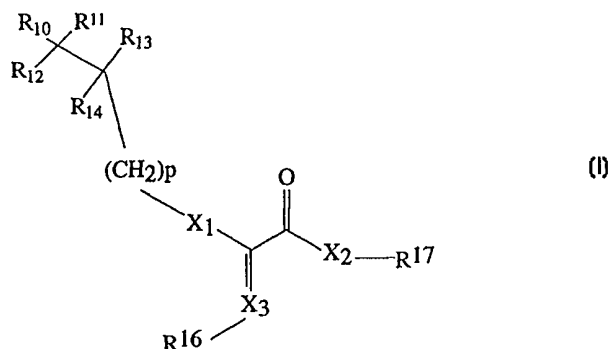




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(21) International Application Number: PCT/EP99/05470 (22) International Filing Date: 16 July 1999 (16.07.99) (30) Priority Data: 9815508.8 16 July 1998 (16.07.98) GB 9816783.6 31 July 1998 (31.07.98) GB 9826903.8 7 December 1998 (07.12.98) GB (71) Applicant (for all designated States except US): RHONE-POULENC AGRICULTURE LTD. [GB/GB]; Fyfield Road, Ongar, Essex CM5 0HW (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): RAY, Nicholas, Charles [GB/GB]; Rhône-Poulenc Agriculture Ltd., Research Sta- tion, Fyfield Road, Ongar, Essex CM5 0HW (GB). WHITE, Catherine, Jacqueline [FR/GB]; Rhône-Poulenc Agriculture Ltd., Research Station, Fyfield Road, Ongar, Essex CM5 0HW (GB). GINGELL, Michael [GB/GB]; Rhône-Poulenc Agriculture Ltd., Research Station, Fyfield Road, Ongar, Essex CM5 0HW (GB). PETTIT, Simon, Neil [GB/GB]; Rhône-Poulenc Agriculture Ltd., Research Station, Fyfield Road, Ongar, Essex CM5 0HW (GB). RAPHY, Gilles [FR/GB]; Rhône-Poulenc Agriculture Ltd., Research Sta- tion, Fyfield Road, Ongar, Essex CM5 0HW (GB).		(74) Agent: BRACHOTTE, Charles; Rhône-Poulenc Agro, DPI, Boîte postale 9163, F-69263 Lyon Cedex 09 (FR). (81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>

(54) Title: ARYL VINYL ETHER DERIVATIVES AND THEIR USE AS HERBICIDES



(57) Abstract

The invention relates to aryl vinyl ether derivatives of general formula (I), wherein the substituents are as defined in the description; compositions containing them, processes and intermediates for their preparation and a method of controlling weeds by means of such compositions.

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ARYL VINYL ETHER DERIVATIVES AND THEIR USE AS HERBICIDES**Background of the invention**

5 The invention relates to novel aryl vinyl ethers having herbicidal properties, compositions containing them, processes and intermediates for their preparation, a method of controlling weeds by means of such compositions and the safening of aryl vinyl ethers with antidotal or safener compounds.

10 An object of this invention is to provide new aryl vinyl ether derivatives useful as highly effective herbicides, and processes for their preparation.

 Another object of the instant invention is to provide herbicides which are effective against grasses in addition to broad-leafed weeds.

15 Another object is to provide herbicides which possess selective herbicidal activity.

 Another object is to provide herbicides effective as low dose herbicides.

20 Another object is to provide herbicides which possess good residual activity.

 It is known that many herbicides may injure crop plants at herbicide application rates needed to control weed growth. This renders many herbicides unsuitable for controlling weeds in the presence of certain crops. Where weed growth in crops is uncontrolled however, this results in lower crop yield and reduced crop quality, as weeds will compete with crops for nutrients, light and water. Reduction in herbicidal injury to crops without an unacceptable reduction in the herbicidal action can be accomplished by use of crop protectants known as "antidotes", also sometimes referred to as "safeners" or

25 "antagonists".

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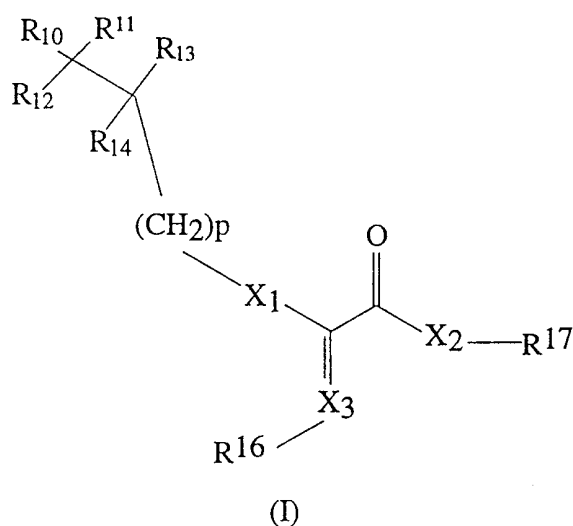
 Aryl vinyl ether compounds under certain conditions can produce damage in crop plants, particularly cereal crop plants such as maize and

wheat, and it is therefore a further object of the present invention to provide a method for reducing the damage caused to crop plants by aryl vinyl ether compounds.

These and other objects of the instant invention can be achieved in whole or in part by means of the compounds of the invention.

Description of the Invention

The present invention provides compounds of formula (I):



wherein:

p is 0 or 1,

X¹ is O, NH or S;

X² is O, S, NR¹⁸ or a simple bond (preferably O, S or NR¹⁸);

X³ is N or CR¹⁹;

R¹⁷ and R¹⁸ independently represent a hydrogen atom or an optionally substituted group R²⁰, R²¹, R²² or R²³, wherein;

R²⁰ represents a lower alkyl radical;

R²¹ represents a lower alkenyl radical;

R²² represents a lower alkynyl radical;

R²³ represents a -(CH₂)_m-phenyl radical;

m represents zero or one;

R^{16} is R^{24} or OR^{25} or SR^{25} , $NR^{25}R^{26}$ or alkyl substituted by alkoxy carbonyl;

R^{24} , R^{25} and R^{26} independently have one of the meanings given for R^{18} ;

5 R^{19} has one of the meanings given for R^{16} ;

R^{10} represents a radical selected from;

- CH_2NO_2 , - $CHR^{27}R^{28}$, - $CR^{27}R^{28}R^{281}$, - $CR^{30}R^{29}R^{291}$, - $CO-NR^{30}R^{31}$,
 - $CH_2NR^{30}R^{31}$, - $CH=CR^{31}R^{32}$, - $CH_2N(R^{30})S(O)qR^{33}$, - $C(O)SR^{32}$, - CH_2
 - $C(O)SR^{32}$, - $(CH_2)_zCO_2R^{32}$, - CO_2R^{32} , - $CH=CHC(O)OR^{32}$, - $C(R^{32})=N-$
 10 - $NR^{30}R^{31}$, - $C(R^{32})=N-NH-C(O)$ lower alkyl, - COR^{32} , - $C(O)OC(O)R^{32}$, -
 - $C(=N-OH)R^{32}$, - $C\equiv CCOOR^{32}$, - CH_2SCN , - CH_2NCO , - CH_2NCS , -
 - CH_2N_3 , - CH_2CN , - CH_2OSCN , - CH_2OCN , - $CH_2N(R^{30})CO_2R^{33}$, -
 - $CH_2OSO_2R^{33}$, - $CH_2SO_2OR^{33}$, - $CH_2OCO_2R^{33}$, - $CH=CHNR^{33}R^{34}$, -
 - $C(O)ONR^{33}R^{34}$, - $C(=NR^{35})R^{32}$, - $CH_2P(O)R^{35}R^{36}$, - $CH_2OP(O)R^{35}R^{36}$,
 15 - $CH_2OC(O)NR^{30}R^{36}$, - $CH_2OCH_2C(O)$ (optionally substituted phenyl),
 - $CO_2N=C$ (optionally substituted phenyl)₂, N-succinimidomethyl, N-phthalimidomethyl, a tetrazolyl group (especially 1-tetrazolyl), -
 - $CONHNHR^{30}$, - CO_2CH_2CO (optionally substituted phenyl, or a
 saturated or unsaturated 5-7 membered heterocyclic ring containing
 20 from 1-3 hetero atoms selected from O, N and S), - CO_2CH_2 (saturated
 or unsaturated 5-7 membered heterocyclic ring containing from 1-3
 hetero atoms selected from O, N and S), CO_2R^{32a} , $COCH_2COR^{33}$,
 $COCHN_2$, $CONH$ (lower alkyl substituted by hydroxy), -
 $CH(OH)$ (lower alkyl), $C(R^{32})=N-NH-C(S)NR^a$, $C(R^{32})=N-NH$
 25 (optionally substituted unsaturated 5-7 membered heterocyclic ring
 containing from 1-3 atoms selected from O, N and S), $C(R^{32})=N-$
 - $NR^{30a}R^{31a}$, $C(R^{32})=N-NHSO_2R^{33}$ and $C(O)F$;

z represents one, two, three or four;

q represents zero or two;

30 R^a represents H or lower alkyl;

R^{32a} represents an optionally substituted N-linked imidazole or triazole ring optionally fused to a benzene ring;

R^{30a} and R^{31a} together with the N atom to which they are attached form a 5 or 6 -membered saturated heterocyclic ring optionally containing an additional O, S or NR^a group in the ring;

R^{27} , R^{28} and R^{281} represent the same or different halogen atoms;

R^{29} and R^{291} represent OR^{37} or SR^{37} or,

R^{29} and R^{291} together form a divalent radical with which the carbon atom to which they are attached forms a 5 or 6 membered cyclic acetal or thioacetal ring, the ring system of which is optionally substituted by one or more lower alkyl groups;

R^{30} , R^{31} and R^{32} independently represent hydrogen, lower alkyl, lower haloalkyl, lower alkoxyalkyl, lower alkenyl, lower haloalkenyl, lower alkynyl, lower haloalkynyl, optionally substituted cycloalkyl, optionally substituted $-(CH_2)_m$ -phenyl;

R^{33} and R^{34} represent R^{32} with the exclusion of the hydrogen atom;

R^{35} and R^{36} represent a hydrogen atom or a radical which may be any of the following ; alkyl, alkoxy or optionally substituted phenyl;

R^{37} represents lower alkyl, lower haloalkyl, lower alkenyl or lower haloalkenyl ;

R^{11} and R^{13} each independently represent hydrogen or alkyl, or

R^{11} and R^{13} may be together a simple bond creating a double bond with the carbon atom to which they are attached, or

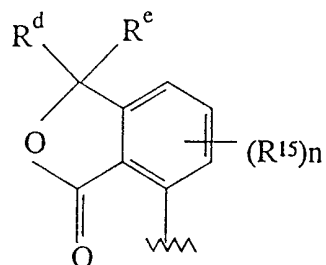
R^{11} and R^{13} may be a single divalent radical comprising one to six atoms on the main chain, this main chain optionally containing one to three nitrogen atoms, one oxygen atom or one sulphur atom; this divalent radical forming with the two carbon atoms to which they are attached, a saturated or non-saturated carbocyclic or heterocyclic ring (for example phenyl or pyridyl) or a bicyclic ring, these rings being optionally substituted by from one to four R^{15} radicals, each ring containing at most eight ring members, preferably at most six,

wherein R^{15} represents a halogen atom, hydroxy, cyano, lower alkoxycarbonyl, lower alkyl, lower alkenyl, lower alkynyl, optionally

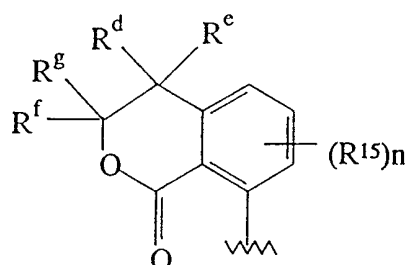
substituted cycloalkyl, lower alkoxy, lower alkylthio, lower
alkylsulfinyl, lower alkylsulfonyl, lower haloalkoxycarbonyl, lower
haloalkyl, lower haloalkenyl, lower haloalkynyl, halocycloalkyl, lower
haloalkoxy, lower haloalkylthio, lower haloalkylsulfinyl, lower
5 haloalkylsulfonyl, nitro, amino, lower alkylamino, lower dialkylamino,
optionally substituted phenoxy, lower alkylcarbonylamino, carbamoyl,
lower alkylcarbamoyl, lower dialkylcarbamoyl, $-\text{CH}_2\text{SCN}$, SF_5 ,
 $-\text{CR}^{30}=\text{N}-\text{R}^{31}$, $-\text{CR}^{30}=\text{NOR}^{31}$, $-\text{CR}^{30}=\text{NNR}^{30}\text{R}^{31}$, $-\text{CR}^{30}\text{R}^{29}\text{R}^{291}$,
alkoxyalkyl, $\text{CR}^b\text{R}^c\text{R}^a$, COR^a , optionally substituted phenyl or naphthyl;
10 or alkenyloxy substituted by alkoxycarbonyl or CO_2H ;

R^b and R^c together with the C atoms to which they are attached
form a 5 or 6 -membered cyclic acetal group;

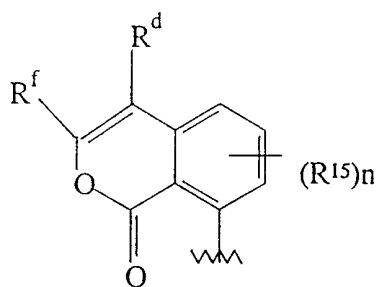
or $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a group (A), (B), (C), (D)
or (E):



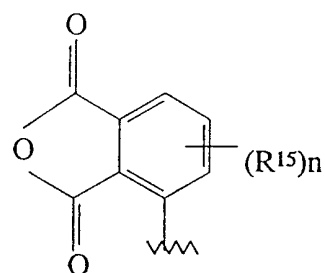
(A)



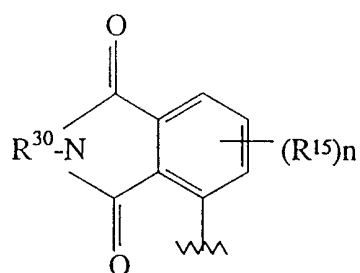
(B)



(C)



(D)



(E)

wherein R^d , R^e , R^f , R^g and R^h represent H, lower alkyl, halogen or
OH, and n represents the values 0, 1, 2 or 3;

R^{151} represents R^{15} or a hydrogen atom;

R^{12} and R^{14} each independently represent hydrogen or alkyl or may form a simple bond, creating a double bond together where R^{11} and R^{13} are together a single divalent radical;

preferably with the following provisos;

5 i) when $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a phenyl ring optionally substituted by R^{15} ; R^{10} represents $-CO_2R^{32}$, $CONR^{30}R^{31}$, $CHR^{27}R^{28}$ or $CR^{27}R^{28}R^{281}$, wherein R^{32} represents alkyl or haloalkyl; R^{30} and R^{31} represent H or alkyl, and R^{27} , R^{28} and R^{281} are as defined above; p is zero; X_1 is O; X_2 is O; X_3 is CH; R^{16} is OR^{25} ; then R^{15} is not
10 a monohalomethyl group;

ii) when $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a group $EtO_2C-CH=CH-$; p is 1; X_1 is S; X_2 is a bond; R^{17} represents phenyl; X_3 is CH; then R^{16} is not NH_2 or NMe_2 ;

15 iii) when R^{11} , R^{12} , R^{13} , R^{14} each represent H; p is 1; X_1 is S, X_2 is O; R^{17} represents Et; X_3 is N; R^{16} represents $-NH(4-$ nitrophenyl); R^{10} is not CO_2H or $CONHPh$;

iv) when R^{11} , R^{12} , R^{13} , R^{14} each represent H; p is zero; X_1 is S, X_2 is O; R^{17} represents Et; X_3 is N; R^{16} represents $-NH(4-$ nitrophenyl); R^{10} is not CO_2H or $CONH_2$;

20 v) when p represents zero; X_1 is O; X_2 is a bond; R^{17} represents H; X_3 is CH; R^{16} represents NMe_2 ; $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a 5-methyl-2- R^{10} -substituted-thien-3-yl group; R^{10} is not CO_2H or CO_2Me ;

25 vi) when R^{11} , R^{12} , R^{13} and R^{14} each represent H; p is zero; X_1 is S; X_2 is O, R^{17} represents H; X_3 is N; R^{16} represents $-NH(4-$ nitrophenyl); R^{10} is not CO_2H ;

vii) when R^{10} represents CO_2Et ; R^{11} , R^{12} , R^{13} and R^{14} each represent H; p is zero; X_1 is S; X_2 is NH, R^{17} represents phenyl; X_3 is CMe; R^{16} is not NH_2 or $NHMe$; and

30 viii) when p is zero; X_1 is O; X_2 is O; R^{17} represents Me; X_3 is CH; R^{16} represents OMe; $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a

1,3-dimethyl-4- R¹⁰-substituted-pyrazol-5-yl group; R¹⁰ is not 4-chlorobenzoyl;

and agriculturally acceptable salts and metal complexes thereof which have valuable herbicidal properties.

5 It will be understood that while compounds of formula (I) listed in the provisos i) to viii) above are not considered per se part of the invention, their use as herbicides, and compositions containing them does form part of the invention.

10 The invention also embraces any stereoisomer, enantiomer, geometric isomer of formula (I) or mixture thereof.

15 The aryl vinyl ether derivatives of the present invention, have two possible stereoisomers, (Z) and (E) isomers, as defined in the Cahn-Ingold-Prelog rules at a double bond. It will be understood that the present invention embraces both the pure isomers and mixtures which may be more or less enriched mixtures thereof. Furthermore it is understood that the compounds of formula (I) wherein R¹⁰, R¹¹, R¹², R¹³, R¹⁴ and R¹⁷ are as defined above, X₃ is CR¹⁹ and in which R¹⁶ is OR²⁵ wherein R²⁵ is hydrogen, may exist in a tautomeric form and acetal forms thereof.

20 By the term "agriculturally acceptable salts" is meant salts the cations or anions of which are known and accepted in the art for the formation of salts for agricultural or horticultural use. Suitable salts with bases include alkali metal (e.g. sodium and potassium), alkaline earth metal (e.g. calcium and magnesium), ammonium and amine (e.g. diethanolamine, triethanolamine, octylamine, morpholine and dioctylmethylamine) salts. Suitable acid addition salts, e.g. formed by 25 compounds of formula I containing an amino group, include salts with inorganic acids, for example hydrochlorides, sulphates, phosphates and nitrates and salts with organic acids for example acetic acid.

30 Formyl groups may exist as their hydrates i.e. as the dihydroxymethyl form.

In the above definitions used in formula (I) all of the optionally substituted groups may have as the optional substituent one or more halogen atoms, among other possible substituents.

Among the optional substituents for cycloalkyl radicals, the following may be selected; lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl and halogen.

Among the optional substituents for phenyl radicals, the following may be selected; phenoxy, lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, cyano, lower alkoxycarbonyl, lower haloalkoxycarbonyl, lower alkoxy, lower haloalkoxy, lower alkylthio, lower haloalkylthio, lower alkylsulfonyl, lower haloalkylsulfonyl, lower alkylsulfinyl, lower haloalkylsulfinyl, nitro, lower alkylcarbonyl, lower alkylamino, lower dialkylamino, carbamoyl, lower alkylcarbamoyl, lower dialkylcarbamoyl, lower alkylcarbonylamino and phenyl optionally substituted by halogen, alkyl, alkoxy or benzyloxy.

In the present patent specification, including the accompanying claims, certain atoms and groups have the following meanings:

halogen atom means fluorine, chlorine, bromine or iodine;
the alkyl, alkenyl and alkynyl radicals may be straight- or branched-chain groups;

cycloalkyl groups have from three to six carbon atoms in the ring; lower for a radical means that the said radical may have up to 8 carbon atoms (preferably up to 6), which are straight or branched chain.

Among the compounds represented by general formula (I) described above, preferred groups of the compounds include those compounds of general formula (I) in which;

R^{11} and R^{13} form a non-saturated carbocyclic ring (preferably phenyl) substituted by a halogen atom (preferably chlorine or fluorine); or R^{11} and R^{13} represent a pyridine ring; or R^{11} and R^{13} represent a phenyl ring which is fused at the o- and m- positions (relative to the R^{10} group) to a saturated or unsaturated 5 or 6-membered carbocyclic ring;

X_3 is CR^{19} wherein R^{19} represents a hydrogen atom;

X_2 is an oxygen atom;

X_1 is an oxygen or sulphur atom (preferably an oxygen atom);

R^{16} is a hydrogen atom or lower alkyl group (preferably methyl)

5 or OR^{25} wherein R^{25} represents a lower alkyl group or a hydrogen atom (most preferably R^{16} is methoxy);

R^{17} is a hydrogen atom or lower alkyl group (preferably methyl).

Compounds in which R^{10} is $-CHR^{27}R^{28}$ (in which R^{27} and R^{28} are preferably bromine), or $-COR^{32}$ or $-CO_2R^{32}$ (in which R^{32} is preferably lower alkyl or hydrogen), or $-CH_2OSO_2R^{33}$ (preferably R^{33} represents substituted phenyl), or $-CH_2NO_2$, or $-CH_2OCH_2C(O)Ph$, or $-CH_2OTs$, or $-C(R^{32})=N-NHSO_2R^{33}$ (in which R^{32} is hydrogen and R^{33} is lower alkyl), or $-C(R^{32})=N-NH-C(S)NR^a$ (in which R^{32} is hydrogen and R^a is lower alkyl), or $-C(R^{32})=N-NR^{30}R^{31}$ (in which R^{32} and R^{30} are hydrogen and R^{31} is optionally substituted $-(CH_2)_m$ -phenyl), or $-C(R^{32})=N-N^{30a}R^{31a}$ (in which R^{32} is hydrogen, and R^{30a} and R^{31a} together with the N atom to which they are attached form a 6 membered saturated heterocyclic ring containing an additional O and NR^a group in the ring), or $-C(R^{32})=N-NH$ (optionally substituted unsaturated 6 membered heterocyclic ring containing a nitrogen atom) (in which R^{32} is hydrogen), or $-C(O)F$, or $-CO_2CH_2CO$ (optionally substituted phenyl), or $-CO_2R^{32a}$ (in which R^{32a} is an optionally substituted N-linked triazole ring fused to a benzene ring), or $-CO-NR^{30}R^{31}$ (in which R^{30} is hydrogen and R^{31} is lower alkyl), or $-CONHNHR^{30}$ (in which R^{30} is optionally substituted $-(CH_2)_m$ -phenyl), or $-C(R^{32})=NNH-C(O)$ lower alkyl (in which R^{32} is hydrogen), or $-C(O)SR^{32}$ (in which R^{32} is lower alkyl) or $-CH(OH)$ lower alkyl, or $-COCHN_2$, or $-CR^{30}R^{29}R^{291}$ (in which R^{30} is hydrogen, and R^{29} and R^{291} together form a divalent radical with which the carbon atom to which they are attached forms a 5 membered optionally substituted thioacetal ring), or $-C(=N-OH)R^{32}$ (in which R^{32} is lower alkyl), or $-(CH_2)_2CO_2R^{32}$ (in which R^{32} is hydrogen, lower

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alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, lower alkoxyalkyl, optionally substituted $-(CH_2)_m$ -phenyl);

or $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a group A in which R^d and R^e represent hydrogen or halogen; and

R^{15} is $-COR^a$, or halogen, or lower alkyl, or lower alkoxy, or lower haloalkoxy, or lower alkoxycarbonyl, or $CR^bR^cR^a$ (in which R^b and R^c form a 5 membered cyclic acetal group and in which R^a represents hydrogen) are also preferred.

A preferred class of compounds of formula (I) are those in which:

R^{11} and R^{13} form a phenyl or naphthyl ring substituted by one or more halogen, alkyl or haloalkyl groups; X_3 is CR^{19} wherein R^{19} represents a hydrogen atom; X_1 and X_2 each represent an oxygen atom; R^{16} and R^{17} each represent a methyl group; and R^{10} is $-CO_2R^{32}$.

A most preferred class of compounds of formula (I) are those in which:

R^{11} and R^{13} form a phenyl or naphthyl ring substituted by one or more halogen, alkyl or haloalkyl groups; X_3 is CR^{19} wherein R^{19} represents a hydrogen atom; X_1 and X_2 each represent an oxygen atom; R^{16} and R^{17} each represent a methyl group; and R^{10} is $-CO_2R^{32}$ in which R^{32} is lower alkyl or hydrogen.

The following compounds are particularly preferred:

1. methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)-3-methoxypropenoate;
2. methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate;
3. methyl 2-(2-carboxy-4-iodophenoxy)-3-methoxypropenoate;
4. methyl 2-(2-dibromomethyl-4-chlorophenoxy)-3-methoxypropenoate;
5. methyl 2-(2-formyl-4-chlorophenoxy)-3-methoxypropenoate;
6. methyl 2-[4-chloro-2-((N-methyl-N-phenylamino)methyl)phenoxy]-3-methoxypropenoate;
7. methyl 2-[4-chloro-2-(N-allylamino)methyl)phenoxy]-3-methoxypropenoate;

8. methyl 2-[4-chloro-2-(N-benzylamino)methyl]phenoxy]-3-methoxypropenoate;

9. methyl 2-[4-chloro-2-(N-cyclopropylamino)methyl]phenoxy]-3-methoxypropenoate;

5 10. methyl 2-[4-chloro-2-(azidomethyl)phenoxy]-3-methoxypropenoate;

11. methyl 2-[4-chloro-2-(N-succinimidomethyl)phenoxy]-3-methoxypropenoate;

10 12. methyl 2-[4-chloro-2-(N-phthalimidomethyl)phenoxy]-3-methoxypropenoate;

13. methyl 2-[4-chloro-2-(N-isopropyl-N-(methanesulfonyl)aminomethyl)phenoxy]-3-methoxypropenoate;

14. methyl 2-[4-chloro-2-(N-methyl-N-(methanesulfonyl)aminomethyl)phenoxy]-3-methoxypropenoate;

15 15. methyl 2-[4-chloro-2-(N-(methoxycarbonyl)aminomethyl)phenoxy]-3-methoxypropenoate;

16. methyl 2-(4-chloro-2-(nitromethyl)phenoxy)-3-methoxypropenoate;

20 17. methyl 2-(4-chloro-2-(cyanomethyl)phenoxy)-3-methoxypropenoate;

18. methyl 2-(4-chloro-2-(thiocyanomethyl)phenoxy)-3-methoxypropenoate;

19. methyl 2-(4-chloro-2-methoxycarbonylphenoxy)-3-methoxypropenoate;

25 20. methyl 2-(4-chloro-2-ethoxycarbonylphenoxy)-3-methoxypropenoate;

21. methyl 2-(4-chloro-2-N-(4-trifluoromethoxyphenyl)aminocarbonyl)phenoxy-3-methoxypropenoate;

30 22. 2-(4-chloro-2-N-(2-chloro-4-(ethoxycarbonyl)phenyl)aminocarbonyl)phenoxy-3-methoxypropenoate;

23. 2-(4-chloro-2-N-(3,5-difluorophenyl)aminocarbonyl)phenoxy-3-methoxypropenoate;

24. 2-(4-chloro-2-N-(3-trifluoromethylphenyl)aminocarbonyl)-
phenoxy-3-methoxypropenoate;

25. 2-(4-chloro-2-N-(3,5-dichlorophenyl)aminocarbonyl)phenoxy-
3-methoxypropenoate;

5 26. 2-(4-chloro-2-N-(2,6-difluorophenyl)aminocarbonyl)phenoxy-
3-methoxypropenoate;

27. 2-(4-chloro-2-N-(4-bromo-3-trifluoromethylphenyl)-
aminocarbonyl)phenoxy-3-methoxypropenoate;

10 28. 2-(4-chloro-2-N-(3-chlorophenyl)aminocarbonyl)phenoxy-3-
methoxypropenoate;

29. 2-(4-chloro-2-N-(5-chloro-2-methylphenyl)aminocarbonyl)-
phenoxy-3-methoxypropenoate;

30. 2-(4-chloro-2-N-(2,5-difluorophenyl)aminocarbonyl)phenoxy-
3-methoxypropenoate;

15 31. 2-(4-chloro-2-N-(3-phenoxyphenyl)aminocarbonyl)phenoxy-3-
methoxypropenoate;

32. 2-(4-chloro-2-N-(3-bromo-5-trifluoromethylphenyl)-
aminocarbonyl)phenoxy-3-methoxypropenoate;

20 33. 2-(4-chloro-2-N-(3,5-dibromophenyl)aminocarbonyl)phenoxy-
3-methoxypropenoate;

34. 2-(4-chloro-2-N-(5-methoxy-2-methylphenyl)aminocarbonyl)-
phenoxy-3-methoxypropenoate;

35. methyl 2-(4-chloro-2-acetylaminoiminomethylenephenoxy)-3-
propenoate;

25 36. methyl 2-(4-chloro-2-hydroxyiminomethylenephenoxy)-3-
propenoate;

37. methyl 2-(4-chloro-2-methoxyiminomethylenephenoxy)-3-
propenoate;

30 38. methyl 2-(4-chloro-2-ethoxyiminomethylenephenoxy)-3-
propenoate;

39. methyl 2-(4-chloro-2-allyloxyiminomethylenephenoxy)-3-
propenoate;

40. methyl 2-(4-chloro-2-t-butyloxyiminomethylenephenoxy)-3-propenoate;

41. methyl 2-(4-chloro-2-benzyloxyiminomethylenephenoxy)-3-propenoate;

5 42. methyl 2-(4-chloro-2-phenoxyiminomethylenephenoxy)-3-propenoate;

43. methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate, sodium salt;

10 44. methyl 2-(4-chloro-2-(2-methoxycarbonylethenyl)phenoxy)-3-methoxypropenoate;

45. methyl 2-(2-carboxy-4-methylphenoxy)-3-methoxypropenoate;

46. methyl 2-[2-carboxy-3-(2-methoxy-1-methoxycarbonylvinyloxy)phenoxy]-3-methoxypropenoate;

15 47. 2,4-dichlorophenyl 2-(2-carboxy-4-chlorophenoxy)-(3-methoxy)thiopropenoate;

48. methyl 2-(2-carboxy-4-chlorophenoxy)-3-(1-ethoxycarbonyl)ethoxypropenoate;

20 49. methyl 2-(2-carboxy-4-chlorophenoxy)-3-prop-2-yn-yloxypropenoate;

50. methyl 2-{4-chloro-2-[N'-(2-chlorophenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate;

51. methyl 2-[4-chloro-2-(prop-2-ynyloxycarbonyl)phenoxy]-3-methoxypropenoate;

25 52. methyl 2-[2-(benzyloxycarbonyl)-4-chlorophenoxy]-3-methoxypropenoate;

53. methyl 2-[4-chloro-2-(propyloxycarbonyl)phenoxy]-3-methoxypropenoate;

30 54. methyl 2-[2-(butyloxycarbonyl)-4-chlorophenoxy]-3-methoxypropenoate;

55. methyl 2-[4-chloro-2-(prop-2-yloxycarbonyl)phenoxy]-3-methoxypropenoate;

56. methyl 2-[4-chloro-2-(3-chloropropylloxycarbonyl) phenoxy]-
3-methoxypropenoate;

57. methyl 2-[4-chloro-2-(but-2-ylloxycarbonyl)phenoxy]-3-
methoxypropenoate;

5 58. methyl 2-[4-chloro-2-(3-pentylloxycarbonyl)phenoxy]-3-
methoxypropenoate;

59. methyl 2-[4-chloro-2-(hept-2-ylloxycarbonyl)phenoxy]-3-
methoxypropenoate;

10 60. methyl 2-[4-chloro-2-(octylloxycarbonyl)phenoxy]-3-
methoxypropenoate;

61. methyl 2-[4-chloro-2-(cyclopentylloxycarbonyl)phenoxy]-3-
methoxypropenoate;

62. methyl 2-[4-chloro-2-(2-methoxyethoxycarbonyl) phenoxy]-3-
methoxypropenoate;

15 63. methyl 2-[4-chloro-2-(2-ethoxyethoxycarbonyl)phenoxy]-3-
methoxypropenoate;

64. methyl 2-[4-chloro-2-(cyclopropylmethoxycarbonyl)
phenoxy]-3-methoxypropenoate;

20 65. methyl 2-(4-methoxy-2-methoxycarbonylphenoxy)-3-
methoxypropenoate;

66. methyl 2-[2-(benztriazol-1-ylloxycarbonyl)-4-chlorophenoxy]-
3-methoxypropenoate;

67. methyl 2-[4-chloro-2-(4-nitrophenoxy carbonyl)phenoxy]-3-
methoxypropenoate;

25 68. methyl 2-[4-chloro-
2-(2,4,5-trichlorophenoxy carbonyl)phenoxy]-3-methoxypropenoate;

69. methyl 2-[4-chloro-2-(2,3,4,5,6-
pentachlorophenoxy carbonyl)phenoxy]-3-methoxypropenoate;

30 70. methyl 2-[4-chloro-2-(ethyl carbamoyl)phenoxy]-3-
methoxypropenoate;

71. methyl 2-[4-chloro-2-(ethyl thiocarbonyl)phenoxy]-3-
methoxypropenoate;

72. methyl 2-(2-carboxy-4-methoxyphenoxy)-3-methoxypropenoate;
73. butyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate;
74. methyl 2-(2-carboxy-3-fluorophenoxy)-3-methoxypropenoate;
- 5 75. methyl 2-(2-carboxy-3-chlorophenoxy)-3-methoxypropenoate;
76. methyl 2-(2-carboxy-3-methylphenoxy)-3-methoxypropenoate;
77. methyl 2-(2-carboxy-4-chlorophenoxy)-3-methylthiopropenoate;
- 10 78. methyl 2-(2-carboxyphenoxy)-3-methoxypropenoate;
79. methyl 2-(1-carboxynaphth-2-yloxy)-3-methoxypropenoate;
80. methyl 2-(2-carboxy-3,4 difluorophenoxy)-3-methoxypropenoate;
81. methyl 2-(2-carboxy-3-chloro-4-fluorophenoxy)-3-methoxypropenoate;
- 15 82. methyl 2-(2-carboxy-4-chloro-3-fluorophenoxy)-3-methoxypropenoate;
83. methyl 2-(2-carboxy-4-difluoromethylphenoxy)-3-methoxypropenoate;
- 20 84. methyl 2-(4-bromo-2-carboxyphenoxy)-3-methoxypropenoate;
85. methyl 2-(2-carboxy-4-fluorophenoxy)-3-methoxypropenoate;
86. methyl 2-(3-bromo-2-carboxyphenoxy)-3-methoxypropenoate;
- 25 87. methyl 2-(2-carboxy-3-thiocyanatomethylphenoxy)-3-methoxypropenoate;
88. methyl 2-(3-acetoxymethyl-2-carboxyphenoxy)-3-methoxypropenoate;
89. methyl 2-(2-carboxy-3,4-dichlorophenoxy)-3-methoxypropenoate;
- 30 90. methyl 2-(2-carboxy-3-dihydroxymethylphenoxy)-3-methoxypropenoate;

91. methyl 2-(3-hydroxyphthalid-7-yloxy)-3-methoxypropenoate;
92. methyl 2-{4-chloro-2-[N'-(2,4-dichlorophenyl)hydrazino
carbonyl]phenoxy}-3-methoxypropenoate;
93. methyl 2-{4-chloro-2-[N'-(3-
5 trifluoromethylphenyl)hydrazinocarbonyl]phenoxy}-3-
methoxypropenoate;
94. methyl 2-[2-(2,2,2-trifluoroethoxycarbonyl)phenoxy]-3-
methoxypropenoate;
95. methyl 2-[4-chloro-2-(2,2,2-trichloroethoxycarbonyl)
10 phenoxy]-3-methoxypropenoate;
96. methyl 2-{4-chloro-2-[(1-hydroxy-2-methylprop-2-
yl)carbamoyl]phenoxy}-3-methoxypropenoate;
97. methyl 2-[4-methyl-2-(2,2,2-trifluoroethoxycarbonyl)
phenoxy]-3-methoxypropenoate;
- 15 98. methyl 2-(3-fluoro-2-hexylthiocarbonylphenoxy)-3-
methoxypropenoate;
99. methyl 2-[4-fluoro-2-(2-ethoxyethoxycarbonyl)phenoxy]-3-
methoxypropenoate;
100. methyl 2-(4-bromo-2-methoxycarbonylphenoxy)-3-
20 methoxypropenoate;
101. methyl 2-(4-fluoro-2-methoxycarbonylphenoxy)-3-
methoxypropenoate;
102. methyl 2-(2-ethoxycarbonyl-3-fluorophenoxy)-3-
methoxypropenoate;
- 25 103. methyl 2-[3-fluoro-2-(prop-2-ynyloxycarbonyl)phenoxy]-3-
methoxypropenoate;
104. methyl 2-(2-benzyloxycarbonyl-3-fluorophenoxy)-3-
methoxypropenoate;
105. methyl 2-[3-fluoro-2-(2-methoxyethoxycarbonyl)phenoxy]-
30 3-methoxypropenoate;
106. methyl 2-[2-(2-ethoxyethoxycarbonyl)-3-fluorophenoxy]-3-
methoxypropenoate;

107. methyl 2-[3-fluoro-2-(tetrahydrofuran-2-ylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

108. methyl 2-[2-(3-chloropropylloxycarbonyl)-3-fluorophenoxy]-3-methoxypropenoate;

5 109. methyl 2-(2-butyloxycarbonylphenoxy)-3-methoxypropenoate;

110. methyl 2-(2-pentyloxycarbonylphenoxy)-3-methoxypropenoate;

10 111. methyl 2-(2-octyloxycarbonylphenoxy)-3-methoxypropenoate;

112. methyl 2-[2-(3-chloropropylloxycarbonyl)phenoxy]-3-methoxypropenoate;

113. methyl 2-[2-(prop-2-ynylloxycarbonyl)phenoxy]-3-methoxypropenoate;

15 114. methyl 2-(2-benzyloxycarbonylphenoxy)-3-methoxypropenoate;

115. methyl 2-(2-carboxy-3,4-difluorophenoxy)-3-methoxypropenoate;

20 116. methyl 2-(2-carboxy-4-iodophenoxy)-3-methoxypropenoate sodium salt;

117. methyl 2-[3-methyl-2-(4-methylbenzyloxycarbonyl)phenoxy]-3-methoxypropenoate;

118. methyl 2-[2-(2-ethoxyethoxycarbonyl)-3,4-difluorophenoxy]-3-methoxypropenoate;

25 119. methyl 2-[3,4-difluoro-2-(4-methylbenzyloxycarbonyl)phenoxy]-3-methoxypropenoate;

120. methyl 2-(2-benzyloxycarbonyl-3,4-difluorophenoxy)-3-methoxypropenoate;

30 121. methyl 2-[2-(4-methylbenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

122. methyl 2-[4-fluoro-2-(4-methylbenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

123. methyl 2-[2-(4-nitrobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

124. methyl 2-[2-(3,4-dichlorobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

5 125. methyl 2-[2-(4-cyanobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

126. methyl 2-[4-chloro-2-(benzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

10 127. methyl 2-[2-(benzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

128. methyl 2-[4-chloro-2-(diphenylmethylenimine-oxycarbonyl)phenoxy]-3-methoxypropenoate;

129. methyl 2-[4-chloro-2-(3-cyclopropyl-3-oxopropanoyl)phenoxy]-3-methoxypropenoate;

15 130. methyl 2-[2-(pyrid-2-ylhydrazonomethylene)phenoxy]-3-methoxypropenoate;

131. methyl 2-[4-chloro-2-(N-methylsulphonylhydrazonomethylene)phenoxy]-3-methoxypropenoate;

20 132. methyl 2-[4-chloro-2-(2,4,6-trichlorophenylhydrazonomethylene)phenoxy]-3-methoxypropenoate;

133. methyl 2-{4-chloro-2-[N-(4-morpholinyl)iminomethylene]phenoxy}-3-methoxypropenoate;

134. methyl 2-[4-chloro-2-(pyrid-2-ylhydrazonomethylene)phenoxy]-3-methoxypropenoate;

25 135. methyl 2-[4-chloro-2-(4-fluorophenylhydrazonomethylene)phenoxy]-3-methoxypropenoate;

136. methyl 2-[4-chloro-2-(4-nitrophenylhydrazonomethylene)phenoxy]-3-methoxypropenoate;

30 137. methyl 2-{4-chloro-2-[N-(dimethylthiocarbamoyl)hydrazonomethylene]phenoxy}-3-methoxypropenoate;

138. methyl 2-[4-chloro-2-(1,3-dithiolan-2-yl)phenoxy]-3-methoxypropenoate;

139. methyl 2-[2-methoxycarbonyl-3-(2-methyl-1,3-dioxolan-2-yl) phenoxy]-3-methoxypropenoate;

5 140. methyl 2-(2-methoxycarbonylbenzyloxy)-3-methoxypropenoate;

141. methyl 2-(3-acetyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate;

10 142. methyl 2-[4-chloro-2-(1-hydroxyethyl)phenoxy]-3-methoxypropenoate;

143. methyl 2-[4-chloro-2-(diazoacetyl)phenoxy]-3-methoxypropenoate;

144. methyl 2-[4-(3-acetamidophenyl)-2-carboxyphenoxy]-3-methoxypropenoate;

15 145. methyl 2-{2-carboxy-4-[3-fluoro-4-phenyl]phenylphenoxy}-3-methoxypropenoate;

146. methyl 2-[2-carboxy-4-(naphth-2-yl)phenoxy]-3-methoxypropenoate;

20 147. methyl 2-[4-(4-benzyloxyphenyl)-2-carboxyphenoxy]-3-methoxypropenoate;

148. methyl 2-[2-carboxy-4-(benzo-1,3-dioxolan-5-yl)phenoxy]-3-methoxypropenoate;

149. methyl 2-[4-chloro-2-(methoxymethoxycarbonyl)phenoxy]-3-methoxypropenoate;

25 150. methyl 2-{2-[2-(methoxyethoxy)methoxycarbonyl]phenoxy}-3-methoxypropenoate;

151. methyl 2-[4-chloro-2-(fluorocarbonyl)phenoxy]-3-methoxypropenoate;

30 152. methyl 2-(3-formyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate;

153. methyl 2-(3-dibromomethyl-2-carboxyphenoxy)-3-methoxypropenoate;

154. methyl 2-(3-bromophthalid-7-yloxy)-3-methoxypropenoate;

155. methyl 2-(phthalid-7-yloxy)-3-methoxypropenoate;

156. methyl 2-[4-chloro-2-(methylcarbamoyl)phenoxy]-3-methoxypropenoate;

5 157. methyl 2-(2-carboxy-4-chlorophenoxy)-3-ethoxypropenoate;

158. methyl 2-(2-carboxy-4-chlorophenoxy)-3-(2-trifluoromethoxybenzyloxy)propenoate;

159. methyl 2-{4-chloro-2-[N'-(4-fluorophenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate;

10 160. methyl 2-{4-chloro-2-[N'-(4-methoxyphenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate;

161. methyl 2-[2-(2,2,2-trichloroethoxycarbonyl)phenoxy]-3-methoxypropenoate;

15 162. methyl 2-[3-fluoro-2-(2,2,2-trifluoroethoxycarbonyl)phenoxy]-3-methoxypropenoate;

163. methyl 2-[4-chloro-2-(2,2,2-trifluoroethoxycarbonyl)phenoxy]-3-methoxypropenoate;

164. methyl 2-[3-fluoro-2-(2,2,2-trichloroethoxycarbonyl)phenoxy]-3-methoxypropenoate;

20 165. methyl 2-(2-ethylthiocarbonyl-3-fluorophenoxy)-3-methoxypropenoate;

166. methyl 2-[2-(4-fluorobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate;

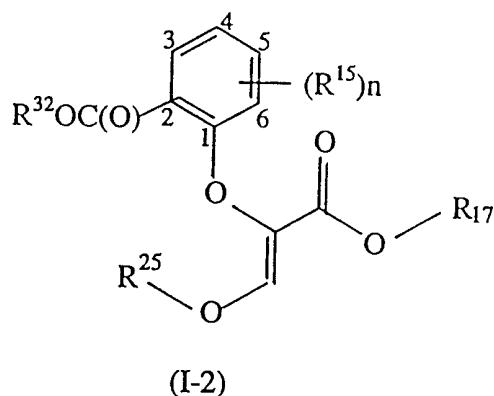
25 167. methyl 2-(3-dibromomethyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate.

The numbers 1-167 are assigned to these compounds for reference and identification hereafter.

Specific examples of the compound of general formula (I), provided by the present invention are shown in Tables 1 to 14
30 hereinbelow, the compounds having the general formula I-2, I-3, I-4, I-5, I-6, I-7, I-8, I-9, I-10, I-11, I-12, I-13, I-14 and I-15. In the Tables, abbreviations used have the following meanings; Me means methyl, Et

means ethyl, Pr means n-propyl, i-Pr means iso-propyl, c-Pr means cyclopropyl, Bu means n-butyl, Pen means pentyl, c-Pen means cyclopentyl, c-Hex means cyclohexyl, Bn means benzyl, Ph means phenyl and Ts means tosyl. Also, where numbers appear directly after atoms or groups they are understood to be subscripts, (e.g. CH₃ means CH₃, CH₂NO₂ means CH₂NO₂, etc.)

Furthermore it is understood that the compounds in the following tables may represent either the Z or E isomers at the double bond of formula (I) which is substituted by R¹⁶ wherein R¹⁶ represents OR²⁵, or represents a mixture of both isomers.

Table 1

In formulae (I-2) and (I-7) below, R^{10} represents CO_2R^{32} , wherein R^{32} is as hereinbefore defined and in which R^{15} , R^{25} and R^{17} have the meanings indicated hereinbelow. It is to be understood that in the following table, Identification Group I recites individual species in which R^{32} represents, hydrogen, Na, Me, Et, n-Pr, i-Pr, c-Pr-methyl, n-Bu, 2-Bu, Pen, c-Pen, c-Hex, Bn, 2-heptyl, octyl, 2-octyl, 2,2,2-trifluoroethyl, 3-chloroprop-1-yl, propargyl, methoxyethyl, ethoxyethyl, allyl. The R^{15} group is located according to the numbering system in (I-2) and (I-7) and when more than one R^{15} substituent is present, the various meanings have been placed in the same column.

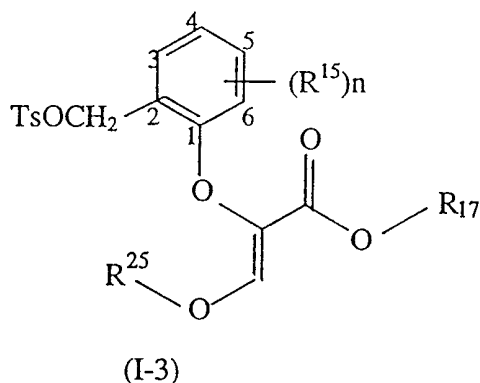
Where R^{15} represents $-CR^{30}=NOR^{31}$, $-CR^{30}R^{29}R^{291}$ or $-CR^{30}=NNR^{30}R^{31}$, the meanings of R^{29} , R^{291} , R^{30} and R^{31} are as defined hereinabove.

Identification Group	R^{10}	R^{25}	R^{17}	R^{15}
I-1	CO_2R^{32}	Me	Me	3-OH
I-2	CO_2R^{32}	Me	Me	4-Cl
I-3	CO_2R^{32}	Me	Me	5-Cl
I-4	CO_2R^{32}	Me	Me	6-Cl
I-5	CO_2R^{32}	Me	Me	3-Br
I-6	CO_2R^{32}	Me	Me	4-Br
I-7	CO_2R^{32}	Me	Me	5-Br
I-8	CO_2R^{32}	Me	Me	3-F
I-9	CO_2R^{32}	Me	Me	4-F
I-10	CO_2R^{32}	Me	Me	3-CH ₃
I-11	CO_2R^{32}	Me	Me	3-Cl

Identification Group	R ¹⁰	R ²⁵	R ¹⁷	R ¹⁵
I-12	CO2R32	Me	Me	5-CH3
I-13	CO2R32	Me	Me	3-CR ³⁰ =NOR ³¹
I-14	CO2R32	Me	Me	4-CR ³⁰ =NOR ³¹
I-15	CO2R32	Me	Me	H
I-16	CO2R32	Me	Me	3-OCH3
I-17	CO2R32	Me	Me	4-OCH3
I-18	CO2R32	Me	Me	5-OCH3
I-19	CO2R32	Me	Me	3-C(H3C)(-OCH2CH2O-)
I-20	CO2R32	Me	Me	4-C(H3C)(-OCH2CH2O-)
I-21	CO2R32	Me	Me	4,6-dichloro
I-22	CO2R32	Me	Me	3,5-dichloro
I-23	CO2R32	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-24	CO2R32	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-25	CO2R32	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-26	CO2R32	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-27	CO2R32	Me	Me	4-CH3
I-28	CO2R32	Me	Et	3-OH
I-29	CO2R32	Me	Et	4-Cl
I-30	CO2R32	Me	Et	5-Cl
I-31	CO2R32	Me	Et	6-Cl
I-32	CO2R32	Me	Et	3-Br
I-33	CO2R32	Me	Et	4-Br
I-34	CO2R32	Me	Et	5-Br
I-35	CO2R32	Me	Et	3-F
I-36	CO2R32	Me	Et	4-F
I-37	CO2R32	Me	Et	3-CH3
I-38	CO2R32	Me	Et	3-Cl
I-39	CO2R32	Me	Et	5-CH3
I-40	CO2R32	Me	Et	3-CR ³⁰ =NOR ³¹
I-41	CO2R32	Me	Et	4-CR ³⁰ =NOR ³¹
I-42	CO2R32	Me	Et	H
I-43	CO2R32	Me	Et	3-OCH3
I-44	CO2R32	Me	Et	4-OCH3
I-45	CO2R32	Me	Et	5-OCH3
I-46	CO2R32	Me	Et	3-C(H3C)(-OCH2CH2O-)
I-47	CO2R32	Me	Et	4-C(H3C)(-OCH2CH2O-)
I-48	CO2R32	Me	Et	4,6-dichloro
I-49	CO2R32	Me	Et	3,5-dichloro
I-50	CO2R32	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-51	CO2R32	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-52	CO2R32	Me	Et	-CR ³⁰ =NNR ³⁰ R ³¹
I-53	CO2R32	Me	Et	-CR ³⁰ =NNR ³⁰ R ³¹
I-54	CO2R32	Me	Et	4-CH3

Identification Group	R ¹⁰	R ²⁵	R ¹⁷	R ¹⁵
I-55	CO2R32	Et	Me	3-OH
I-56	CO2R32	Et	Me	4-Cl
I-57	CO2R32	Et	Me	5-Cl
I-58	CO2R32	Et	Me	6-Cl
I-59	CO2R32	Et	Me	3-Br
I-60	CO2R32	Et	Me	4-Br
I-61	CO2R32	Et	Me	5-Br
I-62	CO2R32	Et	Me	3-F
I-63	CO2R32	Et	Me	4-F
I-64	CO2R32	Et	Me	3-CH3
I-65	CO2R32	Et	Me	3-Cl
I-66	CO2R32	Et	Me	5-CH3
I-67	CO2R32	Et	Me	3-CR ³⁰ =NOR ³¹
I-68	CO2R32	Et	Me	4-CR ³⁰ =NOR ³¹
I-69	CO2R32	Et	Me	H
I-70	CO2R32	Et	Me	3-OCH3
I-71	CO2R32	Et	Me	4-OCH3
I-72	CO2R32	Et	Me	5-OCH3
I-73	CO2R32	Et	Me	3-C(H3C)(-OCH2CH2O-)
I-74	CO2R32	Et	Me	4-C(H3C)(-OCH2CH2O-)
I-75	CO2R32	Et	Me	4,6-dichloro
I-76	CO2R32	Et	Me	3,5-dichloro
I-77	CO2R32	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-78	CO2R32	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-79	CO2R32	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-80	CO2R32	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-81	CO2R32	Et	Me	4-CH3
I-82	CO2R32	Et	Et	3-OH
I-83	CO2R32	Et	Et	4-Cl
I-84	CO2R32	Et	Et	5-Cl
I-85	CO2R32	Et	Et	6-Cl
I-86	CO2R32	Et	Et	3-Br
I-87	CO2R32	Et	Et	4-Br
I-88	CO2R32	Et	Et	5-Br
I-89	CO2R32	Et	Et	3-F
I-90	CO2R32	Et	Et	4-F
I-91	CO2R32	Et	Et	3-CH3
I-92	CO2R32	Et	Et	3-Cl
I-93	CO2R32	Et	Et	5-CH3
I-94	CO2R32	Et	Et	3-CR ³⁰ =NOR ³¹
I-95	CO2R32	Et	Et	4-CR ³⁰ =NOR ³¹
I-96	CO2R32	Et	Et	H
I-97	CO2R32	Et	Et	3-OCH3

Identification Group	R ¹⁰	R ²⁵	R ¹⁷	R ¹⁵
I-98	CO ₂ R ₃₂	Et	Et	4-OCH ₃
I-99	CO ₂ R ₃₂	Et	Et	5-OCH ₃
I-100	CO ₂ R ₃₂	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-101	CO ₂ R ₃₂	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-102	CO ₂ R ₃₂	Et	Et	4,6-dichloro
I-103	CO ₂ R ₃₂	Et	Et	3,5-dichloro
I-104	CO ₂ R ₃₂	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-105	CO ₂ R ₃₂	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-106	CO ₂ R ₃₂	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-107	CO ₂ R ₃₂	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-108	CO ₂ R ₃₂	Et	Et	4-CH ₃

Table 2

In formulae (I-3 to I-6 and I-8 to I-11), R¹⁰, R¹⁵, R²⁵ and R¹⁷ have the meanings shown. The R¹⁵ group is located according to the numbering system in the formulae, and when more than one R¹⁵ substituent is present then the various meanings have been placed in the same column.

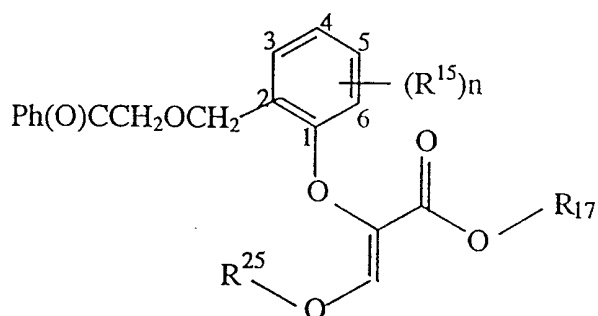
Where R¹⁵ represents -CR³⁰=NOR³¹, -CR³⁰R²⁹R²⁹¹ or CR³⁰=NNR³⁰R³¹, the meanings of R²⁹, R²⁹¹, R³⁰ and R³¹ are as defined hereinabove.

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-109	Me	Me	3-OH
I-110	Me	Me	4-Cl
I-111	Me	Me	5-Cl
I-112	Me	Me	6-Cl

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-113	Me	Me	3-Br
I-114	Me	Me	4-Br
I-115	Me	Me	5-Br
I-116	Me	Me	3-F
I-117	Me	Me	4-F
I-118	Me	Me	3-CH ₃
I-119	Me	Me	3-Cl
I-120	Me	Me	5-CH ₃
I-121	Me	Me	3-CR ³⁰ =NOR ³¹
I-122	Me	Me	4-CR ³⁰ =NOR ³¹
I-123	Me	Me	H
I-124	Me	Me	3-OCH ₃
I-125	Me	Me	4-OCH ₃
I-126	Me	Me	5-OCH ₃
I-127	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-128	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-129	Me	Me	4,6-dichloro
I-130	Me	Me	3,5-dichloro
I-131	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-132	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-133	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-134	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-135	Me	Me	4-CH ₃
I-136	Me	Et	3-OH
I-137	Me	Et	4-Cl
I-138	Me	Et	5-Cl
I-139	Me	Et	6-Cl
I-140	Me	Et	3-Br
I-141	Me	Et	4-Br
I-142	Me	Et	5-Br
I-143	Me	Et	3-F
I-144	Me	Et	4-F
I-145	Me	Et	3-CH ₃
I-146	Me	Et	3-Cl
I-147	Me	Et	5-CH ₃
I-148	Me	Et	3-CR ³⁰ =NOR ³¹
I-149	Me	Et	4-CR ³⁰ =NOR ³¹
I-150	Me	Et	H
I-151	Me	Et	3-OCH ₃
I-152	Me	Et	4-OCH ₃
I-153	Me	Et	5-OCH ₃
I-154	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-155	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-156	Me	Et	4,6-dichloro
I-157	Me	Et	3,5-dichloro
I-158	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-159	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-160	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-161	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-162	Me	Et	4-CH ₃
I-163	Et	Me	3-OH
I-164	Et	Me	4-Cl
I-165	Et	Me	5-Cl
I-166	Et	Me	6-Cl
I-167	Et	Me	3-Br
I-168	Et	Me	4-Br
I-169	Et	Me	5-Br
I-170	Et	Me	3-F
I-171	Et	Me	4-F
I-172	Et	Me	3-CH ₃
I-173	Et	Me	3-Cl
I-174	Et	Me	5-CH ₃
I-175	Et	Me	3-CR ³⁰ =NOR ³¹
I-176	Et	Me	4-CR ³⁰ =NOR ³¹
I-177	Et	Me	H
I-178	Et	Me	3-OCH ₃
I-179	Et	Me	4-OCH ₃
I-180	Et	Me	5-OCH ₃
I-181	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-182	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-183	Et	Me	4,6-dichloro
I-184	Et	Me	3,5-dichloro
I-185	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-186	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-187	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-188	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-189	Et	Me	4-CH ₃
I-190	Et	Et	3-OH
I-191	Et	Et	4-Cl
I-192	Et	Et	5-Cl
I-193	Et	Et	6-Cl
I-194	Et	Et	3-Br
I-195	Et	Et	4-Br
I-196	Et	Et	5-Br
I-197	Et	Et	3-F
I-198	Et	Et	4-F

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-199	Et	Et	3-CH ₃
I-200	Et	Et	3-Cl
I-201	Et	Et	5-CH ₃
I-202	Et	Et	3-CR ³⁰ =NOR ³¹
I-203	Et	Et	4-CR ³⁰ =NOR ³¹
I-204	Et	Et	H
I-205	Et	Et	3-OCH ₃
I-206	Et	Et	4-OCH ₃
I-207	Et	Et	5-OCH ₃
I-208	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-209	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-210	Et	Et	4,6-dichloro
I-211	Et	Et	3,5-dichloro
I-212	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-213	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-214	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-215	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-216	Et	Et	4-CH ₃

Table 3

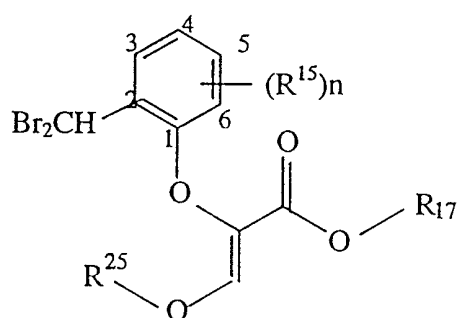
(I-4)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-217	Me	Me	3-OH
I-218	Me	Me	4-Cl
I-219	Me	Me	5-Cl
I-220	Me	Me	6-Cl
I-221	Me	Me	3-Br
I-222	Me	Me	4-Br

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-223	Me	Me	5-Br
I-224	Me	Me	3-F
I-225	Me	Me	4-F
I-226	Me	Me	3-CH ₃
I-227	Me	Me	3-Cl
I-228	Me	Me	5-CH ₃
I-229	Me	Me	3-CR ³⁰ =NOR ³¹
I-230	Me	Me	4-CR ³⁰ =NOR ³¹
I-231	Me	Me	H
I-232	Me	Me	3-OCH ₃
I-233	Me	Me	4-OCH ₃
I-234	Me	Me	5-OCH ₃
I-235	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-236	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-237	Me	Me	4,6-dichloro
I-238	Me	Me	3,5-dichloro
I-239	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-240	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-241	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-242	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-243	Me	Me	4-CH ₃
I-244	Me	Et	3-OH
I-245	Me	Et	4-Cl
I-246	Me	Et	5-Cl
I-247	Me	Et	6-Cl
I-248	Me	Et	3-Br
I-249	Me	Et	4-Br
I-250	Me	Et	5-Br
I-251	Me	Et	3-F
I-252	Me	Et	4-F
I-253	Me	Et	3-CH ₃
I-254	Me	Et	3-Cl
I-255	Me	Et	5-CH ₃
I-256	Me	Et	3-CR ³⁰ =NOR ³¹
I-257	Me	Et	4-CR ³⁰ =NOR ³¹
I-258	Me	Et	H
I-259	Me	Et	3-OCH ₃
I-260	Me	Et	4-OCH ₃
I-261	Me	Et	5-OCH ₃
I-262	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-263	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-264	Me	Et	4,6-dichloro
I-265	Me	Et	3,5-dichloro

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-266	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-267	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-268	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-269	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-270	Me	Et	4-CH ₃
I-271	Et	Me	3-OH
I-272	Et	Me	4-Cl
I-273	Et	Me	5-Cl
I-274	Et	Me	6-Cl
I-275	Et	Me	3-Br
I-276	Et	Me	4-Br
I-277	Et	Me	5-Br
I-278	Et	Me	3-F
I-279	Et	Me	4-F
I-280	Et	Me	3-CH ₃
I-281	Et	Me	3-Cl
I-282	Et	Me	5-CH ₃
I-283	Et	Me	3-CR ³⁰ =NOR ³¹
I-284	Et	Me	4-CR ³⁰ =NOR ³¹
I-285	Et	Me	H
I-286	Et	Me	3-OCH ₃
I-287	Et	Me	4-OCH ₃
I-288	Et	Me	5-OCH ₃
I-289	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-290	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-291	Et	Me	4,6-dichloro
I-292	Et	Me	3,5-dichloro
I-293	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-294	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-295	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-296	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-297	Et	Me	4-CH ₃
I-298	Et	Et	3-OH
I-299	Et	Et	4-Cl
I-300	Et	Et	5-Cl
I-301	Et	Et	6-Cl
I-302	Et	Et	3-Br
I-303	Et	Et	4-Br
I-304	Et	Et	5-Br
I-305	Et	Et	3-F
I-306	Et	Et	4-F
I-307	Et	Et	3-CH ₃
I-308	Et	Et	3-Cl

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-309	Et	Et	5-CH ₃
I-310	Et	Et	3-CR ³⁰ =NOR ³¹
I-311	Et	Et	4-CR ³⁰ =NOR ³¹
I-312	Et	Et	H
I-313	Et	Et	3-OCH ₃
I-314	Et	Et	4-OCH ₃
I-215	Et	Et	5-OCH ₃
I-316	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-317	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-318	Et	Et	4,6-dichloro
I-319	Et	Et	3,5-dichloro
I-320	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-321	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-322	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-323	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-324	Et	Et	4-CH ₃

Table 4

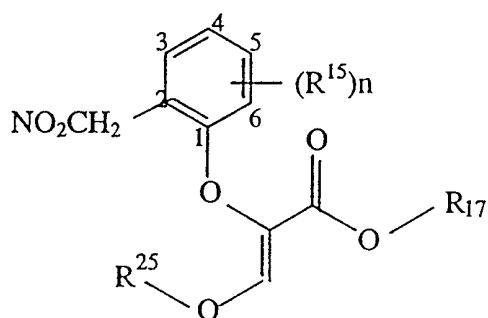
(I-5)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-325	Me	Me	3-OH
I-326	Me	Me	4-Cl
I-327	Me	Me	5-Cl
I-328	Me	Me	6-Cl
I-329	Me	Me	3-Br
I-330	Me	Me	4-Br
I-331	Me	Me	5-Br
I-332	Me	Me	3-F

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-333	Me	Me	4-F
I-334	Me	Me	3-CH ₃
I-335	Me	Me	3-Cl
I-336	Me	Me	5-CH ₃
I-337	Me	Me	3-CR ³⁰ =NOR ³¹
I-338	Me	Me	4-CR ³⁰ =NOR ³¹
I-339	Me	Me	H
I-340	Me	Me	3-OCH ₃
I-341	Me	Me	4-OCH ₃
I-342	Me	Me	5-OCH ₃
I-343	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-344	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-345	Me	Me	4,6-dichloro
I-346	Me	Me	3,5-dichloro
I-347	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-348	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-349	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-350	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-351	Me	Me	4-CH ₃
I-352	Me	Et	3-OH
I-353	Me	Et	4-Cl
I-354	Me	Et	5-Cl
I-355	Me	Et	6-Cl
I-356	Me	Et	3-Br
I-357	Me	Et	4-Br
I-358	Me	Et	5-Br
I-359	Me	Et	3-F
I-360	Me	Et	4-F
I-361	Me	Et	3-CH ₃
I-362	Me	Et	3-Cl
I-363	Me	Et	5-CH ₃
I-364	Me	Et	3-CR ³⁰ =NOR ³¹
I-365	Me	Et	4-CR ³⁰ =NOR ³¹
I-366	Me	Et	H
I-367	Me	Et	3-OCH ₃
I-368	Me	Et	4-OCH ₃
I-369	Me	Et	5-OCH ₃
I-370	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-371	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-372	Me	Et	4,6-dichloro
I-373	Me	Et	3,5-dichloro
I-374	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-375	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-376	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-377	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-378	Me	Et	4-CH ₃
I-379	Et	Me	3-OH
I-380	Et	Me	4-Cl
I-381	Et	Me	5-Cl
I-382	Et	Me	6-Cl
I-383	Et	Me	3-Br
I-384	Et	Me	4-Br
I-385	Et	Me	5-Br
I-386	Et	Me	3-F
I-387	Et	Me	4-F
I-388	Et	Me	3-CH ₃
I-389	Et	Me	3-Cl
I-390	Et	Me	5-CH ₃
I-391	Et	Me	3-CR ³⁰ =NOR ³¹
I-392	Et	Me	4-CR ³⁰ =NOR ³¹
I-393	Et	Me	H
I-394	Et	Me	3-OCH ₃
I-395	Et	Me	4-OCH ₃
I-396	Et	Me	5-OCH ₃
I-397	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-398	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-399	Et	Me	4,6-dichloro
I-400	Et	Me	3,5-dichloro
I-401	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-402	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-403	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-404	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-405	Et	Me	4-CH ₃
I-406	Et	Et	3-OH
I-407	Et	Et	4-Cl
I-408	Et	Et	5-Cl
I-409	Et	Et	6-Cl
I-410	Et	Et	3-Br
I-411	Et	Et	4-Br
I-412	Et	Et	5-Br
I-413	Et	Et	3-F
I-414	Et	Et	4-F
I-415	Et	Et	3-CH ₃
I-416	Et	Et	3-Cl
I-417	Et	Et	5-CH ₃
I-418	Et	Et	3-CR ³⁰ =NOR ³¹

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-419	Et	Et	3-CR ³⁰ =NOR ³¹
I-420	Et	Et	H
I-421	Et	Et	3-OCH ₃
I-422	Et	Et	4-OCH ₃
I-423	Et	Et	5-OCH ₃
I-424	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-425	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-426	Et	Et	4,6-dichloro
I-427	Et	Et	3,5-dichloro
I-428	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-429	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-430	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-431	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-432	Et	Et	4-CH ₃

Table 5

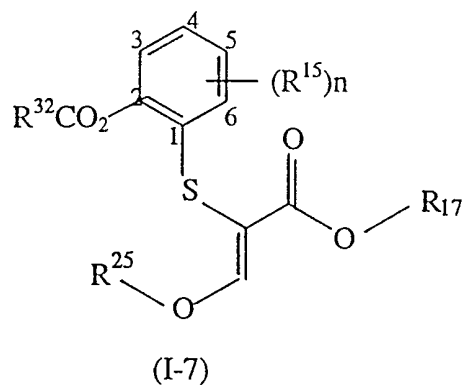
(I-6)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-433	Me	Me	3-OH
I-434	Me	Me	4-Cl
I-435	Me	Me	5-Cl
I-436	Me	Me	6-Cl
I-437	Me	Me	3-Br
I-438	Me	Me	4-Br
I-439	Me	Me	5-Br
I-440	Me	Me	3-F
I-441	Me	Me	4-F
I-442	Me	Me	3-CH ₃

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-443	Me	Me	3-Cl
I-444	Me	Me	5-CH ₃
I-445	Me	Me	3-CR ³⁰ =NOR ³¹
I-446	Me	Me	4-CR ³⁰ =NOR ³¹
I-447	Me	Me	H
I-448	Me	Me	3-OCH ₃
I-449	Me	Me	4-OCH ₃
I-450	Me	Me	5-OCH ₃
I-451	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-452	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-453	Me	Me	4,6-dichloro
I-454	Me	Me	3,5-dichloro
I-455	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-456	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-457	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-458	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-459	Me	Me	4-CH ₃
I-460	Me	Et	3-OH
I-461	Me	Et	4-Cl
I-462	Me	Et	5-Cl
I-463	Me	Et	6-Cl
I-464	Me	Et	3-Br
I-465	Me	Et	4-Br
I-466	Me	Et	5-Br
I-467	Me	Et	3-F
I-468	Me	Et	4-F
I-469	Me	Et	3-CH ₃
I-470	Me	Et	3-Cl
I-471	Me	Et	5-CH ₃
I-472	Me	Et	3-CR ³⁰ =NOR ³¹
I-473	Me	Et	4-CR ³⁰ =NOR ³¹
I-474	Me	Et	H
I-475	Me	Et	3-OCH ₃
I-476	Me	Et	4-OCH ₃
I-477	Me	Et	5-OCH ₃
I-478	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-479	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-480	Me	Et	4,6-dichloro
I-481	Me	Et	3,5-dichloro
I-482	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-483	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-484	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-485	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-486	Me	Et	4-CH ₃
I-487	Et	Me	3-OH
I-488	Et	Me	4-Cl
I-489	Et	Me	5-Cl
I-490	Et	Me	6-Cl
I-491	Et	Me	3-Br
I-492	Et	Me	4-Br
I-493	Et	Me	5-Br
I-494	Et	Me	3-F
I-495	Et	Me	4-F
I-496	Et	Me	3-CH ₃
I-497	Et	Me	3-Cl
I-498	Et	Me	5-CH ₃
I-499	Et	Me	3-CR ³⁰ =NOR ³¹
I-500	Et	Me	4-CR ³⁰ =NOR ³¹
I-501	Et	Me	H
I-502	Et	Me	3-OCH ₃
I-503	Et	Me	4-OCH ₃
I-504	Et	Me	5-OCH ₃
I-505	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-506	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-507	Et	Me	4,6-dichloro
I-508	Et	Me	3,5-dichloro
I-509	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-510	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-511	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-512	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-513	Et	Me	4-CH ₃
I-514	Et	Et	3-OH
I-515	Et	Et	4-Cl
I-516	Et	Et	5-Cl
I-517	Et	Et	6-Cl
I-518	Et	Et	3-Br
I-519	Et	Et	4-Br
I-520	Et	Et	5-Br
I-521	Et	Et	3-F
I-522	Et	Et	4-F
I-523	Et	Et	3-CH ₃
I-524	Et	Et	3-Cl
I-525	Et	Et	5-CH ₃
I-526	Et	Et	3-CR ³⁰ =NOR ³¹
I-527	Et	Et	4-CR ³⁰ =NOR ³¹
I-528	Et	Et	H

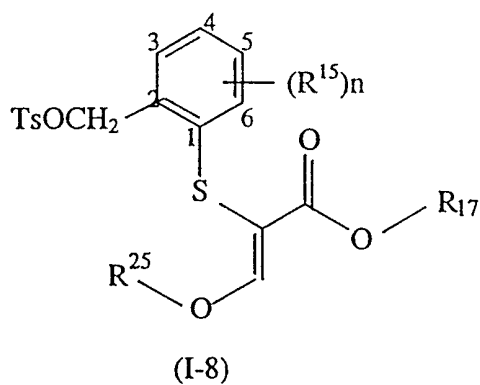
Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-529	Et	Et	3-OCH ₃
I-530	Et	Et	4-OCH ₃
I-531	Et	Et	5-OCH ₃
I-532	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-533	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-534	Et	Et	4,6-dichloro
I-535	Et	Et	3,5-dichloro
I-536	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-537	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-538	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-539	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-540	Et	Et	4-CH ₃

Table 6

Identification Group	R ¹⁰	R ²⁵	R ¹⁷	R ¹⁵
I-541	CO2R32	Me	Me	3-OH
I-542	CO2R32	Me	Me	4-Cl
I-543	CO2R32	Me	Me	5-Cl
I-544	CO2R32	Me	Me	6-Cl
I-545	CO2R32	Me	Me	3-Br
I-546	CO2R32	Me	Me	4-Br
I-547	CO2R32	Me	Me	5-Br
I-548	CO2R32	Me	Me	3-F
I-549	CO2R32	Me	Me	4-F
I-550	CO2R32	Me	Me	3-CH ₃
I-551	CO2R32	Me	Me	3-Cl
I-552	CO2R32	Me	Me	5-CH ₃
I-553	CO2R32	Me	Me	3-CR ³⁰ =NOR ³¹
I-554	CO2R32	Me	Me	4-CR ³⁰ =NOR ³¹
I-555	CO2R32	Me	Me	H
I-556	CO2R32	Me	Me	3-OCH ₃
I-557	CO2R32	Me	Me	4-OCH ₃
I-558	CO2R32	Me	Me	5-OCH ₃
I-559	CO2R32	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-560	CO2R32	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-561	CO2R32	Me	Me	4,6-dichloro
I-562	CO2R32	Me	Me	3,5-dichloro
I-563	CO2R32	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-564	CO2R32	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-565	CO2R32	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-566	CO2R32	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-567	CO2R32	Me	Me	4-CH ₃
I-568	CO2R32	Me	Et	3-OH
I-569	CO2R32	Me	Et	4-Cl
I-570	CO2R32	Me	Et	5-Cl
I-571	CO2R32	Me	Et	6-Cl
I-572	CO2R32	Me	Et	3-Br
I-573	CO2R32	Me	Et	4-Br
I-574	CO2R32	Me	Et	5-Br
I-575	CO2R32	Me	Et	3-F
I-576	CO2R32	Me	Et	4-F
I-577	CO2R32	Me	Et	3-CH ₃
I-578	CO2R32	Me	Et	3-Cl
I-579	CO2R32	Me	Et	5-CH ₃
I-580	CO2R32	Me	Et	3-CR ³⁰ =NOR ³¹
I-581	CO2R32	Me	Et	4-CR ³⁰ =NOR ³¹
I-582	CO2R32	Me	Et	H

Identification Group	R ¹⁰	R ²⁵	R ¹⁷	R ¹⁵
I-583	CO2R32	Me	Et	3-OCH3
I-584	CO2R32	Me	Et	4-OCH3
I-585	CO2R32	Me	Et	5-OCH3
I-586	CO2R32	Me	Et	3-C(H3C)(-OCH2CH2O-)
I-587	CO2R32	Me	Et	4-C(H3C)(-OCH2CH2O-)
I-588	CO2R32	Me	Et	4,6-dichloro
I-589	CO2R32	Me	Et	3,5-dichloro
I-590	CO2R32	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-591	CO2R32	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-592	CO2R32	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-593	CO2R32	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-594	CO2R32	Me	Et	4-CH3
I-595	CO2R32	Et	Me	3-OH
I-596	CO2R32	Et	Me	4-Cl
I-597	CO2R32	Et	Me	5-Cl
I-598	CO2R32	Et	Me	6-Cl
I-599	CO2R32	Et	Me	3-Br
I-600	CO2R32	Et	Me	4-Br
I-601	CO2R32	Et	Me	5-Br
I-602	CO2R32	Et	Me	3-F
I-603	CO2R32	Et	Me	4-F
I-604	CO2R32	Et	Me	3-CH3
I-605	CO2R32	Et	Me	3-Cl
I-606	CO2R32	Et	Me	5-CH3
I-607	CO2R32	Et	Me	3-CR ³⁰ =NOR ³¹
I-608	CO2R32	Et	Me	4-CR ³⁰ =NOR ³¹
I-609	CO2R32	Et	Me	H
I-610	CO2R32	Et	Me	3-OCH3
I-611	CO2R32	Et	Me	4-OCH3
I-612	CO2R32	Et	Me	5-OCH3
I-613	CO2R32	Et	Me	3-C(H3C)(-OCH2CH2O-)
I-614	CO2R32	Et	Me	4-C(H3C)(-OCH2CH2O-)
I-615	CO2R32	Et	Me	4,6-dichloro
I-616	CO2R32	Et	Me	3,5-dichloro
I-617	CO2R32	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-618	CO2R32	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-619	CO2R32	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-620	CO2R32	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-621	CO2R32	Et	Me	4-CH3
I-622	CO2R32	Et	Et	3-OH
I-623	CO2R32	Et	Et	4-Cl
I-624	CO2R32	Et	Et	5-Cl
I-625	CO2R32	Et	Et	6-Cl

Identification Group	R ¹⁰	R ²⁵	R ¹⁷	R ¹⁵
I-626	CO2R32	Et	Et	3-Br
I-627	CO2R32	Et	Et	4-Br
I-628	CO2R32	Et	Et	5-Br
I-629	CO2R32	Et	Et	3-F
I-630	CO2R32	Et	Et	4-F
I-631	CO2R32	Et	Et	3-CH3
I-632	CO2R32	Et	Et	3-Cl
I-633	CO2R32	Et	Et	5-CH3
I-634	CO2R32	Et	Et	3-CR ³⁰ =NOR ³¹
I-635	CO2R32	Et	Et	4-CR ³⁰ =NOR ³¹
I-636	CO2R32	Et	Et	H
I-637	CO2R32	Et	Et	3-OCH3
I-638	CO2R32	Et	Et	4-OCH3
I-639	CO2R32	Et	Et	5-OCH3
I-640	CO2R32	Et	Et	3-C(H3C)(-OCH2CH2O-)
I-641	CO2R32	Et	Et	4-C(H3C)(-OCH2CH2O-)
I-642	CO2R32	Et	Et	4,6-dichloro
I-643	CO2R32	Et	Et	3,5-dichloro
I-644	CO2R32	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-645	CO2R32	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-646	CO2R32	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-647	CO2R32	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-648	CO2R32	Et	Et	4-CH3

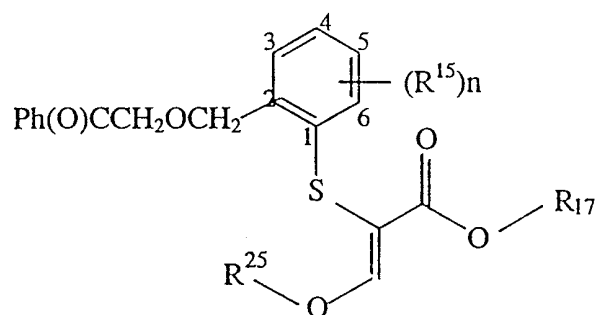
Table 7

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-649	Me	Me	3-OH
I-650	Me	Me	4-Cl
I-651	Me	Me	5-Cl
I-652	Me	Me	6-Cl
I-653	Me	Me	3-Br
I-654	Me	Me	4-Br
I-655	Me	Me	5-Br
I-656	Me	Me	3-F
I-657	Me	Me	4-F
I-658	Me	Me	3-CH ₃
I-659	Me	Me	3-Cl
I-660	Me	Me	5-CH ₃
I-661	Me	Me	3-CR ³⁰ =NOR ³¹
I-662	Me	Me	4-CR ³⁰ =NOR ³¹
I-663	Me	Me	H
I-664	Me	Me	3-OCH ₃
I-665	Me	Me	4-OCH ₃
I-666	Me	Me	5-OCH ₃
I-667	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-668	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-669	Me	Me	4,6-dichloro
I-670	Me	Me	3,5-dichloro
I-671	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-672	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-673	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-674	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-675	Me	Me	4-CH ₃
I-676	Me	Et	3-OH
I-677	Me	Et	4-Cl
I-678	Me	Et	5-Cl
I-679	Me	Et	6-Cl
I-680	Me	Et	3-Br
I-681	Me	Et	4-Br
I-682	Me	Et	5-Br
I-683	Me	Et	3-F
I-684	Me	Et	4-F
I-685	Me	Et	3-CH ₃
I-686	Me	Et	3-Cl
I-687	Me	Et	5-CH ₃
I-688	Me	Et	3-CR ³⁰ =NOR ³¹
I-689	Me	Et	4-CR ³⁰ =NOR ³¹
I-690	Me	Et	H

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-691	Me	Et	3-OCH ₃
I-692	Me	Et	4-OCH ₃
I-693	Me	Et	5-OCH ₃
I-694	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-695	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-696	Me	Et	4,6-dichloro
I-697	Me	Et	3,5-dichloro
I-698	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-699	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-700	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-701	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-702	Me	Et	4-CH ₃
I-703	Et	Me	3-OH
I-704	Et	Me	4-Cl
I-705	Et	Me	5-Cl
I-706	Et	Me	6-Cl
I-707	Et	Me	3-Br
I-708	Et	Me	4-Br
I-709	Et	Me	5-Br
I-710	Et	Me	3-F
I-711	Et	Me	4-F
I-712	Et	Me	3-CH ₃
I-713	Et	Me	3-Cl
I-714	Et	Me	5-CH ₃
I-715	Et	Me	3-CR ³⁰ =NOR ³¹
I-716	Et	Me	4-CR ³⁰ =NOR ³¹
I-717	Et	Me	H
I-718	Et	Me	3-OCH ₃
I-719	Et	Me	4-OCH ₃
I-720	Et	Me	5-OCH ₃
I-721	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-722	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-723	Et	Me	4,6-dichloro
I-724	Et	Me	3,5-dichloro
I-725	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-726	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-727	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-728	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-729	Et	Me	4-CH ₃
I-730	Et	Et	3-OH
I-731	Et	Et	4-Cl
I-732	Et	Et	5-Cl
I-733	Et	Et	6-Cl

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-734	Et	Et	3-Br
I-735	Et	Et	4-Br
I-736	Et	Et	5-Br
I-737	Et	Et	3-F
I-738	Et	Et	4-F
I-739	Et	Et	3-CH ₃
I-740	Et	Et	3-Cl
I-741	Et	Et	5-CH ₃
I-742	Et	Et	3-CR ³⁰ =NOR ³¹
I-743	Et	Et	4-CR ³⁰ =NOR ³¹
I-744	Et	Et	H
I-745	Et	Et	3-OCH ₃
I-746	Et	Et	4-OCH ₃
I-747	Et	Et	5-OCH ₃
I-748	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-749	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-750	Et	Et	4,6-dichloro
I-751	Et	Et	3,5-dichloro
I-752	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-753	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-754	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-755	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-756	Et	Et	4-CH ₃

Table 8



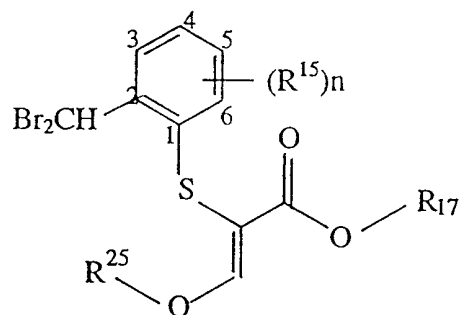
(I-9)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-757	Me	Me	3-OH
I-758	Me	Me	4-Cl

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-759	Me	Me	5-Cl
I-760	Me	Me	6-Cl
I-761	Me	Me	3-Br
I-762	Me	Me	4-Br
I-763	Me	Me	5-Br
I-764	Me	Me	3-F
I-765	Me	Me	4-F
I-766	Me	Me	3-CH ₃
I-767	Me	Me	3-Cl
I-768	Me	Me	5-CH ₃
I-769	Me	Me	3-CR ³⁰ =NOR ³¹
I-770	Me	Me	4-CR ³⁰ =NOR ³¹
I-771	Me	Me	H
I-772	Me	Me	3-OCH ₃
I-773	Me	Me	4-OCH ₃
I-774	Me	Me	5-OCH ₃
I-775	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-776	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-777	Me	Me	4,6-dichloro
I-778	Me	Me	3,5-dichloro
I-779	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-780	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-781	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-782	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-783	Me	Me	4-CH ₃
I-784	Me	Et	3-OH
I-785	Me	Et	4-Cl
I-786	Me	Et	5-Cl
I-787	Me	Et	6-Cl
I-788	Me	Et	3-Br
I-789	Me	Et	4-Br
I-790	Me	Et	5-Br
I-791	Me	Et	3-F
I-792	Me	Et	4-F
I-793	Me	Et	3-CH ₃
I-794	Me	Et	3-Cl
I-795	Me	Et	5-CH ₃
I-796	Me	Et	3CR ³⁰ =NOR ³¹
I-797	Me	Et	4-CR ³⁰ =NOR ³¹
I-798	Me	Et	H
I-799	Me	Et	3-OCH ₃
I-800	Me	Et	4-OCH ₃
I-801	Me	Et	5-OCH ₃

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-802	Me	Et	3-C(H3C)(-OCH2CH2O-)
I-803	Me	Et	4-C(H3C)(-OCH2CH2O-)
I-804	Me	Et	4,6-dichloro
I-805	Me	Et	3,5-dichloro
I-806	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-807	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-808	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-809	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-810	Me	Et	4-CH3
I-811	Et	Me	3-OH
I-812	Et	Me	4-Cl
I-813	Et	Me	5-Cl
I-814	Et	Me	6-Cl
I-815	Et	Me	3-Br
I-816	Et	Me	4-Br
I-817	Et	Me	5-Br
I-818	Et	Me	3-F
I-819	Et	Me	4-F
I-820	Et	Me	3-CH3
I-821	Et	Me	3-Cl
I-822	Et	Me	5-CH3
I-823	Et	Me	3-CR ³⁰ =NOR ³¹
I-824	Et	Me	4-CR ³⁰ =NOR ³¹
I-825	Et	Me	H
I-826	Et	Me	3-OCH3
I-827	Et	Me	4-OCH3
I-828	Et	Me	5-OCH3
I-829	Et	Me	3-C(H3C)(-OCH2CH2O-)
I-830	Et	Me	4-C(H3C)(-OCH2CH2O-)
I-831	Et	Me	4,6-dichloro
I-832	Et	Me	3,5-dichloro
I-833	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-834	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-835	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-836	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-837	Et	Me	4-CH3
I-838	Et	Et	3-OH
I-839	Et	Et	4-Cl
I-840	Et	Et	5-Cl
I-841	Et	Et	6-Cl
I-842	Et	Et	3-Br
I-843	Et	Et	4-Br
I-844	Et	Et	5-Br

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-845	Et	Et	3-F
I-846	Et	Et	4-F
I-847	Et	Et	3-CH ₃
I-848	Et	Et	3-Cl
I-849	Et	Et	5-CH ₃
I-850	Et	Et	3-CR ³⁰ =NOR ³¹
I-851	Et	Et	4-CR ³⁰ =NOR ³¹
I-852	Et	Et	H
I-853	Et	Et	3-OCH ₃
I-854	Et	Et	4-OCH ₃
I-855	Et	Et	5-OCH ₃
I-856	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-857	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-858	Et	Et	4,6-dichloro
I-859	Et	Et	3,5-dichloro
I-860	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-861	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-862	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-863	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-864	Et	Et	4-CH ₃

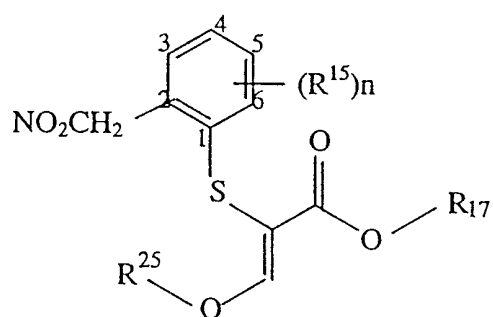
Table 9

(I-10)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-865	Me	Me	3-OH
I-866	Me	Me	4-Cl
I-867	Me	Me	5-Cl
I-868	Me	Me	6-Cl
I-869	Me	Me	3-Br
I-870	Me	Me	4-Br
I-871	Me	Me	5-Br
I-872	Me	Me	3-F
I-873	Me	Me	4-F
I-874	Me	Me	3-CH ₃
I-875	Me	Me	3-Cl
I-876	Me	Me	5-CH ₃
I-877	Me	Me	3-CR ³⁰ =NOR ³¹
I-878	Me	Me	4-CR ³⁰ =NOR ³¹
I-879	Me	Me	H
I-880	Me	Me	3-OCH ₃
I-881	Me	Me	4-OCH ₃
I-882	Me	Me	5-OCH ₃
I-883	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-884	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-885	Me	Me	4,6-dichloro
I-886	Me	Me	3,5-dichloro
I-887	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-888	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-889	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-890	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-891	Me	Me	4-CH ₃
I-892	Me	Et	3-OH
I-893	Me	Et	4-Cl
I-894	Me	Et	5-Cl
I-895	Me	Et	6-Cl
I-896	Me	Et	3-Br
I-897	Me	Et	4-Br
I-898	Me	Et	5-Br
I-899	Me	Et	3-F
I-900	Me	Et	4-F
I-901	Me	Et	3-CH ₃
I-902	Me	Et	3-Cl
I-903	Me	Et	5-CH ₃
I-904	Me	Et	3-CR ³⁰ =NOR ³¹
I-905	Me	Et	4-CR ³⁰ =NOR ³¹
I-906	Me	Et	H

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-907	Me	Et	3-OCH ₃
I-908	Me	Et	4-OCH ₃
I-909	Me	Et	5-OCH ₃
I-910	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-911	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-912	Me	Et	4,6-dichloro
I-913	Me	Et	3,5-dichloro
I-914	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-915	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-916	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-917	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-918	Me	Et	4-CH ₃
I-919	Et	Me	3-OH
I-920	Et	Me	4-Cl
I-921	Et	Me	5-Cl
I-922	Et	Me	6-Cl
I-923	Et	Me	3-Br
I-924	Et	Me	4-Br
I-925	Et	Me	5-Br
I-926	Et	Me	3-F
I-927	Et	Me	4-F
I-928	Et	Me	3-CH ₃
I-929	Et	Me	3-Cl
I-930	Et	Me	5-CH ₃
I-931	Et	Me	3-CR ³⁰ =NOR ³¹
I-932	Et	Me	4-CR ³⁰ =NOR ³¹
I-933	Et	Me	H
I-934	Et	Me	3-OCH ₃
I-935	Et	Me	4-OCH ₃
I-936	Et	Me	5-OCH ₃
I-937	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-938	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-939	Et	Me	4,6-dichloro
I-940	Et	Me	3,5-dichloro
I-941	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-942	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-943	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-944	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-945	Et	Me	4-CH ₃
I-946	Et	Et	3-OH
I-947	Et	Et	4-Cl
I-948	Et	Et	5-Cl
I-949	Et	Et	6-Cl

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-950	Et	Et	3-Br
I-951	Et	Et	4-Br
I-952	Et	Et	5-Br
I-953	Et	Et	3-F
I-954	Et	Et	4-F
I-955	Et	Et	3-CH ₃
I-956	Et	Et	3-Cl
I-957	Et	Et	5-CH ₃
I-958	Et	Et	3-CR ³⁰ =NOR ³¹
I-959	Et	Et	4-CR ³⁰ =NOR ³¹
I-960	Et	Et	H
I-961	Et	Et	3-OCH ₃
I-962	Et	Et	4-OCH ₃
I-963	Et	Et	5-OCH ₃
I-964	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-965	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-966	Et	Et	4,6-dichloro
I-967	Et	Et	3,5-dichloro
I-968	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-969	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-970	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-971	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-972	Et	Et	4-CH ₃

Table 10

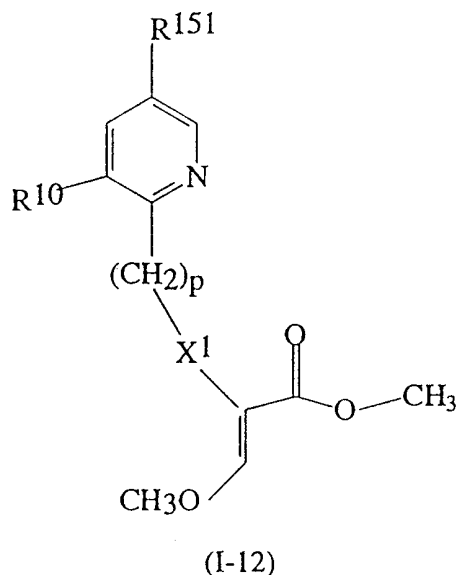
(I-11)

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-873	Me	Me	3-OH

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-874	Me	Me	4-Cl
I-875	Me	Me	5-Cl
I-876	Me	Me	6-Cl
I-877	Me	Me	3-Br
I-878	Me	Me	4-Br
I-879	Me	Me	5-Br
I-880	Me	Me	3-F
I-881	Me	Me	4-F
I-882	Me	Me	3-CH ₃
I-883	Me	Me	3-Cl
I-884	Me	Me	5-CH ₃
I-885	Me	Me	3-CR ³⁰ =NOR ³¹
I-886	Me	Me	4-CR ³⁰ =NOR ³¹
I-887	Me	Me	H
I-888	Me	Me	3-OCH ₃
I-889	Me	Me	4-OCH ₃
I-890	Me	Me	5-OCH ₃
I-891	Me	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-892	Me	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-893	Me	Me	4,6-dichloro
I-894	Me	Me	3,5-dichloro
I-895	Me	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-896	Me	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-897	Me	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-898	Me	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-999	Me	Me	4-CH ₃
I-1000	Me	Et	3-OH
I-1001	Me	Et	4-Cl
I-1002	Me	Et	5-Cl
I-1003	Me	Et	6-Cl
I-1004	Me	Et	3-Br
I-1005	Me	Et	4-Br
I-1006	Me	Et	5-Br
I-1007	Me	Et	3-F
I-1008	Me	Et	4-F
I-1009	Me	Et	3-CH ₃
I-1010	Me	Et	3-Cl
I-1011	Me	Et	5-CH ₃
I-1012	Me	Et	3-CR ³⁰ =NOR ³¹
I-1013	Me	Et	4-CR ³⁰ =NOR ³¹
I-1014	Me	Et	H
I-1015	Me	Et	3-OCH ₃
I-1016	Me	Et	4-OCH ₃

Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-1017	Me	Et	5-OCH ₃
I-1018	Me	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-1019	Me	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-1020	Me	Et	4,6-dichloro
I-1021	Me	Et	3,5-dichloro
I-1022	Me	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-1023	Me	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-1024	Me	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-1025	Me	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-1026	Me	Et	4-CH ₃
I-1027	Et	Me	3-OH
I-1028	Et	Me	4-Cl
I-1029	Et	Me	5-Cl
I-1030	Et	Me	6-Cl
I-1031	Et	Me	3-Br
I-1032	Et	Me	4-Br
I-1033	Et	Me	5-Br
I-1034	Et	Me	3-F
I-1035	Et	Me	4-F
I-1036	Et	Me	3-CH ₃
I-1037	Et	Me	3-Cl
I-1038	Et	Me	5-CH ₃
I-1039	Et	Me	3-CR ³⁰ =NOR ³¹
I-1040	Et	Me	4-CR ³⁰ =NOR ³¹
I-1041	Et	Me	H
I-1042	Et	Me	3-OCH ₃
I-1043	Et	Me	4-OCH ₃
I-1044	Et	Me	5-OCH ₃
I-1045	Et	Me	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-1046	Et	Me	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-1047	Et	Me	4,6-dichloro
I-1048	Et	Me	3,5-dichloro
I-1049	Et	Me	3-CR ³⁰ R ²⁹ R ²⁹¹
I-1050	Et	Me	4-CR ³⁰ R ²⁹ R ²⁹¹
I-1051	Et	Me	3-CR ³⁰ =NNR ³⁰ R ³¹
I-1052	Et	Me	4-CR ³⁰ =NNR ³⁰ R ³¹
I-1053	Et	Me	4-CH ₃
I-1054	Et	Et	3-OH
I-1055	Et	Et	4-Cl
I-1056	Et	Et	5-Cl
I-1057	Et	Et	6-Cl
I-1058	Et	Et	3-Br
I-1059	Et	Et	4-Br

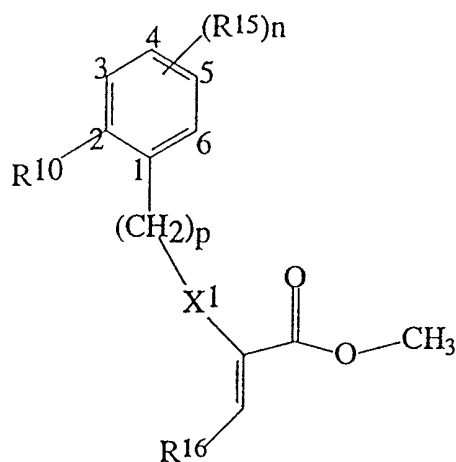
Identification Group	R ²⁵	R ¹⁷	R ¹⁵
I-1060	Et	Et	5-Br
I-1061	Et	Et	3-F
I-1062	Et	Et	4-F
I-1063	Et	Et	3-CH ₃
I-1064	Et	Et	3-Cl
I-1065	Et	Et	5-CH ₃
I-1066	Et	Et	3-CR ³⁰ =NOR ³¹
I-1067	Et	Et	4-CR ³⁰ =NOR ³¹
I-1068	Et	Et	H
I-1069	Et	Et	3-OCH ₃
I-1070	Et	Et	4-OCH ₃
I-1071	Et	Et	5-OCH ₃
I-1072	Et	Et	3-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-1073	Et	Et	4-C(H ₃ C)(-OCH ₂ CH ₂ O-)
I-1074	Et	Et	4,6-dichloro
I-1075	Et	Et	3,5-dichloro
I-1076	Et	Et	3-CR ³⁰ R ²⁹ R ²⁹¹
I-1077	Et	Et	4-CR ³⁰ R ²⁹ R ²⁹¹
I-1078	Et	Et	3-CR ³⁰ =NNR ³⁰ R ³¹
I-1079	Et	Et	4-CR ³⁰ =NNR ³⁰ R ³¹
I-1080	Et	Et	4-CH ₃

Table 11

5

In this formula (I-12), p represents zero or one, and R¹⁵¹ represents R¹⁵ or a hydrogen atom, R¹⁰ and X₁ have the meanings indicated hereinbelow.

Identification Group	R ¹⁰	R ¹⁵¹	X ₁
I-1081	CO ₂ H	H	O
I-1082	CO ₂ Me	H	O
I-1083	CO ₂ Et	H	O
I-1084	CO ₂ Na	H	O
I-1085	CO ₂ H	Et	O
I-1086	CO ₂ Me	Et	O
I-1087	CO ₂ Et	Et	O
I-1088	CO ₂ Na	Et	O
I-1089	CO ₂ H	CH ₂ OCH ₃	O
I-1090	CO ₂ Me	CH ₂ OCH ₃	O
I-1091	CO ₂ Et	CH ₂ OCH ₃	O
I-1092	CO ₂ Na	CH ₂ OCH ₃	O
I-1093	CO ₂ H	H	S
I-1094	CO ₂ Me	H	S
I-1095	CO ₂ Et	H	S
I-1096	CO ₂ Na	H	S
I-1097	CO ₂ H	Et	S
I-1098	CO ₂ Me	Et	S
I-1099	CO ₂ Et	Et	S
I-1100	CO ₂ Na	Et	S
I-1101	CO ₂ H	CH ₂ OCH ₃	S
I-1102	CO ₂ Me	CH ₂ OCH ₃	S
I-1103	CO ₂ Et	CH ₂ OCH ₃	S
I-1104	CO ₂ Na	CH ₂ OCH ₃	S

Table 12

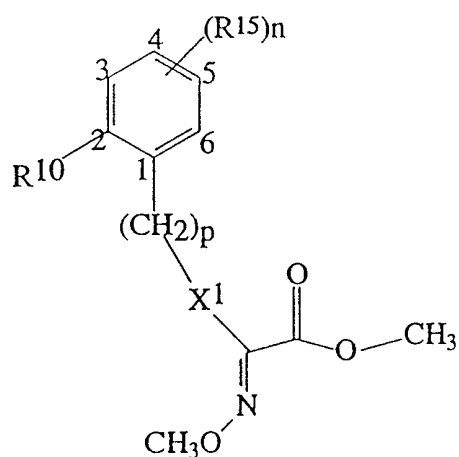
(I-13)

5 In this formula (I-13), p represents zero or one and R^{10} , R^{16} , R^{15} and X_1 have the meanings indicated hereinbelow. The R^{15} group is located according to the numbering system in (I-13).

Identification Group	R^{10}	R^{15}	X_1	R^{16}
I-1105	CO ₂ Na	4-Cl	S	OCH ₃
I-1106	CO ₂ Et	4-Cl	S	OCH ₃
I-1107	CO ₂ Me	4-Cl	S	OCH ₃
I-1108	CO ₂ H	4-Cl	S	OCH ₃
I-1109	CO ₂ Na	4-Cl	S	SCH ₃
I-1110	CO ₂ Et	4-Cl	S	SCH ₃
I-1111	CO ₂ Me	4-Cl	S	SCH ₃
I-1112	CO ₂ H	4-Cl	S	SCH ₃
I-1113	CO ₂ Na	4-Cl	S	C ₂ H ₅
I-1114	CO ₂ Et	4-Cl	S	C ₂ H ₅
I-1115	CO ₂ Me	4-Cl	S	C ₂ H ₅
I-1116	CO ₂ H	4-Cl	S	C ₂ H ₅
I-1117	CO ₂ Na	4-Cl	S	CH ₃
I-1118	CO ₂ Et	4-Cl	S	CH ₃
I-1119	CO ₂ Me	4-Cl	S	CH ₃
I-1120	CO ₂ H	4-Cl	S	CH ₃
I-1121	CO ₂ Na	4-Cl	O	SCH ₃
I-1122	CO ₂ Et	4-Cl	O	SCH ₃
I-1123	CO ₂ Me	4-Cl	O	SCH ₃
I-1124	CO ₂ H	4-Cl	O	SCH ₃
I-1125	CO ₂ Na	4-Cl	O	C ₂ H ₅
I-1126	CO ₂ Et	4-Cl	O	C ₂ H ₅
I-1127	CO ₂ Me	4-Cl	O	C ₂ H ₅

Identification Group	R ¹⁰	R ¹⁵	X ₁	R ¹⁶
I-1128	CO ₂ H	4-Cl	O	C ₂ H ₅
I-1129	CO ₂ Na	4-Cl	O	CH ₃
I-1130	CO ₂ Et	4-Cl	O	CH ₃
I-1131	CO ₂ Me	4-Cl	O	CH ₃
I-1132	CO ₂ H	4-Cl	O	CH ₃
I-1133	CO ₂ Na	3-Cl	S	OCH ₃
I-1134	CO ₂ Et	3-Cl	S	OCH ₃
I-1135	CO ₂ Me	3-Cl	S	OCH ₃
I-1136	CO ₂ H	3-Cl	S	OCH ₃
I-1137	CO ₂ Na	3-Cl	S	SCH ₃
I-1138	CO ₂ Et	3-Cl	S	SCH ₃
I-1139	CO ₂ Me	3-Cl	S	SCH ₃
I-1140	CO ₂ H	3-Cl	S	SCH ₃
I-1141	CO ₂ Na	3-Cl	S	C ₂ H ₅
I-1142	CO ₂ Et	3-Cl	S	C ₂ H ₅
I-1143	CO ₂ Me	3-Cl	S	C ₂ H ₅
I-1144	CO ₂ H	3-Cl	S	C ₂ H ₅
I-1145	CO ₂ Na	3-Cl	S	CH ₃
I-1146	CO ₂ Et	3-Cl	S	CH ₃
I-1147	CO ₂ Me	3-Cl	S	CH ₃
I-1148	CO ₂ H	3-Cl	S	CH ₃
I-1149	CO ₂ Na	3-Cl	O	SCH ₃
I-1150	CO ₂ Et	3-Cl	O	SCH ₃
I-1151	CO ₂ Me	3-Cl	O	SCH ₃
I-1152	CO ₂ H	3-Cl	O	SCH ₃
I-1153	CO ₂ Na	3-Cl	O	C ₂ H ₅
I-1154	CO ₂ Et	3-Cl	O	C ₂ H ₅
I-1155	CO ₂ Me	3-Cl	O	C ₂ H ₅
I-1156	CO ₂ H	3-Cl	O	C ₂ H ₅
I-1157	CO ₂ Na	3-Cl	O	CH ₃
I-1158	CO ₂ Et	3-Cl	O	CH ₃
I-1159	CO ₂ Me	3-Cl	O	CH ₃
I-1160	CO ₂ H	3-Cl	O	CH ₃
I-1161	CO ₂ Na	4-Cl	NH	OCH ₃
I-1162	CO ₂ Et	4-Cl	NH	OCH ₃
I-1163	CO ₂ Me	4-Cl	NH	OCH ₃
I-1164	CO ₂ H	4-Cl	NH	OCH ₃
I-1165	CO ₂ Na	4-Cl	NH	SCH ₃
I-1166	CO ₂ Et	4-Cl	NH	SCH ₃
I-1167	CO ₂ Me	4-Cl	NH	SCH ₃
I-1168	CO ₂ H	4-Cl	NH	SCH ₃
I-1169	CO ₂ Na	4-Cl	NH	C ₂ H ₅
I-1170	CO ₂ Et	4-Cl	NH	C ₂ H ₅

Identification Group	R ¹⁰	R ¹⁵	X ₁	R ¹⁶
I-1171	CO ₂ Me	4-Cl	NH	C ₂ H ₅
I-1172	CO ₂ H	4-Cl	NH	C ₂ H ₅
I-1173	CO ₂ Na	4-Cl	NH	CH ₃
I-1174	CO ₂ Et	4-Cl	NH	CH ₃
I-1175	CO ₂ Me	4-Cl	NH	CH ₃
I-1176	CO ₂ H	4-Cl	NH	CH ₃
I-1177	CO ₂ Na	3-Cl	NH	OCH ₃
I-1178	CO ₂ Et	3-Cl	NH	OCH ₃
I-1179	CO ₂ Me	3-Cl	NH	OCH ₃
I-1180	CO ₂ H	3-Cl	NH	OCH ₃
I-1181	CO ₂ Na	3-Cl	NH	SCH ₃
I-1182	CO ₂ Et	3-Cl	NH	SCH ₃
I-1183	CO ₂ Me	3-Cl	NH	SCH ₃
I-1184	CO ₂ H	3-Cl	NH	SCH ₃
I-1185	CO ₂ Na	3-Cl	NH	C ₂ H ₅
I-1186	CO ₂ Et	3-Cl	NH	C ₂ H ₅
I-1187	CO ₂ Me	3-Cl	NH	C ₂ H ₅
I-1188	CO ₂ H	3-Cl	NH	C ₂ H ₅
I-1189	CO ₂ Na	3-Cl	NH	CH ₃
I-1190	CO ₂ Et	3-Cl	NH	CH ₃
I-1191	CO ₂ Me	3-Cl	NH	CH ₃
I-1192	CO ₂ H	3-Cl	NH	CH ₃

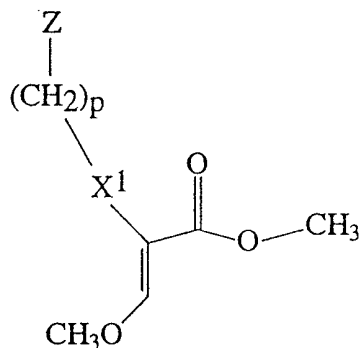
Table 13

(I-14)

5

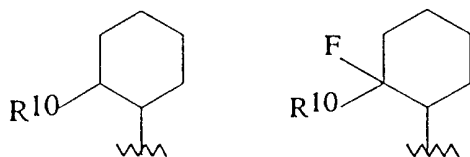
In this formula (I-14), p represents zero or one and R¹⁰, R¹⁵ and X₁ have the meanings indicated hereinbelow. The R¹⁵ group is located according to the numbering system in (I-14).

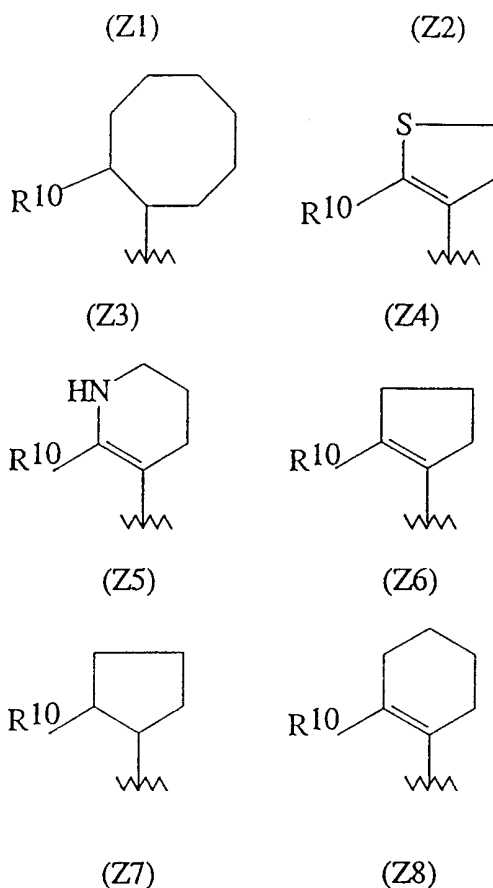
Identification Group	R ¹⁰	R ¹⁵	X ¹
I-1193	CO ₂ Na	3-Cl	O
I-1194	CO ₂ Et	3-Cl	O
I-1195	CO ₂ Me	3-Cl	O
I-1196	CO ₂ H	3-Cl	O
I-1197	CO ₂ Na	3-Cl	S
I-1198	CO ₂ Et	3-Cl	S
I-1199	CO ₂ Me	3-Cl	S
I-1200	CO ₂ H	3-Cl	S
I-1201	CO ₂ Na	4-Cl	O
I-1202	CO ₂ Et	4-Cl	O
I-1203	CO ₂ Me	4-Cl	O
I-1204	CO ₂ H	4-Cl	O
I-1205	CO ₂ Na	4-Cl	S
I-1206	CO ₂ Et	4-Cl	S
I-1207	CO ₂ Me	4-Cl	S
I-1208	CO ₂ H	4-Cl	S

Table 14

(I-15)

In this formula (I-15), p represents zero, and R¹⁰ and X¹ have the meanings indicated hereinbelow. It is to be understood that in the following table, Identification Group I recites individual species in which Z represents;





5

wherein  represents an attachment point to the rest of the molecule.

Identification Group	Z	R10	X1
I-1209	Z-8	CO ₂ Na	O
I-1210	Z-7	CO ₂ Na	O
I-1211	Z-6	CO ₂ Na	O
I-1212	Z-5	CO ₂ Na	O
I-1213	Z-4	CO ₂ Na	O
I-1214	Z-3	CO ₂ Na	O
I-1215	Z-2	CO ₂ Na	O
I-1216	Z-1	CO ₂ Na	O
I-1217	Z-8	CO ₂ Et	O
I-1218	Z-7	CO ₂ Et	O
I-1219	Z-6	CO ₂ Et	O
I-1220	Z-5	CO ₂ Et	O
I-1221	Z-4	CO ₂ Et	O
I-1222	Z-3	CO ₂ Et	O
I-1223	Z-2	CO ₂ Et	O
I-1224	Z-1	CO ₂ Et	O
I-1225	Z-8	CO ₂ Me	O
I-1226	Z-7	CO ₂ Me	O
I-1227	Z-6	CO ₂ Me	O

Identification Group	Z	R10	X1
I-1228	Z-5	CO ₂ Me	O
I-1229	Z-4	CO ₂ Me	O
I-1230	Z-3	CO ₂ Me	O
I-1231	Z-2	CO ₂ Me	O
I-1232	Z-1	CO ₂ Me	O
I-1233	Z-8	CO ₂ H	O
I-1234	Z-7	CO ₂ H	O
I-1235	Z-6	CO ₂ H	O
I-1236	Z-5	CO ₂ H	O
I-1237	Z-4	CO ₂ H	O
I-1238	Z-3	CO ₂ H	O
I-1239	Z-2	CO ₂ H	O
I-1240	Z-1	CO ₂ H	O
I-1241	Z-8	CO ₂ Na	S
I-1242	Z-7	CO ₂ Na	S
I-1243	Z-6	CO ₂ Na	S
I-1244	Z-5	CO ₂ Na	S
I-1245	Z-4	CO ₂ Na	S
I-1246	Z-3	CO ₂ Na	S
I-1247	Z-2	CO ₂ Na	S
I-1248	Z-1	CO ₂ Na	S
I-1249	Z-8	CO ₂ Et	S
I-1250	Z-7	CO ₂ Et	S
I-1251	Z-6	CO ₂ Et	S
I-1252	Z-5	CO ₂ Et	S
I-1253	Z-4	CO ₂ Et	S
I-1254	Z-3	CO ₂ Et	S
I-1255	Z-2	CO ₂ Et	S
I-1256	Z-1	CO ₂ Et	S
I-1257	Z-8	CO ₂ Me	S
I-1258	Z-7	CO ₂ Me	S
I-1259	Z-6	CO ₂ Me	S
I-1260	Z-5	CO ₂ Me	S
I-1261	Z-4	CO ₂ Me	S
I-1262	Z-3	CO ₂ Me	S
I-1263	Z-2	CO ₂ Me	S
I-1264	Z-1	CO ₂ Me	S
I-1265	Z-8	CO ₂ H	S
I-1266	Z-7	CO ₂ H	S
I-1267	Z-6	CO ₂ H	S
I-1268	Z-5	CO ₂ H	S
I-1269	Z-4	CO ₂ H	S
I-1270	Z-3	CO ₂ H	S

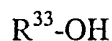
Identification Group	Z	R10	X1
I-1271	Z-2	CO ₂ H	S
I-1272	Z-1	CO ₂ H	S

Compounds of formula (I) above may be prepared by the application or adaptation of known methods (i.e. methods heretofore used or described in the literature), for example as hereinafter described.

In the following description where symbols appearing in formulae are not specifically defined, it is to be understood that they are "as hereinbefore defined" in accordance with the first definition of each symbol in the specification.

It is to be understood that in the descriptions of the following processes the sequences may be performed in different orders, and that suitable protecting groups may be required to achieve the compounds sought.

According to a feature of the present invention compounds of formula (I), wherein R¹¹, R¹², R¹³, R¹⁴, R¹⁶, R¹⁷, p, X₁, X₂ and X₃ are as defined above and in which R¹⁰ represents -CO₂R³³, wherein R³³ represents R³² with the exclusion of the hydrogen atom, may be prepared from the corresponding compound of formula (I) wherein R¹⁰ represents CO₂H by reaction with an alcohol of formula (II):

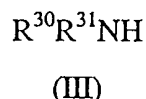


(II)

The reaction is generally carried out in the presence of an organic solvent, preferably the alcohol R³³OH, optionally in the presence of an acid or base catalyst, preferably an acid catalyst such as sulphuric acid.

According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above and in which R¹⁰ represents -CO₂H, may be prepared from the corresponding compound wherein R¹⁰ represents -CO₂R³³ and R³³ represents t-butyl, using an acid such as trifluoroacetic acid in a solvent such as dichloromethane at a temperature of from 0-50°C.

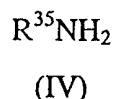
According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above and in which R^{10} represents $-\text{CONR}^{30}\text{R}^{31}$, may be prepared from the corresponding compound of formula (I) wherein R^{10} represents $-\text{CO}_2\text{H}$ by successive treatment with a halogenating agent to give the acyl halide, followed by an amine of formula (III):



The halogenating agent is generally an oxalyl halide or a sulfonyl halide, the halide; is preferably chloride. The halogenation can be performed in the presence or absence of solvent, preferably in an halogenated hydrocarbon such as dichloromethane at a temperature between 0 °C and 40 °C, optionally in the presence of a dialkylformamide as catalyst, usually dimethylformamide. The reaction of the thus formed acyl halide with an amine of formula (III) is generally performed in an inert solvent such as dichloromethane, optionally in the presence of a base, generally a tertiary amine base such as triethylamine, at a temperature between 0 °C and 40 °C.

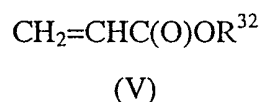
According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above, in which R^{10} is $-\text{CH}_2\text{NO}_2$, $-\text{CH}_2\text{SCN}$, $-\text{CH}_2\text{CN}$ or $-\text{CH}_2\text{N}_3$, may be prepared from the corresponding compound of formula (I) wherein R^{10} is $-\text{CH}_2\text{-L}$, where L is a leaving group, generally a sulfonate ester such as a para toluenesulfonate or a mesylate, or wherein R^{10} is replaced by $-\text{CH}_2\text{-L}^1$, where L^1 is a leaving group, generally a halogen, by treatment with the metal salt of the appropriate nitro, thiocyno, cyano or azido anion respectively, especially a group Ia or Ib metal salt, such as sodium, potassium or silver, in an organic solvent such as dimethylformamide or dimethylsulfoxide, at a temperature between 0 °C and 150 °C, preferably 0° to 60 °C. Such compounds are generally known in the literature, or may be prepared from known compounds by a practitioner skilled in the art.

According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above, in which R^{10} is $-C(=NR^{35})R^{32}$, can be prepared from the corresponding compound of formula (I) wherein R^{10} is $-COR^{32}$ by reaction with a compound of formula (IV);



optionally in the presence of an organic solvent, such as toluene, acetic acid or an alcohol such as methanol or ethanol, optionally in the presence of an acid, such as para-toluene sulfonic acid or a base, such as sodium acetate, as catalyst. The reaction is generally performed at a temperature of 0°C to 150°C , optionally with the physical removal of water (for example, by azeotropic distillation), or by the use of a dehydrating agent such as molecular sieves or titanium tetrachloride.

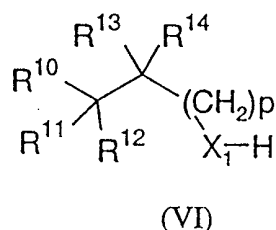
According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above, and in which R^{10} is $-\text{CH}=\text{CHC}(\text{O})\text{OR}^{32}$ can be prepared from the corresponding compound of formula (I) wherein R^{10} is halogen, by reaction with a compound of formula (V):



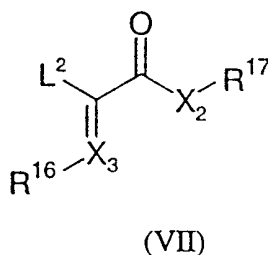
The halogen is preferably bromine or iodine. The reaction can be conducted in the absence or presence of solvent, which may be organic or aqueous, generally a polar aprotic solvent such as N,N-dimethylformamide or a polyether such as glyme. The reaction is usually carried out in the presence of a transition metal compound as catalyst, usually of palladium, such as palladium acetate, optionally in the presence of a base, for example triethylamine and other catalysts such as trialkyl or triaryl phosphines, generally triphenylphosphine. The reactions are performed at temperatures from 0°C to 150°C , generally 50°C to 150°C .

According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above and in which R^{10} represents $-CHR^{27}R^{28}$ or $-CR^{27}R^{28}R^{281}$ and R^{27} , R^{28} and R^{281} are as defined above, may be prepared by the halogenation of the corresponding compound in which one or more of R^{27} , R^{28} and R^{281} are replaced by hydrogen atoms. The reaction is generally performed using a N-halosuccinimide such as N-bromosuccinimide, in a solvent such as carbon tetrachloride, optionally with a radical initiator such as azobisisobutyronitrile, and optionally in the presence of irradiation with light, at a temperature of from 20°C to the reflux temperature of the solvent.

According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as hereinbefore defined, may be prepared from the corresponding compound of formula (VI),

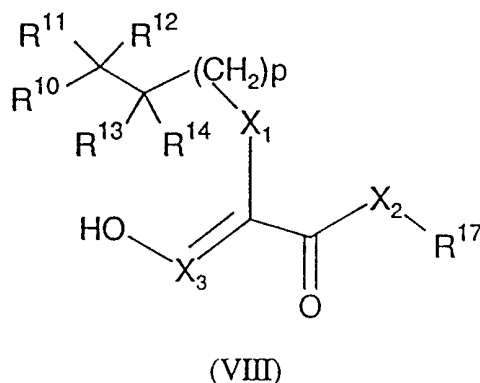


wherein R^{10} , R^{11} , R^{12} , R^{13} , R^{14} , X_1 and p are as hereinbefore defined by reaction with a compound of formula (VII),



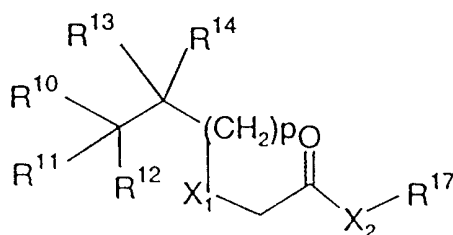
wherein X_2 , X_3 , R^{16} and R^{17} are as hereinbefore defined, and L^2 is a leaving group, such as a halogen, usually a bromine, chlorine or iodine radical, optionally in the presence of a base, generally an amine such as triethylamine or pyridine or a metal hydride such as sodium hydride.

According to a further feature of the invention, compounds of formula (I) wherein the various symbols are as defined above and R^{16} represents OR^{251} wherein R^{251} represents R^{25} with the exclusion of the hydrogen atom, may be prepared by the reaction of a compound of formula (VIII);



with an alkylating agent (to introduce a group R^{251} which is alkyl), generally a dialkylsulfate such as dimethylsulfate, or an alkyl halide, preferably an alkyl iodide such as methyl iodide. The reaction may be performed in the absence or presence of an organic solvent, such as an ether such as diethyl ether, or a dialkylformamide, such as dimethylformamide, at a temperature between 0° and 40°C , optionally in the presence of a base which may be organic, such as a tertiary amine, or inorganic, such as a metal carbonate or a metal bicarbonate, such as potassium carbonate.

According to a further feature of the invention, compounds of formula (VIII) wherein R^{10} , R^{11} , R^{12} , R^{13} , R^{14} , R^{17} , X_1 , X_2 are as hereinbefore defined and X_3 represents CR^{19} wherein R^{19} represents R^{24} may be prepared from the reaction of a compound of formula (IX);



(IX)

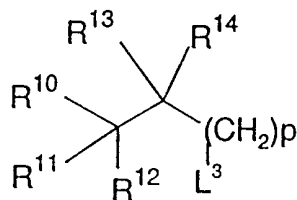
with an aminomethylating agent followed by hydrolysis with an acid. The aminomethylating agent is generally a dialkylaminodialkylacetal, such as dimethylformamide dimethyl acetal, or an alkoxybis(dialkylamino)methane, specifically t-butoxybis(dimethylamino)methane (Bredereck's reagent). The reaction is conducted in the absence or in the presence of an organic solvent such as toluene at a temperature between 20°C and 150°C, preferably between 80°C and 130°C. Hydrolysis is accomplished with an acid, generally a mineral acid, such as hydrochloric acid in the presence of an organic solvent, which may or may not be miscible with water, such as tetrahydrofuran.

According to a further feature of the present invention, compounds of formula (I) wherein the various symbols are as defined above and in which R^{10} represents $-\text{COCH}_2\text{COR}^{33}$ wherein R^{33} is as defined above, may be prepared from the corresponding compound in which R^{10} is replaced by a group $\text{COCH}(\text{CO}_2\text{tBu})\text{COR}^{33}$. The reaction is generally performed using an acid such as 4-toluenesulphonic acid in a solvent such as dichloromethane at a temperature of from 0-50°C.

According to a further feature of the present invention compounds of formula (I) wherein R^{10} represents $-\text{COF}$ may be prepared from the corresponding compound in which R^{10} represents CO_2H , by reaction with a fluorinating agent such as cyanuric fluoride in the presence of a base such as pyridine in an inert solvent such as dichloromethane at 0-50°C.

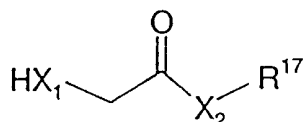
Compounds in which R^{10} represents $-\text{CO}_2\text{R}^{33}$ and R^{33} represents t-butyl may be prepared by the reaction of the corresponding compound in which R^{10} represents $-\text{CO}_2\text{H}$ with t-butanol in a solvent such as dichloromethane. The reaction is performed in the presence of an acid such as sulphuric acid and preferably a dehydrating agent such as anhydrous magnesium sulphate at a temperature of from 0-50°C.

According to a further feature of the invention, compounds of formula (IX) may be prepared by the reaction of a compound of formula (X),



(X)

wherein R^{10} , R^{11} , R^{12} , R^{13} and R^{14} are as hereinbefore defined and L^3 is a leaving group, generally a sulfonate, such as a triflate or tosylate, or a halide, generally a chloride, bromide or iodide radical, with a compound of formula (XI),



(XI)

wherein X_1 , X_2 and R^{17} are as hereinbefore defined, optionally in the presence of a base, such as a tertiary amine, a metal carbonate or a metal hydride. Compounds of formula (XI) are generally known in the literature or may be prepared by known methods.

Intermediates of formula (I) in which R^{10} is replaced by $\text{COCH}(\text{CO}_2\text{tBu})\text{COR}^{33}$, used above, may be prepared from the corresponding acid of formula (I) in which R^{10} represents CO_2H by conversion to the acid chloride using a chlorinating agent such as oxalyl chloride in an inert solvent, followed by reaction with a metal salt (preferably a magnesium salt) of a compound of formula (XII),



wherein R^{33} is as defined above. The reaction is generally performed in a solvent, such as toluene.

Compounds of formula (II), (III), (IV), (V), (VI), (VII), (IX), (X) and (XI) are generally known or may be prepared by known methods.

The following examples are given to illustrate the invention and to facilitate the work of the man skilled in the art to reproduce the invention. However, they have not to be understood as limiting the invention. Some of the initial steps of some examples may be already known directly or indirectly for analogous compounds. Nevertheless, such descriptions have been kept within this description to provide an easier and better practice for the man skilled in the art to reach any of the compounds of the invention.

Example 1

0.396g of methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)-3-hydroxypropenoate was mixed with 336mg of K_2CO_3 , $(CH_3)_2SO_4$ (0.16ml) and dimethylformamide (8.2ml). The mixture was stirred for 12 hours at 20°C and extracted with ether (following the addition of Na_2CO_3). The organic layer was washed with water and brine and dried so as to give, methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)-3-methoxypropenoate (compound 1), M.S. analysis showed m/z 343 (M+H).

By proceeding in a similar manner the following compounds were prepared:

methyl 2-[2-methoxycarbonyl-3-(2-methyl-1,3-dioxolan-2-yl)phenoxy]-3-methoxypropenoate (compound 139, NMR ($CDCl_3$): 1.75 (s,3H), 3.70 (s,3H), 3.85 (s,3H), 3.90 (s,3H), 3.73 (m,2H), 4.00 (m,2H), 6.75 (d,1H), 7.00-7.35 (m,3H)); and

methyl 2-(2-methoxycarbonylbenzyloxy)-3-methoxypropenoate (compound 140, NMR ($CDCl_3$): 3.6(s,3H), 3.7(s,3H), 3.8(s,3H), 5.2(s,2H), 6.95(s,1H), 7.25(t,1H), 7.5(t,1H), 7.8(d,1H), 7.9(d,1H)).

Example 2

298mg of (methyl (2-t-butyloxycarbonyl 4-chlorophenoxy)-3-methoxypropenoate was mixed with CH_2Cl_2 (0.9ml) and CF_3COOH (0.67ml). The mixture was stirred for 2 hours at 20°C, diluted with ethyl acetate and extracted with aqueous sodium carbonate, then water. The

aqueous phase was acidified with 2N HCl and extracted with ethyl acetate. The organic layer was washed, dried and evaporated to give methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate (compound 2, a white solid, mp 119-120 °C).

5 The following compounds were similarly prepared:

methyl 2-(2-carboxy-4-methylphenoxy)-3-methoxypropenoate (compound 45, mp 128-130°C);

10 methyl 2-[2-carboxy-3-(2-methoxy-1-methoxycarbonylvinyloxy)phenoxy]-3-methoxypropenoate (compound 46, NMR (CDCl₃) 3.75(s,6H), 3.9(s,6H), 6.6(d,2H), 7.2(t,1H), 7.35(s,2H));

2,4-dichlorophenyl 2-(2-carboxy-4-chlorophenoxy)-(3-methoxy)thiopropenoate (compound 47, M.S. m/z 455 (M+Na+H); 431 (M-H));

15 methyl 2-(2-carboxy-4-chlorophenoxy)-3-(1-ethoxycarbonyl)ethoxypropenoate (compound 48, NMR (CDCl₃): 1.25(t,3H), 1.5(d,3H), 3.7(s,3H), 4.2(q,2H), 4.6(q,1H), 7.1(d,1H), 7.35(dd,1H), 7.4(s,1H), 7.85(d,1H));

20 methyl 2-(2-carboxy-4-chlorophenoxy)-3-prop-2-ynyloxypropenoate (compound 49, NMR (CDCl₃): 2.75(t,1H), 3.8(s,3H), 4.7(d,2H), 6.9(d,1H), 7.4(dd,1H), 7.65(s,1H), 8.0(d,1H), 9.25 (bs,1H));

methyl 2-(2-carboxy-4-methoxyphenoxy)-3-methoxypropenoate (compound 72, NMR (CDCl₃): 3.80(s,3H), 3.85(s,3H), 4.00(s,3H), 6.90(d,1H), 7.00(d,1H), 7.40(s,1H), 7.55(s,1H));

25 butyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate (compound 73, NMR (CDCl₃) 0.90(t,3H), 1.30(m,2H), 1.60(m,2H), 4.00(s,3H), 4.20(t,2H), 6.90(d,1H), 7.40(d,1H), 7.45(s,1H), 8.00(s,1H));

methyl 2-(2-carboxy-3-fluorophenoxy)-3-methoxypropenoate (compound 74, mp 104-106°C);

30 methyl 2-(2-carboxy-3-chlorophenoxy)-3-methoxypropenoate (compound 75, mp 151-152 °C);

methyl 2-(2-carboxy-3-methylphenoxy)-3-methoxypropenoate
(compound 76, NMR (CDCl₃): 2.4(s,3H), 3.7(s,3H), 3.9(s,3H),
6.7(d,1H), 6.9(d,1H), 7.15(t,1H), 7.3(s,1H));

methyl 2-(2-carboxy-4-chlorophenoxy)-3-methylthiopropenoate
(compound 77, NMR (CDCl₃) 2.5(s,3H), 3.8(s,3H), 6.9(d,1H),
7.4(m,1H), 7.6(s,1H), 8.0(d,1H), OH peak of acid not visible);

methyl 2-(2-carboxyphenoxy)-3-methoxypropenoate (compound
78, NMR (CDCl₃): 3.8(s,3H), 4.0(s,3H), 6.9(d,1H), 7.2(t,1H),
7.5(m,3H), 8.0(d,1H));

methyl 2-(1-carboxynaphth-2-yloxy)-3-methoxypropenoate
(compound 79, mp 145.4°C);

methyl 2-(2-carboxy-3,4 difluorophenoxy)-3-methoxypropenoate
(compound 80, NMR (CDCl₃): 7.40 (s, 1 H), 7.18 (q, 1 H), 6.70 (dt, 1
H), 4.02 (s, 3 H) and 3.80 (s, 3 H));

methyl 2-(2-carboxy-3-chloro-4-fluorophenoxy)-3-
methoxypropenoate (compound 81, mp 131°C);

methyl 2-(2-carboxy-4-chloro-3-fluorophenoxy)-3-
methoxypropenoate (compound 82, NMR (CDCl₃): 3.7 (s, 3H), 3.95 (s,
3H), 6.65 (m, 1H), 7.35-7.2 (m, 2H); ¹⁹F NMR -111.834);

methyl 2-(2-carboxy-4-difluoromethylphenoxy)-3-
methoxypropenoate (compound 83, NMR (CDCl₃): 3.8 (s, 3H), 4.0 (s,
3H), 6.85-6.45 (t, 1H), 7.0 (d, 1H), 7.5 (s, 1H), 7.65 (m, 1H), 8.2 (m,
1H));

methyl 2-(4-bromo-2-carboxyphenoxy)-3-methoxypropenoate
(compound 84, mp 142.7 -145°C);

methyl 2-(2-carboxy-4-fluorophenoxy)-3-methoxypropenoate
(compound 85, mp 141.5-143.1°C);

methyl 2-(3-bromo-2-carboxyphenoxy)-3-methoxypropenoate
(compound 86, NMR (CDCl₃): 3.75(s,3H),4.0(s,3H), 6.9(d,1H),
7.2(t,1H), 7.35-7.55(m,2H));

methyl 2-(2-carboxy-3-thiocyanatomethylphenoxy)-3-methoxypropenoate (compound 87, NMR (CDCl₃): 3.7(s,3H), 3.95(s,3H), 4.2(s,2H), 6.9(d,1H), 7.1(d,1H), 7.3-7.5(d,2H));

methyl 2-(3-acetoxymethyl-2-carboxyphenoxy)-3-methoxypropenoate (compound 88, NMR (CDCl₃): 2.1(s,3H), 3.45(s,2H), 3.75(s,3H), 4.0(s,3H), 6.9(d,1H), 7.15(d,1H), 7.35(t,1H), 7.4(s,1H));

methyl 2-(2-carboxy-3,4-dichlorophenoxy)-3-methoxypropenoate (compound 89, NMR (CDCl₃): 3.7(s,3H), 4.0(s,3H), 6.8(d,1H), 7.4-7.5(m,2H));

methyl 2-(2-carboxy-3,4-difluorophenoxy)-3-methoxypropenoate (compound 115, NMR (CDCl₃): 7.30 (s, 1 H), 7.12 (q, 1 H), 6.60 (dt, 1 H), 3.96 (s, 3 H), 3.90 (s, 3 H) and 3.72 (s, 3 H));

methyl 2-(2-carboxy-4-chlorophenoxy)-3-ethoxypropenoate (compound 157, NMR (CDCl₃): 1.35(t,3H), 3.75(s,3H), 4.2(q,2H), 6.9(d,1H), 7.4(dd,1H), 7.5(s,1H), 7.95(d,1H), 9.4 (bs,1H)); and

methyl 2-(2-carboxy-4-chlorophenoxy)-3-(2-trifluoromethoxybenzyloxy)propenoate (compound 158, NMR (CDCl₃): 3.75(s,3H), 5.25(s,2H), 6.85(d,1H), 7.35(m,5H), 7.6(s,1H), 7.95(d,1H), 8.6 (bs,1H)).

Example 3

Similarly, the corresponding chain of reactions of examples 1 to 2 and reference examples 3, 4, 5 were followed so as to give, starting from 5-iodosalicylic acid, methyl 2-(2-carboxy-4-iodophenoxy)-3-methoxypropenoate (compound 3, mp 130-131 °C).

Example 4

A mixture of 5.13g methyl 2-(4-chloro-2-methylphenoxy)-3-methoxypropenoate, 3.56g of N-bromosuccinimide, and a catalytic amount of azobisisobutyronitrile was heated at reflux in carbon tetrachloride with light irradiation for 4 hours. The mixture was filtered through silica gel, the solvent evaporated and the residue purified by fractional recrystallisation to give methyl 2-(2-bromomethyl-4-

chlorophenoxy)-3-methoxypropenoate, NMR (CDCl₃): 3.70 (s,3H), 3.9 (s,3H), 4.60 (s,2H), 6.70 (d, H), 7.20 (d,1H), 7.30 (s,1H), 7.40 (s,1H), and methyl 2-(2-dibromomethyl-4-chlorophenoxy)-3-methoxypropenoate (compound 4, NMR (CDCl₃): 3.70 (s,3H), 3.9 (s,3H), 6.70 (d,1H), 7.20 (d,3H), 7.30 (s,2H), 7.90 (s,1H).

Example 5

100mg of methyl 2-(2-bromomethyl-4-chlorophenoxy)-3-methoxyacrylate were mixed with 70mg of N-methylmorpholine N-oxide monohydrate and stirred in acetonitrile at 20°C for 12 hours in the presence of sieves as a drying agent. The mixture was filtered, washed with water and dried so as to give 56mg of methyl 2-(2-formyl-4-chlorophenoxy)-3-methoxypropenoate (compound 5), M.S. m/z 271 (M+H).

Example 6

0.1g of methyl 2-(2-bromomethyl-4-chlorophenoxy)-3-methoxyacrylate, 45.3 mg of potassium carbonate, N-methylaniline (35.5μl) and toluene (1ml) were heated at 100 °C for 18 hours. Filtration, evaporation and chromatography gave methyl 2-[4-chloro-2-((N-methyl-N-phenylamino)methyl)phenoxy]-3-methoxypropenoate (compound 6), M.S. m/z 362 (M+H).

The following compounds were similarly prepared by replacing the N-methylaniline with the nitrogen compounds shown in the following table:

Nitrogen compound	Product	Compound No.	M.S. Data m/z
allylamine	methyl 2-[4-chloro-2-(N-allylamino)methyl]phenoxy]-3-methoxypropenoate	7	312 (M+H)
benzylamine	methyl 2-[4-chloro-2-(N-benzylamino)methyl]phenoxy]-3-methoxypropenoate	8	362 (M+H)
cyclopropylamine	methyl 2-[4-chloro-2-(N-cyclopropylamino)methyl]phenoxy]-3-methoxypropenoate	9	312 (M+H)
sodium azide	methyl 2-[4-chloro-2-(azidomethyl)phenoxy]-3-	10	298 (M+H)

	methoxypropenoate		
succinimide	methyl 2-[4-chloro-2-(N-succinimidomethyl)phenoxy]-3-methoxypropenoate	11	354 (M+H)
phthalimide	methyl 2-[4-chloro-2-(N-phthalimidomethyl)phenoxy]-3-methoxypropenoate	12	402 (M+H)
N-isopropyl-methane-sulphonamide	methyl 2-[4-chloro-2-(N-isopropyl-N-(methanesulfonyl)aminomethyl)-phenoxy]-3-methoxypropenoate	13	392 (M+H)
N-methylmethane sulphonamide	methyl 2-[4-chloro-2-(N-methyl-N-(methanesulfonyl)aminomethyl)-phenoxy]-3-methoxypropenoate	14	364 (M+H)
methyl carbamate	methyl 2-[4-chloro-2-(N-(methoxycarbonyl)aminomethyl)phenoxy]-3-methoxypropenoate	15	330 (M+H)

Example 7

0.1g of methyl 2-(2-bromomethyl-4-chlorophenoxy)-3-methoxyacrylate, 0.068g of silver nitrite and diethyl ether (1ml) were stirred at 0 °C for 8 hours, and at ambient temperature for 60 hours. Filtration, evaporation and chromatography of the residue gave methyl 2-(4-chloro-2-(nitromethyl)phenoxy)-3-methoxypropenoate (compound 16), M.S. m/z 302 (M+H).

Example 8

To 0.1g of methyl 2-(2-bromomethyl-4-chlorophenoxy)-3-methoxyacrylate in DMSO (1ml) at 0 °C was added 0.021g potassium cyanide. The contents were stirred at ambient temperature for 16 hours, diluted with water and extracted with diethyl ether. The organic layer was washed with saturated sodium chloride solution, dried and evaporated to give methyl 2-(4-chloro-2-(cyanomethyl)phenoxy)-3-methoxypropenoate (compound 17), M.S. m/z 282 (M+H).

Example 9

To 0.1g of methyl 2-(2-bromomethylphenoxy)-3-methoxyacrylate in DMSO (1ml) at 0 °C was added 0.026g sodium thiocyanate. The

contents were stirred at ambient temperature for 16 hours, diluted with water and extracted with ethyl acetate. The organic layer was washed with saturated sodium chloride solution, dried and evaporated to give methyl 2-(4-chloro-2-(thiocyanomethyl)phenoxy)-3-methoxypropenoate (compound 18), M.S. m/z 314 (M+H).

Example 10

0.04g of methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate, conc. H₂SO₄ (20μl) and methanol (3 ml) were stirred at ambient temperature for 18 hours and then at 60 °C for 30 minutes. The solvent was removed by evaporation and the residue partitioned between diethyl ether and aqueous sodium bicarbonate. The organic layer was separated, dried and evaporated to give 0.042g of methyl 2-(4-chloro-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 19, NMR (CDCl₃): 3.80 (3H,s), 3.85 (3H,s), 3.60 (3H,s).

Similarly, using ethanol there was obtained methyl 2-(4-chloro-2-ethoxycarbonylphenoxy)-3-methoxypropenoate (compound 20, NMR (CDCl₃): 3.75 (s,3H), 1.30 (t,3H), 3.60 (s,3H), 4.30 (q,2H).

The following compounds were similarly prepared:

methyl 2-[4-chloro-2-(prop-2-ynyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 51, M.S. m/z 325 (M+H));

methyl 2-[2-(benzyloxycarbonyl)-4-chlorophenoxy]-3-methoxypropenoate (compound 52, M.S. m/z 377 (M+H));

methyl 2-[4-chloro-2-(propyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 53, M.S. m/z 329 (M+H));

methyl 2-[2-(butyloxycarbonyl)-4-chlorophenoxy]-3-methoxypropenoate (compound 54, M.S. m/z 343 (M+H));

methyl 2-[4-chloro-2-(prop-2-yloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 55, M.S. m/z 329 (M+H));

methyl 2-[4-chloro-2-(3-chloropropyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 56, M.S. m/z 363 (M+H));

methyl 2-[4-chloro-2-(but-2-yloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 57, M.S. m/z 343 (M+H));

methyl 2-[4-chloro-2-(3-pentyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 58, M.S. m/z 357 (M+H));

methyl 2-[4-chloro-2-(hept-2-yloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 59, M.S. m/z 385 (M+H));

5 methyl 2-[4-chloro-2-(octyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 60, M.S. m/z 399 (M+H));

methyl 2-[4-chloro-2-(cyclopentyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 61, M.S. m/z 355 (M+H));

10 methyl 2-[4-chloro-2-(2-methoxyethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 62, M.S. m/z 345 (M+H));

methyl 2-[4-chloro-2-(2-ethoxyethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 63, M.S. m/z 359 (M+H));

methyl 2-[4-chloro-2-(cyclopropylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 64, M.S. m/z 341 (M+H));

15 methyl 2-(4-methoxy-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 65, NMR (CDCl₃): 3.70(s,3H), 3.80(s,3H), 3.85(s,3H), 3.90(s,3H), 6.80(d,1H), 6.95(d,1H), 7.30(s,1H), 7.40(s,1H));

20 methyl 2-(4-bromo-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 100, NMR (CDCl₃): 3.70(s,3H), 3.85(s,3H), 3.9(s,3H), 6.8(d,1H), 7.30(s,1H), 7.45(d,1H), 8.00(s,1H));

25 methyl 2-(4-fluoro-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 101, NMR (CDCl₃): 3.70(s,3H), 3.85(s,3H), 3.90(s,3H), 6.83(m,1H), 7.10(m,1H), 7.30(s,1H), 7.55(d,1H); (¹⁹F) -122.21 (s,1F)); and

methyl 2-(2-ethoxycarbonyl-3-fluorophenoxy)-3-methoxypropenoate (compound 102, NMR (CDCl₃) 1,3(t,3H), 3.6(s,3H), 3.8(s,3H), 4.35(q,2H), 6.6(d,1H), 6.7(t,1H), 7.2(m,1H), 7.25(s,1H)).

30 **Example 11**

To 0.042g of methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate in CH₂Cl₂ (5ml) was added oxalyl chloride (14.1μl)

and 73 μ l of a solution of dimethylformamide in CH₂Cl₂ (1 drop DMF in 5ml CH₂Cl₂). The contents were heated at 40°C for 1 hour, cooled, and 0.026g 4-trifluoromethoxyaniline in CH₂Cl₂ (0.1ml) was added followed by triethylamine (44.9 μ l). The reaction was stirred at ambient
5 temperature for 4 hours then purified by chromatography to yield 0.062g methyl 2-(4-chloro-2-N-(4-trifluoromethoxyphenyl)-aminocarbonyl)phenoxy-3-methoxypropenoate (compound 21, NMR (CDCl₃): 8.0 (broad, 1H), 7.40 (s, 1H), 7.15 (d, 2H), 7.70 (d, 2H).

10 The following amides were similarly prepared by using the appropriate amines;

Amine	Product	Cpd No.	M.S. Data m/z
2-chloro-4-(ethoxycarbonyl)aniline	2-(4-chloro-2-N-(2-chloro-4-(ethoxycarbonyl)phenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	22	468 (M+H)
3,5-difluoroaniline	2-(4-chloro-2-N-(3,5-difluorophenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	23	398 (M+H)
3-trifluoromethyl-aniline	2-(4-chloro-2-N-(3-trifluoromethylphenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	24	430 (M+H)
3,5-dichloroaniline	2-(4-chloro-2-N-(3,5-dichlorophenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	25	430 (M+H)
2,6-difluoroaniline	2-(4-chloro-2-N-(2,6-difluorophenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	26	398 (M+H)
4-bromo-3-trifluoromethyl-aniline	2-(4-chloro-2-N-(4-bromo-3-trifluoromethylphenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	27	508 (M+H)
3-chloroaniline	2-(4-chloro-2-N-(3-chlorophenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	28	396 (M+H)
5-chloro-2-methylaniline	2-(4-chloro-2-N-(5-chloro-2-methylphenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	29	410 (M+H)
2,5-difluoroaniline	2-(4-chloro-2-N-(2,5-difluorophenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	30	398 (M+H)
3-phenoxyaniline	2-(4-chloro-2-N-(3-phenoxyphenyl)aminocarbonyl)phenoxy-3-methoxypropenoate	31	454 (M+H)

3-bromo-5-trifluoromethyl-aniline	2-(4-chloro-2-N-(3-bromo-5-trifluoromethylphenyl)-aminocarbonyl)phenoxy-3-methoxypropenoate	32	508 (M+H)
3,5-dibromoaniline	2-(4-chloro-2-N-(3,5-dibromophenyl)-aminocarbonyl)phenoxy-3-methoxypropenoate	33	518 (M+H)
5-methoxy-2-methylaniline	2-(4-chloro-2-N-(5-methoxy-2-methylphenyl)-aminocarbonyl)phenoxy-3-methoxypropenoate	34	406 (M+H)

The following compounds were similarly prepared:

methyl 2-[2-(benztriazol-1-yloxy carbonyl)-4-chlorophenoxy]-3-methoxypropenoate (compound 66, M.S. m/z 404 (M+H));

5 methyl 2-[4-chloro-2-(4-nitrophenoxy carbonyl)phenoxy]-3-methoxypropenoate (compound 67, M.S. m/z 408 (M+H));

methyl 2-[4-chloro-2-(2,4,5-trichlorophenoxy carbonyl)phenoxy]-3-methoxypropenoate (compound 68, M.S. m/z 482 (M+H));

10 methyl 2-[4-chloro-2-(2,3,4,5,6-pentachlorophenoxy carbonyl)phenoxy]-3-methoxypropenoate (compound 69, M.S. m/z 550 (M+H));

methyl 2-[4-chloro-2-(ethyl carbamoyl)phenoxy]-3-methoxypropenoate (compound 70, M.S. m/z 314 (M+H));

15 methyl 2-[4-chloro-2-(ethyl thiocarbonyl)phenoxy]-3-methoxypropenoate (compound 71, M.S. m/z 331 (M+H));

methyl 2-{4-chloro-2-[N'-(2-chlorophenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate (compound 50, NMR (CDCl₃): 3.75(s,3H), 3.95(s,3H), 6.65(d,1H), 6.8(m,2H), 7.0(m,1H), 7.1(m,1H) 7.25(m,2H), 7.4(s,1H), 7.95(d,1H), 9.5 (m,1H));

20 methyl 2-{4-chloro-2-[N'-(2,4-dichlorophenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate (compound 92, NMR

(CDCl₃): 3.75(s,3H), 4.0(s,3H), 6.65(d,1H), 6.85(d,1H), 6.95(d,1H),
7.1(dd,1H), 7.35(m,2H), 7.4(s,1H), 8.0(d,1H), 9.7(d,1H));

methyl 2-{4-chloro-2-[N'-(3-
trifluoromethylphenyl)hydrazinocarbonyl]phenoxy}-3-
5 methoxypropenoate (compound 93, NMR (CDCl₃): 3.8(s,3H),
4.0(s,3H), 6.5(d,1H), 6.85(d,1H), 7.15(m,3H), 7.35(m,2H), 7.45(s,1H),
8.0(d,1H), 9.65(d,1H));

methyl 2-[2-(2,2,2-trifluoroethoxycarbonyl)phenoxy]-3-
methoxypropenoate (compound 94, NMR (CDCl₃): 3.6(s,3H),
10 3.8(s,3H), 4.6(q,2H), 6.85(d,1H), 7.0(t,1H), 7.3(s,1H), 7.4(t,1H),
7.85(d,1H));

methyl 2-[4-chloro-2-(2,2,2-trichloroethoxycarbonyl) phenoxy]-3-
methoxypropenoate (compound 95, NMR (CDCl₃): 3.7(s,3H),
3.85(s,3H), 4.95(s,2H), 6.85(d,1H), 7.3(s,1H), 7.4(d,1H), 7.9(d,1H));

15 methyl 2-{4-chloro-2-[(1-hydroxy-2-methylprop-2-
yl)carbamoyl]phenoxy}-3-methoxypropenoate (compound 96, NMR
(CDCl₃): 1.35(s,6H), 3.70(s,2H), 3.75(s,3H), 3.95(s,3H), 6.80(d,1H),
7.29(d,1H), 7.40(s,1H), 7.90(s,1H), 7.95(bs,1H));

methyl 2-[4-methyl-2-(2,2,2-trifluoroethoxycarbonyl) phenoxy]-
20 3-methoxypropenoate (compound 97, NMR (CDCl₃) 2.30 (s,3H), 3.70
(s, 3H), 3.90 (s, 3H), 4.65 (q, 2H), 6.80 (d, 1H), 7.25 (d, 1H), 7.30 (s,
1H), 7.70 (s, 1H));

methyl 2-(3-fluoro-2-hexylthiocarbonylphenoxy)-3-
methoxypropenoate (compound 98, M.S. m/z 371 (M+H));

25 methyl 2-[4-fluoro-2-(2-ethoxyethoxycarbonyl)phenoxy]-3-
methoxypropenoate (compound 99, NMR (CDCl₃): 1.22 (t, 3H), 3.58 (d,
2H), 3.70 (s, 3H), 3.75 (m, 2H), 3.86 (s, 3H), 4.45 (m, 2H), 6.85 (m,
1H), 7.08 (m, 1H), 7.30 (s, 1H), 7.55 (m, 1H); ¹⁹F: -122.30 (s));

methyl 2-[4-chloro-2-(diphenylmethyleneimino-
30 oxycarbonyl)phenoxy]-3-methoxypropenoate (compound 128, NMR
(CDCl₃): 3.65(s,3H), 3.80(s,3H), 6.75(d,1H), 7.30-7.70(m,13H));

methyl 2-[4-chloro-2-(methylcarbamoyl)phenoxy]-3-methoxypropenoate (compound 156, M.S. m/z 300 (M+H));

methyl 2-{4-chloro-2-[N'-(4-fluorophenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate (compound 159, NMR (CDCl₃): 3.75(s,3H), 4.0(s,3H), 6.4(d,1H), 6.9(m,5H), 7.35(dd,1H), 7.4(s,1H), 8.0(d,1H), 9.6(d,1H));

methyl 2-{4-chloro-2-[N'-(4-methoxyphenyl)hydrazinocarbonyl]phenoxy}-3-methoxypropenoate (compound 160, NMR (CDCl₃): 3.75(s,6H), 3.95(s,3H), 6.85(m,6H), 7.3(dd,1H), 7.45(s,1H), 8.0(d,1H), 9.6(bs,1H));

methyl 2-[2-(2,2,2-trichloroethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 161, NMR (CDCl₃): 3.6(s,3H), 3.8(s,3H), 4.9(s,2H), 6.85(d,1H), 7.0(t,1H), 7.3(s,1H), 7.4(t,1H), 7.9(d,1H));

methyl 2-[3-fluoro-2-(2,2,2-trifluoroethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 162, NMR (CDCl₃): 3.6(s,3H), 3.8(s,3H), 4.6(q,2H), 6.6(d,1H), 6.7(t,1H), 7.25(m,2H));

methyl 2-[4-chloro-2-(2,2,2-trifluoroethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 163, NMR (CDCl₃): 3.7(s,3H), 3.85(s,3H), 6.85(d,1H), 7.3(s,1H), 7.4(d,1H), 7.85(d,1H));

methyl 2-[3-fluoro-2-(2,2,2-trichloroethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 164, M.S. m/z 401/403/405 (M+H));
and

methyl 2-(2-ethylthiocarbonyl-3-fluorophenoxy)-3-methoxypropenoate (compound 165, m/z 315 (M+H)⁺).

Example 12

0.1 g of methyl 2-(2-formyl-4-chlorophenoxy)-3-methoxypropenoate was suspended in ethanol (2 ml) and 0.033 g of acetylhydrazide was added. The mixture was stirred at ambient temperature for 18 hours. The precipitate was filtered off, washed with a small amount of ethanol and dried to give methyl 2-(4-chloro-2-

acetylaminoininomethylenephenoxy)-3-propenoate (compound 35),
M.S. m/z 327 (M+H).

The following compounds were prepared in a similar manner from
the following reactants:

5

Reactant	Product	Compound No.	M.S.Data m/z
hydroxylamine	methyl 2-(4-chloro-2-hydroxyimino-methylenephenoxy)-3-propenoate	36	286 (M+H)
O-methyl-hydroxylamine	methyl 2-(4-chloro-2-methoxyimino-methylenephenoxy)-3-propenoate	37	300 (M+H)
O-ethyl-hydroxylamine	methyl 2-(4-chloro-2-ethoxyimino-methylenephenoxy)-3-propenoate	38	314 (M+H)
O-allylhydroxylamine	methyl 2-(4-chloro-2-allyloxyimino-methylenephenoxy)-3-propenoate	39	326 (M+H)
O-t-butyl-hydroxylamine	methyl 2-(4-chloro-2-t-butyloxyimino-methylenephenoxy)-3-propenoate	40	342 (M+H)
O-benzyl-hydroxylamine	methyl 2-(4-chloro-2-benzyloxyimino-methylenephenoxy)-3-propenoate	41	376 (M+H)
O-phenyl	methyl 2-(4-chloro-2-phenoxyimino-methylenephenoxy)-3-propenoate	42	362 (M+H)

The following compounds were prepared in a similar manner from
the corresponding hydrazines in the presence of sodium acetate:

methyl 2-[2-(pyrid-2-ylhydrazonomethylene)phenoxy]-3-methoxypropenoate (compound 130, NMR (CDCl₃): 8.34 (s, 1 H), 8.28 (s, 1 H), 8.14 (d, 1 H), 8.04 (d, 2 H), 7.60 (t, 1 H), 7.38 (d, 1 H), 7.36 (s,

10

1 H), 7.22 (t, 1 H), 7.06 (t, 1 H), 6.82-6.72 (m, 2 H), 3.90 (s, 3 H) and 3.74 (s, 3 H));

methyl 2-[4-chloro-2-(N-methylsulphonylhydrazono
methylene)phenoxy]-3-methoxypropenoate (compound 131, M.S. m/z
363/365 (M+H));

methyl 2-[4-chloro-2-(2,4,6-
trichlorophenylhydrazonomethylene)phenoxy]-3-methoxypropenoate
(compound 132, M.S. m/z 463/465/467 (M+H));

methyl
2-[4-chloro-2-[N-(4-morpholinyl)iminomethylene]phenoxy]-3-
methoxypropenoate (compound 133, M.S. m/z 355/357 (M+H));

methyl
2-[4-chloro-2-(pyrid-2-ylhydrazonomethylene)phenoxy]-3-
methoxypropenoate (compound 134, M.S. m/z 362/364 (M+H));

methyl 2-[4-chloro-2-(4-
fluorophenylhydrazonomethylene)phenoxy]-3-methoxypropenoate
(compound 135, M.S. m/z 379/381 (M+H));

methyl 2-
[4-chloro-2-(4-nitrophenylhydrazonomethylene)phenoxy]-3-
methoxypropenoate (compound 136, M.S. m/z 406/408 (M+H)); and

methyl 2-[4-chloro-2-[N-
(dimethylthiocarbamoyl)hydrazonomethylene]phenoxy]-3-
methoxypropenoate (compound 137, M.S. m/z 372/374 (M+H)).

Example 13

42 mg of methyl 2-(2-carboxy-4-chlorophenoxy)-3-
methoxypropenoate dissolved in a mixture of diethyl ether (0.8 ml) and
tetrahydrofuran (0.4 ml) were added to 7.5 mg of a 60% dispersion of
sodium hydride in mineral oil. The mixture was stirred at ambient
temperature for 4 hours to give a white precipitate that was filtered,
washed with ether and dried to give methyl 2-(2-carboxy-4-
chlorophenoxy)-3-methoxypropenoate, sodium salt (compound 43), mp
230-234 °C (decomposed).

By proceeding in a similar manner:

methyl 2-(2-carboxy-4-iodophenoxy)-3-methoxypropenoate sodium salt (compound 116, mp 234-235°C) was prepared.

Example 14

5 50 mg of methyl 2-(2-bromo-4-chlorophenoxy)-3-methoxypropenoate, 30µl of triethylamine, 3.4 mg of triphenylphosphine, 40µl of methyl acrylate, 1.4 mg of palladium acetate and DMF (2 ml) were stirred at 100 °C for 24 hours. The reaction mixture was worked up with 2N HCl, extracted into ethyl acetate, dried
10 and concentrated. Column chromatography gave methyl 2-(4-chloro-2-(2-methoxycarbonyl-ethenyl)phenoxy)-3-methoxypropenoate (compound 44), M.S. m/z 327 (M+H).

Example 15

15 By proceeding according to Example 2 starting from methyl 2-(2-t-butoxycarbonyl-3-formylphenoxy)-3-methoxypropenoate, there was prepared a mixture of methyl 2-(2-carboxy-3-dihydroxymethylphenoxy)-3-methoxypropenoate (compound 90, NMR (CDCl₃): 3.6(s,3H), 3.8(s,3H), 6.5(s,1H), 6.85(d,1H), 7.15(d,1H), 7.3(s,1H), 7.5(d,1H)) and methyl 2-(3-hydroxyphthalid-7-yloxy)-3-methoxypropenoate
20 (compound 91, NMR (CDCl₃): 3.6(s,3H), 3.8(s,3H), 6.4(s,1H), 6.8(d,1H), 7.0(d,1H), 7.3(s,1H), 7.5(t,1H)).

Example 16

25 A mixture of methyl 2-(2-carboxy-3-fluorophenoxy)-3-methoxypropenoate (0.05g), propargyl bromide (0.278 mmol) and potassium carbonate was stirred and heated in acetonitrile at 70°C for 4 hours. Water was added to the cooled mixture, which was then extracted (ether), dried and evaporated to give methyl 2-[3-fluoro-2-(prop-2-ynyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 103, 0.047g, M.S. m/z 309 (M+H)).

30 By proceeding in a similar manner the following compounds were prepared:

methyl 2-(2-benzyloxycarbonyl-3-fluorophenoxy)-3-methoxypropenoate (compound 104, M.S. m/z 361 (M+H));

methyl 2-[3-fluoro-2-(2-methoxyethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 105, M.S. m/z 329 (M+H));

5 methyl 2-[2-(2-ethoxyethoxycarbonyl)-3-fluorophenoxy]-3-methoxypropenoate (compound 106, M.S. m/z 343 (M+H));

methyl 2-[3-fluoro-2-(tetrahydrofuran-2-ylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 107, M.S. m/z 355 (M+H));

10 methyl 2-[2-(3-chloropropylloxycarbonyl)-3-fluorophenoxy]-3-methoxypropenoate (compound 108, M.S. m/z 347/349 (M+H));

methyl 2-(2-butyloxycarbonylphenoxy)-3-methoxypropenoate (compound 109, NMR (CDCl₃): 0.9(t,3H), 1.4(m,2H), 1.65(m,2H), 3.6(s,3H), 3.8(s,3H), 4.25(t,2H), 6.8(d,1H), 7.0(t,1H), 7.2(s,1H), 7.3(t,1H), 7.75(d,1H));

15 methyl 2-(2-pentyloxycarbonylphenoxy)-3-methoxypropenoate (compound 110, NMR (CDCl₃): 0.9(t,3H), 1.4(m,4H), 1.75(m,2H), 3.7(s,3H), 3.9(s,3H), 4.3(t,2H), 6.85(d,1H), 7.0(t,1H), 7.3(s,1H), 7.4(t,1H), 7.85(d,1H));

20 methyl 2-(2-octyloxycarbonylphenoxy)-3-methoxypropenoate (compound 111, NMR (CDCl₃): 0.9(t,3H), 1.3(m,6H), 1.8(m,4H), 3.2(t,2H), 3.7(s,3H), 3.9(s,3H), 4.3(t,2H), 7.15(m,1H), 7.3(m,2H), 7.6(m,1H), 7.7(d,1H));

25 methyl 2-[2-(3-chloropropylloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 112, NMR (CDCl₃): 2.2(t,2H), 3.7(t,2H), 3.75(s,3H), 3.9(s,3H), 4.5(t,2H), 7.2(d,1H), 7.35(m,2H), 7.6(m,1H), 7.7(d,1H));

30 methyl 2-[2-(prop-2-ynyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 113, NMR (CDCl₃): 2.5(t,1H), 3.7(s,3H), 3.9(s,3H), 4.9(d,2H), 6.9(d,1H), 7.1(t,1H), 7.3(s,1H), 7.4(m,1H), 7.9(d,1H)); and

methyl 2-(2-benzyloxycarbonylphenoxy)-3-methoxypropenoate
(compound 114, NMR (CDCl₃): 3.7(s,3H), 3.9(s,3H), 5.4(s,2H),
6.9(d,1H), 7.0(t,1H), 7.4(m,7H), 7.9(d,1H)).

Example 17

5 A solution of 4-methylbenzyl bromide (0.05g) in N,N-
dimethylformamide was added to a suspension of potassium fluoride
(0.034g) in N,N-dimethylformamide. A solution of methyl 2-(2-
carboxy-3-methylphenoxy)-3-methoxypropenoate (0.1g) in N,N-
dimethylformamide was added and the mixture stirred overnight. Water
10 and ethyl acetate were added and the organic phase dried (magnesium
sulphate) and evaporated to give methyl 2-[3-methyl-2-(4-methyl
benzyloxycarbonyl)phenoxy]-3-methoxypropenoate (compound 117,
0.1g, NMR (CDCl₃): 2.25(s,3H), 2.35(s,3H), 3.65(s,3H), 3.8(s,3H),
5.35(s,2H), 6.6(d,1H), 6.8(d,1H), 7.1-7.2(m,3H), 7.25-7.4(m,3H)).

15 By proceeding in a similar manner the following compounds were
prepared:

methyl 2-[2-(2-ethoxyethoxycarbonyl)-3,4-difluorophenoxy]-3-
methoxypropenoate (compound 118, NMR (CDCl₃): 1.2(t,3H),
3.55(q,2H), 3.7(s,3H), 3.75(t,2H), 3.8(s,3H), 4.5(t,2H), 6.6(d,1H),
20 7.1(q,1H), 7.25(s,1H));

methyl 2-[3,4-difluoro-2-(4-methylbenzyloxycarbonyl) phenoxy]-
3-methoxypropenoate (compound 119, NMR (CDCl₃): 2.4(s,3H),
3.65(s,3H), 3.85(s,3H), 6.6(d,1H), 7.0-7.2(m,3H), 7.25-7.4(m,3H));

methyl 2-(2-benzyloxycarbonyl-3,4-difluorophenoxy)-3-
25 methoxypropenoate (compound 120, NMR (CDCl₃): 3.6(s,3H),
3.7(s,3H), 5.3(s,2H), 6.5(dd,1H), 7.0(q,1H), 7.1-7.4(m,6H));

methyl 2-[2-(4-methylbenzoylmethoxycarbonyl)phenoxy]-3-
methoxypropenoate (compound 121, NMR (CDCl₃): 2.45(s,3H),
3.7(s,3H), 3.85(s,3H), 5.5(s,2H), 6.9(d,1H), 7.1(t,3H), 7.2-7.3(m,3H),
30 7.45(t,1H), 7.85(d,2H), 8.05(d,1H));

methyl 2-[4-fluoro-2-(4-methylbenzoylmethoxycarbonyl)
phenoxy]-3-methoxypropenoate (compound 122, NMR (CDCl₃): 2.37

(s, 3H), 3.65 (s, 3H), 3.80 (s, 3H), 5.45 (s, 2H), 6.80 (m, 1H), 7.05 (m, 1H), 7.20 (m, 2H), 7.25 (s, 1H), 7.65 (m, 1H), 7.80 (m, 2H); ^{19}F : - 122.08 (s));

methyl 2-[2-(4-nitrobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 123, NMR (CDCl_3): 8.34 (d, 2 H), 8.14 (d, 2 H), 8.00 (d, 1 H), 7.44 (t, 1 H), 7.28 (s, 1 H), 7.06 (t, 1 H), 6.90 (d, 1 H), 5.50 (s, 2 H), 3.88 (s, 3 H) and 3.70 (s, 3 H));

methyl 2-[2-(3,4-dichlorobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 124, NMR (CDCl_3): 8.06 (s, 1 H), 8.00 (d, 1 H), 7.80 (d, 1 H), 7.58 (d, 1 H), 7.44 (t, 1 H), 7.34 (s, 1 H), 7.08 (t, 1 H), 6.90 (d, 1 H), 5.44 (s, 2 H), 3.86 (s, 3 H) and 3.72 (s, 3 H));

methyl 2-[2-(4-cyanobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 125, NMR (CDCl_3): 8.08 (d, 2 H), 8.00 (d, 1 H), 7.80 (d, 2 H), 7.44 (t, 1 H), 7.34 (s, 1 H), 7.18 (t, 2 H), 7.08 (t, 1 H), 6.90 (d, 1 H), 5.48 (s, 2 H), 3.88 (s, 3 H) and 3.74 (s, 3 H));

methyl 2-[4-chloro-2-(benzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 126, NMR (CDCl_3): 7.96 (d, 1 H), 7.90 (d, 2 H), 7.54 (t, 1 H), 7.42 (t, 2 H), 7.30 (dd, 1 H), 7.26 (s, 1 H), 6.68 (d, 1 H), 5.48 (s, 2 H), 3.78 (s, 3 H) and 3.64 (s, 3 H));

methyl 2-[2-(benzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 127, NMR (CDCl_3): 7.98 (d, 1 H), 7.92 (d, 2 H), 7.56 (t, 1 H), 7.42 (t, 2 H), 7.36 (t, 1 H), 7.28 (s, 1 H), 7.02 (t, 1 H), 6.76 (d, 1 H), 5.48 (s, 2 H), 3.80 (s, 3 H) and 3.62 (s, 3 H)); and

methyl 2-[2-(4-fluorobenzoylmethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 166, NMR (CDCl_3): 8.08-7.96 (m, 3 H), 7.44 (t, 1 H), 7.34 (s, 1 H), 7.18 (t, 2 H), 7.08 (t, 1 H), 6.90 (d, 1 H), 5.50 (s, 2 H), 3.88 (s, 3 H) and 3.70 (s, 3 H)).

Example 18

Using the method of Example 2 but starting from methyl 2-[2-(2-t-butoxycarbonyl-3-cyclopropyl-3-oxopropanoyl)-4-chlorophenoxy]-3-methoxypropenoate, there was prepared: methyl 2-[4-chloro-2-(3-cyclopropyl-3-oxopropanoyl)phenoxy]-3-methoxypropenoate

(compound 129, NMR (CDCl₃): 0.95 (m, 2H), 1.20 (m, 2H), 1.80 (m, 1H), 3.75 (s, 3H), 3.90 (s, 3H), 6.70 (s, 1H), 6.80 (d, 1H), 7.3 (m, 1H), 7.40 (s, 1H), 7.90 (d, 1H), 16.25 (s, 1H)).

Example 19

5 Ethane-1,2-dithiol (0.05ml), followed by boron trifluoride etherate (0.01ml) were added to a solution of methyl 2-(4-chloro-2-formylphenoxy)-3-methoxypropenoate (0.1g) in dichloromethane and stirred overnight. Sodium carbonate solution was added, the mixture stirred and the organic phase dried (magnesium sulphate) and
10 evaporated to give methyl 2-[4-chloro-2-(1,3-dithiolan-2-yl)phenoxy]-3-methoxypropenoate (compound 138, 0.1g, m/z 347/349 (M+H)).

Example 20

 A mixture of methyl 2-[2-methoxycarbonyl-3-(2-methyl-1,3-dioxolan-2-yl)phenoxy]-3-methoxypropenoate (0.31g) and 4-
15 toluenesulphonic acid monohydrate (34mg) in acetone was stirred at reflux overnight. A further addition of 4-toluenesulphonic acid (17mg) was made, and after 4 hours at reflux, the mixture was evaporated, extracted (ethyl acetate), washed (sodium carbonate solution), dried (sodium sulphate), evaporated and crystallised (aqueous methanol) to
20 give methyl 2-(3-acetyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 141, 0.12g, NMR (CDCl₃): 2.57 (s,3H), 3.72 (s,3H), 3.85 (s,3H), 3.95 (s,3H), 7.02 (d, 1H), 7.32-7.50 (m,3H)
NMR (CDCl₃) 2.57 (s,3H), 3.72 (s,3H), 3.85 (s,3H), 3.95 (s,3H), 7.02 (d, 1H), 7.32-7.50 (m,3H)).

Example 21

25 Methyl magnesium iodide (0.112ml of a 3M solution) was added dropwise to a stirred solution of methyl 2-(4-chloro-2-formylphenoxy)-3-methoxypropenoate (0.1g) in toluene. After 1 hour the solvent was evaporated and the residue partitioned between hydrochloric acid (2M)
30 and ethyl acetate. The organic phase was dried (magnesium sulphate), evaporated and purified by chromatography on silica gel eluting with ethyl acetate/toluene (1:9) to give methyl 2-[4-chloro-2-(1-

hydroxyethyl)phenoxy]-3-methoxypropenoate (compound 142, 24mg,
NMR (CDCl₃): 1.50(d,3H), 3.70(s,3H), 3.90(s,3H), 5.30(m,1H),
6.70(d,1H), 7.10(d,1H), 7.35(s,1H), 7.40(s,1H) NMR (CDCl₃)
1.50(d,3H), 3.70(s,3H), 3.90(s,3H), 5.30(m,1H), 6.70(d,1H), 7.10(d,1H),
7.35(s,1H), 7.40(s,1H)).

Example 22

Oxalyl chloride (0.4ml) and N,N-dimethylformamide were added
to a solution of methyl 2-(2-carboxy-4-chlorophenoxy)-3-
methoxypropenoate (1.0g) in dichloromethane and stirred at reflux for 2
hours and evaporated. A solution of the residue in tetrahydrofuran was
added dropwise to a solution of trimethylsilyldiazomethane (2.2ml of a
2M solution in hexane) and triethylamine (0.6ml) in tetrahydrofuran at
0°C. The mixture was kept at 0°C overnight, evaporated and partitioned
between sodium bicarbonate solution and ethyl acetate. The organic
phase was washed (water), dried (magnesium sulphate) and evaporated
to give methyl 2-[4-chloro-2-(diazoacetyl)phenoxy]-3-
methoxypropenoate (compound 143, 1.08g, NMR (CDCl₃): 3.75 (s,
3H), 3.90 (s, 3H), 6.55 (s, 1H), 6.80 (d, 1H), 7.30 (d, 1H), 7.40 (m, 1H),
7.85 (s, 1H)).

Example 23

3-Acetamidophenylboronic acid (67mg) was added to a solution of
methyl 2-(2-carboxy-4-iodophenoxy)-3-methoxypropenoate (0.15
mmol) in sodium carbonate solution (0.45mmol). Palladium (II) acetate
(a catalytic amount) was added and the mixture stirred at 20°C overnight
under nitrogen. The mixture was diluted (water), acidified, extracted
(dichloromethane), dried (magnesium sulphate) and evaporated to give
methyl 2-[4-(3-acetamidophenyl)-2-carboxyphenoxy]-3-
methoxypropenoate (compound 144, 7mg, NMR (CDCl₃): 2.2 (s, 3H),
3.8 (s, 3H), 4.0 (s, 3H), 7.0 (d, 1H), 7.6-7.25 (m, 6H), 8.2 (s, 1H)).

By proceeding in a similar manner the following compounds were
prepared:

methyl 2-{2-carboxy-4-[3-fluoro-4-phenyl]phenylphenoxy}-3-methoxypropenoate (compound 145, NMR (CDCl₃): 3.8 (s, 3H), 4.0 (s, 3H), 7.05 (d, 1H), 7.65-7.35 (m, 9H), 7.75 (m, 1H), 8.35 (m, 1H));

methyl 2-[2-carboxy-4-(naphth-2-yl)phenoxy]-3-methoxypropenoate (compound 146, NMR (CDCl₃): 3.75 (s, 3H), 3.95 (s, 3H), 7.0 (d, 1H), 7.45 (m, 3H), 7.9-7.6 (m, 5H), 8.0 (m, 1H), 8.4 (m, 1H));

methyl 2-[4-(4-benzyloxyphenyl)-2-carboxyphenoxy]-3-methoxypropenoate (compound 147, NMR (CDCl₃): 3.8 (s, 3H), 4.0 (s, 3H), 5.1 (s, 2H), 7.15-7.95 (m, 3H), 7.5-7.3 (m, 8H), 7.6 (m, 1H), 8.25 (d, 1H)); and methyl 2-[2-carboxy-4-(benzo-1,3-dioxolan-5-yl)phenoxy]-3-methoxypropenoate (compound 148, NMR (CDCl₃): 3.8 (s, 3H), 4.0 (s, 3H), 6.0 (s, 2H), 6.85 (d, 1H), 7.05-6.95 (m, 3H), 7.45 (s, 1H), 7.6 (m, 1H), 8.2 (m, 1H)).

Example 24

Using the procedure of Example 16 but replacing the potassium carbonate by potassium t-butoxide and using ether as solvent the following compounds were prepared:

methyl 2-[4-chloro-2-(methoxymethoxycarbonyl)phenoxy]-3-methoxypropenoate (compound 149, NMR (CDCl₃): 7.80 (d, 2 H), 7.28 (dd, 1 H), 7.26 (s, 1 H), 6.76 (d, 1 H), 5.40 (s, 2 H), 3.80 (s, 3 H), 3.64 (s, 3 H) and 3.48 (s, 3 H)); and

methyl 2-{2-[2-(methoxyethoxy)methoxycarbonyl]phenoxy}-3-methoxypropenoate (compound 150, NMR (CDCl₃): 7.86 (d, 2 H), 7.34 (t, 1 H), 7.26 (s, 1 H), 6.98 (t, 1 H), 6.82 (d, 1 H), 5.50 (s, 2 H), 3.86-3.78 (m, 2 H), 3.78 (s, 3 H), 3.64 (s, 3 H), 3.58-3.50 (m, 2 H) and 3.32 (s, 3 H)).

Example 25

Cyanuric fluoride (39.6mg) and pyridine (11.6mg) were added to a solution of methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate (42mg) in dichloromethane, and stirred at 20°C under nitrogen for 4 hours. The solid was filtered and the filtrate

washed (water), dried (magnesium sulphate) and evaporated to give methyl 2-[4-chloro-2-(fluorocarbonyl)phenoxy]-3-methoxypropenoate (compound 151, 45mg, NMR (CDCl₃): 3.75(s,3H), 3.90(s,3H), 6.90(d,1H), 7.40(s,1H), 7.50(d,1H), 7.95(s,1H); ¹⁹F NMR 10.44 (s,1F).

5

Example 26

A mixture of methyl 2-(3-bromomethyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate (0.15g), N-methylmorpholine N-oxide (0.1g), and 4A molecular sieves was stirred overnight in acetonitrile, filtered and ethyl acetate and water added. The organic phase was dried (magnesium sulphate), evaporated and the residue purified by chromatography on silica gel eluting with cyclohexane/ethyl acetate to give methyl 2-(3-formyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 152, 0.045mg, NMR (CDCl₃): 3.6(s,3H), 3.8(s,3H), 3.95(s,3H), 7.05(d,1H), 7.25(s,1H), 7.4-7.5(m,2H)).

15

Example 27

By proceeding according to Example 4 starting from methyl 2-(2-t-butoxycarbonyl-3-methylphenoxy)-3-methoxypropenoate,

methyl 2-(3-dibromomethyl-2-carboxyphenoxy)-3-methoxypropenoate (compound 153, NMR (CDCl₃): 3.65(s,3H), 3.75(s,3H), 6.8(d,1H), 7.1(d,1H), 7.25(s,1H), 7.5(s,1H), 7.55(t,1H)); and

20

methyl 2-(3-dibromomethyl-2-methoxycarbonylphenoxy)-3-methoxypropenoate (compound 167, NMR (CDCl₃): 3.65(s,3H), 3.8(s,3H), 3.9(s,3H), 6.7(d,1H), 6.8(s,1H), 7.2(s,1H), 7.3(t,1H), 7.6(d,1H)) were similarly prepared.

25

Example 28

By using the method of Example 4 but starting from methyl 2-(phthalid-7-yloxy)-3-methoxypropenoate, there was prepared methyl 2-(3-bromophthalid-7-yloxy)-3-methoxypropenoate (compound 154, NMR (CDCl₃): 3.65(s,3H), 3.85(s,3H), 6.85(d,1H), 7.1(d,1H), 7.25-7.35(m,2H), 7.5(t,1H)).

30

Example 29

By using the method of Example 4 but starting from methyl 2-(2-t-butoxycarbonyl-3-methylphenoxy)-3-methoxypropenoate, there was prepared methyl 2-(phthalid-7-yloxy)-3-methoxypropenoate (compound
5 155, NMR (CDCl₃): 3.7(s,3H), 3.85(s,3H), 5.25(s,2H), 6.8(d,1H), 7.05(d,1H), 7.4(s,1H), 7.55(t,1H)).

Reference Example 1

By proceeding according to Example 1, methyl 2-(4-chloro-2-methylphenoxy)-3-methoxypropenoate was prepared from methyl 2-(4-chloro-2-methylphenoxy)-3-hydroxypropenoate, M.S. m/z 257 (M+H);
10 and methyl 2-(2-bromo-4-chlorophenoxy)-3-methoxypropenoate, M.S. m/z 321 (M+H), from methyl 2-(2-bromo-4-chlorophenoxy)-3-hydroxypropenoate.

Reference Example 2

To 2.06g sodium hydride (60% dispersion in mineral oil) in dimethylformamide (20ml) cooled to 0 °C was added ethyl formate (53.33ml) and 12.0g of methyl (2-bromo-4-chlorophenoxy)acetate in 80ml of dimethylformamide. The cooling bath was removed and the
20 contents stirred at ambient temperature for 1 hour. Sodium carbonate solution was added and the contents extracted with ether. The aqueous phase was separated, acidified to pH4 with HCl_{aq.} and extracted with ether. The ethereal layer was washed with saturated sodium chloride solution, dried and evaporated to give methyl 2-(2-bromo-4-chlorophenoxy)-3-hydroxypropenoate. M.S. m/z 308 (M+H).
25

Methyl 2-(4-chloro-2-methylphenoxy)-3-hydroxypropenoate, M.S. m/z 241 (M-H) was similarly prepared starting from methyl (4-chloro-2-methylphenoxy)acetate.

Reference Example 3

Conc. H₂SO₄ 1.54(ml) was added to a stirred suspension of anhydrous MgSO₄ in CH₂Cl₂. After 15 minutes 5g of 5-chlorosalicylic

acid was added, followed by t-butanol (13.66ml). The mixture was stoppered and stirred for 43 hours at ambient temperature. To the suspension was added saturated aqueous NaHCO_3 (220ml) and the mixture stirred for 20 minutes. The organic phase was separated, washed with brine, dried and evaporated to give t-butyl 5-chloro-2-hydroxybenzoate, NMR (CDCl_3): 11 (1H,s), 7.7 (1H,s), 7.35 (1H,d), 6.9(1H,d), 1.6 (s, 9H).

Reference Example 4

3.6g of t-butyl 5-chloro 2-hydroxybenzoate were heated to reflux during 2.5 hours with 2.2ml of methyl bromoacetate and 4.3g of K_2CO_3 in acetonitrile. The mixture was cooled, diluted with water and extracted with ethyl acetate. The organic layer was washed and dried to give methyl (2-t-butyloxycarbonyl-4-chlorophenoxy) acetate, NMR (CDCl_3): 7.7 (1H,s), 7.35 (1H,d), 6.8(1H,d) 4.7 (s,2H), 3.8 (3H,s), 1.6 (9H,s).

By proceeding in a similar manner were prepared:

methyl (4-chloro-2-methylphenoxy)acetate, NMR (CDCl_3): 4.6 (s, 2H) 3.8 (s), $R_f = 0.44$ on silica TLC, Et_2O /Hexane eluent 1:1 v/v, and methyl (2-bromo-4-chlorophenoxy)acetate, MS m/z 279 (M+H).

Reference Example 5

0.95g of methyl (2-t-butyloxycarbonyl-4-chlorophenoxy) acetate were mixed with 7.5ml of t-butoxy bis(dimethylamino)methane. The mixture was heated for 2 hours at 80°C , then cooled, diluted with water and extracted with CH_2Cl_2 . The organic layer was dried, filtered and purified by chromatography to give methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)-3-N-dimethylaminopropenoate, N.M.R. 7.7 (1H,s) 7.35 (1H,d), 7.15 (1H,s), 6.9 (1H,d), 3.6 (3H,s), 3.0 (s, 6H) 1.6 (9H,s).

50mg of methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)-3-N-dimethylaminopropenoate were mixed at 0°C with tetrahydrofuran (1.3ml) and 0.436ml aqueous HCl (2M). The mixture was stirred for 12 hours at 20°C , then evaporated, washed with brine and extracted with ether. The organic layer is dried and purified by chromatography, so as

to give methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)-3-hydroxypropenoate, M.S. m/z 327 (M-H).

Reference Example 6

5 t-Butyl 5-chlorosalicylate (1.6g) was dissolved in acetone (35ml) and potassium carbonate (4.84g) and methyl 2-bromo-2-butenate (1.25g) was added. The contents were heated to reflux for 24 hours, cooled and filtered. Concentration in vacuo gave an oil that was purified by chromatography to give 2.1g methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)but-2-enoate. NMR ($CDCl_3$): 1.6 (s, 9H), 1.75 (d, 3H),
10 3.65 (s, 3H), 6.7 (m, 2H), 7.25 (m, 1H), 7.70 (m, 1H).

Reference Example 7

510 mg of methyl 2-(2-t-butyloxycarbonyl-4-chlorophenoxy)but-2-enoate was dissolved in dichloromethane and cooled to $-20^{\circ}C$. HCl gas was bubbled through it for 5 minutes and the solution was allowed
15 to warm to ambient temperature. After 30 minutes the contents were washed several times with water and dried. Removal of solvent gave 0.41g of methyl 2-(2-carboxy-4-chlorophenoxy)but-2-enoate. NMR ($CDCl_3$): 1.90 (d, 3H), 3.75 (s, 3H), 6.75 (d, 1H) 6.90 (q, 1H), 7.40 (m, 1H), 8.00 (m, 1H).

Reference Example 8

To 130 mg of ethyl 2-chloro-3-oxopropanoate dissolved in 2ml of isopropanol and 162 μ l of triethylamine was added methyl thiosalicylate dropwise. The contents were stirred at ambient temperature for 30 minutes and at reflux for 3 hours. The solvent was removed in vacuo
25 and the residue partitioned between water and ether. The organic layer was discarded and the aqueous layer acidified at pH4 and extracted with ether. The ethereal layer was separated, dried, concentrated and purified by column chromatography to give 36 mg of ethyl 3-oxo-2-(2-methoxycarbonyl)thiophenoxypropanoate, M.S. m/z 283 (M+H).

30 11.1 mg of ethyl 3-oxo-2-(2-methoxycarbonyl)thiophenoxypropanoate was dissolved in 0.5 ml DMF and dimethylsulfate (5.6 μ l) added followed by 11.4 mg of potassium carbonate. The contents were

stirred at ambient temperature for 24 hours then 2.5 ml of sodium carbonate solution (2N) was added and the contents extracted with ether. The ethereal extract was dried and concentrated to give 9.6mg ethyl 3-methoxy-2-(2-methoxycarbonyl)thiophenoxy-2-propenoate. NMR (CDCl₃): 1.05 (t, 3H), 3.8 (3, 3H), 3.9 (s, 3H), 4.1 (q, 2H), 7.05 (m, 2H), 7.25 (m, 1H), 7.9 (m, 1H) 8.0 (s, 1H).

Reference Example 9

Oxalyl chloride (0.4ml) was added to a solution of methyl 2-(2-carboxy-4-chlorophenoxy)-3-methoxypropenoate (1.0g) in dichloromethane containing N,N-dimethylformamide (1 drop) and stirred at reflux for 2 hours. After evaporation, the residue was dissolved in toluene, and a solution of t-butyl-3-cyclopropyl-3-oxopropanoate magnesium methoxide enolate (1.05g) in toluene added, and the mixture stirred overnight. Hydrochloric acid (2M) was added and stirred for 5 minutes. The organic phase was washed (water), dried (magnesium sulphate) and evaporated to give methyl 2-[2-(2-t-butoxycarbonyl-3-cyclopropyl-3-oxopropanoyl)-4-chlorophenoxy]-3-methoxypropenoate (1.49g).

According to a feature of the present invention, there is provided a method for controlling the growth of weeds (i.e. undesired vegetation) at a locus which comprises applying to the locus a herbicidally effective amount of at least one aryl vinyl ether derivative of formula (I) or an agriculturally acceptable salt or metal complex thereof. For this purpose, the aryl vinyl ether derivatives are normally used in the form of herbicidal compositions (i.e. in association with compatible diluents or carriers and/or surface active agents suitable for use in herbicidal compositions), for example as hereinafter described.

The compounds of formula (I) show herbicidal activity against dicotyledonous (i.e. broad-leaved) and monocotyledonous (e.g. grass) weeds by pre- and/or post-emergence application.

By the term "pre-emergence application" is meant application to the soil in which the weed seeds or seedlings are present before emergence of the weeds above the surface of the soil. By the term "post-emergence application" is meant application to the aerial or exposed portions of the weeds which have emerged above the surface of the soil. For example, the compounds of formula (I) may be used to control the growth of:

broad-leafed weeds, for example, Abutilon theophrasti, Amaranthus retroflexus, Bidens pilosa, Chenopodium album, Galium aparine, Ipomoea spp. e.g. Ipomoea purpurea, Sesbania exaltata, Sinapis arvensis, Solanum nigrum and Xanthium strumarium, and

grass weeds, for example Alopecurus myosuroides, Avena fatua, Digitaria sanguinalis, Echinochloa crus-galli, Eleusine indica and Setaria spp, e.g. Setaria faberii or Setaria viridis, and sedges, for example, Cyperus esculentus.

The amounts of compounds of formula (I) applied vary with the nature of the weeds, the compositions used, the time of application, the climatic and edaphic conditions and (when used to control the growth of weeds in crop-growing areas) the nature of the crops. When applied to a crop-growing area, the rate of application should be sufficient to control the growth of weeds without causing substantial permanent damage to the crop. In general, taking these factors into account, application rates between 1g and 1000g of active material per hectare give good results. However, it is to be understood that higher or lower application rates may be used, depending upon the particular problem of weed control encountered.

The compounds of formula (I) may be used to control selectively the growth of weeds, for example to control the growth of those species hereinbefore mentioned, by pre- or post-emergence application in a directional or non-directional fashion, e.g. by directional or non-

directional spraying, to a locus of weed infestation which is an area used, or to be used, for growing crops, for example cereals, e.g. wheat, barley, oats, maize and rice, soybean, field and dwarf beans, peas, lucerne, cotton, peanuts, flax, onions, carrots, cabbage, oilseed rape, sunflower, sugar beet, and permanent or sown grassland before or after sowing of the crop or before or after emergence of the crop.

The compounds of formula (I) may also be used to control the growth of weeds, especially those indicated above, by pre- or post-emergence application in established orchards and other tree-growing areas, for example forests, woods and parks, and plantations, e.g. sugar cane, oil palm and rubber plantations. For this purpose they may be applied in a directional or non-directional fashion (e.g. by directional or non-directional spraying) to the weeds or to the soil in which they are expected to appear, before or after planting of the trees or plantations at application rates between 50g and 5000g, and preferably between 50g and 2000g, most preferably between 100g and 1000g of active material per hectare.

The compounds of formula (I) may also be used to control the growth of weeds, especially those indicated above, at loci which are not crop-growing areas but in which the control of weeds is nevertheless desirable.

Examples of such non-crop-growing areas include airfields, industrial sites, railways, roadside verges, the verges of rivers, irrigation and other waterways, scrublands and fallow or uncultivated land, in particular where it is desired to control the growth of weeds in order to reduce fire risks. When used for such purposes in which a total herbicidal effect is frequently desired, the active compounds are normally applied at dosage rates higher than those used in crop-growing areas as hereinbefore described. The precise dosage will depend upon the nature of the vegetation treated and the effect sought.

Pre- or post-emergence application, and preferably pre-emergence application, in a directional or non-directional fashion (e.g. by

directional or non-directional spraying) at application rates between 50g and 5000g, and preferably between 50g and 2000g, most preferably between 100g and 1000g of active material per hectare are particularly suitable for this purpose.

5 When used to control the growth of weeds by pre-emergence application, the compounds of formula (I) may be incorporated into the soil in which the weeds are expected to emerge. It will be appreciated that when the compounds of formula (I) are used to control the growth of weeds by post-emergence application, i.e. by application to the aerial
10 or exposed portions of emerged weeds, the compounds of formula (I) will also normally come into contact with the soil and may also then exercise a pre-emergence control on later-germinating weeds in the soil.

Where especially prolonged weed control is required, the application of the compounds of formula (I) may be repeated if required.

15 According to a further feature of the present invention, there are provided compositions suitable for herbicidal use comprising one or more of the aryl vinyl ethers of formula (I) or an agriculturally acceptable salt or metal complex thereof, in association with, and
20 preferably homogeneously dispersed in, one or more compatible agriculturally- acceptable diluents or carriers and/or surface active agents [i.e. diluents or carriers and/or surface active agents of the type generally accepted in the art as being suitable for use in herbicidal compositions and which are compatible with compounds of formula (I)].
25 The term "homogeneously dispersed" is used to include compositions in which the compounds of formula (I) are dissolved in other components. The term "herbicidal compositions" is used in a broad sense to include not only compositions which are ready for use as herbicides but also concentrates which must be diluted before use. Preferably, the
30 compositions contain from 0.05 to 90% by weight of one or more compounds of formula (I).

The herbicidal compositions may contain both a diluent or carrier and surface-active (e.g. wetting, dispersing, or emulsifying) agent.

Surface-active agents which may be present in herbicidal compositions of the present invention may be of the ionic or non-ionic types, for example sulphoricinoleates, quaternary ammonium derivatives, products based on condensates of ethylene oxide with alkyl and polyaryl phenols, e.g. nonyl- or octyl-phenols, or carboxylic acid esters of anhydrosorbitols which have been rendered soluble by etherification of the free hydroxy groups by condensation with ethylene oxide, alkali and alkaline earth metal salts of sulphuric acid esters and sulphonic acids such as dinonyl- and dioctyl-sodium sulphonosuccinates and alkali and alkaline earth metal salts of high molecular weight sulphonic acid derivatives such as sodium and calcium lignosulphonates and sodium and calcium alkylbenzene sulphonates.

Suitably, the herbicidal compositions according to the present invention may comprise up to 10% by weight, e.g. from 0.05% to 10% by weight, of surface-active agent but, if desired, herbicidal compositions according to the present invention may comprise higher proportions of surface-active agent, for example up to 15% by weight in liquid emulsifiable suspension concentrates and up to 25% by weight in liquid water soluble concentrates.

Examples of suitable solid diluents or carriers are aluminium silicate, microfine silicon dioxide, talc, chalk, calcined magnesia, kieselguhr, tricalcium phosphate, powdered cork, adsorbent carbon black and clays such as kaolin and bentonite. The solid compositions (which may take the form of dusts, granules or wettable powders) are preferably prepared by grinding the compounds of formula (I) with solid diluents or by impregnating the solid diluents or carriers with solutions of the compounds of formula (I) in volatile solvents, evaporating the solvents and, if necessary, grinding the products so as to obtain powders. Granular formulations may be prepared by absorbing the compounds of formula (I) (dissolved in suitable solvents, which may, if desired, be

volatile) onto the solid diluents or carriers in granular form and, if desired, evaporating the solvents, or by granulating compositions in powder form obtained as described above. Solid herbicidal compositions, particularly wettable powders and granules, may contain wetting or dispersing agents (for example of the types described above), which may also, when solid, serve as diluents or carriers.

Liquid compositions according to the invention may take the form of aqueous, organic or aqueous-organic solutions, suspensions and emulsions which may incorporate a surface-active agent. Suitable liquid diluents for incorporation in the liquid compositions include water, glycols, glycol ethers, tetrahydrofurfuryl alcohol, acetophenone, cyclohexanone, isophorone, N-alkyl pyrrolidones, toluene, xylene, mineral, animal and vegetable oils, esterified vegetable oils and light aromatic and naphthenic fractions of petroleum (and mixtures of these diluents). Surface-active agents, which may be present in the liquid compositions, may be ionic or non-ionic (for example of the types described above) and may, when liquid, also serve as diluents or carriers.

Powders, dispersible granules and liquid compositions in the form of concentrates may be diluted with water or other suitable diluents, for example mineral or vegetable oils, particularly in the case of liquid concentrates in which the diluent or carrier is an oil, to give compositions ready for use.

When desired, liquid compositions of the compound of formula (I) may be used in the form of self-emulsifying concentrates containing the active substances dissolved in the emulsifying agents or in solvents containing emulsifying agents compatible with the active substances, the simple addition of such concentrates to water producing compositions ready for use.

Liquid concentrates in which the diluent or carrier is an oil may be used without further dilution using the electrostatic spray technique.

Herbicidal compositions according to the present invention may also contain, if desired, conventional adjuvants such as adhesives, protective colloids, thickeners, penetrating agents, spreading agents, stabilisers, sequestering agents, anti-caking agents, colouring agents and corrosion inhibitors. These adjuvants may also serve as carriers or diluents.

Unless otherwise specified, the following percentages are by weight. Preferred herbicidal compositions according to the present invention are aqueous suspension concentrates which comprise from 10 to 70% of one or more compounds of formula (I), from 2 to 10% of surface-active agent, from 0.1 to 5% of thickener and from 15 to 87.9% of water;

wettable powders which comprise from 10 to 90% of one or more compounds of formula (I), from 2 to 10% of surface-active agent and from 8 to 88% of solid diluent or carrier;

water soluble or water dispersible powders which comprise from 10 to 90% of one or more compounds of formula (I), from 2 to 40% of sodium carbonate and from 0 to 88% of solid diluent;

liquid water soluble concentrates which comprise from 5 to 50%, e.g. 10 to 30%, of one or more compounds of formula (I), from 0 to 25% of surface-active agent and from 10 to 90%, e.g. 45 to 85%, of water miscible solvent, e.g. triethylene glycol, or a mixture of water-miscible solvent and water;

liquid emulsifiable suspension concentrates which comprise from 10 to 70% of one or more compounds of formula (I), from 5 to 15% of surface-active agent, from 0.1 to 5% of thickener and from 10 to 84.9% of organic solvent, e.g. mineral oil;

water dispersible granules which comprise from 1 to 90%, e.g. 25 to 75% of one or more compounds of formula (I), from 1 to 15%, e.g. 2 to 10%, of surface-active agent and from 5 to 95%, e.g. 20 to 60%, of solid diluent, e.g. clay, granulated with the addition of water to form a paste and then dried and,

emulsifiable concentrates which comprise 0.05 to 90%, and preferably from 1 to 60% of one or more compounds of formula (I), from 0.01 to 10%, and preferably from 1 to 10%, of surface-active agent and from 9.99 to 99.94%, and preferably from 39 to 98.99%, of organic solvent.

Herbicidal compositions according to the present invention may also comprise the compounds of formula (I) in association with, and preferably homogeneously dispersed in, one or more other pesticidally active compounds and, if desired, one or more compatible pesticidally acceptable diluents or carriers, surface-active agents and conventional adjuvants as hereinbefore described.

Examples of other pesticidally active compounds which may be included in, or used in conjunction with, the herbicidal compositions of the present invention include herbicides, for example to increase the range of weed species controlled for example alachlor [2-chloro-2,6'-diethyl-N-(methoxy-methyl)-acetanilide], amidosulfuron, which is 1-(4,6-dimethoxypyrimidin-2-yl)-3-mesyl(methyl)sulfamoylurea, atrazine [2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine], bromoxynil [3,5-dibromo-4-hydroxybenzonitrile], chlortoluron [N'-(3-chloro-4-methylphenyl)-N,N-dimethylurea], cinidon-ethyl, which is ethyl (Z)-2-chloro-3-[2-chloro-5-(1,3-dioxo-1,3,4,5,6,7-hexahydroisindol-2-yl)-phenyl]-acrylate, clopyralid, which is 3,6-dichloropyridine-2-carboxylic acid, cyanazine [2-chloro-4-(1-cyano-1-methylethylamino)-6-ethylamino-1,3,5-triazine], 2,4-D [2,4-dichlorophenoxy-acetic acid], dicamba [3,6-dichloro-2-methoxybenzoic acid], dichlorprop-P, which is (R)-2-(2,4-dichlorophenoxy)propionic acid, difenzoquat [1,2-dimethyl-3,5-diphenyl-pyrazolium salts], diflufenican, which is 2',4'-difluoro-2-(α,α,α -trifluoro-*m*-tolylloxy)nicotinamide, fenoxaprop-p-ethyl, which is (R)-2-[4-(6-chloro-1,3-benzoxazol-2-ylloxy)phenoxy]propionic acid, flumetsulam, which is 2',6'-difluoro-5-methyl[1,2,4]triazolo[1,5-*a*]pyrimidine-2-sulfonamide, fluometuron,

which is [N'-(3-trifluoro- methylphenyl)-N,N-dimethylurea],
flupyrsulfuron, which is 2-[2-(4,6-dimethoxypyrimidin-2-
ylcarbamoylsulfamoyl)]-6-trifluoromethylpyridine-3-carboxylic acid,
flurtamone, which is (RS)-5-methylamino-2-phenyl-4-(α,α,α -trifluoro-
5 *m*-tolyl)furan-3(2H)-one, iodosulfuron, which is 2-(4-methyl-6-
methoxy-1,3,5-triazyn-2-ylcarbamoylsulfamoyl)-4-iodobenzoic acid,
ioxynil, which is 4 hydroxy-3,5-di-iodobenzonitrile, isopropyl 2-chloro-
5-[4-chloro-5-(1,1-difluoromethoxy)-1-methyl-1*H*-pyrazol-3-yl]-4-
fluorobenzoate, isoproturon, which is 3-(4-isopropylphenyl)-1,1-
10 dimethylurea, (R)-2-[4-(6-chlorobenzoxazol-2-
yloxy)phenoxy]propionic acid, JV-485, which is 5-[4-bromo-1-methyl-
5-(trifluoromethyl)-1*H*-pyrazol-3-yl]-2-chloro-4-fluoro-benzoic acid,
mecoprop-P, which is (R)-2-(4-chloro-*o*-tolylloxy)propionic acid,
metosulam, which is 2',6',-dichloro-5,7-dimethoxy-3'-
15 methyl[1,2,4]triazolo[1,5-*a*]pyrimidine-2-sulfonanilide, metsulfuron-
methyl, which is methyl 2-(4-methoxy-6-methyl-1,3,5-triazin-2-
ylcarbamoylsulfamoyl)benzoate, pendimethalin, which is *N*-(1-
ethylpropyl)-2,6-dinitro-3,4-xylidine, picolinafen, which is *N*-(4-
fluorophenyl)-6-(3-trifluoromethylphenoxy)-pyridine-2-carboxamide,
20 insecticides, e.g. synthetic pyrethroids, e.g. permethrin and
cypermethrin, and fungicides, e.g. carbamates, e.g. methyl *N*-(1-butyl-
carbamoyl- benzimidazol-2-yl)carbamate, and triazoles e.g. 1-(4-chloro-
phenoxy)-3,3- dimethyl-1-(1,2,4-triazol-1-yl)-butan-2-one.

Pesticidally active compounds and other biologically active
25 materials which may be included in, or used in conjunction with, the
herbicidal compositions of the present invention, for example those
hereinbefore mentioned, and which are acids or bases, may, if desired,
be utilized in the form of conventional derivatives, for example alkali
metal and amine salts and esters.

30 The following Examples illustrate herbicidal compositions
according to the present invention. The following trade marks appear in
the Examples: Synperonic, Solvesso, Arylan, Arkopon, Sopropo,

Tixosil, Soprophor, Attagel, Rhodorsil. The Active Ingredient listed in the following examples refers to compounds of general formula (I).

Example C1:

An emulsifiable concentrate is formed from:

Active Ingredient	20% w/v
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N-Methylpyrrolidinone (NMP)	25% w/v
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Calcium dodecylbenzenesulphonate (CaDDBS)	4% w/v
---	--------

(Arylan CA)

Nonylphenol ethylene oxide propylene oxide condensate (NPEOPO) (Synperonic NPE 1800)	6% w/v
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Aromatic solvent (Solvesso) to 100 volumes

by stirring NMP, active ingredient (Compound 1), CaDDBS, NPEOPO and Aromatic solvent until a clear solution is formed, and adjusting to volume with Aromatic solvent.

Example C2

A wettable powder is formed from:

Active Ingredient	50% w/w
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Sodium dodecylbenzenesulphonate (Arylan SX85)	3% w/w
--	--------

Sodium methyl oleoyl taurate (Arkapon T)	5% w/w
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Sodium polycarboxylate (Sopropon T36)	1% w/w
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Microfine silicon dioxide (Tixosil 38)	3% w/w
--	--------

China clay	38% w/w
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by blending the above ingredients together and grinding the mixture in an air jet mill.

Example C3

A suspension concentrate is formed from:

	Active Ingredient	50% w/v
	Antifreeze (Propylene glycol)	5% w/v
	Ethoxylated tristyrylphenol phosphate (Soprophor FL)	0.5% w/v
5	Nonyl phenol 9 mole ethoxylate (Ethylan BCP)	0.5% w/v
	Sodium polycarboxylate (Sopropon T36)	0.2% w/v
	Attaclay (Attagel)	1.5% w/v
	Antifoam (Rhodorsil AF426R)	0.003% w/v
10	Water	to 100 volumes

by stirring the above ingredients together and milling in a bead mill.

Example C4

A water dispersible granule is formed from:

15	Active Ingredient	50% w/w
	Sodium dodecylbenzenesulphonate (Arylan SX 85)	3% w/w
	Sodium methyl oleoyl taurate (Arkopon T)	5% w/w
	Sodium polycarboxylate (Sopropon T36)	1% w/w
20	Binder (Sodium lignosulphonate)	8% w/w
	China clay	30% w/w
	Microfine silicon dioxide (Tixosil 38)	3% w/w

by blending the above ingredients together, grinding the mixture in an air jet mill and granulating by addition of water in a suitable granulation plant (e.g. Fluid bed drier) and drying. Optionally the active ingredient may be ground either on its own or admixed with some or all of the other ingredients.

The following non-limiting examples illustrate the invention.

EXPERIMENTAL EXAMPLE 1

Seed of various broad-leaf and grass weed species were sown and herbicide, dissolved in a mixture of acetone and water, was applied at a

rate of 62g/ha to the soil surface. The said weeds are Amaranthus retroflexus, Abutilon theophrasti, Galium aparine, Setaria viridis, Alopecurus myosuroides, Avena fatua and Echinochloa crus-galli.

5 Two weeks after treatment the percent reduction in plant growth, compared to an untreated control, was assessed.

Compounds 1, 2, 5, 42, 43, 45, 62, 74, 85, 131, 132, 133, 134, 135, 136, 137, 140, 149, 159, gave 100% reduction in the growth of one or more weed species.

10 Compounds 3, 6, 7, 8, 18, 19, 20, 35, 36, 38, 39, 40, 44, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 66, 68, 75, 76, 78, 79, 80, 81, 82, 83, 84, 87, 88, 89, 90, 92, 93, 94, 97, 99, 100, 101, 109, 110, 112, 113, 114, 115, 116, 118, 119, 120, 122, 123, 125, 126, 128, 129, 130, 138, 150, 152, 156, 160, 163, 166, gave at least 80% reduction in
15 the growth of one or more weed species.

Compounds 10, 12, 15, 16, 26, 28, 31, 65, 67, 69, 71, 73, 77, 86, 91, 95, 96, 103, 111, 121, 124, 127, 145, 146, 148, 154, 155, 157, 161, 162, 164, 167, gave at least 70% reduction in the growth of one or more weeds species.

20

EXPERIMENTAL EXAMPLE 2

Seed of the various weed species, as listed in example 1, were sown and grown up to a 1-3 leaves stage. A post-emergence application of herbicide, dissolved in a mixture of acetone and water, was applied at
25 a rate of 62g/ha.

Two weeks after treatment the percent reduction in plant growth, compared to an untreated control, was assessed.

Compounds 2, 49, 50, 51, 72, 78, 81, 82, 83, 84, 85, 88, 90, 92, 93, 94, 95, 99, 101, 118, 119, 120, 131, 132, 133, 134, 135, 136, 137,
30 140, 149, 152, 153, 156, 167, gave 100% reduction in the growth of one or more weed species.

Compounds 3, 4, 5, 10, 16, 18, 19, 20, 35, 43, 45, 46, 47, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 73, 74, 75, 76, 77, 79, 80, 86, 87, 89, 91, 96, 97, 98, 100, 102, 103, 109, 110, 111, 112, 113, 114, 115, 116, 117, 121, 122, 123, 124, 125, 126, 128, 129, 130, 138, 141, 150, 154, 155, 157, 158, 159, 160, 161, 162, 163, gave at least 80% reduction in the growth of one or more weed species.

Compounds 17, 21, 26, 42, 48, 139, 142, 143, 144, 145, 146, 148, gave at least 70% reduction in the growth of one or more weed species.

In another aspect of the invention there is provided a method of reducing phytotoxicity to crop plants caused by compounds of formula (I) which comprises applying generally to the crop plant locus or crop plant seed an antidotally effective amount of an antidote effective to said compound.

The crops that may be protected by the method of the invention include cereal crops corn, rice, wheat, soybean, sorghum and cotton. The method of the invention is preferably performed where the crop to be protected is maize or a cereal crop, particularly wheat.

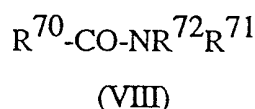
The amount of antidote used in the compositions of the invention varies according to a number of parameters including the particular antidote employed, the crop to be protected, the amount and rate of herbicide applied, and the edaphic and climatic conditions prevailing. Also, the selection of the specific antidotes for use in the method of the invention, the manner in which it is to be applied and the determination of the activity which is non-phytotoxic but antidotally effective, can be readily performed in accordance with common practice in the art.

By "non-phytotoxic" is meant an amount of the antidote which causes at most minor or no injury to the desired crop species. By "antidotally effective" is meant an antidote used in an amount which is effective as an antidote to decrease the extent of injury caused by the herbicide to the desired crop species.

Preferably the weight ratio of herbicide (a) to antidote (b) is from about 16:1 to about 0.25:1, preferably from about 8:1 to about 0.5:1, more preferably from 2:1 to about 1:1.

Examples of the antidotes suitable for use in the present invention include the following (in which alkyl, alkenyl, alkynyl and alkoxy groups and moieties thereof are 'lower' as hereinbefore defined; cycloalkyl and phenyl groups are optionally substituted as hereinbefore defined; halogen is as hereinbefore defined; cycloalkenyl groups have from three to six carbon atoms in the ring and are optionally substituted by lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl and halogen; and bicycloalkyl means a saturated fused bicycloalkane one ring of which contains from 5 to 8 carbon atoms and the other ring contains from 3 to 6 carbon atoms and is optionally substituted by lower alkyl or halogen):

(i) a compound of the formula (VIII):



wherein R^{70} can be selected from the group consisting of haloalkyl; haloalkenyl; alkyl; alkenyl; cycloalkyl; cycloalkylalkyl; halogen; hydrogen; carboalkoxy; N-N-alkynylcarbamylalkyl; N-alkenylcarbamylalkoxyalkyl; N-alkyl-N-alkynylcarbamylalkoxyalkyl; alkynyloxy; haloalkoxy; thiocyanatoalkyl; alkenylaminoalkyl; alkylcarboalkyl; cyanoalkyl; cyanatoalkyl; alkenylaminosulfonalkyl; alkylthioalkyl; haloalkylcarbonyloxyalkyl; alkoxycarboalkyl; haloalkenylcarbonyloxyalkyl; hydroxyhaloalkyloxyalkyl; hydroxyalkylcarboalkyloxyalkyl; hydroxyalkyl; alkoxysulfonoalkyl; furyl; thienyl; alkylthiolenyl; thienalkyl; phenyl; substituted phenyl wherein the substituents can be selected from halogen, alkyl, haloalkyl, alkoxy, carbamyl, nitro, carboxy and salts thereof, and haloalkylcarbamyl; phenylalkyl; phenylhaloalkyl; phenylalkenyl; substituted phenylalkenyl wherein the substituents can be selected from

halogen, alkyl, alkoxy, and halophenoxy, phenylalkoxy;
phenylalkylcarboxyalkyl; phenylcycloalkyl; halophenylalkenoxy;
halothiophenylalkyl; halophenoxyalkyl; bicycloalkyl;
alkenylcarbamylpyridinyl; alkynylcarbamylpyridinyl;
5 dialkenylcarbamylbicycloalkenyl and alkynylcarbamylbicycloalkenyl;

R^{71} and R^{72} , which may be the same or different, are selected
from the group consisting of alkenyl; haloalkenyl; hydrogen; alkyl;
haloalkyl; alkynyl; cyanoalkyl; hydroxyalkyl; hydroxyhaloalkyl;
haloalkylcarboxyalkyl; alkylcarboxyalkyl; alkoxycarboxyalkyl;
10 thioalkylcarboxyalkyl; alkoxycarboalkyl; alkylcarbamyloxyalkyl; amino;
formyl; haloalkyl-N-alkylamido; haloalkylamido; haloalkylamidoalkyl;
haloalkyl-N-alkylamidoalkyl; haloalkylamidoalkenyl; alkylimino;
cycloalkyl; alkylcycloalkyl; alkoxyalkyl; alkylsulfonyloxyalkyl;
mercaptoalkyl; alkylaminoalkyl; alkoxycarboalkenyl; haloalkylcarbonyl;
15 alkylcarbonyl; alkenylcarbamyloxyalkyl; cycloalkylcarbamyloxyalkyl;
alkoxycarbonyl; haloalkoxycarbonyl; halophenylcarbamyloxyalkyl;
cycloalkenyl; phenyl; substituted phenyl wherein said substituents can
be selected from alkyl, halogen, haloalkyl, alkoxy, haloalkylamido,
phthalimido, hydroxy, alkylcarbamyloxy, alkenylcarbamyloxy,
20 alkylamido, haloalkylamido and alkylcarboalkenyl; phenylsulfonyl;
substituted phenylalkyl wherein said substituents can be selected from
halogen or alkyl; dioxyalkylene; halophenoxyalkylamido-alkyl;
alkylthiodiazolyl; piperidyl; piperidylalkyl; dioxolanylalkyl; thiazolyl;
alkylthiazolyl; benzothiazolyl; halobenzothiazolyl; furyl; alkyl-
25 substituted furyl; furylalkyl; pyridyl; alkylpyridyl; alkoxyazolyl;
tetrahydrofurylalkyl; 3-cyano-thienyl; alkyl substituted thienyl; 4,5-
polyalkylene thienyl; α -haloalkylacetamidophenylalkyl; α -
haloalkylacetamidonitrophenylalkyl; α -
haloalkylacetamidohalophenylalkyl; and cyanoalkenyl; or

30 R^{71} and R^{72} when taken together can form a structure consisting
of piperidinyl; alkylpiperidinyl; pyridyl; di- or tetrahydropyridinyl;

alkyltetrahydropyridyl; morpholyl; azabicyclononyl; diazacycloalkanyl;
benzoalkylpyrrolidinyl; oxazolidinyl; perhydrooxazolidinyl;
alkyloxazolidinyl; furyloxazolidinyl; thienyloxazolidinyl;
pyridyloxazolidinyl; pyrimidinyloxazolidinyl; benzooxazolidinyl; C_{3.7}
spirocycloalkyl-oxazolidinyl; alkylaminoalkenyl; alkylideneimino;
pyrrolidinyl; piperidonyl; perhydroazepinyl; perhydroazocinyl;
pyrazolyl; -tetrahydro- or perhydroquinolyl or isoquinolyl; indolyl or di-
or perhydroindolyl; and which combined R⁷¹ and R⁷² members can be
substituted with those independent R⁷¹ and R⁷² radicals enumerated
above; or

(ii) one of the following compounds:

α -[(cyanomethoxy)imino]benzeneacetonitrile; α -[(1,3-dioxolan-2-ylmethoxy)imino]-benzeneacetonitrile; O-[3-dioxolan-2-ylmethyl]-
2,2,2-trifluoromethyl-4'-chloroacetophenone oxime; benzenemethamine,
which is N-[4-(dichloromethylene)-1,3-dioxolan-2-ylidene]- α -methyl,
hydrochloride; diphenylmethoxy acetic acid methyl ester; 1,8-naphthalic
anhydride; 4,6-dichloro-2-phenylpyrimidine; 2-chloro-N-[1-(2, 4, 6-
trimethylphenyl)ethenyl]acetamide; ethylene glycol acetal of 1,1-
dichloroacetone; benoxacor, which is 4-dichloroacetyl-3,4-dihydro-3-
methyl-2H-1,4-benzoxazine; dichlormid, which is N,N-diallyl-2,2-
dichloroacetamide; fencloir, which is 4,6-dichloro-2-
phenylpyrimidine; furilazole which is (RS)-3-dichloroacetyl-5-(2-
furanyl)-2,2-dimethyloxazolidine; cloquintocet (5-chloroquinoline-8-
yloxy acid) or a salt or ester thereof such as cloquintocet-mexy which is
(1-methylhexyl(5-chloroquinoline-8-yloxy) acetate); fenchlorazole,
which is (1-(2,4-dichlorophenyl)-5-trichloromethyl)-1H-1,2,4-triazole-3-
carboxylic acid), or a salt or ester thereof such as fenchlorazole-ethyl,
which is (ethyl 1-(2,4-dichlorophenyl)-5-trichloromethyl)-1H-1,2,4-
triazole-3-carboxylate); mefenpyr-ethyl, which is (diethyl 1-(2,4-
dichlorophenyl)-5-methyl-2-pyrazoline-3,5-dicarboxylate); 5,5-

diphenylisoxazolinone-3-carboxylic acid; and R29148, which is 2,2-dichloro-1-(2,2,5-trimethyloxazolidin-3-yl)-ethanone.

Especially preferred antidotes for use in the present invention include: cloquintocet, cloquintocet-mexyl, fenchlorazole, fenchlorazole-ethyl, benoxacor and R29148.

The following non-limiting examples illustrate the invention.

EXPERIMENTAL EXAMPLE 3

An experiment was carried-out to examine the damage on maize and wheat following post-emergence applications of compounds of formula (I) (hereafter "the Herbicide") and flurilazole, benoxacor, dichlormid, cloquintocet, fenchlorazole, naphthalic anhydride and R29148, alone and in tank mixtures.

The Herbicide, flurilazole, benoxacor, dichlormid, cloquintocet, fenchlorazole, naphthalic anhydride and R29148 were applied as technical materials prepared in acetone. Mixtures of the Herbicide and safeners were applied post-emergence. Two weeks after treatment the percent reduction in plant growth, compared to an untreated control (the Herbicide sprayed alone), was assessed.

The safeners provided an antidotal effect on maize and wheat by decreasing the extent of injury caused by the Herbicide.

EXPERIMENTAL EXAMPLE 4

Representative compounds of formula (I), Compounds 2 and 82 and cloquintocet-mexyl, were applied as technical materials prepared in acetone to a locus comprising a natural population of Galium aparine and wheat (*Triticum aestivum*).

Individual components and mixtures of Compound 2, Compound 82 and cloquintocet-mexyl were applied late post-emergence of the weeds and crop.

The percent reduction in plant growth, compared to an untreated control was assessed 12 and 25 days after treatment (DAT).

The following tables summarise the results obtained.

Table A Post-emergence treatment of a natural population of
Galium aparine with Compound 2 and cloquintocet-mexyl

Treatment	Dose rate g/ha	% reduction in growth	
		12 DAT	25 DAT
Compound A	0	0	0
	12.5	0	0
	25	13	28
	50	23	35
	100	28	40
Compound A + cloquintocet-mexyl	100 65	25	63

5

Table B Effect of Compound 2 and cloquintocet-mexyl on
Triticum aestivum

Treatment	Dose rate g/ha	% reduction in growth	
		12 DAT	25 DAT
Compound 2	100	10	0
Compound 2 + cloquintocet-mexyl	100 65	8	0

10

Table C Post-emergence treatment of a natural population of
Galium aparine with Compound 82 and cloquintocet-
mexyl

Treatment	Dose rate g/ha	% reduction in growth	
		12 DAT	25 DAT
Compound 82	0	0	0
	12.5	3	0
	25	13	28
	50	18	53
	100	33	68
Compound 82 + cloquintocet-mexyl	100 65	28	63

15

Table D Effect of Compound 82 and cloquintocet-mexyl on
Triticum aestivum

Treatment	Dose rate g/ha	% reduction in growth	
		12 DAT	25 DAT
Compound 82	100	11	0
Compound 82 + cloquintocet-mexyl	100 65	0	0

EXPERIMENTAL EXAMPLE 5

Representative compounds for formula (I), Compounds 2 and 82 and cloquintocet-mexyl, were applied as technical materials prepared in acetone to a locus comprising a drilled population of *Galium aparine* and wheat (*Triticum aestivum*).

Individual components and mixtures of Compound 2, Compound 82 and cloquintocet-mexyl were applied late post-emergence of the weeds and crop.

The percent reduction in plant growth, compared to an untreated control was assessed 20 and 33 days after treatment (DAT).

The following tables summarise the results obtained.

Table E Post-emergence treatment of a drilled population of *Galium aparine* with Compound 2 and cloquintocet-mexyl

Treatment	Dose rate g/ha	% reduction in growth	
		20 DAT	33 DAT
Compound 2	0	0	0
	12.5	0	43
	25	28	60
	50	33	73
	100	43	80
Compound 2 + cloquintocet-mexyl	100 65	38	85

Table F Effect of Compound 2 and cloquintocet-mexyl on *Triticum aestivum*

Treatment	Dose rate g/ha	% reduction in growth	
		20 DAT	33 DAT
Compound 2	100	7	3
Compound 2 + cloquintocet-mexyl	100 65	0	0

Table G Post-emergence treatment of a drilled population of
Galium aparine with Compound 82 and cloquintocet-
mexyl

Treatment	Dose rate g/ha	% reduction in growth	
		20 DAT	33 DAT
Compound 82	0	0	0
	12.5	15	35
	25	28	68
	50	43	75
	100	45	88
Compound 82 + cloquintocet-mexyl	100 65	43	75

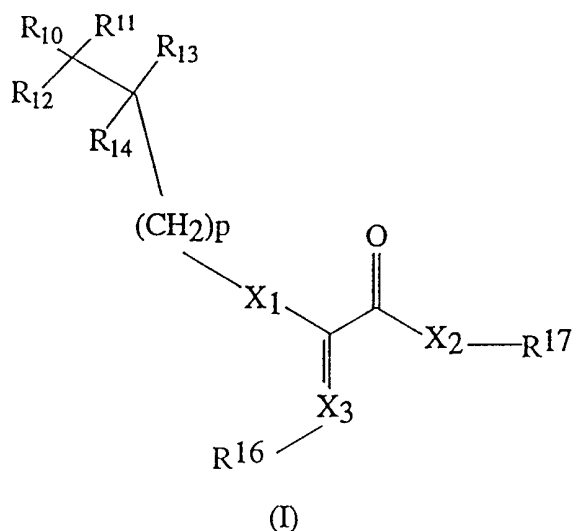
Table H Effect of Compound 82 and cloquintocet-mexyl on
Triticum aestivum

Treatment	Dose rate g/ha	% reduction in growth	
		20 DAT	33 DAT
Compound 82	50	10	5
	100	15	13
Compound 82 + cloquintocet-mexyl	100 65	12	0

According to a further feature of the present invention, there is provided a product comprising: (a) an aryl vinyl ether derivative as defined in general formula (I) or an agriculturally acceptable salt or metal complex thereof, and (b) an antidote as hereinbefore described; as a combined preparation for simultaneous, separate or sequential use, for example, in controlling the growth of weeds at a locus, e.g. crop locus.

CLAIMS

1. An aryl vinyl ether derivative of general formula (I):-



wherein:

p is 0 or 1,

X¹ is O, NH or S;

X² is O, S, NR¹⁸ or a simple bond;

X³ is N or CR¹⁹;

R¹⁷ and R¹⁸ independently represent a hydrogen atom or an optionally substituted group R²⁰, R²¹, R²² or R²³, wherein;

R²⁰ represents a lower alkyl radical;

R²¹ represents a lower alkenyl radical;

R²² represents a lower alkynyl radical;

R²³ represents a -(CH₂)_m-phenyl radical;

m represents zero or one;

R¹⁶ is R²⁴ or OR²⁵ or SR²⁵, NR²⁵R²⁶ or alkyl substituted by alkoxy carbonyl;

R²⁴, R²⁵ and R²⁶ independently have one of the meanings given for R¹⁸;

R¹⁹ has one of the meanings given for R¹⁶;

R¹⁰ represents a radical selected from;

$-\text{CH}_2\text{NO}_2$, $-\text{CHR}^{27}\text{R}^{28}$, $-\text{CR}^{27}\text{R}^{28}\text{R}^{281}$, $-\text{CR}^{30}\text{R}^{29}\text{R}^{291}$, $-\text{CO}-\text{NR}^{30}\text{R}^{31}$,
 $-\text{CH}_2\text{NR}^{30}\text{R}^{31}$, $-\text{CH}=\text{CR}^{31}\text{R}^{32}$, $-\text{CH}_2\text{N}(\text{R}^{30})\text{S}(\text{O})_q\text{R}^{33}$, $-\text{C}(\text{O})\text{SR}^{32}$,
 $-\text{CH}_2\text{C}(\text{O})\text{SR}^{32}$, $-(\text{CH}_2)_z\text{CO}_2\text{R}^{32}$, $-\text{CO}_2\text{R}^{32}$, $-\text{CH}=\text{CHC}(\text{O})\text{OR}^{32}$,
 $-\text{C}(\text{R}^{32})=\text{N}-\text{NR}^{30}\text{R}^{31}$, $-\text{C}(\text{R}^{32})=\text{N}-\text{NH}-\text{C}(\text{O})\text{lower alkyl}$, $-\text{COR}^{32}$,
5 $-\text{C}(\text{O})\text{OC}(\text{O})\text{R}^{32}$, $-\text{C}(=\text{N}-\text{OH})\text{R}^{32}$, $-\text{C}\equiv\text{CCOOR}^{32}$, $-\text{CH}_2\text{SCN}$,
 $-\text{CH}_2\text{NCO}$, $-\text{CH}_2\text{NCS}$, $-\text{CH}_2\text{N}_3$, $-\text{CH}_2\text{CN}$, $-\text{CH}_2\text{OSCN}$, $-\text{CH}_2\text{OCN}$,
 $-\text{CH}_2\text{N}(\text{R}^{30})\text{CO}_2\text{R}^{33}$, $-\text{CH}_2\text{OSO}_2\text{R}^{33}$, $-\text{CH}_2\text{SO}_2\text{OR}^{33}$, $-\text{CH}_2\text{OCO}_2\text{R}^{33}$,
 $-\text{CH}=\text{CHNR}^{33}\text{R}^{34}$, $-\text{C}(\text{O})\text{ONR}^{33}\text{R}^{34}$, $-\text{C}(=\text{NR}^{35})\text{R}^{32}$, $-\text{CH}_2\text{P}(\text{O})\text{R}^{35}\text{R}^{36}$,
 $-\text{CH}_2\text{OP}(\text{O})\text{R}^{35}\text{R}^{36}$, $-\text{CH}_2\text{OC}(\text{O})\text{NR}^{30}\text{R}^{36}$, $-\text{CH}_2\text{OCH}_2\text{C}(\text{O})$ (optionally
10 substituted phenyl), $-\text{CO}_2\text{N}=\text{C}$ (optionally substituted phenyl)₂, N-
succinimidomethyl, N-phthalimidomethyl, a tetrazolyl group (especially
1-tetrazolyl), $-\text{CONHNHR}^{30}$, $-\text{CO}_2\text{CH}_2\text{CO}$ (optionally substituted phenyl),
or a saturated or unsaturated 5-7 membered heterocyclic ring containing
from 1-3 hetero atoms selected from O, N and S), $-\text{CO}_2\text{CH}_2$ (saturated or
15 unsaturated 5-7 membered heterocyclic ring containing from 1-3 hetero
atoms selected from O, N and S), $\text{CO}_2\text{R}^{32a}$, $\text{COCH}_2\text{COR}^{33}$, COCHN_2 ,
 CONH (lower alkyl substituted by hydroxy), $-\text{CH}(\text{OH})(\text{lower alkyl})$,
 $\text{C}(\text{R}^{32})=\text{N}-\text{NH}-\text{C}(\text{S})\text{NR}^a$, $\text{C}(\text{R}^{32})=\text{N}-\text{NH}$ (optionally substituted
unsaturated 5-7 membered heterocyclic ring containing from 1-3 atoms
20 selected from O, N and S), $\text{C}(\text{R}^{32})=\text{N}-\text{NR}^{30a}\text{R}^{31a}$, $\text{C}(\text{R}^{32})=\text{N}-\text{NH}\text{SO}_2\text{R}^{33}$
and $\text{C}(\text{O})\text{F}$;

z represents one, two, three or four;

q represents zero or two;

R^a represents H or lower alkyl;

25 R^{32a} represents an optionally substituted N-linked imidazole or
triazole ring optionally fused to a benzene ring;

R^{30a} and R^{31a} together with the N atom to which they are attached
form a 5 or 6-membered saturated heterocyclic ring optionally
containing an additional O, S or NR^a group in the ring;

30 R^{27} , R^{28} and R^{281} represent the same or different halogen atoms;

R^{29} and R^{291} represent OR^{37} or SR^{37} or,

R^{29} and R^{291} together form a divalent radical with which the carbon atom to which they are attached forms a 5 or 6 membered cyclic acetal or thioacetal ring, the ring system of which is optionally substituted by one or more lower alkyl groups;

5 R^{30} , R^{31} and R^{32} independently represent hydrogen, lower alkyl, lower haloalkyl, lower alkoxyalkyl, lower alkenyl, lower haloalkenyl, lower alkynyl, lower haloalkynyl, optionally substituted cycloalkyl, optionally substituted $-(CH_2)_m$ -phenyl;

R^{33} and R^{34} represent R^{32} with the exclusion of the hydrogen atom;

10 R^{35} and R^{36} represent a hydrogen atom or a radical which may be any of the following ; alkyl, alkoxy or optionally substituted phenyl;

R^{37} represents lower alkyl, lower haloalkyl, lower alkenyl or lower haloalkenyl ;

R^{11} and R^{13} each independently represent hydrogen or alkyl, or

15 R^{11} and R^{13} may be together a simple bond creating a double bond with the carbon atom to which they are attached, or

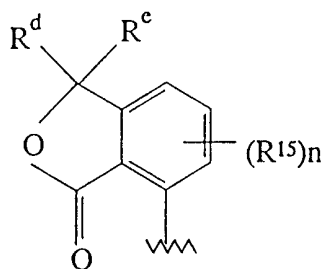
R^{11} and R^{13} may be a single divalent radical comprising one to six atoms on the main chain, this main chain optionally containing one to three nitrogen atoms, one oxygen atom or one sulphur atom; this divalent radical forming with the two carbon atoms to which they are attached, a saturated or non-saturated carbocyclic or heterocyclic ring or a bicyclic ring, these rings being optionally substituted by from one to four R^{15} radicals, each ring containing at most eight ring members, preferably at most six,

25 wherein R^{15} represents a halogen atom, hydroxy, cyano, lower alkoxy, carbonyl, lower alkyl, lower alkenyl, lower alkynyl, optionally substituted cycloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl, lower haloalkoxy, lower haloalkyl, lower haloalkenyl, lower haloalkynyl, halocycloalkyl, lower haloalkoxy, lower haloalkylthio, lower haloalkylsulfinyl, lower haloalkylsulfonyl, nitro, amino, lower alkylamino, lower dialkylamino, optionally substituted phenoxy, lower alkylcarbonylamino, carbamoyl,

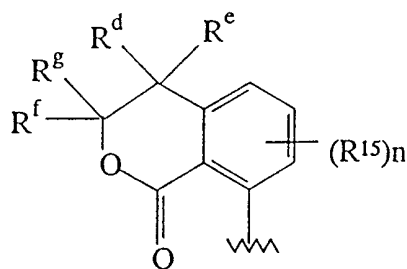
lower alkylcarbamoyl, lower dialkylcarbamoyl, $-\text{CH}_2\text{SCN}$, SF_5 ,
 $-\text{CR}^{30}=\text{N}-\text{R}^{31}$, $-\text{CR}^{30}=\text{NOR}^{31}$, $-\text{CR}^{30}=\text{NNR}^{30}\text{R}^{31}$, $-\text{CR}^{30}\text{R}^{29}\text{R}^{291}$,
alkoxyalkyl, $\text{CR}^b\text{R}^c\text{R}^a$, COR^a , optionally substituted phenyl or naphthyl;
or alkenyloxy substituted by alkoxycarbonyl or CO_2H ;

- 5 R^b and R^c together with the C atoms to which they are attached
form a 5 or 6 -membered cyclic acetal group;

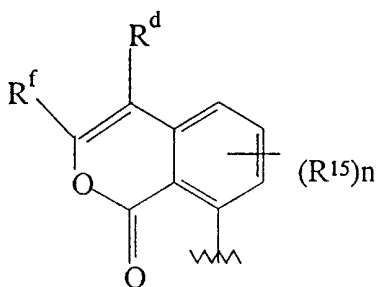
or $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})$ - represents a group (A), (B), (C), (D) or (E):



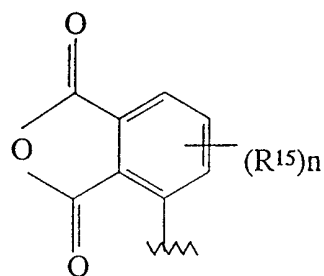
(A)



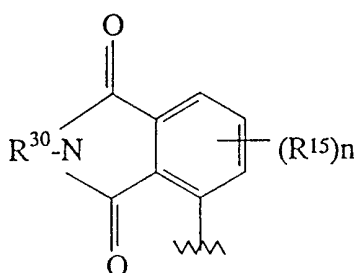
(B)



(C)



(D)



(E)

wherein R^d , R^e , R^f , R^g and R^h represent H, lower alkyl, halogen or OH, and n represents the values 0, 1, 2 or 3;

R^{151} represents R^{15} or a hydrogen atom;

R^{12} and R^{14} each independently represent hydrogen or alkyl or may form a simple bond, creating a double bond together where R^{11} and R^{13} are together a single divalent radical;

preferably with the following provisos;

i) when $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})$ - represents a phenyl ring optionally substituted by R^{15} ; R^{10} represents $-CO_2 R^{32}$, $CONR^{30}R^{31}$,

$\text{CHR}^{27}\text{R}^{28}$ or $\text{CR}^{27}\text{R}^{28}\text{R}^{281}$, wherein R^{32} represents alkyl or haloalkyl;
 R^{30} and R^{31} represent H or alkyl, and R^{27} , R^{28} and R^{281} are as defined
above; p is zero; X_1 is O; X_2 is O; X_3 is CH; R^{16} is OR^{25} ; then R^{15} is not
a monohalomethyl group;

5 ii) when $\text{R}^{10}\text{R}^{11}\text{R}^{12}\text{C}-\text{C}(\text{R}^{13})(\text{R}^{14})-$ represents a group
 $\text{EtO}_2\text{C}-\text{CH}=\text{CH}-$; p is 1; X_1 is S; X_2 is a bond; R^{17} represents phenyl; X_3 is
CH; then R^{16} is not NH_2 or NMe_2 ;

 iii) when R^{11} , R^{12} , R^{13} , R^{14} each represent H; p is 1; X_1 is S, X_2
10 is O; R^{17} represents Et; X_3 is N; R^{16} represents $-\text{NH}(4\text{-nitrophenyl})$; R^{10} is
not CO_2H or CONHPh ;

 iv) when R^{11} , R^{12} , R^{13} , R^{14} each represent H; p is zero; X_1 is S,
 X_2 is O; R^{17} represents Et; X_3 is N; R^{16} represents $-\text{NH}(4\text{-nitrophenyl})$; R^{10}
is not CO_2H or CONH_2 ;

 v) when p represents zero; X_1 is O; X_2 is a bond; R^{17}
15 represents H; X_3 is CH; R^{16} represents NMe_2 ; $\text{R}^{10}\text{R}^{11}\text{R}^{12}\text{C}-\text{C}(\text{R}^{13})(\text{R}^{14})-$
represents a 5-methyl-2- R^{10} -substituted-thien-3-yl group; R^{10} is not CO_2H or
 CO_2Me ;

 vi) when R^{11} , R^{12} , R^{13} and R^{14} each represent H; p is zero; X_1
20 is S; X_2 is O, R^{17} represents H; X_3 is N; R^{16} represents $-\text{NH}(4\text{-nitrophenyl})$;
 R^{10} is not CO_2H ;

 vii) when R^{10} represents CO_2Et ; R^{11} , R^{12} , R^{13} and R^{14} each
represent H; p is zero; X_1 is S; X_2 is NH, R^{17} represents phenyl; X_3 is
 CMe ; R^{16} is not NH_2 or NHMe ; and

 viii) when p is zero; X_1 is O; X_2 is O; R^{17} represents Me; X_3 is
25 CH; R^{16} represents OMe ; $\text{R}^{10}\text{R}^{11}\text{R}^{12}\text{C}-\text{C}(\text{R}^{13})(\text{R}^{14})-$ represents a 1,3-
dimethyl-4- R^{10} -substituted-pyrazol-5-yl group; R^{10} is not 4-chlorobenzoyl;

and agriculturally acceptable salts and metal complexes thereof.

2. An aryl vinyl ether derivative of formula (I) as defined in
claim 1 wherein:

30 p is 0 or 1,
 X^1 is O, NH or S;

X^2 is O, S, NR^{18} or a simple bond;

X^3 is N or CR^{19} ;

R^{17} and R^{18} independently represent a hydrogen atom or an optionally substituted group R^{20} , R^{21} , R^{22} or R^{23} , wherein;

5 R^{20} represents a lower alkyl radical;

R^{21} represents a lower alkenyl radical;

R^{22} represents a lower alkynyl radical;

R^{23} represents a $-(CH_2)_m$ -phenyl radical;

m represents zero or one;

10 R^{16} is R^{24} or OR^{25} or SR^{25} or $NR^{25}R^{26}$;

R^{24} , R^{25} and R^{26} independently have one of the meanings given for R^{18} ;

R^{19} has one of the meanings given for R^{16} ;

R^{10} represents a radical selected from;

15 $-CH_2NO_2$, $-CHR^{27}R^{28}$, $-CR^{27}R^{28}R^{281}$, $-CR^{30}R^{29}R^{291}$, $-CO-NR^{30}R^{31}$,
 $-CH_2NR^{30}R^{31}$, $-CH=CR^{31}R^{32}$, $-CH_2N(R^{30})S(O)_qR^{33}$, $-C(O)SR^{32}$, $-CH_2$
 $C(O)SR^{32}$, $-CH_2CO_2R^{32}$, $-CO_2R^{32}$, $-CH=CHC(O)OR^{32}$, $-C(R^{32})=N-NR^{30}$
 R^{31} , $-C(R^{32})=N-NH-C(O)$ lower alkyl, $-COR^{32}$, $-C(O)OC(O)R^{32}$, $-C(=N-$
 $OH)R^{32}$, $-C\equiv CCOOR^{32}$, $-CH_2SCN$, $-CH_2NCO$, $-CH_2NCS$, $-CH_2N_3$, $-CH_2CN$,
20 $-CH_2OSCN$, $-CH_2OCN$, $-CH_2N(R^{30})CO_2R^{33}$, $-CH_2OSO_2R^{33}$, $-CH_2SO_2OR^{33}$,
 $-CH_2OCO_2R^{33}$, $-CH=CHNR^{33}R^{34}$, $-C(O)ONR^{33}R^{34}$, $-C(=NR^{35})R^{32}$,
 $-CH_2P(O)R^{35}R^{36}$, $-CH_2OP(O)R^{35}R^{36}$, $-CH_2OC(O)NR^{30}R^{36}$, $-CH_2OCH_2C(O)$
(optionally substituted phenyl), $-CO_2N=C$ (optionally substituted phenyl)₂,
N-succinimidomethyl, N-phthalimidomethyl or a tetrazolyl group (especially
25 1-tetrazolyl);

q represents zero or two;

R^{27} , R^{28} and R^{281} represent the same or different halogen atoms;

R^{29} and R^{291} represent OR^{37} or SR^{37} or,

30 R^{29} and R^{291} together form a divalent radical with which the carbon atom to which they are attached forms a 5 or 6 membered cyclic acetal or thioacetal ring, the ring system of which is optionally substituted by one or more lower alkyl groups;

R^{30} , R^{31} and R^{32} independently represent hydrogen, lower alkyl, lower haloalkyl, lower alkoxyalkyl, lower alkenyl, lower haloalkenyl, lower alkynyl, lower haloalkynyl, optionally substituted cycloalkyl, optionally substituted $-(CH_2)_m$ -phenyl;

R^{33} and R^{34} represent R^{32} with the exclusion of the hydrogen atom;

R^{35} and R^{36} represent a hydrogen atom or a radical which may be any of the following ; alkyl, alkoxy or optionally substituted phenyl;

R^{37} represents lower alkyl, lower haloalkyl, lower alkenyl or lower haloalkenyl ;

R^{11} and R^{13} each independently represent hydrogen or alkyl, or

R^{11} and R^{13} may be together a simple bond creating a double bond with the carbon atom to which they are attached, or

R^{11} and R^{13} may be a single divalent radical comprising one to six atoms on the main chain, this main chain optionally containing one to three nitrogen atoms, one oxygen atom or one sulphur atom; this divalent radical forming with the two carbon atoms to which they are attached, a saturated or non-saturated carbocyclic or heterocyclic ring, or a bicyclic ring, these rings being optionally substituted by an R^{15} radical, each ring containing at most eight ring members, preferably at most six,

wherein R^{15} represents a halogen atom, hydroxy, cyano, lower alkoxy, carbonyl, lower alkyl, lower alkenyl, lower alkynyl, optionally substituted cycloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl, lower alkylsulfonyl, lower haloalkoxy, lower haloalkyl, lower haloalkenyl, lower haloalkynyl, halocycloalkyl, lower haloalkoxy, lower haloalkylthio, lower haloalkylsulfinyl, lower haloalkylsulfonyl, nitro, amino, lower alkylamino, lower dialkylamino, optionally substituted phenoxy, lower alkylcarbonylamino, carbamoyl, lower alkylcarbamoyl, lower dialkylcarbamoyl, SF_5 , $-CR^{30}=N-R^{31}$, $-CR^{30}=NOR^{31}$, $-CR^{30}=NNR^{30}R^{31}$ or $-CR^{30}R^{29}R^{291}$;

R^{151} represents R^{15} or a hydrogen atom;

R^{12} and R^{14} each independently represent hydrogen or alkyl or may form a simple bond, creating a double bond together where R^{11} and R^{13} are together a single divalent radical;

with the proviso that when $R^{10}R^{11}R^{12}C-C(R^{13})(R^{14})-$ represents a phenyl ring optionally substituted by R^{15} ; R^{10} represents $-CO_2R^{32}$, $CONR^{30}R^{31}$, $CHR^{27}R^{28}$ or $CR^{27}R^{28}R^{281}$, wherein R^{32} represents alkyl or haloalkyl; R^{30} and R^{31} represent H or alkyl, and R^{27} , R^{28} and R^{281} are as defined above; p is zero; X_1 is O; X_2 is O; X_3 is CH; R^{16} is OR^{25} ; then R^{15} is not a monohalomethyl group; and agriculturally acceptable salts and metal complexes thereof.

3. A compound according to claim 1 or 2 wherein R^{11} and R^{13} form a phenyl ring substituted by a halogen atom.

4. A compound according to claim 1, 2 or 3 wherein X_3 represents CR^{19} , wherein R^{19} is a hydrogen atom.

5. A compound according to any one of claims 1 to 4 wherein X_2 represents an oxygen atom.

6. A compound according to any one of claims 1 to 5 wherein X_1 represents an oxygen atom.

7. A compound according to any one of claims 1 to 6 wherein R^{17} represents methyl.

8. A compound according to claim 1 wherein R^{16} is methoxy.

9. A compound according to claim 1 wherein R^{10} is $-CHR^{27}R^{28}$ (in which R^{27} and R^{28} are bromine), or $-COR^{32}$ or $-CO_2R^{32}$ (in which R^{32} is lower alkyl or hydrogen), or $-CH_2OSO_2R^{33}$ (R^{33} represents substituted phenyl), or $-CH_2NO_2$, or $-CH_2OCH_2C(O)Ph$, or

$-CH_2OTs$, or $-C(R^{32})=N-NHSO_2R^{33}$ (in which R^{32} is hydrogen and R^{33} is lower alkyl), or $-C(R^{32})=N-NH-C(S)NR^a$ (in which R^{32} is hydrogen and R^a is lower alkyl), or $-C(R^{32})=N-NR^{30}R^{31}$ (in which R^{32} and R^{30} are hydrogen and R^{31} is optionally substituted $-(CH_2)_m$ -phenyl), or $-C(R^{32})=N-N^{30a}R^{31a}$ (in which R^{32} is hydrogen, and R^{30a} and R^{31a} together with the N atom to which they are attached form a 6 membered saturated heterocyclic ring containing an additional O and NR^a group in the ring), or

-C(R³²)=N-NH(optionally substituted unsaturated 6 membered heterocyclic ring containing a nitrogen atom) (in which R³² is p hydrogen), or -C(O)F, or -CO₂CH₂CO(optionally substituted phenyl), or -CO₂R^{32a} (in which R^{32a} is an optionally substituted N-linked triazole ring fused to a benzene ring), or
 5 -CO-NR³⁰R³¹(in which R³⁰ is hydrogen and R³¹ is lower alkyl), or -CONHNHR³⁰ (in which R³⁰ is optionally substituted -(CH₂)_m-phenyl), or -C(R³²)=N-NH-C(O)lower alkyl (in which R³² is hydrogen), or -C(O)SR³² (in which R³² is lower alkyl) or -CH(OH)lower alkyl, or -COCHN₂, or -CR³⁰R²⁹R²⁹¹ (in which R³⁰ is hydrogen, and R²⁹ and R²⁹¹ together form a
 10 divalent radical with which the carbon atom to which they are attached forms a 5 membered optionally substituted thioacetal ring), or -C(=N-OH)R³² (in which R³² is lower alkyl), or -(CH₂)_zCO₂R³² (in which R³² is hydrogen, lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, lower alkoxyalkyl, optionally substituted -(CH₂)_m-phenyl);

15 or R¹⁰R¹¹R¹²C-C(R¹³)(R¹⁴)- represents a group A in which R^d and R^e represent hydrogen or halogen; and

R¹⁵ is -COR^a, or halogen, or lower alkyl, or lower alkoxy, or lower haloalkoxy, or lower alkoxy carbonyl, or CR^bR^cR^a (in which R^b and R^c form a 5 membered cyclic acetal group and in which R^a represents hydrogen).

20 10. A compound according to claim 1 or 2 wherein R¹⁰ represents -COR³² or CO₂R³² and R³² represents lower alkyl or hydrogen.

11. A compound according to claim 1 wherein:

R¹¹ and R¹³ form a phenyl or naphthyl ring substituted by one or more halogen, alkyl or haloalkyl groups; X₃ is CR¹⁹ wherein R¹⁹

25 represents a hydrogen atom; X₁ and X₂ each represent an oxygen atom; R¹⁶ and R¹⁷ each represent a methyl group; and R¹⁰ is -CO₂R³².

12. A compound according to claim 1 wherein:

30 R¹¹ and R¹³ form a phenyl or naphthyl ring substituted by one or more halogen, alkyl or haloalkyl groups; X₃ is CR¹⁹ wherein R¹⁹ represents a hydrogen atom; X₁ and X₂ each represent an oxygen atom; R¹⁶ and R¹⁷ each represent a methyl group; and R¹⁰ is -CO₂R³² in which R³² is lower alkyl or hydrogen.

13. A herbicidal composition which comprises as active ingredient a herbicidally effective amount of an aryl vinyl ether derivative of general formula (I) according to any one of claims 1 to 12 or an agriculturally acceptable salt or metal complex thereof, in association with an agriculturally acceptable diluent or carrier and/or surface active agent.

14. A method for controlling weeds at a locus which comprises applying to the locus a herbicidally effective amount of an aryl vinyl ether derivative of general formula (I) according to any one of claims 1 to 12 or an agriculturally acceptable salt or metal complex thereof.

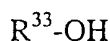
15. A method according to claim 14 in which the locus is an area used, or to be used, for growing of crops and the compound is applied at an application rate from 1g to 1000g per hectare.

16. A method of reducing phytotoxicity to crop plants caused by an aryl vinyl ether derivative of formula (I) according to any one of claims 1 to 12 or an agriculturally acceptable salt or metal complex thereof, which comprises applying generally to the crop plant locus or crop plant seed an antidotally effective amount of an antidote effective to said compound.

17. A product comprising: (a) an aryl vinyl ether derivative as defined in claim 1 or an agriculturally acceptable salt or metal complex thereof, and (b) an antidote, as a combined preparation for simultaneous, separate or sequential use, in controlling the growth of weeds at a locus, e.g. crop locus.

18. A process for the preparation of a compound of general formula (I) as defined in claim 1 which comprises:

a) where R^{11} , R^{12} , R^{13} , R^{14} , R^{16} , R^{17} , p , X_1 , X_2 and X_3 are as defined in claim 1, and R^{10} represents $-\text{CO}_2\text{R}^{33}$, wherein R^{33} represents R^{32} with the exclusion of the hydrogen atom, the esterification of the corresponding compound of formula (I) wherein R^{10} represents CO_2H , with an alcohol of formula (II);



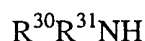
(II)

wherein R^{33} is as defined in claim 1;

b) where the various symbols are as defined in claim 1 and R^{10} represents $-CO_2H$, the acid hydrolysis of the corresponding compound wherein R^{10} represents $-CO_2R^{33}$ and R^{33} is t-butyl;

c) where the various symbols are as defined in claim 1, and R^{10} represents $-CONR^{30}R^{31}$, the reaction of the corresponding compound of formula (I) wherein R^{10} represents $-CO_2H$

by conversion to the acyl halide, followed by reaction with an amine of formula (III):

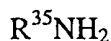


(III)

wherein R^{30} and R^{31} are as defined in claim 1;

d) where the various symbols are as defined in claim 1, and R^{10} is $-CH_2NO_2$, $-CH_2SCN$, $-CH_2CN$ or $-CH_2N_3$ the reaction of the corresponding compound of formula (I) wherein $R^{10} = -CH_2-L$ where L is a leaving group, or wherein $Y = -CH_2-L$ is replaced by $-CH_2-L^1$, where L^1 is a leaving group, with the metal salt of the appropriate nitro, thiocyno, cyano or azido anion respectively;

e) where the various symbols are as defined in claim 1, and R^{10} is $-C(=NR^{35})R^{32}$, the reaction of the corresponding compound of formula (I) wherein R^{10} is $-COR^{32}$ with a compound of formula (IV);



(IV)

wherein R^{35} is as defined in claim 1;

f) where the various symbols are as defined in claim 1, and R^{10} is $-CH=CHC(O)OR^{32}$, the reaction of a compound of formula (I) wherein R^{10} is halogen with a compound of formula (V):

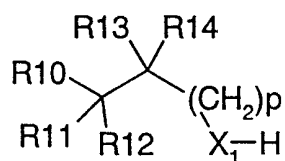


(V)

wherein R^{32} is as defined in claim 1;

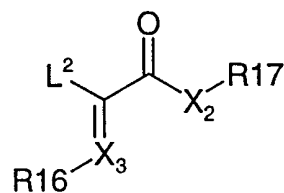
g) where the various symbols are as defined in claim 1 and R^{10} represents $-\text{CHR}^{27}\text{R}^{28}$ or $-\text{CR}^{27}\text{R}^{28}\text{R}^{281}$ wherein R^{27} , R^{28} and R^{281} are as defined in claim 1, the halogenation of the corresponding compound in which one or more of R^{27} , R^{28} and R^{281} are replaced by hydrogen atoms;

h) where the various symbols are as defined in claim 1, the reaction of a compound of formula (VI),



(VI)

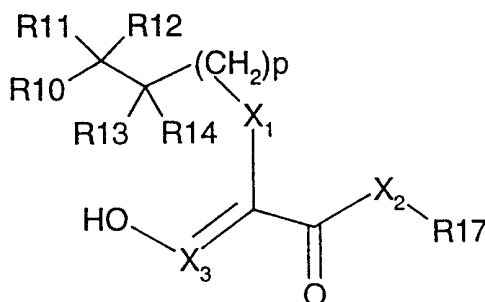
wherein R^{10} , R^{11} , R^{12} , R^{13} , R^{14} , p and X_1 are as defined in claim 1, with a compound of formula (VII),



(VII)

wherein X_2 , X_3 , R^{16} and R^{17} are as defined in claim 1 and L^2 is a leaving group;

i) where the various symbols are as defined in claim 1 and R^{16} represents OR^{251} , wherein R^{251} represents R^{25} with the exclusion of the hydrogen atom, the alkylation of a compound of formula (VIII),



(VIII)

wherein the various symbols are as defined in claim 1;

5 j) where the various symbols are as defined in claim 1 and R^{10} represents $-\text{COCH}_2\text{COR}^{33}$ wherein R^{33} is as defined in claim 1, the hydrolysis of the corresponding compound in which R^{10} is replaced by a group $-\text{COCH}(\text{CO}_2\text{tBu})\text{COR}^{33}$;

k) where the various symbols are as defined in claim 1 and R^{10} represents $-\text{COF}$, the fluorination of the corresponding compound in which R^{10} represents CO_2H ; and

10 l) where the various symbols are as defined in claim 1 and R^{10} represents $-\text{CO}_2\text{R}^{33}$ and R^{33} represents t-butyl, the esterification of the corresponding compound in which R^{10} represents $-\text{CO}_2\text{H}$.

19. A process according to claim 1 substantially as hereinbefore described.

15 20. A herbicidal composition according to claim 13 substantially as hereinbefore described.

21. A method according to claim 14 substantially as hereinbefore described .