound are as follows: ^{1}H NMR (400MHz, $CDCl_3$) δ = 9.34 (br s, 1H), 8.84 (s, 1H), 4.41 (q, 2H) and 1.39 (t, 3H) ppm.

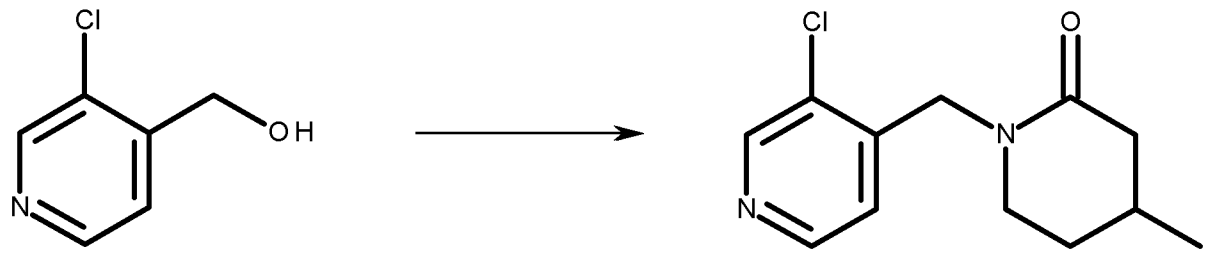
Example 6.3 Synthesis of 3-amino-1-(2-fluorophenyl)-propan-1-ol



A solution of 3-(2-fluorophenyl)-3-oxo-propanenitrile (5.5 g, 36.8 mmol) in tetrahydrofuran (120 ml) was added dropwise to a stirred solution of lithium aluminium hydride (1M in tetrahydrofuran; 135 ml, 135 mmol) in tetrahydrofuran (120 ml) at 0°C. The reaction mixture was then allowed to warm to ambient temperature and stirred for 20 hours. It was cooled to 0°C, further lithium aluminium hydride (1M in tetrahydrofuran; 40 ml, 40 mmol) added and the mixture allowed to warm to ambient temperature and stirred for 4 hours. Water (6.8 ml) was added, the resulting mixture stirred for 30 minutes, then sodium hydroxide (15% aqueous solution; 13.8 ml) and water (20.4 ml) added and stirring continued for a further 30 minutes. The mixture was filtered and the filtrate extracted with ethyl acetate. The combined organic extracts were dried over magnesium sulphate, filtered and evaporated under reduced pressure to provide 3-amino-1-(2-fluorophenyl)-propan-1-ol (4.19 g, 73%) as a brown gum that was used without further purification.

Characterising data for the compound are as follows: ^{1}H NMR (400MHz, $CDCl_3$) δ = 7.49 (t, 1H), 7.22 (m, 1H), 7.16 (t, 1H), 7.07 (dd, 1H), 4.92 (t, 1H), 2.63 (t, 2H) and 1.62 (q, 2H) ppm.

Example 6.4 Synthesis of 1-[(3-chloro-4-pyridyl)-methyl]-4-methyl-piperidin-2-one



A mixture of (3-chloro-4-pyridyl)-methanol (0.97 g, 6.8 mmol), 4-methylpiperidin-2-one (1.5 g, 14 mmol), 4-methylbenzenesulfonic acid hydrate (1.3 g, 6.8 mmol) and chlorobenzene (38 ml) were heated at reflux using a Dean Stark trap for 17 hours, then allowed to cool and concentrated under reduced pressure. The residue was purified by reverse phase preparative HPLC, using FractionLynx (X Bridge

column, ammonium acetate buffer) to provide 1-[(3-chloro-4-pyridyl)-methyl]-4-methyl-piperidin-2-one (0.33 g, 20%) as a brown oil.

Characterising data for the compound are as follows: ^{1}H NMR (400MHz, $CDCl_3$) δ = 8.69 (s, 1H), 8.53 (d, 1H), 7.34 (d, 1H), 4.77 (ABq, 2H), 3.46 - 3.27 (m, 2H), 2.71 - 2.62 (m, 1H), 2.21 - 1.92 (m, 3H), 1.65-1.51 (m, 1H), 1.09 (d, 3H) ppm.

Example 7: Pre-emergence biological efficacy

Seeds of *Alopecurus myosuroides* (ALOMY), *Setaria faberi* (SETFA), *Echinochloa crus-galli* (ECHCG), *Solanum nigrum* (SOLNI), *Amaranthus retroflexus* (AMARE) and *Ipomoea hederaceae* (IPOHE) were sown in standard soil in pots. After cultivation for one day under controlled conditions in a glasshouse (at 24/16°C, day/night; 14 hours light; 65 % humidity), the plants were sprayed with an aqueous spray solution derived from the formulation of the technical active ingredient in acetone / water (50:50) solution containing 0.5% Tween 20 (polyoxyethylene sorbitan monolaurate, CAS RN 9005-64-5) to give a final dose of 500 or 1000 g/ha of test compound.

The test plants were then grown under controlled conditions in the glasshouse (at 24/16°C, day/night; 14 hours light; 65 % humidity) and watered twice daily. After 13 days the test was evaluated (100 = total damage to plant; 0 = no damage to plant). Results are shown below in Table 12.

TABLE 12 Percentage damage caused to weed species by compounds of the invention when applied pre-emergence.

Cpd No	Rate (g/ha)	Species								
		ZEAMX	SETFA	ALOMY	ECHCG	LOLPE	SOLNI	AMARE	IPOHE	ABUTH
9-59	1,000	80	70	-	90	60	-	60	-	70
15-55	1,000	0	30	-	10	20	-	30	-	10
15-64	1,000	0	0	-	0	0	-	0	-	0
16-68	1,000	0	0	-	0	0	-	0	-	0
24-64	1,000	0	0	-	0	0	-	0	-	0
37-68	1,000	0	0	-	0	0	-	0	-	0
53-536	500	-	0	0	0	-	0	0	0	-
54-68	900	20	70	-	20	50	-	60	-	20
55-59	1,000	80	50	-	90	40	-	40	-	20
55-536	1,000	-	50	20	20	-	30	0	0	-

59-64	1,000	0	0	-	0	0	-	0	-	0
60-64	1,000	0	0	-	0	0	-	0	-	0
60-65*	1,000	10	20	-	10	10	-	30	-	40
60-68	1,000	60	70	-	90	60	-	80	-	60
60-676	1,000	0	0	-	0	0	-	0	-	0
60-680	1,000	0	50	-	30	40	-	60	-	30
61-64	1,000	0	0	-	0	0	-	0	-	0
61-68	1,000	0	20	-	10	0	-	0	-	10

* Test evaluated 9 days after treatment

Example 8: Post-emergence biological efficacy

Seeds of *Alopecurus myosuroides* (ALOMY), *Setaria faberi* (SETFA), *Echinochloa crus-galli* (ECHCG), *Solanum nigrum* (SOLNI), *Amaranthus retroflexus* (AMARE) and *Ipomoea hederaceae* (IPOHE) were sown in standard soil in pots. After cultivation for 8 days under controlled conditions in a glasshouse (at 24/16°C, day/night; 14 hours light; 65 % humidity), the plants were sprayed with an aqueous spray solution derived from the formulation of the technical active ingredient in acetone / water (50:50) solution containing 0.5% Tween 20 (polyoxyethylene sorbitan monolaurate, CAS RN 9005-64-5) to give a final dose of 500 or 1000 g/ha of test compound.

The test plants were then grown on under controlled conditions in a glasshouse (at 24/16°C, day/night; 14 hours light; 65 % humidity) and watered twice daily. After 13 days the test was evaluated (100 = total damage to plant; 0 = no damage to plant). Results are shown below in Table 13.

TABLE 13 Percentage damage caused to weed species by compounds of the invention when applied post-emergence

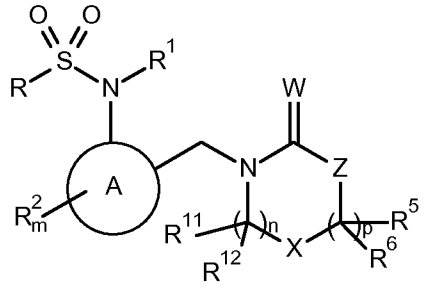
Cpd No	Rate (g/ha)	Species								
		ZEAMX	SETFA	ALOMY	ECHCG	LOLPE	SOLNI	AMARE	IPOHE	ABUTH
9-59	1,000	70	70	-	80	70	-	50	-	80
15-55	1,000	0	0	-	0	0	-	0	-	0
15-64	1,000	0	0	-	0	0	-	0	-	0
16-68	1,000	20	0	-	0	0	-	0	-	20
24-64	1,000	0	0	-	0	0	-	0	-	0

37-68	1,000	20	0	-	0	0	-	0	-	10
53-536	500	-	0	0	10	-	10	0	20	-
54-68	900	20	50	-	50	30	-	10	-	40
55-59	1,000	70	40	-	70	40	-	20	-	80
55-536	1,000	-	10	10	40	-	50	0	50	-
59-64	1,000	20	10	-	0	10	-	10	-	10
60-65*	1,000	10	0	-	0	0	-	10	-	10
60-64	1,000	40	10	-	0	0	-	0	-	40
60-68	1,000	40	60	-	80	30	-	30	-	70
60-676	1,000	20	0	-	0	0	-	0	-	0
60-680	1,000	30	40	-	40	40	-	60	-	60
61-64	1,000	0	0	-	0	0	-	0	-	0
61-68	1,000	10	20	-	10	0	-	0	-	20

* Test evaluated 9 days after treatment

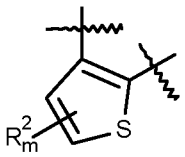
CLAIMS

1. A herbicidal compound of formula (I):



wherein:

A is a 5- or 6-membered heteroaromatic ring containing 1, 2, 3, or 4 heteroatoms selected from oxygen, sulphur and nitrogen, with the proviso that A is not



;

m is an integer selected from 0, 1 or 2;

n is an integer selected from 0, 1, 2 or 3;

p is an integer selected from 0, 1, 2, or 3;

with the proviso that $0 \leq n + p \leq 3$;

W is oxygen or sulphur;

X is oxygen, sulphur, SO, SO_2 or CR^3R^4;

Z is oxygen, sulphur, CR^8R^9 or NR^{10};

R is C_{1-6}alkyl or C_{1-6}haloalkyl;

R^1 is H, C_{1-4}alkyl, C_{3-5}alkenyl, propargyl, C_{1-4}alkoxyC_{1-2}alkyl, C_{1-4}alkoxyC_{1-2}alkoxyC_{1-2}alkyl, C_{1-4}haloalkoxyC_{1-2}alkyl, C_{1-4}alkylthioC_{1-2}alkyl, cyanoC_{1-2}alkyl, C_{1-4}alkylcarbonylC_{1-2}alkyl, C_{1-4}alkoxycarbonylC_{1-2}alkyl, C_{1-4}alkylsulphonylC_{1-2}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, heteroarylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylthioC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkylthioC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylcarbonylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkylcarbonyloxyC_{1-2}alkyl, arylcarbonyloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkoxycarbonyloxyC_{1-2}alkyl, aryloxycarbonyloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-8}alkylcarbonyl, C_{2-5}alkenylcarbonyl, C_{1-}

$_4$haloalkylcarbonyl, C_{1-4}alkoxyC_{1-2}alkylcarbonyl, C_{3-6}cycloalkylcarbonyl, C_{1-4}alkoxycarbonylC_{1-2}alkylcarbonyl, arylcarbonyl optionally substituted by 1-3 groups R^{20}, aryloxyC_{1-2}alkylcarbonyl optionally substituted by 1-3 groups R^{20}, C_{1-10}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl, C_{3-5}alkenyloxycarbonyl, propargyloxycarbonyl, C_{1-4}alkoxyC_{1-2}alkoxycarbonyl, C_{1-4}alkylthiocarbonyl, aryloxycarbonyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxycarbonyl optionally substituted by 1-3 groups R^{20}, aminocarbonyl, C_{1-4}alkylaminocarbonyl, di(C_{1-4}alkyl)aminocarbonyl, C_{1-6}alkylsulphonyl, C_{1-6}haloalkylsulphonyl or arylsulphonyl optionally substituted by 1-3 groups R^{20}, and each R^{20} is, independently, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy;

R^2 is halogen, nitrile, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{3-6}cycloalkyl, C_{2-4}alkenyl, C_{2-4}alkynyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, C_{1-4}alkylcarbonyl, C_{1-4}alkylsulphonyl, or phenyl or two R^2 groups together form $-OCH_2O-$ or $-OCH_2CH_2O-$;

R^3 and R^4 are, independently, H, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxycarbonyl, or aryl optionally substituted by 1-3 groups R^{23} or R^3 and R^4 together form a C_{2-5}alkylene chain or an oxo group or R^3 together with one of R^5, R^8 or R^{11} forms a bond or R^3 and R^8 together form a C_{2-5}alkylene chain and each R^{23} is, independently, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy;

R^5 and R^6 are, independently, H, C_{1-5}alkyl, C_{1-4}haloalkyl, C_{3-6}cycloalkyl optionally substituted with 1-3 groups selected from halogen, C_{1-4}alkyl or phenyl, C_{1-4}alkoxyC_{1-4}alkyl, C_{1-4}alkoxycarbonylaminoC_{1-4}alkyl, C_{1-4}alkylcarbonyloxyC_{1-2}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, aryloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, arylC_{1-2}alkoxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, C_{2-4}alkenyl, hydroxy, C_{1-4}alkoxy, C_{1-4}alkylthio, C_{1-4}alkylcarbonyloxy, aryl optionally substituted by 1-3 groups R^{21}, aryloxy optionally substituted by 1-3 groups R^{21}, arylthio optionally substituted by 1-3 groups R^{21}, heteroaryl optionally substituted by 1-3 groups R^{21} or R^5 and R^6 together form an oxo group or a C_{2-6}alkylene chain optionally containing an oxygen or sulphur atom and optionally substituted by 1-3 groups selected from halogen or C_{1-2}alkyl or R^5 together with together with one of R^3, R^8 or R^{11} forms a bond or R^5 and R^{11} together form a C_{2-5}alkylene chain and each R^{21} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy or two R^{21} groups together form OCH_2O or OCH_2CH_2O;

R^8 and R^9 are, independently, H, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{2-5}alkenyl, C_{2-5}alkynyl, C_{1-4}alkoxy, C_{1-4}alkylthio, C_{1-4}alkoxycarbonyl, aryl optionally substituted by 1-3 groups R^{24}, aryloxy optionally substituted by 1-3 groups R^{24} or arylthio optionally substituted by 1-3 groups R^{24} or R^8 and R^9 together form a C_{2-5}alkylene chain or an oxo group or R^8 together with one of R^3 or R^5 forms a bond or R^8 and R^3 together form a C_{2-5}alkylene chain and each R^{24} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, phenyl or phenoxy;

R^{10} is H, C_{1-4}alkyl, C_{2-5}alkenyl, aryl optionally substituted by 1-3 groups R^{22}, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{22}, heteroaryl optionally substituted by 1-3 groups R^{22}, C_{1-4}alkylcarbonyl,

C_{1-4}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl, C_{1-4}alkoxyC_{1-2}alkoxycarbonyl, C_{3-5}alkenyloxycarbonyl, aryloxycarbonyl optionally substituted by 1-3 groups R^{22}, arylC_{1-2}alkoxycarbonyl optionally substituted by 1-3 groups R^{22}, aminocarbonyl, C_{1-4}alkylaminocarbonyl, di(C_{1-4}alkyl)aminocarbonyl, C_{1-6}alkylsulphonyl or C_{1-6}haloalkylsulphonyl and each R^{22} is, independently, halogen, nitro, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy, C_{1-2}alkoxyC_{1-2}alkoxy, hydroxy, C_{1-4}alkylthio, C_{1-4}haloalkylthio, C_{1-4}alkylsulphonyl, C_{1-4}alkoxycarbonyl, phenyl or phenoxy;

R^{11} and R^{12} are, independently, H, halogen, hydroxy, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, carboxy, C_{1-4}alkoxycarbonyl or R^{11} and R^{12} together form an oxo group or R^{11} together with one of R^3 or R^5 forms a bond or R^{11} and R^5 together form a C_{2-5}alkylene chain.

2. The compound of claim 1, wherein A is a 5-membered heteroaromatic ring containing 1 to 4 heteroatoms selected from oxygen, sulphur and nitrogen.

3. The compound of claim 2, wherein A is a pyrrole, furan, thiophene, pyrazole, imidazole, oxazole, isoxazole, thiazole, isothiazole, 1,2,3-triazole, 1,2,4-triazole, 1,2,3-oxadiazole, 1,2,5-oxadiazole, 1,2,3-thiadiazole, 1,2,5-thiadiazole or tetrazole ring.

4. The compound of claim 3, wherein A is a thiophene,pyrazole, thiazole, 1,2,4-triazole or tetrazole ring.

5. The compound of claim 1, wherein A is a 6-membered heteroaromatic ring containing 1 to 3 nitrogen atoms.

6. The compound of claim 5, wherein A is a pyridine, pyridazine, pyrimidine, pyrazine, 1,2,3-triazine or 1,2,4-triazine ring.

7. The compound of claim 6, wherein A is a pyridazine, pyrimidine or pyrazine ring.

8. The compound of any one of the preceding claims, wherein W is oxygen.

9. The compound of any one of the preceding claims, wherein X is oxygen or CR^3R^4.

10. The compound of any one of the preceding claims, wherein Z is oxygen, CR^8R^9 or NR^{10};

11. The compound of any one of the preceding claims, wherein m is 0 or 1.

12. The compound of claim 11, wherein m is 0.

13. The compound of any one of the preceding claims, wherein n is 0, 1 or 2 and p is 0, 1 or 2 with the proviso that $1 \leq n + p \leq 2$.

14. The compound of any one of the preceding claims, wherein R is C_1-C_6 alkyl.

15. The compound of any one of claims 1 to 13, wherein R is C_{1-4}haloalkyl.

16. The compound of claim 15, wherein R is trifluoromethyl.

17. The compound of any one of the preceding claims, wherein R^1 is H, C_{1-4}alkoxyC_{1-2}alkyl, C_{1-}

$_4$alkoxyC_{1-2}alkoxyC_{1-2}alkyl, C_{1-4}haloalkoxyC_{1-2}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkylcarbonyloxyC_{1-2}alkyl, arylcarbonyloxyC_{1-2}alkyl optionally substituted by 1-3 groups R^{20}, C_{1-4}alkoxycarbonyloxyC_{1-2}alkyl, C_{1-8}alkylcarbonyl, C_{1-4}haloalkylcarbonyl, C_{1-4}alkoxyC_{1-2}alkylcarbonyl, C_{1-10}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl, C_{1-4}alkoxyC_{1-2}alkoxycarbonyl, aryloxycarbonyl optionally substituted by 1-3 groups R^{20}, arylC_{1-2}alkoxycarbonyl optionally substituted by 1-3 groups R^{20}, C_{1-6}alkylsulphonyl or C_{1-6}haloalkylsulphonyl, and each R^{20} is, independently, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy.

18. The compound of claim 17, wherein R^1 is H, C_{1-5}alkylcarbonyl, C_{1-4}haloalkylcarbonyl, C_{1-5}alkoxycarbonyl, C_{1-4}haloalkoxycarbonyl or C_{1-4}haloalkylsulphonyl.

19. The compound of claim 18, wherein R^1 is H, C_{1-5}alkylcarbonyl or C_{1-5}alkoxycarbonyl.

20. The compound of any one of the preceding claims, wherein R^2 is halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}alkylsulphonyl.

21. The compound of claim 20, wherein R^2 is halogen or methyl.

22. The compound of any one of the preceding claims,wherein R^3 and R^4 are, independently, H, halogen or C_{1-4}alkyl.

23. The compound of claim 22, wherein R^3 and R^4 are, independently, H or methyl.

24. The compound of any one of the preceding claims, wherein R^5 and R^6 are, independently, H, C_{1-5}alkyl, C_{1-4}haloalkyl, C_{3-6}cycloalkyl, C_{1-4}alkoxyC_{1-4}alkyl, arylC_{1-2}alkyl optionally substituted by 1-3 groups R^{21}, C_{2-4}alkenyl, C_{1-4}alkoxy, C_{1-4}alkylthio, aryl optionally substituted by 1-3 groups R^{21}, aryloxy optionally substituted by 1-3 groups R^{21}, arylthio optionally substituted by 1-3 groups R^{21}, heteroaryl optionally substituted by 1-3 groups R^{21} or R^5 and R^6 together form a C_{2-5}alkylene chain optionally containing an oxygen atom, and each R^{21} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy.

25. The compound of claim 24, wherein R^5 and R^6 are, independently, H, C_{1-4}alkyl, C_{1-3}haloalkyl, cyclopropyl, C_{1-3}alkoxy, C_{1-3}alkylthio, aryl optionally substituted by 1-3 groups R^{21}, aryloxy optionally substituted by 1-3 groups R^{21}, arylthio optionally substituted by 1-3 groups R^{21}, heteroaryl optionally substituted by 1-3 groups R^{21} or R^5 and R^6 together form a C_{3-5}alkylene chain, and each R^{21} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-4}haloalkoxy.

26. The compound of claim 25, wherein R^5 and R^6 are, independently, H, C_{1-3}alkyl, trifluoromethyl, cyclopropyl, C_{1-3}alkoxy, aryl optionally substituted by 1-2 groups R^{21} or R^5 and R^6 together form a C_{3-5}alkylene chain, and each R^{21} is, independently, halogen, methyl or methoxy.

27. The compound of any one of the preceding claims, wherein R^8 and R^9 are, independently, H, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}alkylthio, aryl optionally substituted by 1-3 groups R^{24}, aryloxy optionally substituted by 1-3 groups R^{24} or arylthio optionally substituted by 1-3 groups R^{24} and each R^{24} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy or C_{1-}

$_4$haloalkoxy.

28. The compound of claim 27,wherein R^8 and R^9 are, independently, H, halogen, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}alkylthio, aryl optionally substituted by 1-2 groups R^{24}, and each R^{24} is, independently, halogen, methyl or methoxy.

29. The compound of claim 28, wherein R^8 and R^9 are, independently, H, halogen, C_{1-3}alkyl, C_{1-3}alkoxy or C_{1-3}alkylthio.

30. The compound of any one of the preceding claims, wherein R^{10} is H, C_{1-4}alkyl, aryl optionally substituted by 1-3 groups R^{22}, heteroaryl optionally substituted by 1-3 groups R^{22}, C_{1-4}alkylcarbonyl, C_{1-4}alkoxycarbonyl, C_{1-4}alkylsulphonyl or C_{1-4}haloalkylsulphonyl and each R^{22} is, independently, halogen, cyano, C_{1-4}alkyl, C_{1-4}haloalkyl, C_{1-4}alkoxy, C_{1-4}haloalkoxy or C_{1-4}alkylsulphonyl.

31. The compound of claim 30, wherein R^{10} is H, C_{1-3}alkyl or aryl optionally substituted by 1-3 groups R^{22}, and each R^{22} is, independently, halogen, methyl or methoxy.

32. The compound of any one of the preceding claims, wherein R^{11} and R^{12} are, independently, H, hydroxy, C_{1-4}alkyl, C_{1-4}alkoxy, carboxy, C_{1-4}alkoxycarbonyl or R^{11} and R^{12} together form an oxo group.

33. The compound of claim 32, wherein R^{11} and R^{12} are each H.

34. A herbicidal composition comprising a compound of formula (I) as defined in any one of claims 1 to 33 together with at least one agriculturally acceptable adjuvant or diluent.

35. A composition according to claim 34 which comprises a further herbicide in addition to the compound of formula (I).

36. A composition according to claim 34 or 35 which comprises a safener.

37. Use of a compound of formula (I) as defined in any one of claims 1 to 33 or a composition as defined in any one of claims 34 to 36 as a herbicide.

38. A method of controlling weeds in crops of useful plants, comprising applying to said weeds or to the locus of said weeds, or to said useful plants or to the locus of said useful plants, a compound of formula (I) as defined in any one of claims 1 to 33 or a composition as claimed in any one of claims 34 to 36.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/064983

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D401/06 A01N43/40 A01N43/52 A01N43/56 A01N43/78
A01N43/80 C07D409/04 C07D413/04 C07D417/04
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/070050 A2 (AVENTIS PHARMA SA [FR]) 19 August 2004 (2004-08-19) Page 103 compound 236 Page 288 lines 6-8 Page 294 lines 36-36 Page 302 lines 14-16 Page 310 lines 1-3 Page 316 lines 29-31 Page 329 lines 3-4 Page 334 lines 20-21 Page 348 lines 23-25 Page 356 lines 8-10 Page 363 lines 32-34 Page 370 lines 34-36 Page 377 lines 29-31 Page 384 lines 5-7 Page 411 lines 30-32 Page 433 lines 15-17 -/--	1,5-14, 17-19, 22,23

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

[X] See patent family annex.

* Special categories of cited documents :

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

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

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 September 2014	06/10/2014

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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