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**2,4,6-phenyl substituted cyclic ketoenols**

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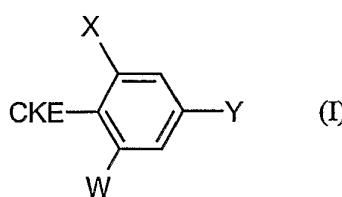
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*[Fortsetzung auf der nächsten Seite]*

(54) Title: 2,4,6-PHENYL SUBSTITUTED CYCLIC KETOENOLS

(54) Bezeichnung: 2, 4, 6-PHENYLSUBSTITUIERTE CYCLISCHE KETOENOLE



(57) Abstract: The invention relates to novel 2,4,6-phenyl substituted cyclic ketoenols of formula (I), in which W, X, Y and CKE are defined as cited in the description, in addition to several methods for their production and to their use as pesticides and/or herbicides. The invention also relates to selective herbicidal agents containing 2,4,6-phenyl substituted cyclic ketoenols and a compound that improves the compatibility of cultivated plants.

(57) Zusammenfassung: Die vorliegende Erfindung betrifft neue 2,4,6-phenylsubstituierte cyclische Ketoenole der Formel (I), in welcher W, X, Y und CKE die oben angegebene Bedeutung haben, mehrere Verfahren zu ihrer Herstellung und ihre Verwendung als Schädlingsbekämpfungsmittel und/oder Herbicide. Außerdem betrifft die Erfindung selektiv herbizide Mittel, die 2,4,6-phenylsubstituierte Ketoenole cyclische Ketoenole einerseits und eine die Kulturpflanzenverträglichkeit verbessende Verbindung andererseits enthalten.

WO 2004/080962 A1



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- vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eintreffen

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("*Guidance Notes on Codes and Abbreviations*") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

2,4,6-Phenyl substituted cyclic ketoenols

The present invention relates to novel 2,4,6-phenyl-substituted cyclic ketoenols, to a plurality of processes for their preparation and to their use as pesticides and/or herbicides. The invention also relates to selective herbicidal compositions comprising firstly the 2,4,6-phenyl-5 substituted cyclic ketoenols and secondly a compound which improves crop plant tolerance.

Pharmaceutical properties of 3-acylpyrrolidine-2,4-diones have already been described (S. Suzuki et al. Chem. Pharm. Bull. 15 1120 (1967)). Furthermore, N-phenylpyrrolidine-2,4-diones were synthesized by R. Schmieder and H. Mildenberger (Liebigs Ann. Chem. 1985, 1095). A biological activity of these compounds has not been described.

10 EP-A-0 262 399 and GB-A-2 266 888 disclose compounds of a similar structure (3-arylpolyrrolidine-2,4-diones), of which, however, no herbicidal, insecticidal or acaricidal action has been disclosed. Unsubstituted, bicyclic 3-arylpolyrrolidine-2,4-dione derivatives (EP-A-355 599, EP-A-415 211 and JP-A-12-053670) and substituted monocyclic 3-arylpolyrrolidine-2,4-dione derivatives (EP-A-377 893 and EP-A-442 077) having herbicidal, insecticidal or 15 acaricidal action have been disclosed.

There have also been disclosed polycyclic 3-arylpolyrrolidine-2,4-dione derivatives (EP-A-442 073) and 1H-arylpolyrrolidinedione derivatives (EP-A-456 063, EP-A-521 334, EP-A-596 298, EP-A-613 884, EP-A-613 885, WO 94/01 997, WO 95/26 954, WO 95/20 572, EP-A-0 668 267, WO 96/25 395, WO 96/35 664, WO 97/01 535, WO 97/02 243, WO 97/36 868, 20 WO 97/43275, WO 98/05638, WO 98/06721, WO 98/25928, WO 99/16748, WO 99/24437, WO 99/43649, WO 99/48869 and WO 99/55673, WO 01/17972, WO 01/23354, WO 01/74770).

It is known that certain substituted  $\Delta^3$ -dihydrofuran-2-one derivatives have herbicidal properties (cf. DE-A-4 014 420). The synthesis of the tetrone acid derivatives used as starting materials (such as, for example, 3-(2-methylphenyl)-4-hydroxy-5-(4-fluorophenyl)- $\Delta^3$ -dihydrofuran-2-one) is also described in DE-A-4 014 420. Compounds of a similar structure are known from the publication Campbell et al., J. Chem. Soc., Perkin Trans. 1, 1985, (8) 1567-76, but no insecticidal and/or acaricidal activity is mentioned. 3-Aryl- $\Delta^3$ -dihydrofuranone derivatives having herbicidal, acaricidal and insecticidal properties are also known from EP-A-528 156, 25 EP-A-0 647 637, WO 95/26 345, WO 96/20 196, WO 96/25 395, WO 96/35 664, WO 97/01 535, WO 97/02 243, WO 97/36 868, WO 98/05638, WO 98/25928, WO 99/16748, WO 99/43649, WO 99/48869, WO 99/55673, WO 01/17972, WO 01/23354 and WO 01/74770. 30 3-

Aryl- $\Delta^3$ -dihydrothiophenone derivatives are likewise known (WO 95/26 345, 96/25 395, WO 97/01 535, WO 97/02 243, WO 97/36 868, WO 98/05638, WO 98/25928, WO 99/16748, WO 99/43649, WO 99/48869, WO 99/55673, WO 01/17972, WO 01/23354 and WO 01/74770).

Certain phenylpyrone derivatives which are unsubstituted in the phenyl ring are already known  
5 (cf. A.M. Chirazi, T. Kappe and E. Ziegler, Arch. Pharm. 309, 558 (1976) and K.-H. Boltze and K. Heidenbluth, Chem. Ber. 91, 2849), but a possible use of these compounds as pesticides has not been mentioned. Phenylpyrone derivatives which are substituted in the phenyl ring and have herbicidal, acaricidal and insecticidal properties are described in EP-A-588 137, WO 96/25 395, WO 96/35 664, WO 97/01 535, WO 97/02 243, WO 97/16 436, WO 97/19 941,  
10 WO 97/36 868, WO 98/05638, WO 99/43649, WO 99/48869, WO 99/55673, WO 01/17972 and WO 01/74770.

Certain 5-phenyl-1,3-thiazine derivatives which are unsubstituted in the phenyl ring are already known (cf. E. Ziegler and E. Steiner, Monatsh. 95, 147 (1964), R. Ketcham, T. Kappe and E. Ziegler, J. Heterocycl. Chem. 10, 223 (1973)), but a possible use of these compounds as  
15 pesticides has not been mentioned. 5-Phenyl-1,3-thiazine derivatives which are substituted in the phenyl ring and have herbicidal, acaricidal and insecticidal action are described in WO 94/14 785, WO 96/02 539, WO 96/35 664, WO 97/01 535, WO 97/02 243, WO 97/02 243, WO 97/36 868, WO 99/05638, WO 99/43649, WO 99/48869, WO 99/55673, WO 01/17972 and WO 01/74770.

20 It is known that certain substituted 2-arylcylopentanediones have herbicidal, insecticidal and acaricidal properties (cf., for example, US-4 283 348; 4 338 122; 4 436 666; 4 526 723; 4 551 547; 4 632 698; WO 96/01 798; WO 96/03 366, WO 97/14 667 and also WO 98/39281, WO 99/43649, WO 99/48869, WO 99/55673, WO 01/17972 and WO 01/74770). Moreover, compounds having similar substitutions are known; 3-hydroxy-5,5-dimethyl-2-phenylcyclopent-2-en-1-one from the publication Micklefield et al., Tetrahedron, (1992), 7519-26, and the natural product involutin (-)-cis-5-(3,4-dihydroxyphenyl)-3,4-dihydroxy-2-(4-hydroxyphenyl)cyclopent-2-enone from the publication Edwards et al., J. Chem. Soc. S, (1967), 405-9. An insecticidal or acaricidal action is not described. Moreover, 2-(2,4,6-trimethylphenyl)-1,3-indanedione is known from the publication J. Economic Entomology, 66,  
25 (1973), 584 and the Offenlegungsschrift (German Published Specification) DE-A 2 361 084, with herbicidal and acaricidal actions being mentioned.  
30

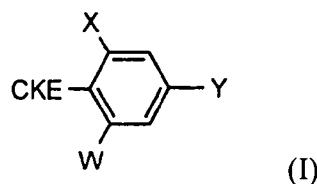
- 3 -

It is known that certain substituted 2-arylcylohexanediones have herbicidal, insecticidal and acaricidal properties (US-4 175 135, 4 209 432, 4 256 657, 4 256 658, 4 256 659, 4 257 858, 4 283 348, 4 303 669, 4 351 666, 4 409 153, 4 436 666, 4 526 723, 4 613 617, 4 659 372, DE-A 2 813 341, and also Wheeler, T.N., *J. Org. Chem.* 44, 4906 (1979)), WO 99/43649, WO 99/48869, WO 99/55673, WO 01/17972 and WO 01/74770.

It is known that certain substituted 4-arylpyrazolidine-3,5-diones have acaricidal, insecticidal and herbicidal properties (cf., for example, WO 92/16 510, EP-A-508 126, WO 96/11 574, WO 96/21 652, WO 99/47525, WO 01/17 351, WO 01/17 352, WO 01/17 353, WO 01/17 972, WO 01/17 973, WO 03/028 466 and WO 03/062244).

However, the activity and/or activity spectrum of these compounds is, in particular at low application rates and concentrations, not always entirely satisfactory. Furthermore, these compounds are not always sufficiently well tolerated by plants.

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



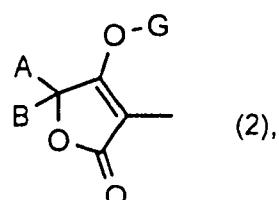
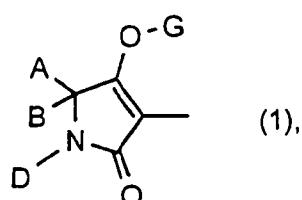
in which

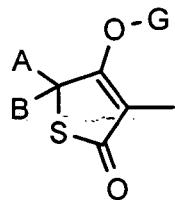
W represents alkoxy, haloalkoxy, alkoxyalkyloxy, alkoxybisalkyloxy or optionally substituted cycloalkylalkanediyoxy which may optionally be interrupted by heteroatoms,

X represents alkyl,

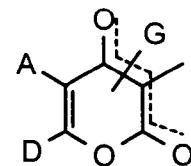
Y represents chlorine, bromine or iodine,

CKE represents one of the groups

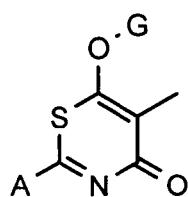




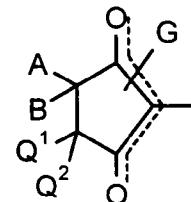
(3),



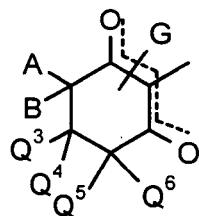
(4),



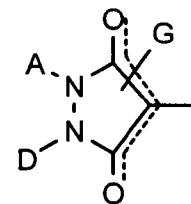
(5),



(6),



(7) or



(8)

in which

5        A        represents hydrogen, in each case optionally halogen-substituted alkyl, alkenyl, alkoxyalkyl, alkylthioalkyl, saturated or unsaturated, optionally substituted cycloalkyl in which optionally at least one ring atom is replaced by a heteroatom, or in each case optionally halogen-, alkyl-, haloalkyl-, alkoxy-, haloalkoxy-, cyano- or nitro-substituted aryl, arylalkyl or hetaryl,

10      B        represents hydrogen, alkyl or alkoxyalkyl, or

A and B together with the carbon atom to which they are attached represent a saturated or unsaturated, unsubstituted or substituted cycle which optionally contains at least one heteroatom,

15      D        represents hydrogen or an optionally substituted radical from the group consisting of alkyl, alkenyl, alkynyl, alkoxyalkyl, saturated or unsaturated cycloalkyl in which optionally one or more ring members are replaced by heteroatoms, arylalkyl, aryl, hetarylalkyl or hetaryl or

A and D together with the atoms to which they are attached represent a saturated or unsaturated cycle which optionally contains at least one (in the case of

CKE = 8, a further) heteroatom and which is unsubstituted or substituted in the A,D moiety, or

5 A and Q<sup>1</sup> together represent alkanediyl or alkenediyl optionally substituted by hydroxyl or by in each case optionally substituted alkyl, alkoxy, alkylthio, cycloalkyl, benzyloxy or aryl or

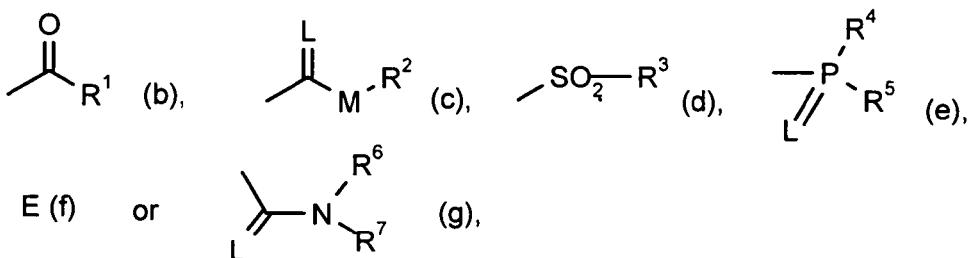
Q<sup>1</sup> represents hydrogen or alkyl,

Q<sup>2</sup>, Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another represent hydrogen or alkyl,

10 Q<sup>3</sup> represents hydrogen, represents optionally substituted alkyl, alkoxyalkyl, alkylthioalkyl, optionally substituted cycloalkyl (in which optionally one methylene group is replaced by oxygen or sulphur) or optionally substituted phenyl, or

Q<sup>3</sup> and Q<sup>4</sup> together with the carbon atom to which they are attached represent a saturated or unsaturated, unsubstituted or substituted cycle which optionally contains a heteroatom,

15 G represents hydrogen (a) or represents one of the groups



in which

E represents a metal ion equivalent or an ammonium ion,

20 L represents oxygen or sulphur,

M represents oxygen or sulphur,

5                    R<sup>1</sup> represents in each case optionally halogen-substituted alkyl, alkenyl, alkoxyalkyl, alkylthioalkyl, polyalkoxyalkyl or optionally halogen-, alkyl- or alkoxy-substituted cycloalkyl which may be interrupted by at least one heteroatom, in each case optionally substituted phenyl, phenylalkyl, hetaryl, phenoxyalkyl or hetaryloxyalkyl,

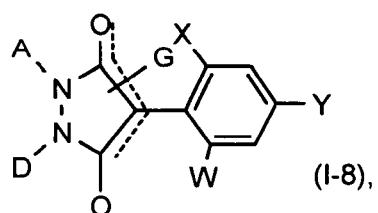
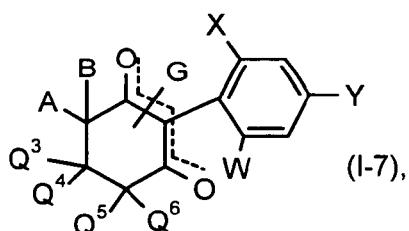
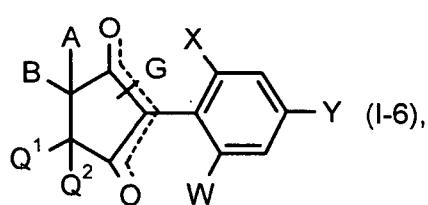
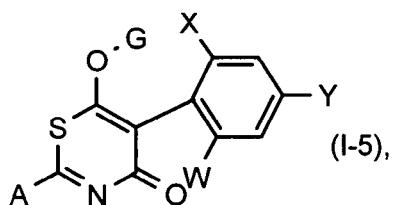
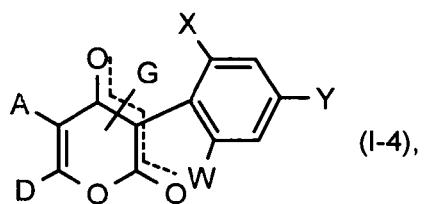
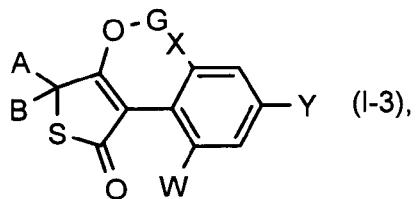
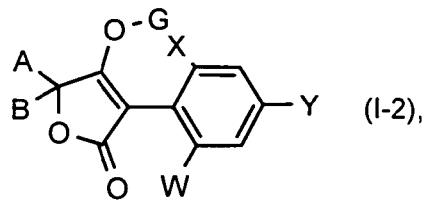
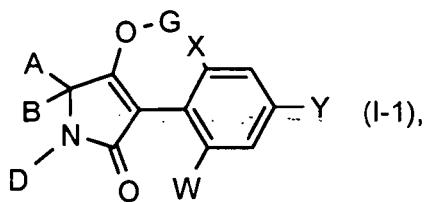
10                  R<sup>2</sup> represents in each case optionally halogen-substituted alkyl, alkenyl, alkoxyalkyl, polyalkoxyalkyl or represents in each case optionally substituted cycloalkyl, phenyl or benzyl,

15                  R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> independently of one another represent in each case optionally halogen-substituted alkyl, alkoxy, alkylamino, dialkylamino, alkylthio, alkenylthio, cycloalkylthio or represent in each case optionally substituted phenyl, benzyl, phenoxy or phenylthio,

20                  R<sup>6</sup> and R<sup>7</sup> independently of one another represent hydrogen, in each case optionally halogen-substituted alkyl, cycloalkyl, alkenyl, alkoxy, alkoxyalkyl, represent optionally substituted phenyl, represent optionally substituted benzyl, or together with the N atom to which they are attached represent a cycle which is optionally interrupted by oxygen or sulphur.

25                  Depending inter alia on the nature of the substituents, the compounds of the formula (I) can be present as geometrical and/or optical isomers or isomer mixtures of varying composition which, if appropriate, can be separated in a customary manner. The present invention provides both the pure isomers and the isomer mixtures, their preparation and use and compositions comprising them. However, for the sake of simplicity, hereinbelow only compounds of the formula (I) are referred to, although what is meant is both the pure compounds and, if appropriate, mixtures having various proportions of isomeric compounds.

Taking into consideration the meanings (1) to (8) of the group CKE, the following principle structures (I-1) to (I-8) result:



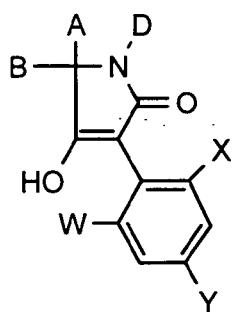
5 in which

A, B, D, G, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above.

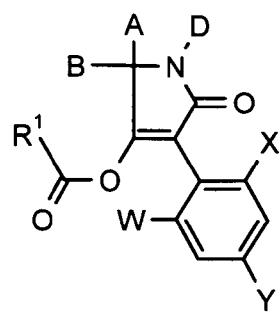
Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-1-a) to (I-1-g) result if CKE represents the group (1)

**(I-1-a):**

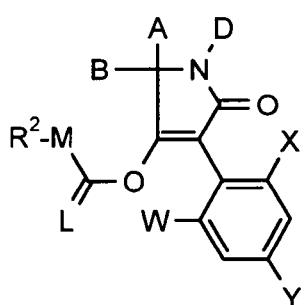
**(I-1-b):**



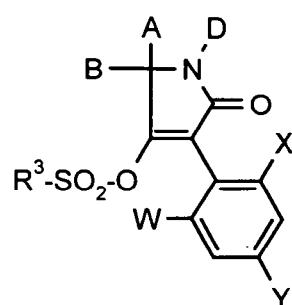
(I-1-c):



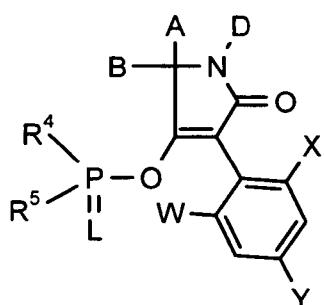
(I-1-d):



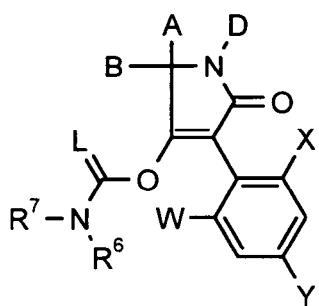
(I-1-e):



(I-1-f):



(I-1-g):

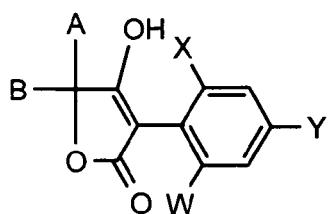


in which

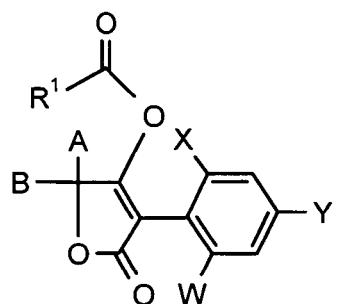
A, B, D, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-2-a) to (I-2-g) result if CKE represents the group (2)

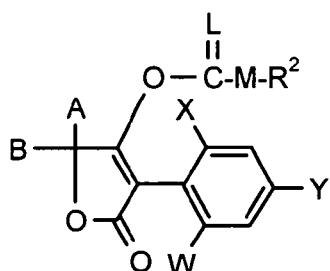
(I-2-a):



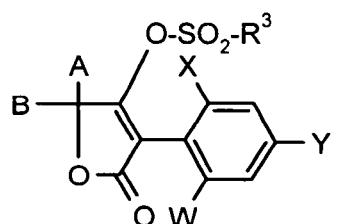
(I-2-b):



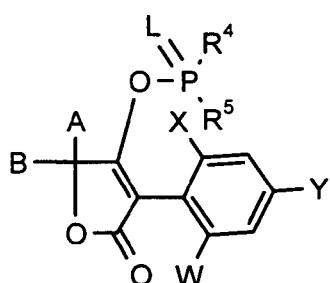
(I-2-c):



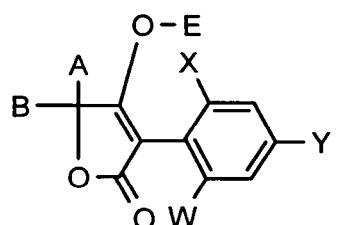
(I-2-d):



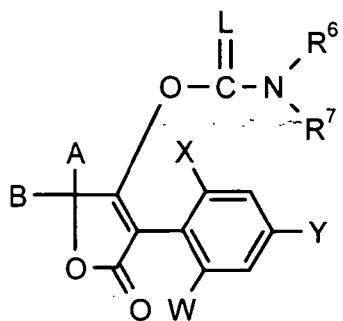
(I-2-e):



(I-2-f):



(I-2-g):

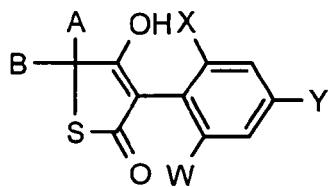


in which

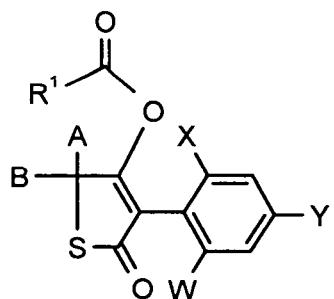
A, B, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-3-a) to (I-3-g) result if CKE represents the group (3)

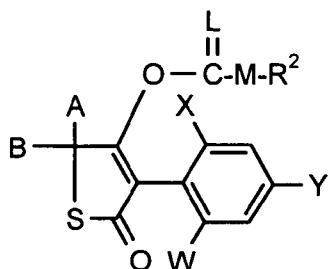
(I-3-a):



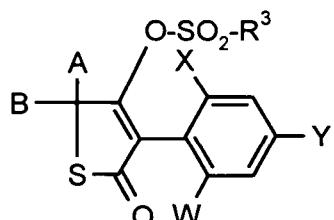
(I-3-b):



(I-3-c):

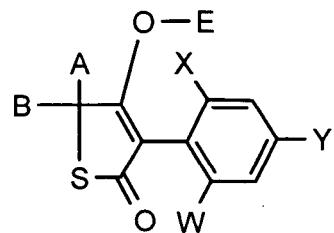
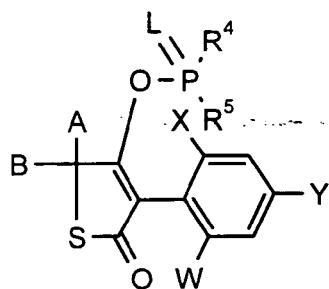


(I-3-d):

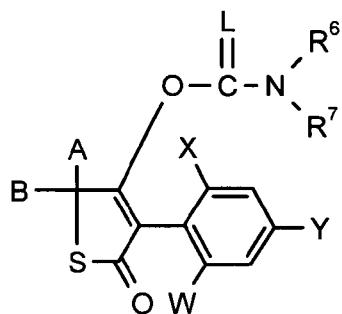


(I-3-e):

(I-3-f):



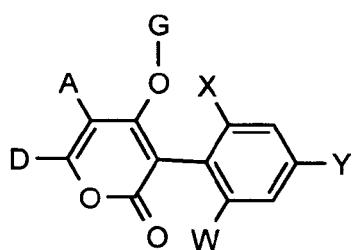
(I-3-g):



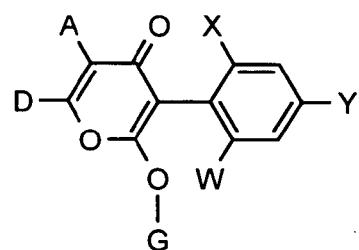
in which

A, B, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

Depending on the position of the substituent G, the compounds of the formula (I-4) can be present in the two isomeric forms of the formulae (I-4-A) and (I-4-B)



(I-4-A)



(I-4-B)

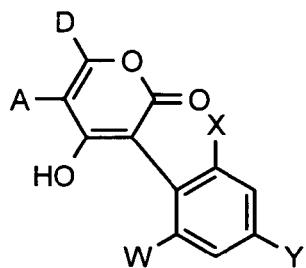
5 which is meant to be indicated by the broken line in the formula (I-4).

The compounds of the formulae (I-4-A) and (I-4-B) can be present both as mixtures and in the form of their pure isomers. Mixtures of the compounds of the formulae (I-4-A) and (I-4-B) can, if appropriate, be separated in a manner known per se by physical methods, for example by chromatographic methods.

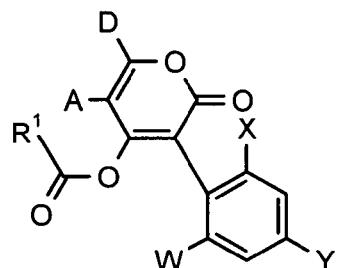
For reasons of clarity, hereinbelow only one of the possible isomers is shown in each case. This does not exclude that the compounds may, if appropriate, be present in the form of the isomer mixtures or in the respective other isomeric form.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group 5 G, the following principle structures (I-4-a) to (I-4-g) result if CKE represents the group (4),

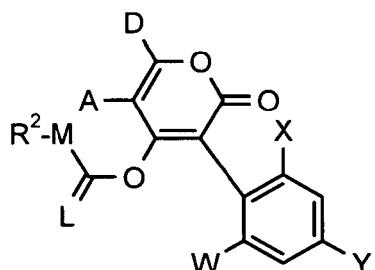
(I-4-a):



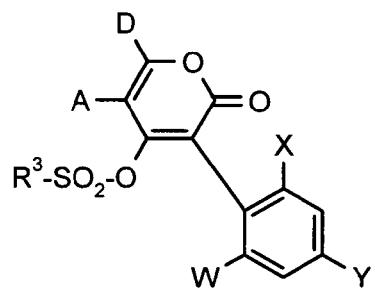
(I-4-b):



(I-4-c):

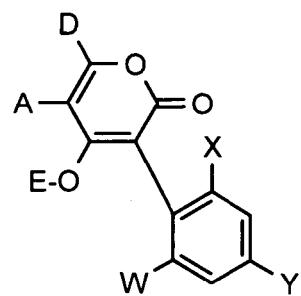
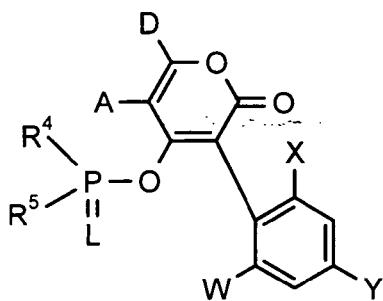


(I-4-d):

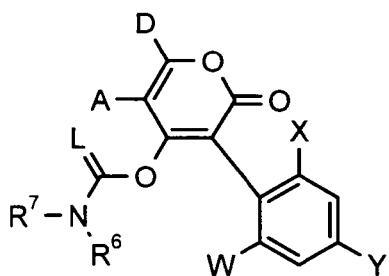


(I-4-e):

(I-4-f):



(I-4-g):

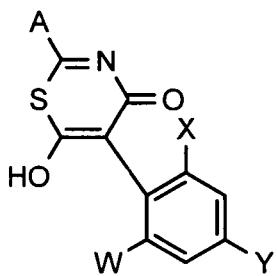


in which

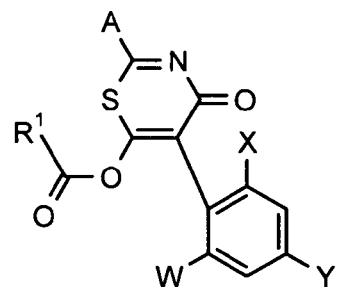
A, D, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-5-a) to (I-5-g) result if CKE represents the group (5),

(I-5-a):

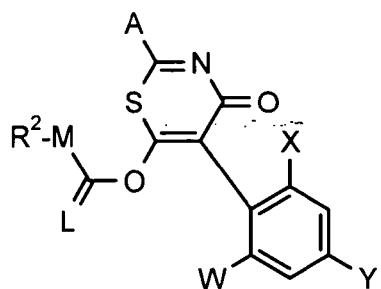


(I-5-b):

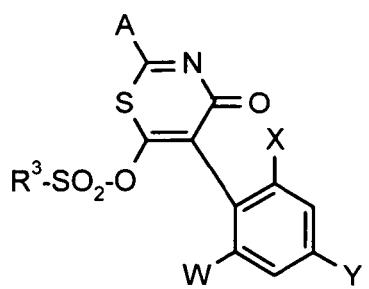


(I-5-c):

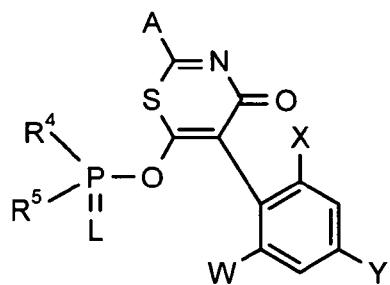
(I-5-d):



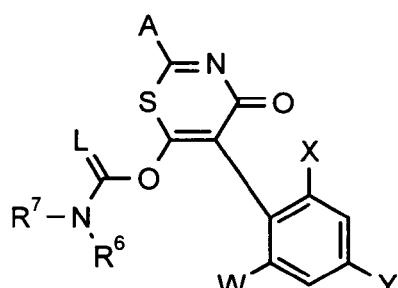
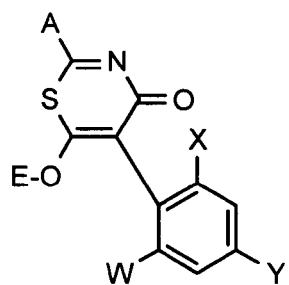
(I-5-e):



(I-5-f):



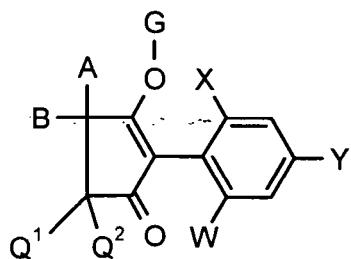
(I-5-g):



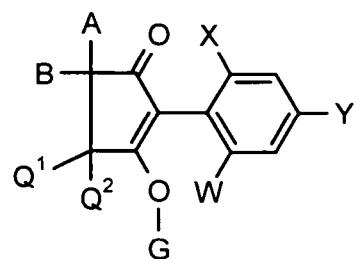
in which

A, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

Depending on the position of the substituent G, the compounds of the formula (I-6) can be present in the two isomeric forms of the formulae (I-6-A) and (I-6-B)



(I-6-A)



(I-6-B)

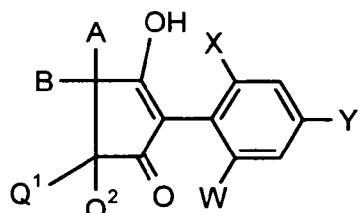
which is meant to be indicated by the broken line in the formula (I-6).

The compounds of the formulae (I-6-A) and (I-6-B) can be present both as mixtures and in the form of their pure isomers. Mixtures of the compounds of the formulae (I-6-A) and (I-6-B) can, if appropriate, be separated by physical methods, for example by chromatographic methods.

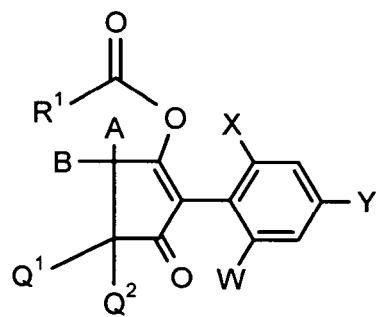
5 For reasons of clarity, hereinbelow only one of the possible isomers is shown in each case. This does not exclude that the compounds may, if appropriate, be present in the form of the isomer mixtures or in the respective other isomeric form.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-6-a) to (I-6-g) result:

(I-6-a):

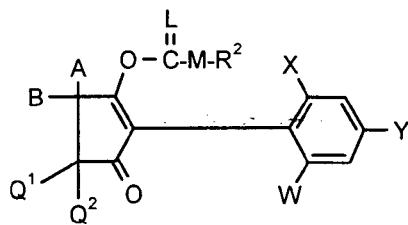


(I-6-b):

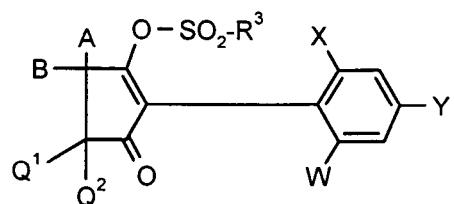


(I-6-c):

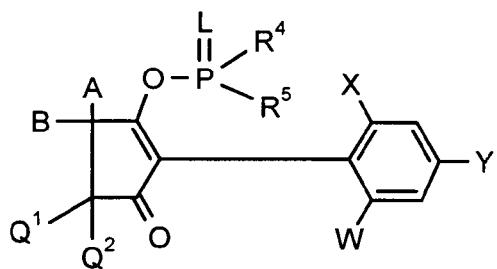
(I-6-d):



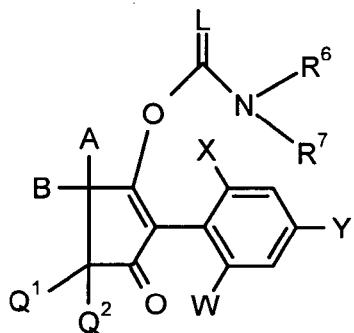
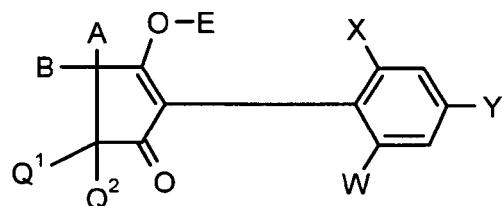
(I-6-e):



(I-6-f):



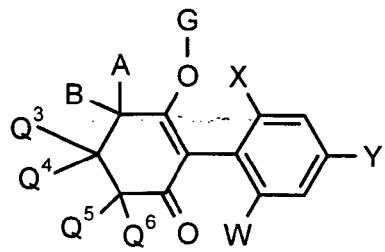
(I-6-g):



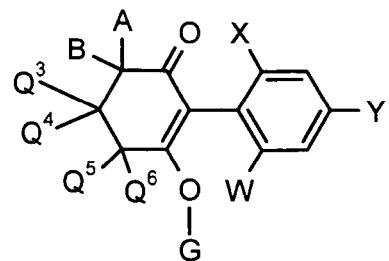
in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

5 Depending on the position of the substituent G, the compounds of the formula (I-7) can be present in the two isomeric forms of the formulae (I-7-A) and (I-7-B), which is meant to be indicated by the broken line in the formula (I-7):



(I-7-A)



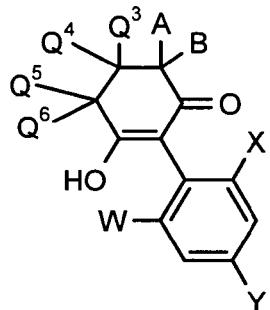
(I-7-B)

The compounds of the formulae (I-7-A) and (I-7-B) can be present both as mixtures and in the form of their pure isomers. Mixtures of the compounds of the formulae (I-7-A) and (I-7-B) can, if appropriate, be separated by physical methods, for example by chromatographic methods.

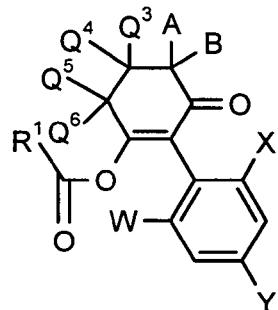
5 For reasons of clarity, hereinbelow only one of the possible isomers is shown in each case. This includes that the compound in question may, if appropriate, be present in the form of the isomer mixture or in the respective other isomeric form.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-7-a) to (I-7-g) result:

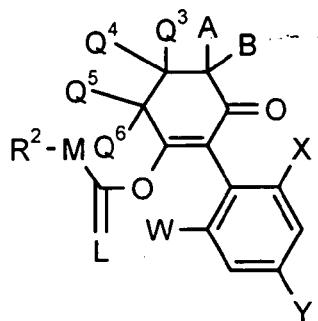
(I-7-a):



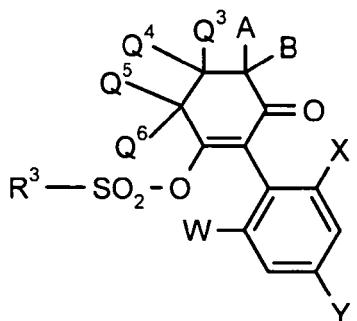
(I-7-b):



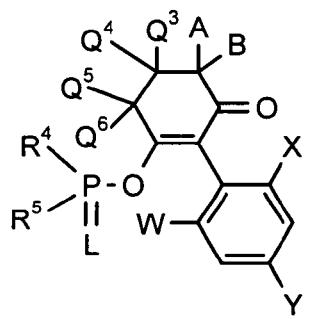
(I-7-c):



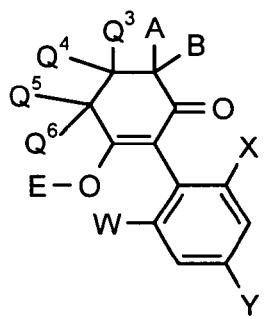
(I-7-d):



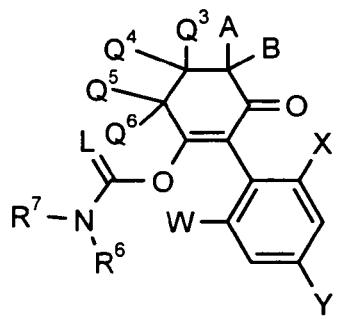
(I-7-e):



(I-7-f):



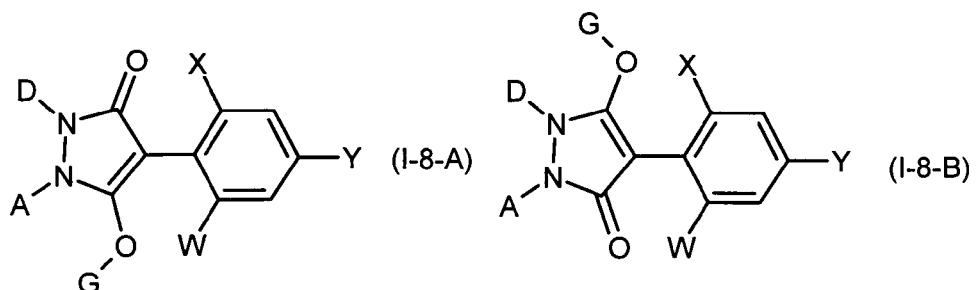
(I-7-g):



in which

A, B, E, L, M, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

Depending on the position of the substituent G, the compounds of the formula (I-8) can be present in the two isomeric forms of the formulae (I-8-A) and (I-8-B)



which is meant to be indicated by the broken line in formula (I-8).

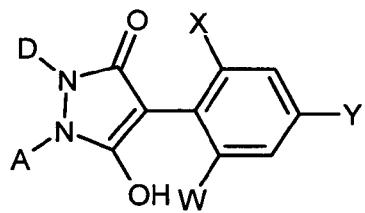
- 5 The compounds of the formulae (I-8-A) and (I-8-B) can be present both as mixtures and in the form of their pure isomers. Mixtures of the compounds of the formulae (I-8-A) and (I-8-B) can, if appropriate, be separated in a manner known per se by physical methods, for example by chromatographic methods.

For reasons of clarity, hereinbelow only one of the possible isomers is shown in each case.

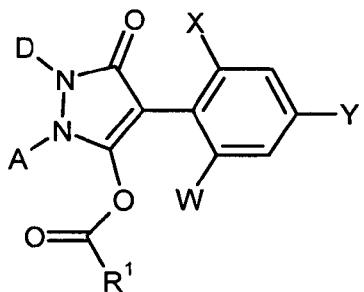
- 10 This does not exclude that the compounds may, if appropriate, be present in the form of the isomer mixtures or in the respective other isomeric form.

Taking into consideration the different meanings (a), (b), (c), (d), (e), (f) and (g) of the group G, the following principle structures (I-8-a) to (I-8-g) result if CKE represents the group (8),

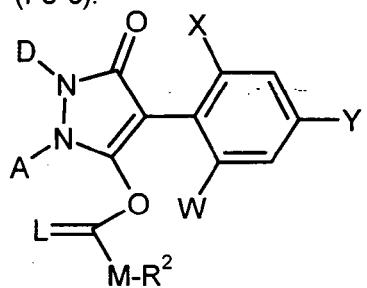
(I-8-a):



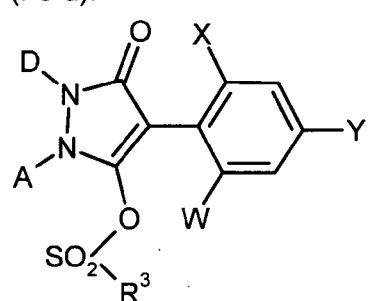
(I-8-b):



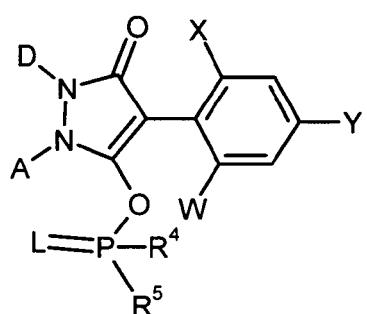
(I-8-c):



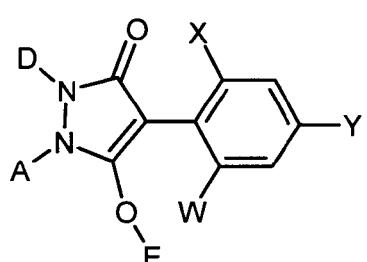
(I-8-d):



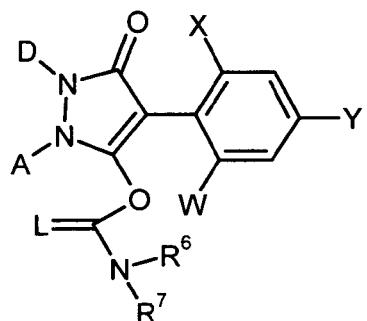
(I-8-e):



(I-8-f):



(I-8-g):



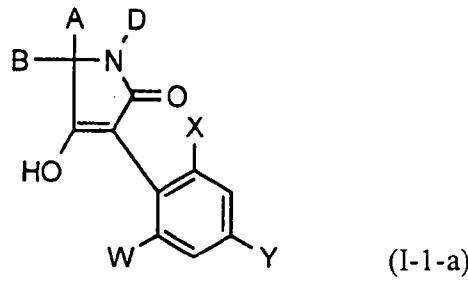
in which

5 A, D, E, L, M, W, X, Y, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are as defined above.

- 21 -

Furthermore, it has been found that the novel compounds of the formula (I) defined in the first aspect are obtained by one or more of the processes described below:

(A) substituted 3-phenylpyrrolidine-2,4-diones or enols thereof of the formula (I-1-a)

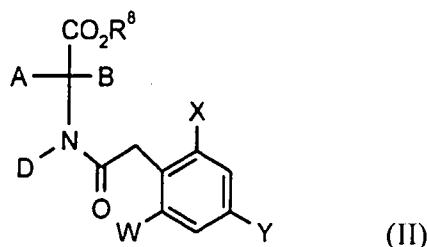


in which

A, B, D, W, X and Y are as defined above

are obtained when

N-acylamino acid esters of the formula (II)



in which

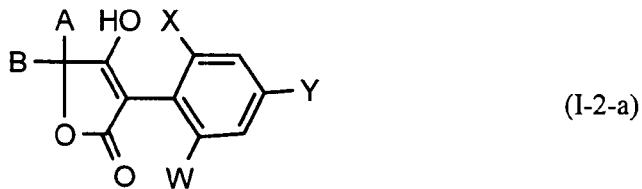
A, B, D, W, X and Y are as defined above

and

R8 represents alkyl (preferably C1-C6-alkyl)

are condensed intramolecularly in the presence of a diluent and in the presence of a base

(B) Moreover, it has been found that substituted 3-phenyl-4-hydroxy- $\Delta^3$ -dihydrofuranone derivatives of the formula (I-2-a)

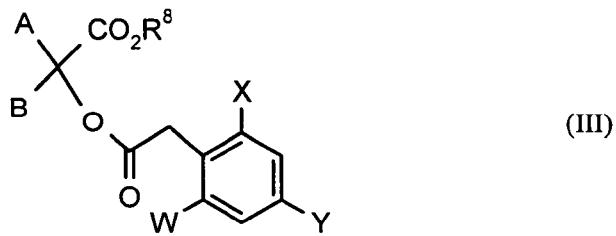


in which

5 A, B, W, X and Y are as defined above

are obtained when

carboxylic esters of the formula (III)

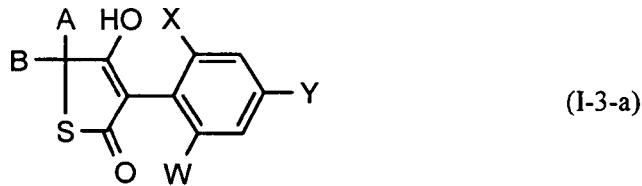


in which

10 A, B, W, X, Y and R8 are as defined above

are condensed intramolecularly in the presence of a diluent and in the presence of a base.

(C) Furthermore, it has been found that substituted 3-phenyl-4-hydroxy- $\Delta^3$ -dihydrothiophenone derivatives of the formula (I-3-a)



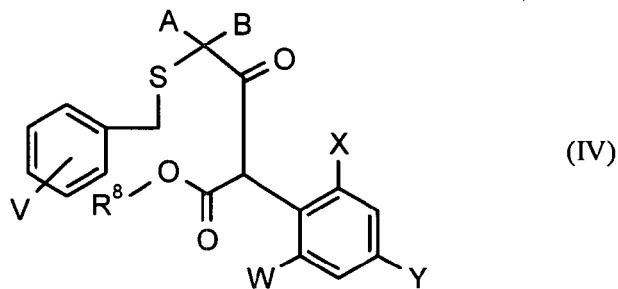
15

in which

A, B, W, X and Y are as defined above

are obtained when

$\beta$ -ketocarboxylic esters of the formula (IV)



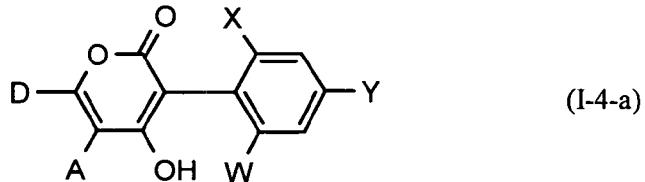
5 in which

A, B, W, X, Y and R<sup>8</sup> are as defined above and

V represents hydrogen, halogen, alkyl (preferably C<sub>1</sub>-C<sub>6</sub>-alkyl) or alkoxy (preferably C<sub>1</sub>-C<sub>8</sub>-alkoxy)

10 are cyclized intramolecularly, if appropriate in the presence of a diluent and in the presence of an acid.

(D) Furthermore, it has been found that the novel substituted 3-phenylpyrone derivatives of the formula (I-4-a)

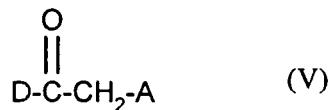


in which

15 A, D, W, X and Y are as defined above

are obtained when

carbonyl compounds of the formula (V)



in which

A and D are as defined above

or silylenol ethers thereof of the formula (Va)

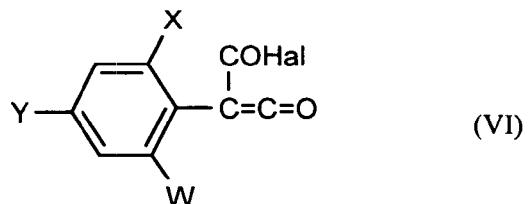


5

in which

A, D and R<sup>8</sup> are as defined above

are reacted with ketene acid halides of the formula (VI)



10

in which

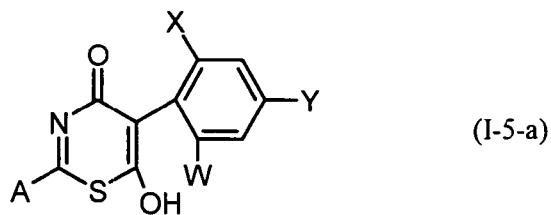
W, X and Y are as defined above and

Hal represents halogen (preferably chlorine or bromine),

if appropriate in the presence of a diluent and if appropriate in the presence of an acid acceptor.

15 Furthermore, it has been found

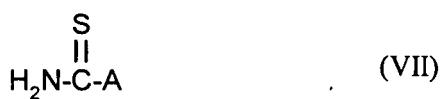
(E) that the novel substituted phenyl-1,3-thiazine derivatives of the formula (I-5-a)



in which

A, W, X and Y are as defined above

are obtained when thioamides of the formula (VII)

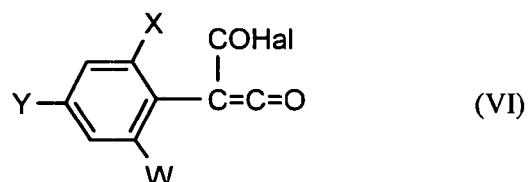


5

in which

A is as defined above

are reacted with ketene acid halides of the formula (VI)



10

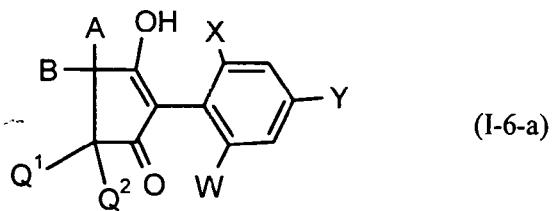
in which

Hal, W, X and Y are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid acceptor.

Furthermore, it has been found

15 (F) that compounds of the formula (I-6-a)

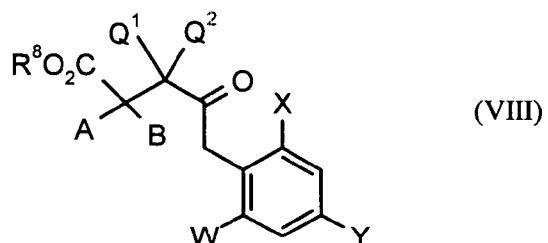


in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above

are obtained when

5        ketocarboxylic esters of the formula (VIII)



in which

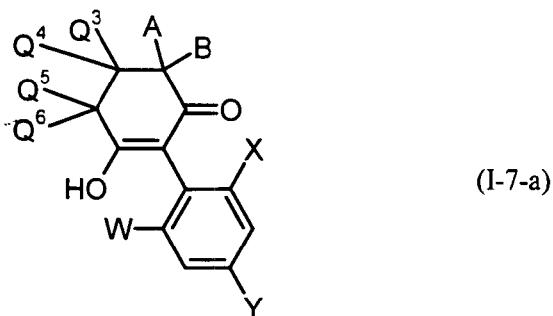
A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above and

R<sup>8</sup> represents alkyl (in particular C<sub>1</sub>-C<sub>8</sub>-alkyl)

10        are cyclized intramolecularly, if appropriate in the presence of a diluent and if appropriate in the presence of a base.

Moreover, it has been found

(G)        that compounds of the formula (I-7-a)



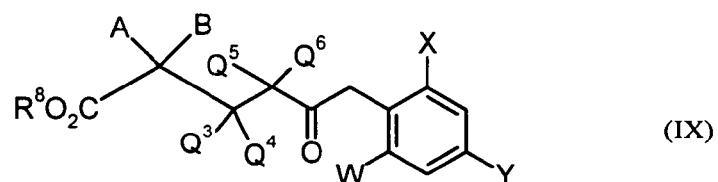
(I-7-a)

in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above

are obtained when

5 6-aryl-5-ketohexanoic esters of the formula (IX)



in which

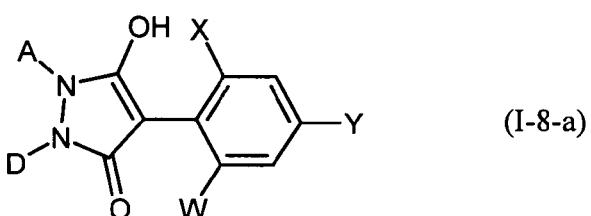
A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above

and

10 R<sup>8</sup> represents alkyl (preferably C<sub>1</sub>-C<sub>6</sub>-alkyl)

are condensed intramolecularly in the presence of a diluent and in the presence of a base.

(H) Furthermore, it has been found that the compounds of the formula (I-8-a)



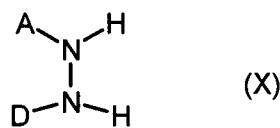
(I-8-a)

in which

A, D, W, X and Y are as defined above

are obtained when

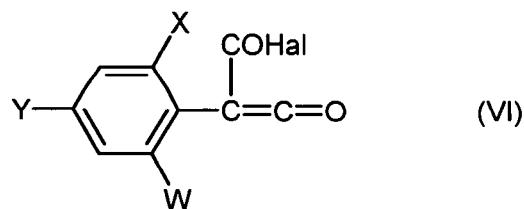
compounds of the formula (X)



in which

A and D are as defined above

α) are reacted with compounds of the formula (VI)



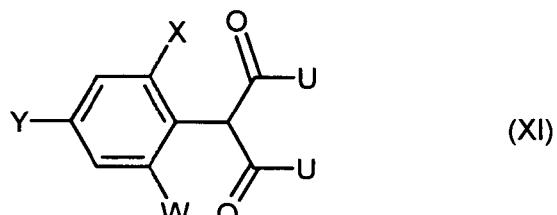
10

in which

Hal, X, Y and W are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid acceptor, or

β) are reacted with compounds of the formula (XI)



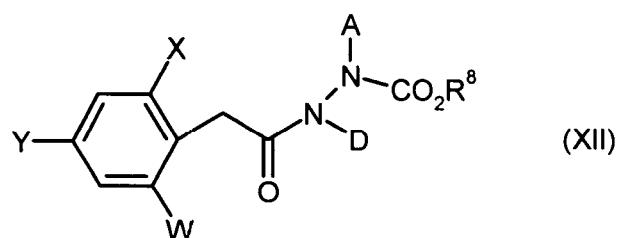
in which

W, X and Y are as defined above

and U represents  $\text{NH}_2$  or  $\text{O}-\text{R}^8$ , where  $\text{R}^8$  is as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of a base,  
or

5 γ) are reacted with compounds of the formula (XII)



in which

A, D, W, X, Y and  $\text{R}^8$  are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of a base.

10 Moreover, it has been found

(I) that the compounds of the formulae (I-1-b) to (I-8-b) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ ,  $\text{R}^1$ , W, X and Y are as defined above are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ , W, X and Y are as defined above are in each case

15 (α) reacted with acid halides of the formula (XIII)



in which

$\text{R}^1$  is as defined above and

Hal represents halogen (in particular chlorine or bromine)

or

(B) reacted with carboxylic anhydrides of the formula (XIV)



in which

5       $R^1$       is as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder;

10     (J) that the compounds of the formulae (I-1-c) to (I-8-c) shown above in which A, B, D,  $Q^1$ ,  $Q^2$ ,  $Q^3$ ,  $Q^4$ ,  $Q^5$ ,  $Q^6$ ,  $R^2$ , M, W, X and Y are as defined above and L represents oxygen are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $Q^1$ ,  $Q^2$ ,  $Q^3$ ,  $Q^4$ ,  $Q^5$ ,  $Q^6$ , W, X and Y are as defined above are in each case

reacted with chloroformic esters or chloroformic thioesters of the formula (XV)



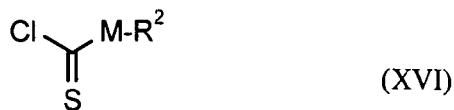
15     in which

$R^2$  and M      are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder;

20     (K) that compounds of the formulae (I-1-c) to (I-8-c) shown above in which A, B, D,  $Q^1$ ,  $Q^2$ ,  $Q^3$ ,  $Q^4$ ,  $Q^5$ ,  $Q^6$ ,  $R^2$ , M, W, X and Y are as defined above and L represents sulphur are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $Q^1$ ,  $Q^2$ ,  $Q^3$ ,  $Q^4$ ,  $Q^5$ ,  $Q^6$ , W, X and Y are as defined above are in each case

25     reacted with chloromonothioformic esters or chlorodithioformic esters of the formula (XVI)



in which

M and  $\text{R}^2$  are as defined above,

5 if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder

and

10 (L) that compounds of the formulae (I-1-d) to (I-8-d) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ ,  $\text{R}^3$ , W, X and Y are as defined above are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ , W, X and Y are as defined above are in each case

reacted with sulphonyl chlorides of the formula (XVII)



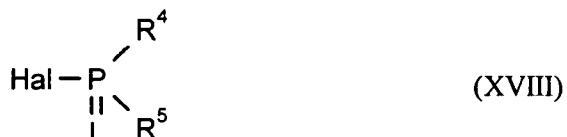
in which

15  $\text{R}^3$  is as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

20 (M) that compounds of the formulae (I-1-e) to (I-8-e) shown above in which A, B, D, L,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ ,  $\text{R}^4$ ,  $\text{R}^5$ , W, X and Y are as defined above are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ , W, X and Y are as defined above are in each case

reacted with phosphorus compounds of the formula (XVIII)



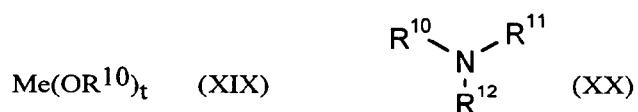
in which

L, R<sup>4</sup> and R<sup>5</sup> are as defined above and

Hal represents halogen (in particular chlorine or bromine),

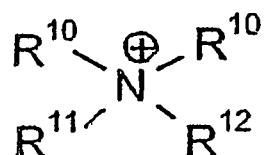
5 if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

(N) that compounds of the formulae (I-1-f) to (I-8-f) shown above in which A, B, D, E, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above are in each case  
10 reacted with metal compounds or amines of the formulae (XIX) and (XX), respectively,



in which

15 Me represents a mono- or divalent metal (preferably an alkali metal or alkaline earth metal, such as lithium, sodium, potassium, magnesium or calcium), or represents an ammonium ion



t represents the number 1 or 2 and

20 R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> independently of one another represent hydrogen or alkyl (preferably C<sub>1</sub>-C<sub>8</sub>-alkyl),

if appropriate in the presence of a diluent,

(O) that compounds of the formulae (I-1-g) to (I-8-g) shown above in which A, B, D, L, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, R<sup>6</sup>, R<sup>7</sup>, W, X and Y are as defined above are obtained when compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above are in each case

5 (α) reacted with isocyanates or isothiocyanates of the formula (XXI)



in which

R<sup>6</sup> and L are as defined above,

10 if appropriate in the presence of a diluent and if appropriate in the presence of a catalyst, or

(β) reacted with carbamoyl chlorides or thiocarbamoyl chlorides of the formula (XXII)

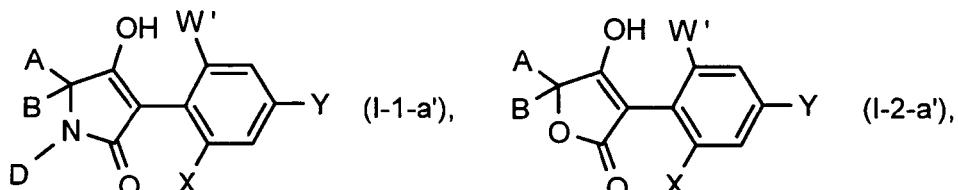


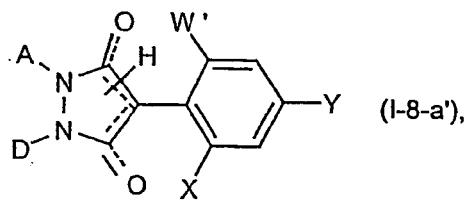
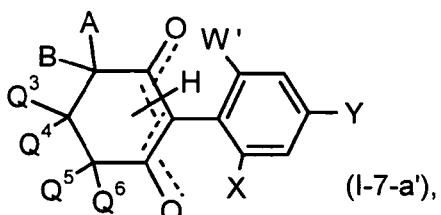
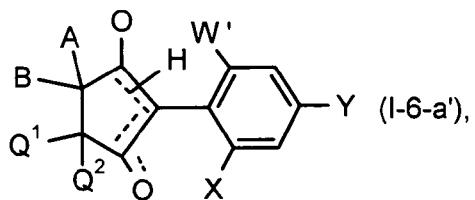
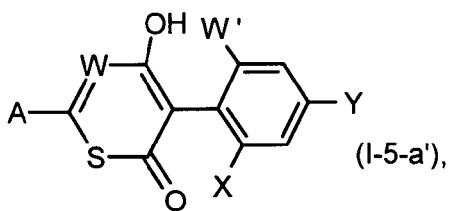
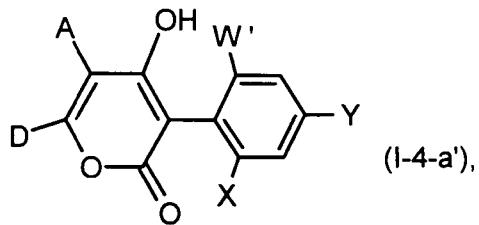
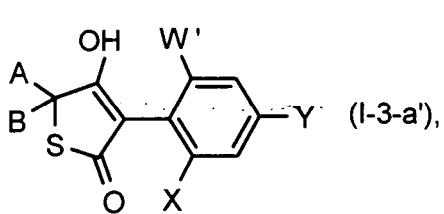
in which

L, R<sup>6</sup> and R<sup>7</sup> are as defined above,

15 if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

(P) that compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above are obtained when compounds of the formulae (I-1-a') to (I-8-a') shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, X and Y are as defined above and W' preferably represents bromine





are reacted with alcohols of the formula

5 W-OH

in which

W is as defined above, if appropriate in the presence of a diluent, a Cu(I) salt (for example CuBr, CuI) and a strong base (for example sodium hydride, potassium tert-butoxide).

10 Furthermore, it has been found that the novel compounds of the formula (I) are highly active as pesticides, preferably as insecticides, acaricides and/or herbicides.

Surprisingly, it has now also been found that certain substituted cyclic ketoenols, when used jointly with the compounds which improve crop plant tolerance (safeners/antidotes) described below, are extremely effective in preventing damage to the crop plants and can be used 15 especially advantageously as combination products with a broad range of activity for the selective control of unwanted plants in crops of useful plants, such as, for example, in cereals, but also in maize, soybeans and rice.

- 35 -

In a second aspect, the present invention provides compositions comprising an effective amount of an active compound combination comprising, as components,

(a') at least one substituted cyclic ketoenol of the formula (I) according to the first aspect in which CKE, W, X and Y are as defined therein

and

(b') at least one compound which improves crop plant tolerance and which is selected from the following group of compounds:

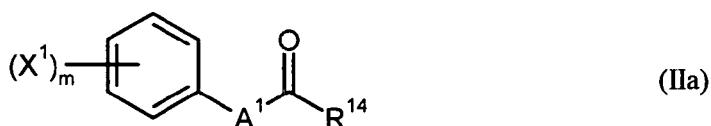
4-dichloroacetyl-1-oxa-4-aza-spiro[4.5]-decane (AD-67, MON-4660), 1-dichloroacetylhexahydro-3,3,8a-trimethylpyrrolo[1,2-a]-pyrimidin-6(2H)-one (dicyclonon, BAS-145138), 4-dichloroacetyl-3,4-dihydro-3-methyl-2H-1,4-benzoxazine (benoxacor), 1-methylhexyl 5-chloro-quinolin-8-oxy-acetate (cloquintocet-mexyl - cf. also related compounds in EP-A-86750, EP-A-94349, EP-A-191736, EP-A-492366), 3-(2-chloro-benzyl)-1-(1-methyl-1-phenyl-ethyl)-urea (cumyluron),  $\alpha$ -(cyanomethoximino)-phenylacetonitrile (cyometrinil), 2,4-dichloro-phenoxyacetic acid (2,4-D), 4-(2,4-dichloro-phenoxy)-butyric acid (2,4-DB), 1-(1-methyl-1-phenyl-ethyl)-3-(4-methyl-phenyl)-urea (daimuron, dymron), 3,6-dichloro-2-methoxy-benzoic acid (dicamba), S-1-methyl-1-phenyl-ethyl piperidine-1-thiocarboxylate (dimepiperate), 2,2-dichloro-N-(2-oxo-2-(2-propenylamino)-ethyl)-N-(2-propenyl)-acetamide (DKA-24), 2,2-dichloro-N,N-di-2-propenyl-acetamide (dichlormid), 4,6-dichloro-2-phenyl-pyrimidine (fenclorim), ethyl 1-(2,4-dichloro-phenyl)-5-trichloromethyl-1H-1,2,4-triazole-3-carboxylate (fenchlorazole-ethyl - cf. also related compounds in EP-A-174562 and EP-A-346620), phenylmethyl 2-chloro-4-trifluoromethyl-thiazole-5-carboxylate (flurazole), 4-chloro-N-(1,3-dioxolan-2-yl-methoxy)- $\alpha$ -trifluoro-acetophenone oxime (fluxofenim), 3-dichloroacetyl-5-(2-furanyl)-2,2-dimethyl-oxazolidine (furilazole, MON-13900), ethyl 4,5-dihydro-5,5-diphenyl-3-isoxazolecarboxylate (isoxadifen-ethyl - cf. also related compounds in WO-A-95/07897), 1-(ethoxycarbonyl)-ethyl-3,6-dichloro-2-methoxybenzoate (lactidichlor), (4-chloro-o-tolyloxy)-acetic acid (MCPA), 2-(4-chloro-o-tolyloxy)-propionic acid (mecoprop), diethyl 1-(2,4-dichloro-phenyl)-4,5-dihydro-5-methyl-1H-pyrazole-3,5-dicarboxylate (mefenpyr-diethyl - cf. also related compounds in WO-A-91/07874), 2-dichloromethyl-2-methyl-1,3-dioxolane (MG-191), 2-propenyl-1-oxa-4-azaspiro[4.5]decane 4-carbodithioate (MG-838), 1,8-naphthalic anhydride,  $\alpha$ -(1,3-dioxolan-2-yl-methoximino)-phenylacetonitrile (oxabetrinil), 2,2-dichloro-N-(1,3-dioxolan-2-yl-methyl)-N-(2-propenyl)-acetamide (PPG-1292), 3-dichloroacetyl-2,2-dimethyl-oxazolidine (R-28725), 3-dichloroacetyl-2,2,5-trimethyl-

oxazolidine (R-29148), 4-(4-chloro-o-tolyl)-butyric acid, 4-(4-chloro-phenoxy)-butyric acid, diphenylmethoxyacetic acid, methyl diphenylmethoxyacetate, ethyl diphenylmethoxyacetate, methyl 1-(2-chloro-phenyl)-5-phenyl-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-methyl-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-isopropyl-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-(1,1-dimethyl-ethyl)-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-phenyl-1H-pyrazole-3-carboxylate (cf. also related compounds in EP-A-269806 and EP-A-333131), ethyl 5-(2,4-dichloro-benzyl)-2-isoxazoline-3-carboxylate, ethyl 5-phenyl-2-isoxazoline-3-carboxylate, ethyl 5-(4-fluoro-phenyl)-5-phenyl-2-isoxazoline-3-carboxylate (cf. also related compounds in WO-A-91/08202), 1,3-dimethyl-but-1-yl 5-chloro-quinolin-8-oxy-acetate, 4-allyloxy-butyl 5-chloro-quinolin-8-oxy-acetate, 1-allyloxy-prop-2-yl 5-chloro-quinolin-8-oxy-acetate, methyl 5-chloro-quinoxalin-8-oxy-acetate, ethyl 5-chloro-quinolin-8-oxy-acetate, allyl 5-chloro-quinoxalin-8-oxy-acetate, 2-oxo-prop-1-yl 5-chloro-quinolin-8-oxy-acetate, diethyl 5-chloro-quinolin-8-oxy-malonate, diallyl 5-chloro-quinoxalin-8-oxy-malonate, diethyl 5-chloro-quinolin-8-oxy-malonate (cf. also related compounds in EP-A-582198), 4-carboxy-chroman-4-yl-acetic acid (AC-304415, cf. EP-A-613618), 4-chloro-phenoxy-acetic acid, 3,3'-dimethyl-4-methoxy-benzophenone, 1-bromo-4-chloromethylsulphonyl-benzene, 1-[4-(N-2-methoxybenzoylsulphamoyl)-phenyl]-3-methyl-urea (alias N-(2-methoxy-benzoyl)-4-[(methylamino-carbonyl)-amino]-benzenesulphonamide), 1-[4-(N-2-methoxybenzoylsulphamoyl)-phenyl]-3,3-dimethyl-urea, 1-[4-(N-4,5-dimethylbenzoylsulphamoyl)-phenyl]-3-methyl-urea, 1-[4-(N-naphthylsulphamoyl)-phenyl]-3,3-dimethyl-urea, N-(2-methoxy-5-methyl-benzoyl)-4-(cyclopropylaminocarbonyl)-benzenesulphonamide,

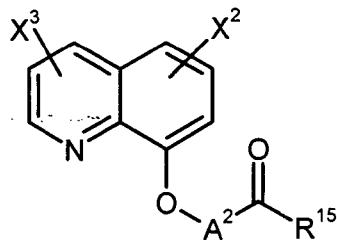
and/or one of the following compounds (defined by general formulae)

of the general formula (IIa)

25

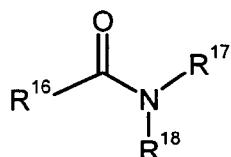


or of the general formula (IIb)



(IIb)

or of the formula (IIc)

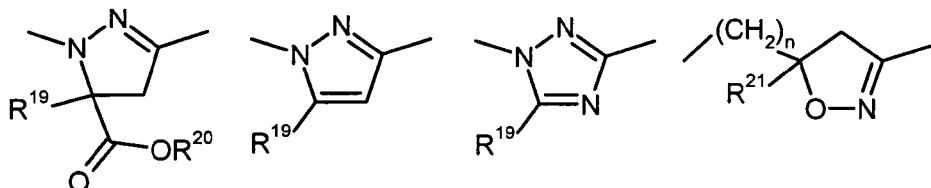


(IIc)

where

5      n      is a number between 0 and 5,

A<sup>1</sup>      represents one of the divalent heterocyclic groups outlined hereinbelow,



n      is a number between 0 and 5,

10      A<sup>2</sup>      represents alkanediyl having 1 or 2 carbon atoms which is optionally substituted by  $C_1$ - $C_4$ -alkyl and/or  $C_1$ - $C_4$ -alkoxy-carbonyl,

R<sup>14</sup>      represents hydroxyl, mercapto, amino,  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -alkylthio,  $C_1$ - $C_6$ -alkylamino or di-( $C_1$ - $C_4$ -alkyl)amino,

R<sup>15</sup>      represents hydroxyl, mercapto, amino,  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -alkylthio,  $C_1$ - $C_6$ -alkylamino or di-( $C_1$ - $C_4$ -alkyl)amino,

15      R<sup>16</sup>      represents  $C_1$ - $C_4$ -alkyl each of which is optionally substituted in each case by fluorine, chlorine and/or bromine,

5      R<sup>17</sup>    represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>2</sub>-C<sub>6</sub>-alkynyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, dioxolanyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, furyl, furyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, thienyl, thiazolyl, piperidinyl, each of which is optionally substituted by fluorine, chlorine and/or bromine, or represents phenyl which is optionally substituted by fluorine, chlorine and/or bromine or C<sub>1</sub>-C<sub>4</sub>-alkyl,

10     R<sup>18</sup>    represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>2</sub>-C<sub>6</sub>-alkynyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, dioxolanyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, furyl, furyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, thienyl, thiazolyl, piperidinyl, each of which is optionally substituted by fluorine, chlorine and/or bromine, or represents phenyl which is optionally substituted by fluorine, chlorine and/or bromine or C<sub>1</sub>-C<sub>4</sub>-alkyl, or, together with R<sup>17</sup>, represents C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>2</sub>-C<sub>5</sub>-oxaalkanediyl, each of which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, phenyl, furyl, a fused benzene ring or by two substituents which, together with the C atom to which they are bonded, form a 5- or 6-membered carbocycle,

15     R<sup>19</sup>    represents hydrogen, cyano, halogen, or represents C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or phenyl, each of which is optionally substituted by fluorine, chlorine and/or bromine,

20     R<sup>20</sup>    represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or tri(C<sub>1</sub>-C<sub>4</sub>-alkyl)silyl, each of which is optionally substituted by hydroxyl, cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy,

25     R<sup>21</sup>    represents hydrogen, cyano, halogen, or represents C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or phenyl, each of which is optionally substituted by fluorine, chlorine and/or bromine,

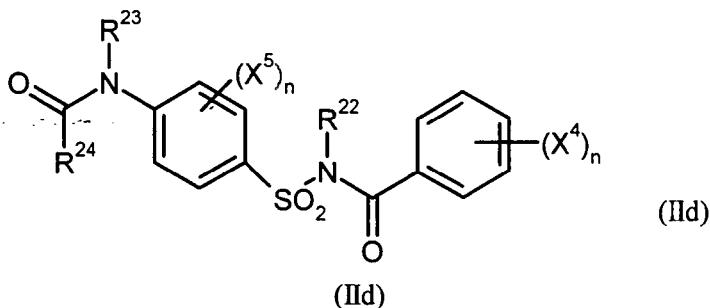
25     X<sup>1</sup>    represents nitro, cyano, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy,

25     X<sup>2</sup>    represents hydrogen, cyano, nitro, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy,

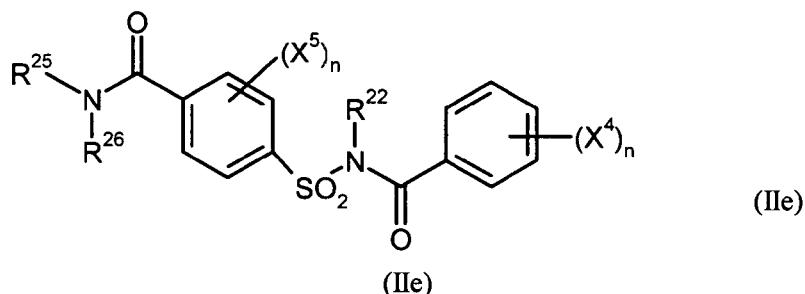
25     X<sup>3</sup>    represents hydrogen, cyano, nitro, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy,

and/or the following compounds (defined by general formulae)

of the general formula (IId)



or of the general formula (IIe)



5

where

n is a number between 0 and 5,

R<sup>22</sup> represents hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

R<sup>23</sup> represents hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

10 R<sup>24</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylamino or di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)amino, each of which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy, or represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyloxy, C<sub>3</sub>-C<sub>6</sub>-cycloalkylthio or C<sub>3</sub>-C<sub>6</sub>-cycloalkylamino, each of which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

15 R<sup>25</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl which is optionally substituted by cyano, hydroxyl, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy, or represents C<sub>3</sub>-C<sub>6</sub>-alkenyl or C<sub>3</sub>-C<sub>6</sub>-alkynyl, each of which is optionally substituted by cyano or halogen, or represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally substituted by cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

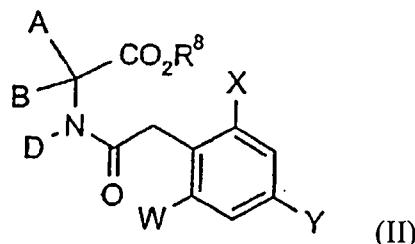
- 40 -

$R^{26}$  represents hydrogen, or represents  $C_1$ - $C_6$ -alkyl which is optionally substituted by cyano, hydroxyl, halogen or  $C_1$ - $C_4$ -alkoxy, or represents  $C_3$ - $C_6$ -alkenyl or  $C_3$ - $C_6$ -alkynyl, each of which is optionally substituted by cyano or halogen, or represents  $C_3$ - $C_6$ -cycloalkyl which is optionally substituted by cyano, halogen or  $C_1$ - $C_4$ -alkyl, or represents phenyl which is optionally substituted by nitro, cyano, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy, or together with  $R^{25}$  represents  $C_2$ - $C_6$ -alkanediyl or  $C_2$ - $C_5$ -oxaalkanediyl, each of which is optionally substituted by  $C_1$ - $C_4$ -alkyl,

$X^4$  represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy, and

$X^5$  represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy.

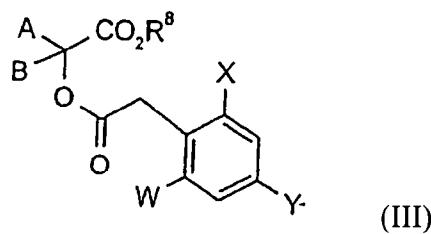
In a third aspect, the present invention provides compounds of the formula (II)



in which

$A$ ,  $B$ ,  $D$ ,  $W$ ,  $X$ ,  $Y$  and  $R^8$  are as defined above.

In a fourth aspect, the present invention provides compounds of the formula (III)

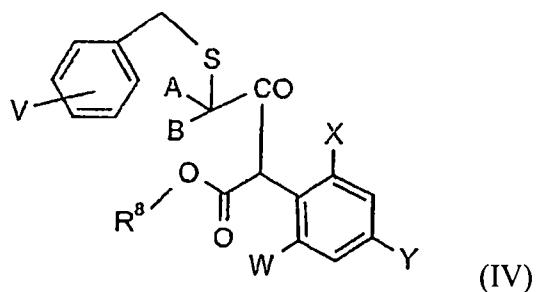


in which

$A$ ,  $B$ ,  $W$ ,  $X$ ,  $Y$  and  $R^8$  are as defined above.

- 40a -

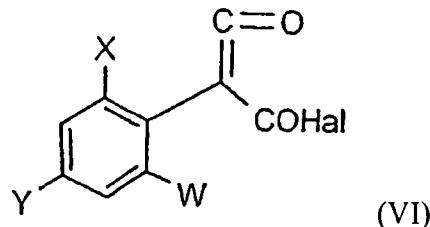
In a fifth aspect, the present invention provides compounds of the formula (IV)



in which

A, B, V, W, X, Y and R<sup>8</sup> are as defined above.

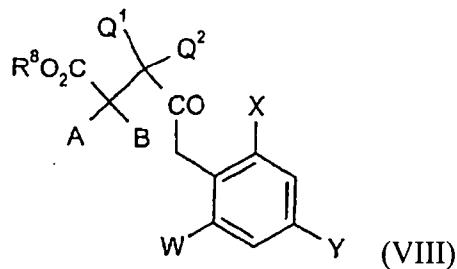
In a sixth aspect, the present invention provides compounds of the formula (VI)



in which

Hal, W, X and Y are as defined above.

In a seventh aspect, the present invention provides compounds of the formula (VIII)

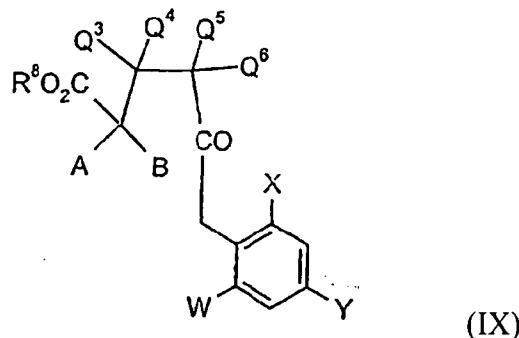


in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X, Y and R<sup>8</sup> are as defined above.

In an eighth aspect, the present invention provides compounds of the formula (IX)

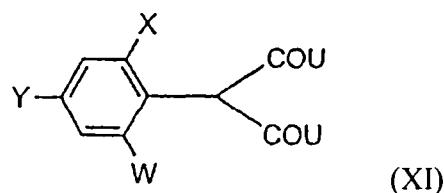
- 40b -



in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X, Y and R<sup>8</sup> are as defined above.

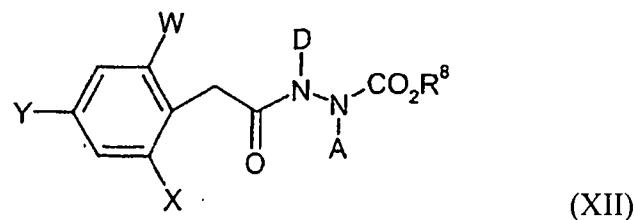
In a ninth aspect, the present invention provides compounds of the formula (XI)



in which

W, X, and Y are as defined above, and U is OR<sup>8</sup> or NH<sub>2</sub>, wherein R<sup>8</sup> is as defined above.

In a tenth aspect, the present invention provides compounds of the formula (XII)

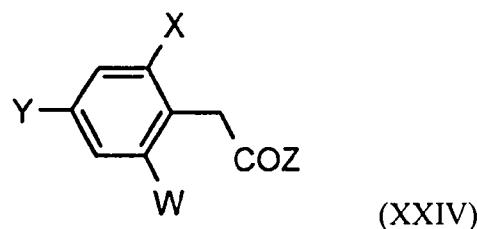


in which

A, D, W, X, Y and R<sup>8</sup> are as defined above.

In an eleventh aspect, the present invention provides compounds of the formula (XXIV)

- 40c -

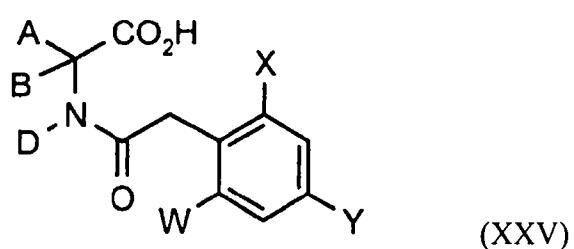


(XXIV)

in which

W, X, Y and Z are as defined above.

In a twelfth aspect, the present invention provides compounds of the formula (XXV)

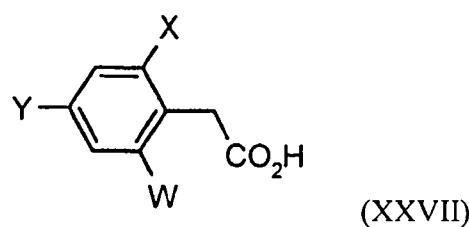


(XXV)

in which

A, B, D, W, X and Y are as defined above.

In a thirteenth aspect, the present invention provides compounds of the formula (XXVII)



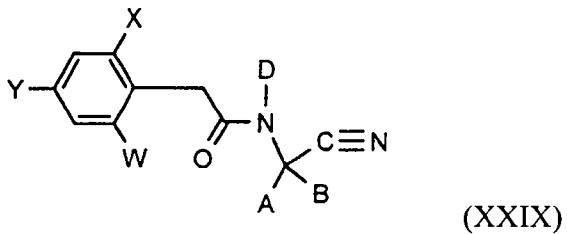
(XXVII)

in which

W, X and Y are as defined above.

In a fourteenth aspect, the present invention provides compounds of the formula (XXIX)

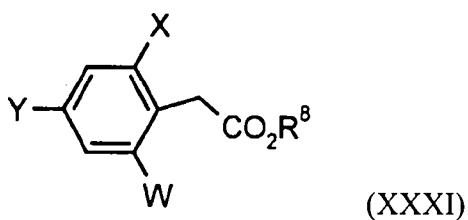
- 40d -



in which

A, B, D, W, X and Y are as defined above.

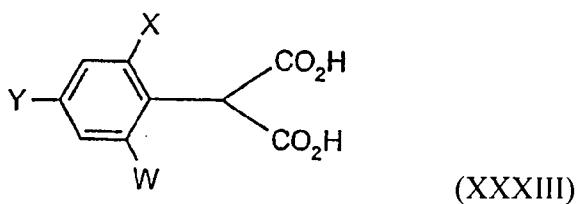
In a fifteenth aspect, the present invention provides compounds of the formula (XXXI)



in which

W, X Y and R<sup>8</sup> are as defined above.

In a sixteenth aspect, the present invention provides compounds of the formula (XXXIII)

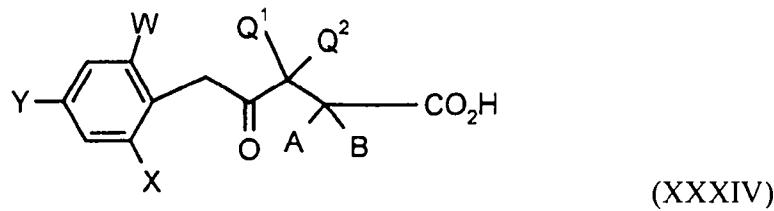


in which

W, X and Y are as defined above.

In a seventeenth aspect, the present invention provides compounds of the formula (XXXIV)

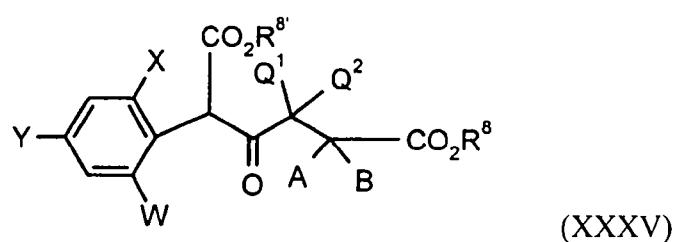
- 40e -



in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above.

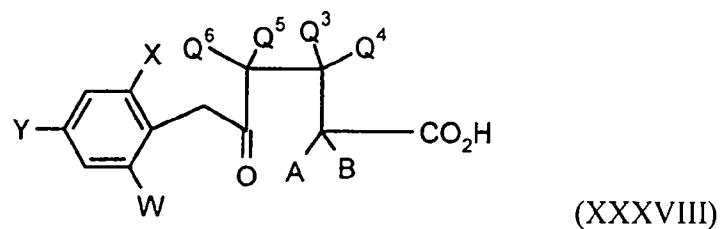
In an eighteenth aspect, the present invention provides compounds of the formula (XXXV)



in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, R<sup>8</sup>, R<sup>8'</sup>, W, X and Y are as defined above.

In a nineteenth aspect, the present invention provides compounds of the formula (XXXVIII)

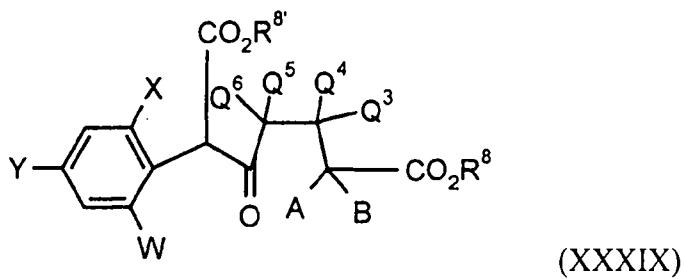


in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above.

In a twentieth aspect, the present invention provides compounds of the formula (XXXIX)

- 40f -



in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, R<sup>8</sup>, R<sup>8'</sup>, W, X and Y are as defined above.

In a twenty-first aspect, the present invention provides pesticides or herbicides which comprise at least one compound of the formula (I) according to the first aspect.

In a twenty-second aspect, the present invention provides a method for controlling animal pests or unwanted vegetation, the method comprising allowing compounds of the formula (I) according to the first aspect to act on the animal pests and/or their habitat, or on the unwanted vegetation.

In a twenty-third aspect, the present invention provides use of a compound of the formula (I) according to the first aspect for controlling animal pests or unwanted vegetation.

In a twenty-fourth aspect, the present invention provides a process for preparing a pesticide or herbicide, wherein compounds of the formula (I) according to the first aspect are mixed with extenders and/or surfactants.

In a twenty-fifth aspect, the present invention provides use of a compound of the formula (I) according to the first aspect for preparing pesticides and/or herbicides.

In a twenty-sixth aspect, the present invention provides a method for controlling unwanted vegetation, the method comprising allowing a composition according to the second aspect to act on the unwanted vegetation or its habitat.

In a twenty-seventh aspect, the present invention provides use of a composition according to the second aspect for controlling unwanted vegetation.

In a twenty-eighth aspect, the present invention provides a method for controlling undesired vegetation, wherein a compound of the formula (I) according to the first aspect

- 40g -

and a compound which improves crop plant tolerance according to the second aspect, are allowed to act separately at short intervals on the undesired vegetation or its environment.

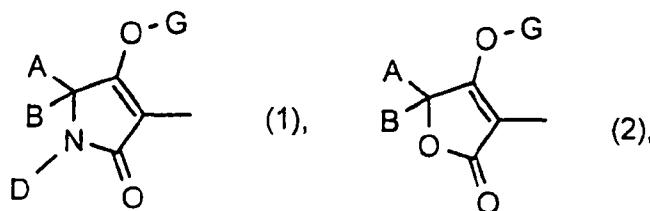
The formula (I) provides a general definition of the compounds according to the invention. Preferred substituents or ranges of the radicals given in the formulae mentioned hereinabove and hereinbelow are illustrated below:

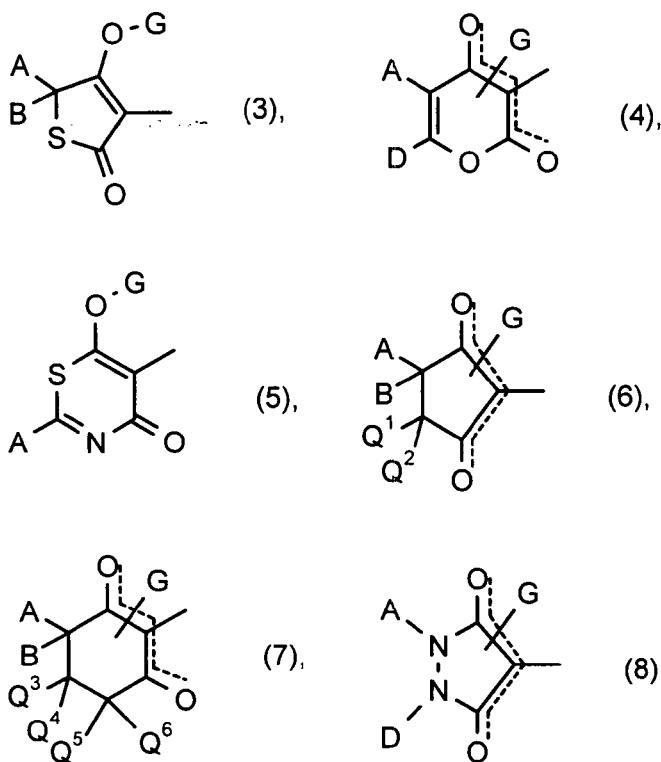
W preferably represents  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -haloalkoxy,  $C_1$ - $C_4$ -alkoxy- $C_2$ - $C_4$ -alkyloxy,  $C_1$ - $C_4$ -alkoxy-bis- $C_2$ - $C_4$ -alkyloxy or  $C_3$ - $C_6$ -cycloalkyl- $C_1$ - $C_3$ -alkanediylxy which is optionally mono- to trisubstituted by fluorine, chlorine,  $C_1$ - $C_3$ -alkyl or  $C_1$ - $C_3$ -alkoxy and in which optionally one methylene group of the ring may be interrupted by oxygen or sulphur,

X preferably represents  $C_1$ - $C_6$ -alkyl,

Y preferably represents chlorine, bromine or iodine,

CKE preferably represents one of the groups





5        A    preferably represents hydrogen or in each case optionally halogen-substituted C<sub>1</sub>-C<sub>12</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-alkenyl, C<sub>1</sub>-C<sub>10</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>10</sub>-alkylthio-C<sub>1</sub>-C<sub>6</sub>-alkyl, optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl- or C<sub>1</sub>-C<sub>6</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one or two not directly adjacent ring members are replaced by oxygen and/or sulphur or represents in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-, cyano- or nitro-substituted phenyl, naphthyl, hetaryl having 5 to 6 ring atoms (for example furanyl, pyridyl, imidazolyl, triazolyl, pyrazolyl, pyrimidyl, thiazolyl or thienyl), phenyl-C<sub>1</sub>-C<sub>6</sub>-alkyl or naphthyl-C<sub>1</sub>-C<sub>6</sub>-alkyl,

10      B    preferably represents hydrogen, C<sub>1</sub>-C<sub>12</sub>-alkyl or C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>6</sub>-alkyl, or

15      A, B   and the carbon atom to which they are attached preferably represent saturated C<sub>3</sub>-C<sub>10</sub>-cycloalkyl or unsaturated C<sub>5</sub>-C<sub>10</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur and which are optionally mono- or disubstituted by C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>10</sub>-cycloalkyl, C<sub>1</sub>-C<sub>8</sub>-haloalkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>1</sub>-C<sub>8</sub>-alkylthio, halogen or phenyl or

20      A, B   and the carbon atom to which they are attached preferably represent C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is substituted by an alkylenedithioyl or by an alkylenedioxyl or by an

alkylenediyl group which optionally contains one or two not directly adjacent oxygen and/or sulphur atoms and which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, which, together with the carbon atom to which it is attached, forms a further five- to eight-membered ring or

5 A, B and the carbon atom to which they are attached preferably represent C<sub>3</sub>-C<sub>8</sub>-cycloalkyl or C<sub>5</sub>-C<sub>8</sub>-cycloalkenyl in which two substituents together with the carbon atoms to which they are attached represent in each case optionally C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy- or halogen-substituted C<sub>2</sub>-C<sub>6</sub>-alkanediyl, C<sub>2</sub>-C<sub>6</sub>-alkenediyl or C<sub>4</sub>-C<sub>6</sub>-alkanedienediyl in which optionally one methylene group is replaced by oxygen or sulphur,

10 D preferably represents hydrogen, in each case optionally halogen-substituted C<sub>1</sub>-C<sub>12</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-alkenyl, C<sub>3</sub>-C<sub>8</sub>-alkynyl, C<sub>1</sub>-C<sub>10</sub>-alkoxy-C<sub>2</sub>-C<sub>8</sub>-alkyl, optionally halogen-, C<sub>1</sub>-C<sub>4</sub>-alkyl-, C<sub>1</sub>-C<sub>4</sub>-alkoxy- or C<sub>1</sub>-C<sub>4</sub>-haloalkyl-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur or in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-, cyano- or nitro-substituted phenyl, hetaryl having 5 or 6 ring atoms (for example furanyl, imidazolyl, pyridyl, thiazolyl, pyrazolyl, pyrimidyl, pyrrolyl, thienyl or triazolyl), phenyl-C<sub>1</sub>-C<sub>6</sub>-alkyl or hetaryl-C<sub>1</sub>-C<sub>6</sub>-alkyl having 5 or 6 ring atoms (for example furanyl, imidazolyl, pyridyl, thiazolyl, pyrazolyl, pyrimidyl, pyrrolyl, thienyl or triazolyl), or

15

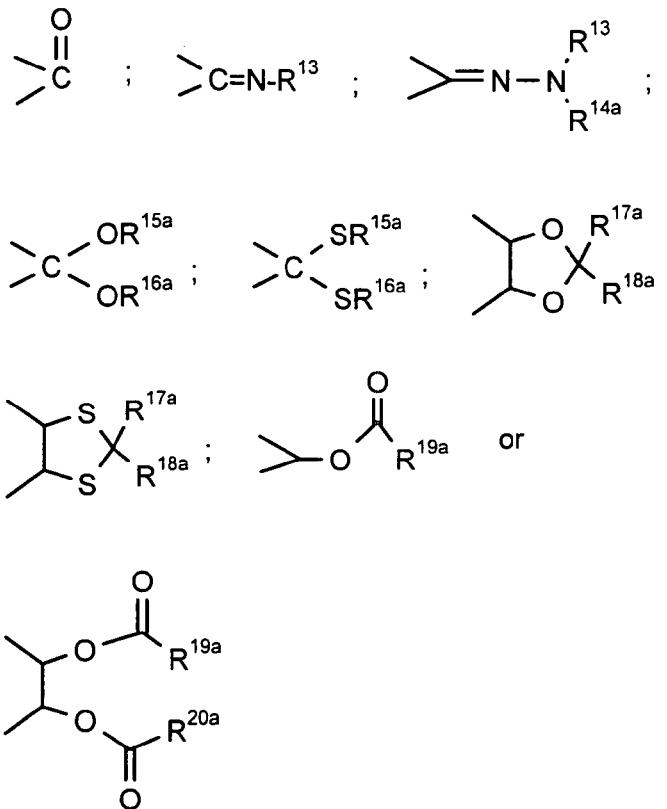
20 A and D together preferably represent in each case optionally substituted C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>3</sub>-C<sub>6</sub>-alkenediyl in which optionally one methylene group is replaced by a carbonyl group, oxygen or sulphur,

possible substituents being in each case:

25 halogen, hydroxyl, mercapto or in each case optionally halogen-substituted C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, phenyl or benzyloxy, or a further C<sub>3</sub>-C<sub>6</sub>-alkanediyl grouping, C<sub>3</sub>-C<sub>6</sub>-alkenediyl grouping or a butadienyl grouping which is optionally substituted by C<sub>1</sub>-C<sub>6</sub>-alkyl or in which optionally two adjacent substituents together with the carbon atoms to which they are attached form a further saturated or unsaturated cycle having 5 or 6 ring atoms (in the case of the compound of the formula (I-1), A and D together with the atoms to which they are attached then represent, for example, the groups AD-1 to AD-10 mentioned below)

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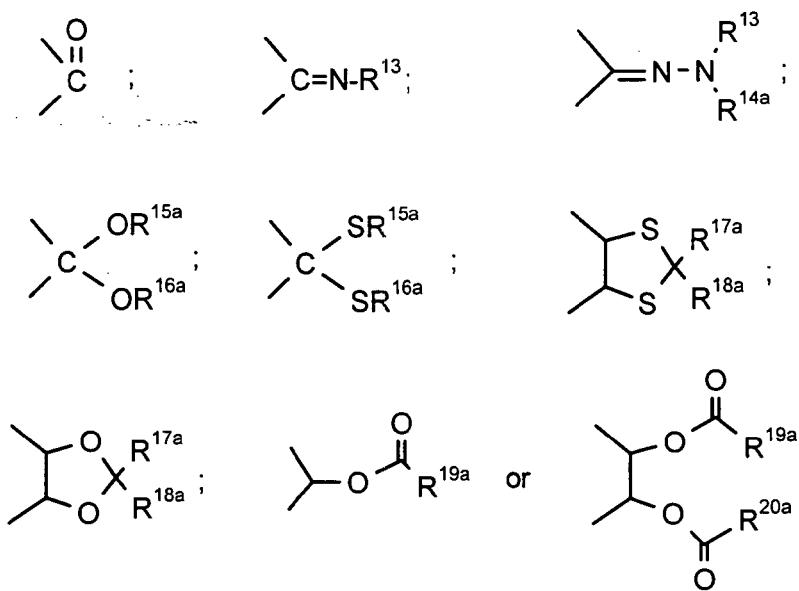
which may contain oxygen or sulphur, or which optionally contains one of the following groups



or

5 A and Q<sup>1</sup> together preferably represent C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>4</sub>-C<sub>6</sub>-alkenediyl, each of which is optionally mono- or disubstituted by identical or different substituents from the group consisting of halogen, hydroxyl, of C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>3</sub>-C<sub>7</sub>-cycloalkyl each of which is optionally mono- to trisubstituted by identical or different halogen, and of benzyloxy and phenyl, each of which is optionally mono- to trisubstituted by identical or different substituents from the group consisting of halogen, C<sub>1</sub>-C<sub>6</sub>-alkyl and C<sub>1</sub>-C<sub>6</sub>-alkoxy, which C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>4</sub>-C<sub>6</sub>-alkenediyl moreover optionally contains one of the groups below

10



or is bridged by a C<sub>1</sub>-C<sub>2</sub>-alkanediyl group or by an oxygen atom or

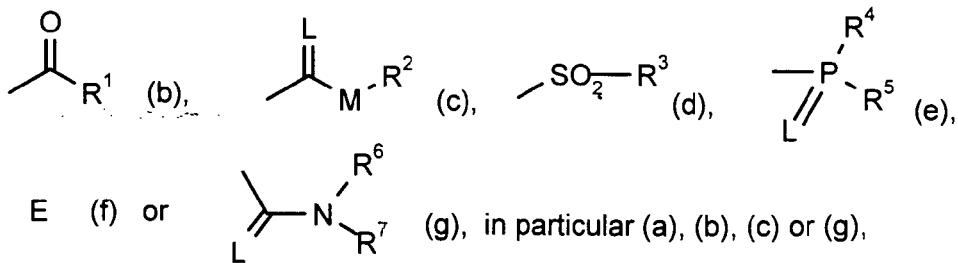
Q<sup>1</sup> preferably represents hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

5 Q<sup>2</sup>, Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another preferably represent hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,

10 Q<sup>3</sup> preferably represents hydrogen, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy-C<sub>1</sub>-C<sub>2</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkylthio-C<sub>1</sub>-C<sub>2</sub>-alkyl, optionally C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one methylene group is replaced by oxygen or sulphur or represents phenyl which is optionally substituted by halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>1</sub>-C<sub>2</sub>-haloalkoxy, cyano or nitro, or

Q<sup>3</sup> and Q<sup>4</sup> together with the carbon atom to which they are attached preferably represent a C<sub>3</sub>-C<sub>7</sub>-ring which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>2</sub>-haloalkyl and in which optionally one ring member is replaced by oxygen or sulphur,

G preferably represents hydrogen (a) or represents one of the groups



in which

E represents a metal ion equivalent or an ammonium ion,  
 5 L represents oxygen or sulphur and  
 M represents oxygen or sulphur,  
 R<sup>1</sup> preferably represents in each case optionally halogen-substituted C<sub>1</sub>-C<sub>20</sub>-alkyl, C<sub>2</sub>-C<sub>20</sub>-alkenyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>8</sub>-alkylthio-C<sub>1</sub>-C<sub>8</sub>-alkyl, poly-C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl or optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl- or C<sub>1</sub>-C<sub>6</sub>-alkoxy-substituted  
 10 C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one or more (preferably not more than two) not directly adjacent ring members are replaced by oxygen and/or sulphur,  
 represents optionally halogen-, cyano-, nitro-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-, C<sub>1</sub>-C<sub>6</sub>-alkylthio- or C<sub>1</sub>-C<sub>6</sub>-alkylsulphonyl-substituted phenyl,  
 15 represents optionally halogen-, nitro-, cyano-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl- or C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-substituted phenyl-C<sub>1</sub>-C<sub>6</sub>-alkyl,  
 represents optionally halogen- or C<sub>1</sub>-C<sub>6</sub>-alkyl-substituted 5- or 6-membered hetaryl (for example pyrazolyl, thiazolyl, pyridyl, pyrimidyl, furanyl or thiényl),  
 represents optionally halogen- or C<sub>1</sub>-C<sub>6</sub>-alkyl-substituted phenoxy-C<sub>1</sub>-C<sub>6</sub>-alkyl or  
 20 represents optionally halogen-, amino- or C<sub>1</sub>-C<sub>6</sub>-alkyl-substituted 5- or 6-membered hetaryloxy-C<sub>1</sub>-C<sub>6</sub>-alkyl (for example pyridyloxy-C<sub>1</sub>-C<sub>6</sub>-alkyl, pyrimidyloxy-C<sub>1</sub>-C<sub>6</sub>-alkyl or thiazolyloxy-C<sub>1</sub>-C<sub>6</sub>-alkyl),

R<sup>2</sup> preferably represents in each case optionally halogen-substituted C<sub>1</sub>-C<sub>20</sub>-alkyl, C<sub>2</sub>-C<sub>20</sub>-alkenyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>2</sub>-C<sub>8</sub>-alkyl, poly-C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>2</sub>-C<sub>8</sub>-alkyl,  
represents optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl- or C<sub>1</sub>-C<sub>6</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl or

5 represents in each case optionally halogen-, cyano-, nitro-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl- or C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-substituted phenyl or benzyl,

R<sup>3</sup> preferably represents optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl or represents in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, cyano- or nitro-substituted phenyl or benzyl,

10 R<sup>4</sup> and R<sup>5</sup> independently of one another preferably represent in each case optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>1</sub>-C<sub>8</sub>-alkylamino, di-(C<sub>1</sub>-C<sub>8</sub>-alkyl)amino, C<sub>1</sub>-C<sub>8</sub>-alkylthio, C<sub>2</sub>-C<sub>8</sub>-alkenylthio, C<sub>3</sub>-C<sub>7</sub>-cycloalkylthio or represent in each case optionally halogen-, nitro-, cyano-, C<sub>1</sub>-C<sub>4</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, C<sub>1</sub>-C<sub>4</sub>-alkylthio-, C<sub>1</sub>-C<sub>4</sub>-haloalkylthio-, C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-haloalkyl-substituted phenyl, phenoxy or phenylthio,

15 R<sup>6</sup> and R<sup>7</sup> independently of one another preferably represent hydrogen, represent in each case optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-cycloalkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>3</sub>-C<sub>8</sub>-alkenyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, represent optionally halogen-, C<sub>1</sub>-C<sub>8</sub>-haloalkyl-, C<sub>1</sub>-C<sub>8</sub>-alkyl- or C<sub>1</sub>-C<sub>8</sub>-alkoxy-substituted phenyl, represent optionally halogen-, C<sub>1</sub>-C<sub>8</sub>-alkyl-, C<sub>1</sub>-C<sub>8</sub>-haloalkyl- or C<sub>1</sub>-C<sub>8</sub>-alkoxy-substituted benzyl or together represent an optionally C<sub>1</sub>-C<sub>4</sub>-alkyl-substituted C<sub>3</sub>-C<sub>6</sub>-alkylene radical in which optionally one carbon atom is replaced by oxygen or sulphur,

20 R<sup>13</sup> preferably represents hydrogen, represents in each case optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl or C<sub>1</sub>-C<sub>8</sub>-alkoxy, represents optionally halogen-, C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one methylene group is replaced by oxygen or sulphur or represents in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, nitro- or cyano-substituted phenyl, phenyl-C<sub>1</sub>-C<sub>4</sub>-alkyl or phenyl-C<sub>1</sub>-C<sub>4</sub>-alkoxy,

25 R<sup>14a</sup> preferably represents hydrogen or C<sub>1</sub>-C<sub>8</sub>-alkyl, or

R<sup>13</sup> and R<sup>14a</sup> together preferably represent C<sub>4</sub>-C<sub>6</sub>-alkanediyl,

R<sup>15a</sup> and R<sup>16a</sup> are identical or different and preferably represent C<sub>1</sub>-C<sub>6</sub>-alkyl, or

R<sup>15a</sup> and R<sup>16a</sup> together preferably represent a C<sub>2</sub>-C<sub>4</sub>-alkanediyl radical which is optionally substituted by C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-haloalkyl or by optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-,  
5 C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, nitro- or cyano-substituted phenyl,

R<sup>17a</sup> and R<sup>18a</sup> independently of one another preferably represent hydrogen, represent optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl or represent optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, nitro- or cyano-  
10 substituted phenyl, or

R<sup>17a</sup> and R<sup>18a</sup> together with the carbon atom to which they are attached preferably represent a carbonyl group or represent optionally halogen-, C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy- substituted C<sub>5</sub>-C<sub>7</sub>-cycloalkyl in which optionally one methylene group is replaced by oxygen or sulphur,

15 R<sup>19a</sup> and R<sup>20a</sup> independently of one another preferably represent C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>2</sub>-C<sub>10</sub>-alkenyl, C<sub>1</sub>-C<sub>10</sub>-alkoxy, C<sub>1</sub>-C<sub>10</sub>-alkylamino, C<sub>3</sub>-C<sub>10</sub>-alkenylamino, di-(C<sub>1</sub>-C<sub>10</sub>-alkyl)amino or di-(C<sub>3</sub>-C<sub>10</sub>-alkenyl)amino.

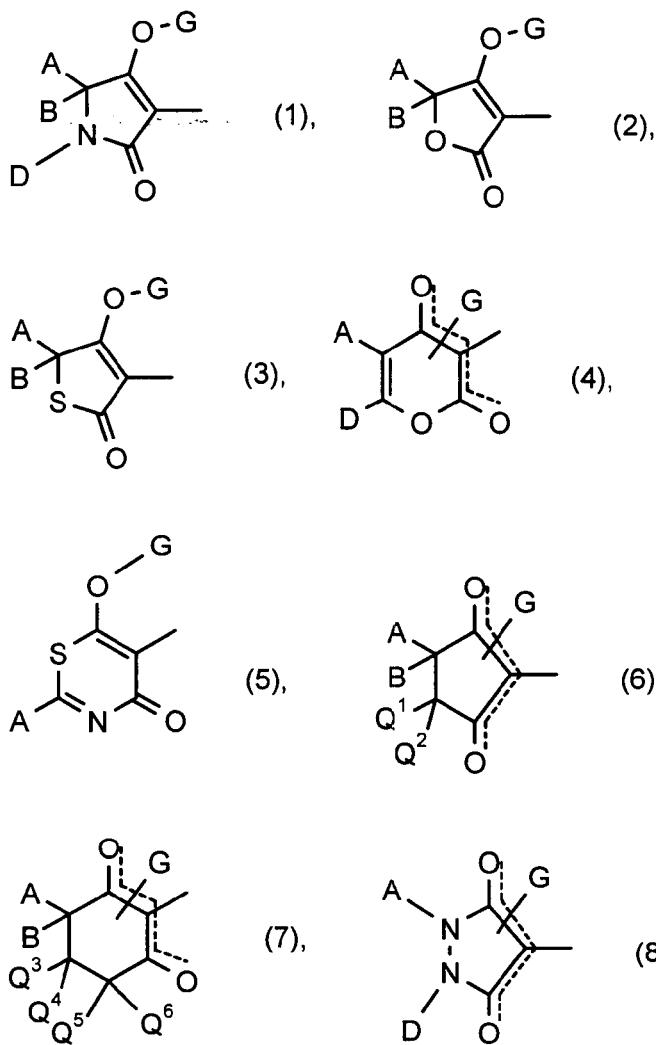
In the radical definitions mentioned as being preferred, halogen represents fluorine, chlorine, bromine and iodine, in particular fluorine, chlorine and bromine.

20 W particularly preferably represents C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, C<sub>1</sub>-C<sub>3</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyloxy, C<sub>1</sub>-C<sub>2</sub>-alkoxy-bis-C<sub>2</sub>-C<sub>3</sub>-alkyloxy or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl-C<sub>1</sub>-C<sub>2</sub>-alkanediyoxy in which optionally one methylene group of the ring may be replaced by oxygen,

X particularly preferably represents C<sub>1</sub>-C<sub>3</sub>-alkyl,

25 Y particularly preferably represents chlorine or bromine,

CKE particularly preferably represents one of the groups



5 A particularly preferably represents hydrogen, represents  $C_1$ - $C_6$ -alkyl or  $C_1$ - $C_4$ -alkoxy- $C_1$ - $C_2$ -alkyl, each of which is optionally mono- to trisubstituted by fluorine or chlorine, represents  $C_3$ - $C_6$ -cycloalkyl which is optionally mono- to disubstituted by  $C_1$ - $C_2$ -alkyl or  $C_1$ - $C_2$ -alkoxy or (but not in the case of the compounds of the formulae (I-3), (I-4), (I-6) and (I-7)) represents phenyl or benzyl, each of which is mono- to disubstituted optionally by fluorine, chlorine, bromine,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_2$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_2$ -haloalkoxy, cyano or nitro,

10 B particularly preferably represents hydrogen,  $C_1$ - $C_4$ -alkyl or  $C_1$ - $C_2$ -alkoxy- $C_1$ - $C_2$ -alkyl, or

15 A, B and the carbon atom to which they are attached particularly preferably represent saturated or unsaturated  $C_5$ - $C_7$ -cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur and which is optionally mono- to disubstituted by  $C_1$ -

$C_6$ -alkyl, trifluoromethyl or  $C_1$ - $C_6$ -alkoxy, with the proviso that in this case  $Q^3$  particularly preferably represents hydrogen or methyl, or

5      A, B and the carbon atom to which they are attached particularly preferably represent  $C_5$ - $C_6$ -cycloalkyl which is substituted by an alkylatedithiol group or by an alkylatedioxyl group or by an alkylatediyl group which optionally contains one or two not directly adjacent oxygen or sulphur atoms and which is optionally substituted by methyl or ethyl, which group, together with the carbon atom to which it is attached, forms a further five- or six-membered ring, with the proviso that in this case  $Q^3$  particularly preferably represents hydrogen or methyl,

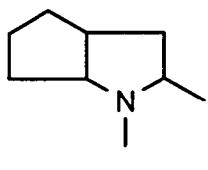
10     A, B and the carbon atom to which they are attached particularly preferably represent  $C_3$ - $C_6$ -cycloalkyl or  $C_5$ - $C_6$ -cycloalkenyl in which two substituents together with the carbon atoms to which they are attached represent in each case optionally  $C_1$ - $C_2$ -alkyl- or  $C_1$ - $C_2$ -alkoxy-substituted  $C_2$ - $C_4$ -alkanediyl,  $C_2$ - $C_4$ -alkenediyl or butadienediyl, with the proviso that in this case  $Q^3$  particularly preferably represents hydrogen or methyl,

15     D particularly preferably represents hydrogen, represents  $C_1$ - $C_6$ -alkyl,  $C_3$ - $C_6$ -alkenyl or  $C_1$ - $C_4$ -alkoxy- $C_2$ - $C_3$ -alkyl, each of which is optionally mono- to trisubstituted by fluorine, represents  $C_3$ - $C_6$ -cycloalkyl which is optionally mono- to disubstituted by  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_2$ -haloalkyl and in which optionally one methylene group is replaced by oxygen or (but not in the case of the compounds of the formula (I-1)) represents phenyl or pyridyl, each of which is optionally mono- to disubstituted by fluorine, chlorine, bromine,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy, or

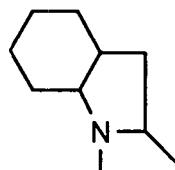
20     A and D together particularly preferably represent optionally mono- to disubstituted  $C_3$ - $C_5$ -alkanediyl in which one methylene group may be replaced by a carbonyl group (but not in the case of the compounds of the formula (I-1)), oxygen or sulphur, possible substituents being  $C_1$ - $C_2$ -alkyl or  $C_1$ - $C_2$ -alkoxy, or

25

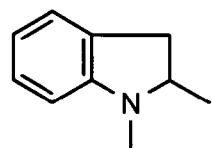
A and D (in the case of the compounds of the formula (I-1)) together with the atoms to which they are attached particularly preferably represent one of the groups AD-1 to AD-10:



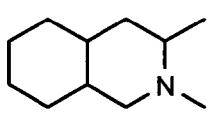
AD-1



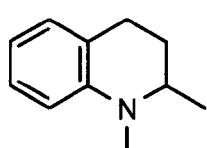
AD-2



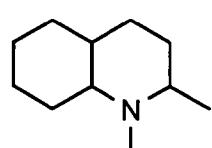
AD-3



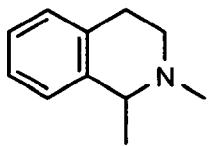
AD-4



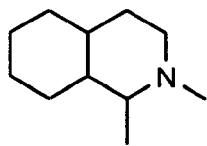
AD-5



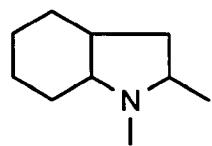
AD-6



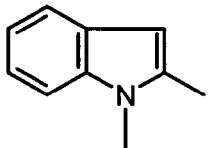
AD-7



AD-8



AD-9



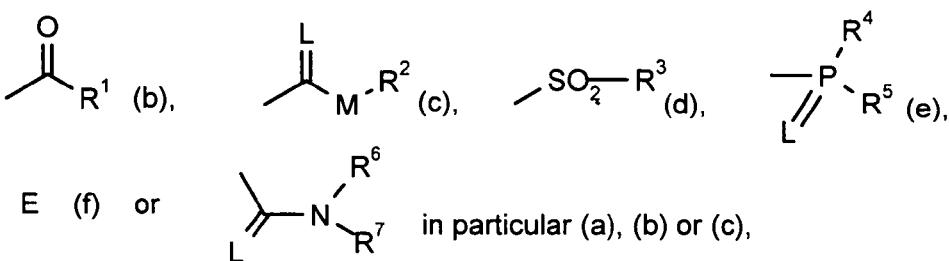
AD-10

or

5 A and Q<sup>1</sup> together particularly preferably represent C<sub>3</sub>-C<sub>4</sub>-alkanediyl which is optionally mono- or disubstituted by identical or different substituents from the group consisting of C<sub>1</sub>-C<sub>2</sub>-alkyl and C<sub>1</sub>-C<sub>2</sub>-alkoxy or

Q<sup>1</sup> particularly preferably represents hydrogen,

Q<sup>2</sup> particularly preferably represents hydrogen,  
Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another particularly preferably represent hydrogen or C<sub>1</sub>-C<sub>3</sub>-alkyl,  
Q<sup>3</sup> particularly preferably represents hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is  
5 optionally mono- to disubstituted by methyl or methoxy, or  
Q<sup>3</sup> and Q<sup>4</sup> together with the carbon to which they are attached particularly preferably represent a saturated C<sub>5</sub>-C<sub>6</sub>-ring which is optionally substituted by C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy and in which optionally one ring member is replaced by oxygen or sulphur,  
with the proviso that in this case A particularly preferably represents hydrogen or  
10 methyl, or  
G particularly preferably represents hydrogen (a) or represents one of the groups



in which

15 E represents a metal ion equivalent or an ammonium ion,  
L represents oxygen or sulphur and  
M represents oxygen or sulphur,  
R<sup>1</sup> particularly preferably represents C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>2</sub>-C<sub>18</sub>-alkenyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>2</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkylthio-C<sub>1</sub>-C<sub>2</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine or chlorine, or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally mono- to disubstituted by fluorine, chlorine, C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy and in which optionally one or two not directly adjacent ring members are replaced by oxygen,  
20

represents phenyl which is optionally mono- to disubstituted by fluorine, chlorine, bromine, cyano, nitro, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>2</sub>-haloalkyl or C<sub>1</sub>-C<sub>2</sub>-haloalkoxy,

2 R<sup>2</sup> particularly preferably represents C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>2</sub>-C<sub>8</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>4</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine,

5 represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally monosubstituted by C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy or

10 represents phenyl or benzyl, each of which is optionally mono- to disubstituted by fluorine, chlorine, bromine, cyano, nitro, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>3</sub>-alkoxy, trifluoromethyl or trifluoromethoxy,

15 R<sup>3</sup> particularly preferably represents C<sub>1</sub>-C<sub>6</sub>-alkyl which is optionally mono- to trisubstituted by fluorine or represents phenyl which is optionally monosubstituted by fluorine, chlorine, bromine, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, trifluoromethyl, trifluoromethoxy, cyano or nitro,

20 R<sup>4</sup> particularly preferably represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylamino, di-(C<sub>1</sub>-C<sub>6</sub>-alkyl)amino, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>3</sub>-C<sub>4</sub>-alkenylthio, C<sub>3</sub>-C<sub>6</sub>-cycloalkylthio or represents phenyl, phenoxy or phenylthio, each of which is optionally monosubstituted by fluorine, chlorine, bromine, nitro, cyano, C<sub>1</sub>-C<sub>3</sub>-alkoxy, C<sub>1</sub>-C<sub>3</sub>-haloalkoxy, C<sub>1</sub>-C<sub>3</sub>-alkylthio, C<sub>1</sub>-C<sub>3</sub>-haloalkylthio, C<sub>1</sub>-C<sub>3</sub>-alkyl or trifluoromethyl,

25 R<sup>5</sup> particularly preferably represents C<sub>1</sub>-C<sub>6</sub>-alkoxy or C<sub>1</sub>-C<sub>6</sub>-alkylthio,

R<sup>6</sup> particularly preferably represents hydrogen, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>3</sub>-C<sub>6</sub>-alkenyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, represents phenyl which is optionally monosubstituted by fluorine, chlorine, bromine, trifluoromethyl, C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy, represents benzyl which is optionally monosubstituted by fluorine, chlorine, bromine, C<sub>1</sub>-C<sub>4</sub>-alkyl, trifluoromethyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy,

R<sup>7</sup> particularly preferably represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-alkenyl or C<sub>1</sub>-C<sub>6</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl,

R<sup>6</sup> and R<sup>7</sup> together particularly preferably represent a C<sub>4</sub>-C<sub>5</sub>-alkylene radical which is optionally substituted by methyl or ethyl and in which optionally one methylene group is replaced by oxygen or sulphur.

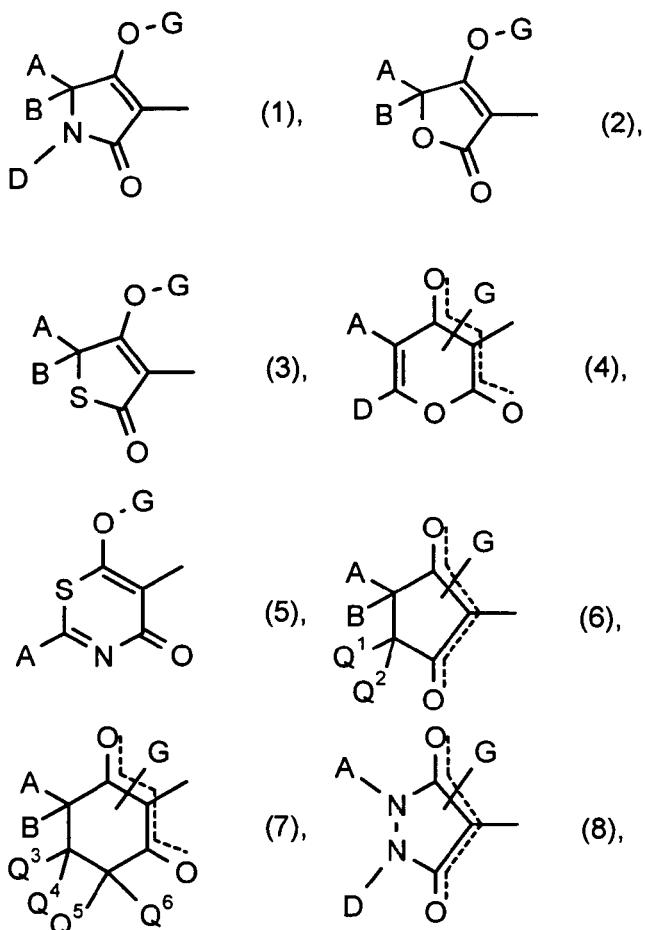
In the radical definitions mentioned as being particularly preferred, halogen represents 5 fluorine, chlorine and bromine, in particular fluorine and chlorine.

W very particularly preferably represents methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy, methoxyethyloxy, ethoxyethyloxy, cyclopropylmethoxy, cyclopentylmethoxy or cyclohexylmethoxy,

X very particularly preferably represents methyl or ethyl,

10 Y very particularly preferably represents chlorine or bromine,

CKE very particularly preferably represents one of the groups



5        A        very particularly preferably represents hydrogen, represents C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy-C<sub>1</sub>-C<sub>2</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine, represents cyclopropyl, cyclopentyl or cyclohexyl and (only in the case of the compounds of the formula (I-5)) represents phenyl which is optionally substituted by fluorine, chlorine, bromine, methyl, ethyl, n-propyl, isopropyl, methoxy, ethoxy, trifluoromethyl, trifluoromethoxy, cyano or nitro,

10      B        very particularly preferably represents hydrogen, methyl or ethyl, or

10      A, B      and the carbon atom to which they are attached very particularly preferably represent saturated C<sub>5</sub>-C<sub>6</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur and which is optionally monosubstituted by methyl, ethyl, propyl, isopropyl, trifluoromethyl, methoxy, ethoxy, propoxy or butoxy, with the proviso that in this case Q<sup>3</sup> very particularly preferably represents hydrogen, or

15      A, B      and the carbon atom to which they are attached very particularly preferably represent C<sub>6</sub>-cycloalkyl which is optionally substituted by an alkylenedioxyl group having two not directly adjacent oxygen atoms, with the proviso that in this case Q<sup>3</sup> very particularly preferably represents hydrogen, or

20      A, B      and the carbon atom to which they are attached very particularly preferably represent C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>5</sub>-C<sub>6</sub>-cycloalkenyl in which two substituents together with the carbon atoms to which they are attached represent C<sub>2</sub>-C<sub>4</sub>-alkanediyl or C<sub>2</sub>-C<sub>4</sub>-alkenediyl or butadienediyl, with the proviso that in this case Q<sup>3</sup> very particularly preferably represents hydrogen,

25      D        very particularly preferably represents hydrogen, represents C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>4</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine, represents cyclopropyl, cyclopentyl or cyclohexyl or (but not in the case of the compounds of the formula (I-1)) represents phenyl or pyridyl, each of which is optionally monosubstituted by fluorine, chlorine, methyl, ethyl, n-propyl, isopropyl, methoxy, ethoxy or trifluoromethyl,

or

A and D together very particularly preferably represent C<sub>3</sub>-C<sub>5</sub>-alkanediyl which is optionally monosubstituted by methyl or methoxy and in which optionally one carbon atom is replaced by oxygen or sulphur, or represents the group AD-1,

5 A and Q<sup>1</sup> together very particularly preferably represent C<sub>3</sub>-C<sub>4</sub>-alkanediyl which is optionally mono- or disubstituted by methyl or methoxy, or

Q<sup>1</sup> very particularly preferably represents hydrogen,

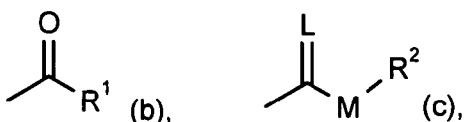
Q<sup>2</sup> very particularly preferably represents hydrogen,

Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another very particularly preferably represent hydrogen or methyl,

10 Q<sup>3</sup> very particularly preferably represents hydrogen, methyl, ethyl or propyl, or

Q<sup>3</sup> and Q<sup>4</sup> together with the carbon to which they are attached very particularly preferably represent a saturated C<sub>5</sub>-C<sub>6</sub>-ring which is optionally monosubstituted by methyl or methoxy, with the proviso that in this case A very particularly preferably represents hydrogen,

15 G very particularly preferably represents hydrogen (a) or represents one of the groups



-SO<sub>2</sub>-R<sub>3</sub> (d) or E (f),

in which

L represents oxygen or sulphur,

20 M represents oxygen or sulphur and

E represents an ammonium ion,

R<sup>1</sup> very particularly preferably represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>17</sub>-alkenyl, C<sub>1</sub>-C<sub>2</sub>-alkoxy-C<sub>1</sub>-alkyl, C<sub>1</sub>-C<sub>2</sub>-alkylthio-C<sub>1</sub>-alkyl or represents cyclopropyl or cyclohexyl, each of which is optionally monosubstituted by fluorine, chlorine, methyl or methoxy,

represents phenyl which is optionally monosubstituted by fluorine, chlorine, bromine, cyano, nitro, methyl, methoxy, trifluoromethyl or trifluoromethoxy,

5      R<sup>2</sup>     very particularly preferably represents phenyl or benzyl, C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyl, each of which is optionally monosubstituted by fluorine,

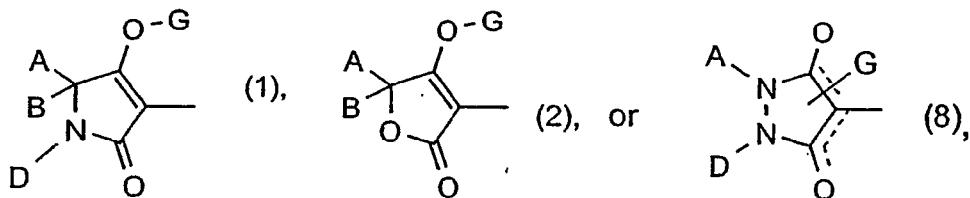
10     R<sup>3</sup>     very particularly preferably represents C<sub>1</sub>-C<sub>8</sub>-alkyl.

W     most preferably represents methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy, methoxyethoxy, ethoxyethoxy or cyclopropylmethoxy,

X     most preferably represents methyl or ethyl,

15    Y     most preferably represents chlorine,

CKE    most preferably represents one of the groups



15    A     most preferably represents hydrogen, methyl, ethyl, cyclopropyl, isopropyl, n-propyl, isobutyl, n-butyl, t-butyl or s-butyl (in particular hydrogen, methyl or ethyl),

B     most preferably represents hydrogen, methyl or ethyl,

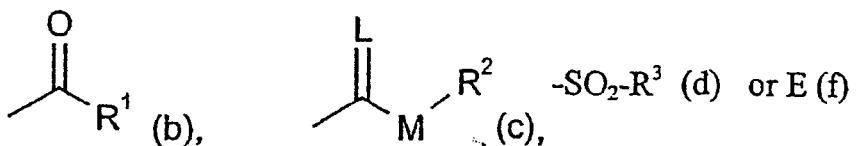
20    A, B and the carbon atom to which they are attached most preferably represent saturated C<sub>5</sub>-C<sub>6</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen and which is optionally monosubstituted by methyl, methoxy, ethoxy, n-propoxy, n-butoxy or trifluoromethyl (in particular by methyl or methoxy),

D     most preferably represents hydrogen, methyl, ethyl, isopropyl, cyclopropyl or cyclohexyl,

or

A and D together most preferably represent C<sub>3</sub>-C<sub>5</sub>-alkanediyl or the group AD-1,

G most preferably represents hydrogen (a) or represents one of the groups



in which

- 5 L represents oxygen,
- M represents oxygen and
- E represents an ammonium ion (N<sup>+</sup>(C<sub>6</sub>H<sub>13</sub>)<sub>4</sub>),
- R<sup>1</sup> most preferably represents C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>2</sub>-alkoxy-C<sub>1</sub>-alkyl or C<sub>2</sub>-C<sub>17</sub>-alkenyl,
- R<sup>2</sup> most preferably represents C<sub>1</sub>-C<sub>8</sub>-alkyl or C<sub>2</sub>-C<sub>6</sub>-alkenyl,
- 10 R<sup>3</sup> most preferably represents C<sub>1</sub>-C<sub>4</sub>-alkyl.

The general or preferred radical definitions or illustrations given above can be combined with one another as desired, i.e. including combinations between the respective ranges and preferred ranges. They apply both to the end products and, correspondingly, to precursors and intermediates.

- 15 Preference according to the invention is given to the compounds of the formula (I) which contain a combination of the meanings given above as being preferred (preferable).

Particular preference according to the invention is given to the compounds of the formula (I) which contain a combination of the meanings given above as being particularly preferred.

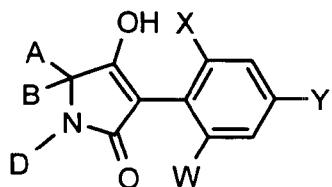
- 20 Very particular preference according to the invention is given to the compounds of the formula (I) which contain a combination of the meanings given above as being very particularly preferred.

Most preference according to the invention is given to the compounds of the formula (I) which contain a combination of the meanings given above as being most preferred.

Saturated or unsaturated hydrocarbon radicals, such as alkyl, alkanediyl or alkenyl, can in each case be straight-chain or branched as far as this is possible, including in combination with heteroatoms, such as, for example, in alkoxy.

5 Optionally substituted radicals can, unless stated otherwise, be mono- or polysubstituted, where in the case of polysubstitution the substituents can be identical or different.

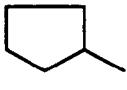
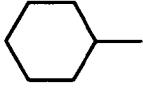
In addition to the compounds mentioned in the Preparation Examples, the following compounds of the formula (I-1-a) may be specifically mentioned:



**Table 1:** W = OCH<sub>3</sub>, X = CH<sub>3</sub>, Y = Cl.

A	B	D
CH <sub>3</sub>	H	H
C <sub>2</sub> H <sub>5</sub>	H	H
C <sub>3</sub> H <sub>7</sub>	H	H
i-C <sub>3</sub> H <sub>7</sub>	H	H

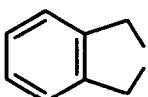
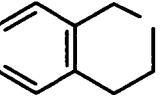
**Table 1 continued:**

A	B	D
C <sub>4</sub> H <sub>9</sub>	H	H
i-C <sub>4</sub> H <sub>9</sub>	H	H
s-C <sub>4</sub> H <sub>9</sub>	H	H
t-C <sub>4</sub> H <sub>9</sub>	H	H
CH <sub>3</sub>	CH <sub>3</sub>	H
C <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	H
C <sub>3</sub> H <sub>7</sub>	CH <sub>3</sub>	H
i-C <sub>3</sub> H <sub>7</sub>	CH <sub>3</sub>	H
C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>	H
i-C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>	H
s-C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>	H
t-C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>	H
C <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	H
C <sub>3</sub> H <sub>7</sub>	C <sub>3</sub> H <sub>7</sub>	H
	CH <sub>3</sub>	H
	CH <sub>3</sub>	H
	CH <sub>3</sub>	H
-(CH <sub>2</sub> ) <sub>2</sub> -		H
-(CH <sub>2</sub> ) <sub>4</sub> -		H
-(CH <sub>2</sub> ) <sub>5</sub> -		H

**Table 1 continued:**

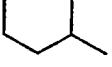
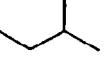
A	B	D
	$-(CH_2)_6-$	H
	$-(CH_2)_7-$	H
	$-(CH_2)_2-O-(CH_2)_2-$	H
	$-CH_2-O-(CH_2)_3-$	H
	$-(CH_2)_2-S-(CH_2)_2-$	H
	$-CH_2-CHCH_3-(CH_2)_3-$	H
	$-(CH_2)_2-CHCH_3-(CH_2)_2-$	H
	$-(CH_2)_2-CHC_2H_5-(CH_2)_2-$	H
	$-(CH_2)_2-CHC_3H_7-(CH_2)_2-$	H
	$-(CH_2)_2-CHi-C_3H_7-(CH_2)_2-$	H
	$-(CH_2)_2-CHOCH_3-(CH_2)_2-$	H
	$-(CH_2)_2-CHOC_2H_5-(CH_2)_2-$	H
	$-(CH_2)_2-CHOC_3H_7-(CH_2)_2-$	H
	$-(CH_2)_2-CHOi-C_3H_7-(CH_2)_2-$	H
	$-(CH_2)_2-C(CH_3)_2-(CH_2)_2-$	H
	$-CH_2-(CHCH_3)_2-(CH_2)_2-$	H
	$-CH_2-CH-(CH_2)_2-CH-$ \    CH <sub>2</sub>	H
	$-CH_2-CH-CH-(CH_2)_4-$ \    (CH <sub>2</sub> ) <sub>4</sub>	H
	$-CH_2-CH-CH-(CH_2)_2-$ \    (CH <sub>2</sub> ) <sub>3</sub>	H

**Table 1 continued:**

A	B	D
		H
		H

A	D	B
$-(CH_2)_3-$		H
$-(CH_2)_4-$		H
$-CH_2-CHCH_3-CH_2-$		H
$-CH_2-CH_2-CHCH_3-$		H
$-CH_2-CHCH_3-CHCH_3-$		H
$-CH_2-CH(OCH_3)-CH_2-$		H

**Table 1 continued:**

A	D	B
$-\text{CH}_2\text{CH}=\text{CH}-\text{CH}_2-$	H	
$-\text{CH}_2\text{CH}(\text{O})\text{CH}-\text{CH}_2-$	H	
$-\text{CH}_2\text{SCH}_2-$	H	
$-\text{CH}_2\text{S}(\text{CH}_2)_2-$	H	
$-(\text{CH}_2)_2\text{SCH}_2-$	H	
$\begin{array}{c} \text{---CH}_2\text{---CH} \\ \quad \diagup \quad \diagdown \\ \quad (\text{CH}_2)_3 \end{array}$	H	
H	CH <sub>3</sub>	H
H	C <sub>2</sub> H <sub>5</sub>	H
H	C <sub>3</sub> H <sub>7</sub>	H
H	i-C <sub>3</sub> H <sub>7</sub>	H
H		H
H		H
H		H
CH <sub>3</sub>	CH <sub>3</sub>	H
CH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	H
CH <sub>3</sub>	C <sub>3</sub> H <sub>7</sub>	H
CH <sub>3</sub>	i-C <sub>3</sub> H <sub>7</sub>	H
CH <sub>3</sub>		H
CH <sub>3</sub>		H

**Table 1 continued:**

A	D	B
CH <sub>3</sub>		H
$-\text{CH}_2\text{CH}-\text{CH}-$ $\text{CH}_2\text{O}-\text{CH}_2$		H
C <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	H
C <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	H

**Table 2:** A, B and D are as shown in Table 1

W = OCH<sub>3</sub>; X = CH<sub>3</sub>; Y = Br

5 **Table 3:** A, B and D are as shown in Table 1

W = OCH<sub>3</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Cl.

**Table 4:** A, B and D are as shown in Table 1

W = OCH<sub>3</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Br.

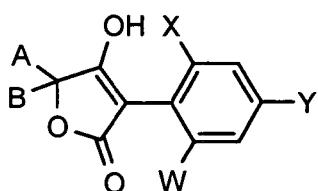
**Table 5:** A, B and D are as shown in Table 1

10 W = OC<sub>2</sub>H<sub>5</sub>; X = CH<sub>3</sub>; Y = Cl.

**Table 6:** A, B and D are as shown in Table 1

W = OC<sub>2</sub>H<sub>5</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Cl.

In addition to the compounds mentioned in the Preparation Examples, the following compounds of the formula (I-2-a) may be specifically mentioned:



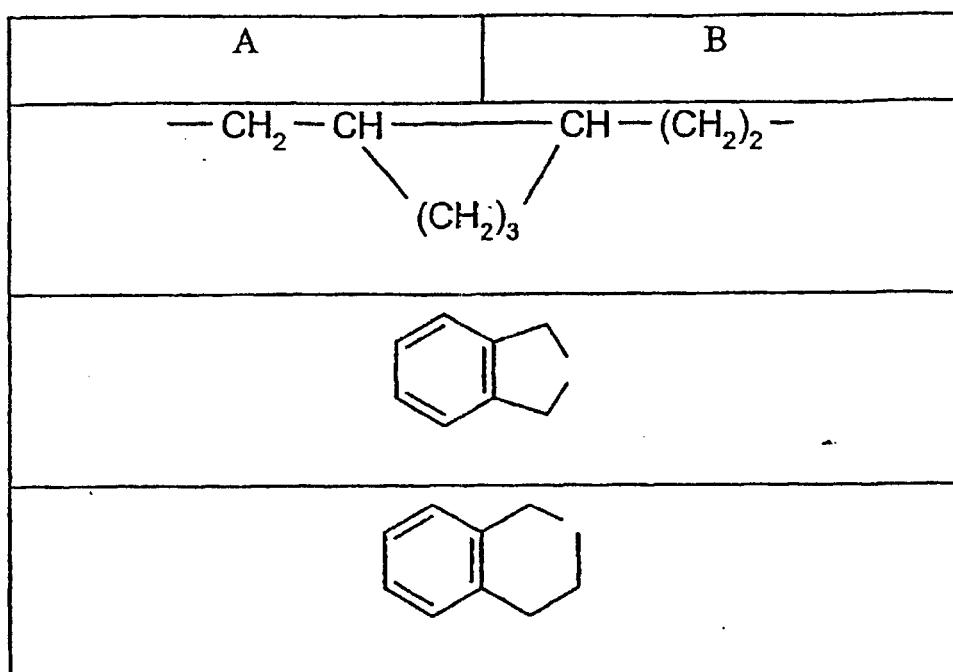
**Table 7:** W = OCH<sub>3</sub>, X = CH<sub>3</sub>, Y = Cl.

A	B
CH <sub>3</sub>	H
C <sub>2</sub> H <sub>5</sub>	H
C <sub>3</sub> H <sub>7</sub>	H
i-C <sub>3</sub> H <sub>7</sub>	H
C <sub>4</sub> H <sub>9</sub>	H
i-C <sub>4</sub> H <sub>9</sub>	H
s-C <sub>4</sub> H <sub>9</sub>	H
t-C <sub>4</sub> H <sub>9</sub>	H
CH <sub>3</sub>	CH <sub>3</sub>
C <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>
C <sub>3</sub> H <sub>7</sub>	CH <sub>3</sub>
i-C <sub>3</sub> H <sub>7</sub>	CH <sub>3</sub>
C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>
i-C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>
s-C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>
t-C <sub>4</sub> H <sub>9</sub>	CH <sub>3</sub>
C <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>
C <sub>3</sub> H <sub>7</sub>	C <sub>3</sub> H <sub>7</sub>
△	CH <sub>3</sub>
	CH <sub>3</sub>
	CH <sub>3</sub>
	-(CH <sub>2</sub> ) <sub>2</sub> -

**Table 7 continued**

A	B
	-(CH <sub>2</sub> ) <sub>4</sub> -
	-(CH <sub>2</sub> ) <sub>5</sub> -
	-(CH <sub>2</sub> ) <sub>6</sub> -
	-(CH <sub>2</sub> ) <sub>7</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -O-(CH <sub>2</sub> ) <sub>2</sub> -
	-CH <sub>2</sub> -O-(CH <sub>2</sub> ) <sub>3</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -S-(CH <sub>2</sub> ) <sub>2</sub> -
	-CH <sub>2</sub> -CHCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>3</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CHCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	(CH <sub>2</sub> ) <sub>2</sub> -CHC <sub>2</sub> H <sub>5</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CHC <sub>3</sub> H <sub>7</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CH <sub>2</sub> -C <sub>3</sub> H <sub>7</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CHOC <sub>2</sub> H <sub>5</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CHOC <sub>3</sub> H <sub>7</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -CHO-i-C <sub>3</sub> H <sub>7</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -C(CH <sub>3</sub> ) <sub>2</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
	-CH <sub>2</sub> -(CHCH <sub>3</sub> ) <sub>2</sub> -(CH <sub>2</sub> ) <sub>2</sub> -
$-\text{CH}_2-\text{CH}-(\text{CH}_2)_2-\text{CH}-$ <div style="text-align: center; margin-top: 10px;"> <math display="block">\text{CH}_2</math> </div>	
$-\text{CH}_2-\text{CH}-$ <div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;"> <math display="block">\text{CH}_2</math> <math display="block">(\text{CH}_2)_4</math> <math display="block">\text{CH}-\text{CH}_2-</math> </div>	

**Table 7 continued**



**Table 8:** A and B are as shown in Table 7

W = OCH<sub>3</sub>; X = CH<sub>3</sub>; Y = Br.

5 **Table 9:** A and B are as shown in Table 7

W = OCH<sub>3</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Cl.

**Table 10:** A and B are as shown in Table 7

W = OCH<sub>3</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Br.

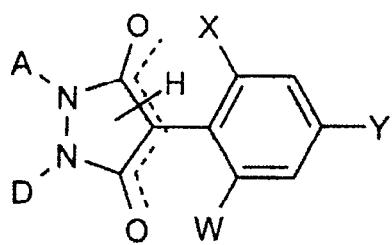
**Table 11:** A and B are as shown in Table 7

10 W = OC<sub>2</sub>H<sub>5</sub>; X = CH<sub>3</sub>; Y = Cl.

**Table 12:** A and B are as shown in Table 7

W = OC<sub>2</sub>H<sub>5</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Cl.

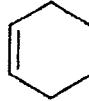
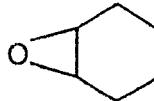
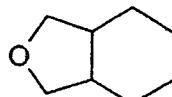
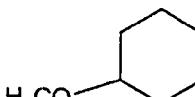
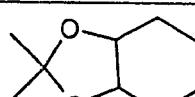
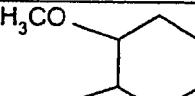
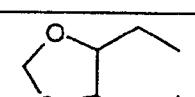
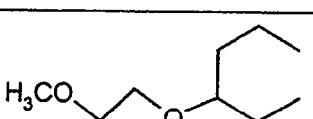
The following compounds of the formula (I-8-a) may be mentioned individually in addition to compounds mentioned in the preparation examples:



**Table 13:** W = OCH<sub>3</sub>, X = CH<sub>3</sub>, Y = Cl.

5

A	D
CH <sub>3</sub>	CH <sub>3</sub>
CH <sub>3</sub>	-(CH <sub>2</sub> ) <sub>2</sub> OH-
CH <sub>3</sub>	-(CH <sub>2</sub> ) <sub>2</sub> OCH <sub>3</sub> -
CH <sub>3</sub>	-(CH <sub>2</sub> ) <sub>2</sub> -O-(CH <sub>2</sub> ) <sub>2</sub> -OCH <sub>3</sub> -
-(CH <sub>2</sub> ) <sub>2</sub> -O-CH <sub>3</sub> -	-(CH <sub>2</sub> ) <sub>2</sub> -O-CH <sub>3</sub> -
-(CH <sub>2</sub> ) <sub>2</sub> -O-(CH <sub>2</sub> ) <sub>2</sub> -OCH <sub>3</sub> -	-(CH <sub>2</sub> ) <sub>2</sub> -O-(CH <sub>2</sub> ) <sub>2</sub> -OCH <sub>3</sub> -
	-(CH <sub>2</sub> ) <sub>3</sub> -
	-(CH <sub>2</sub> ) <sub>4</sub> -
	-(CH <sub>2</sub> ) <sub>2</sub> -O-(CH <sub>2</sub> ) <sub>2</sub> -

A	D
	
	
	
	
	
	
	
	

**Table 14:** A and D as shown in Table 13

W = OCH<sub>3</sub>; X = CH<sub>3</sub>; Y = Br.

5

**Table 15:** A and D as shown in Table 13

W = OCH<sub>3</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Cl.

**Table 16:** A and D as shown in Table 13

W = OCH<sub>3</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Br.

**Table 17:** A and D as shown in Table 13

5 W = OC<sub>2</sub>H<sub>5</sub>; X = CH<sub>3</sub>; Y = Cl.

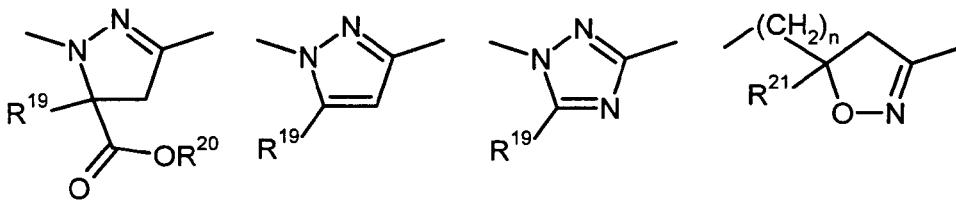
**Table 18:** A and D as shown in Table 13

W = OC<sub>2</sub>H<sub>5</sub>; X = C<sub>2</sub>H<sub>5</sub>; Y = Cl.

10 Preferred meanings of the groups mentioned above in connection with the compounds improving crop plant tolerance ("herbicide safeners") of the formulae (IIa), (IIb), (IIc), (IId) and (IIe) are defined hereinbelow.

n preferably represents the numbers 0, 1, 2, 3 or 4.

A<sup>1</sup> preferably represents one of the divalent heterocyclic groups outlined hereinbelow



15

A<sup>2</sup> preferably represents methylene or ethylene, each of which is optionally substituted by methyl, ethyl, methoxycarbonyl or ethoxycarbonyl.

20 R<sup>14</sup> preferably represents hydroxyl, mercapto, amino, methoxy, ethoxy, n- or i-propoxy, n-, i-, s- or t-butoxy, methylthio, ethylthio, n- or i-propylthio, n-, i-, s- or t-butylthio, methylamino, ethylamino, n- or i-propylamino, n-, i-, s- or t-butylamino, dimethylamino or diethylamino.

25

R<sup>15</sup> preferably represents hydroxyl, mercapto, amino, methoxy, ethoxy, n- or i-propoxy, n-, i-, s- or t-butoxy, methylthio, ethylthio, n- or i-propylthio, n-, i-, s- or t-butylthio, methylamino, ethylamino, n- or i-propylamino, n-, i-, s- or t-butylamino, dimethylamino or diethylamino.

16 R<sup>16</sup> preferably represents methyl, ethyl, n- or i-propyl, each of which is optionally substituted by fluorine, chlorine and/or bromine.

17 R<sup>17</sup> preferably represents hydrogen, or represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, propenyl, butenyl, propynyl or butynyl, methoxymethyl, ethoxymethyl, methoxyethyl, ethoxyethyl, dioxolanyl methyl, furyl, furylmethyl, thienyl, thiazolyl, piperidinyl, each of which is optionally substituted by fluorine and/or chlorine, or represents phenyl which is optionally substituted by fluorine, chlorine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl.

18 R<sup>18</sup> preferably represents hydrogen, or represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, propenyl, butenyl, propynyl or butynyl, methoxymethyl, ethoxymethyl, methoxyethyl, ethoxyethyl, dioxolanyl methyl, furyl, furylmethyl, thienyl, thiazolyl, piperidinyl, each of which is optionally substituted by fluorine and/or chlorine, or represents phenyl which is optionally substituted by fluorine, chlorine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, or, together with R<sup>17</sup>, represents one of the radicals -CH<sub>2</sub>-O-CH<sub>2</sub>-CH<sub>2</sub>- and -CH<sub>2</sub>-CH<sub>2</sub>-O-CH<sub>2</sub>-CH<sub>2</sub>- which are optionally substituted by methyl, ethyl, furyl, phenyl, a fused benzene ring or by two substituents which, together with the carbon atom to which they are bonded, form a 5- or 6-membered carbocycle.

19 R<sup>19</sup> preferably represents hydrogen, cyano, fluorine, chlorine, bromine, or represents methyl, ethyl, n- or i-propyl, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or phenyl, each of which is optionally substituted by fluorine, chlorine and/or bromine.

20 R<sup>20</sup> preferably represents hydrogen, or represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, optionally substituted by hydroxyl, cyano, fluorine, chlorine, methoxy, ethoxy, n- or i-propoxy.

21 R<sup>21</sup> preferably represents hydrogen, cyano, fluorine, chlorine, bromine, or represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl or phenyl, each of which is optionally substituted by fluorine, chlorine and/or bromine.

22 X<sup>1</sup> preferably represents nitro, cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, difluoromethyl, dichloromethyl, trifluoromethyl, trichloromethyl, chlorodifluoromethyl, fluorodichloromethyl, methoxy, ethoxy, n- or i-propoxy, difluoromethoxy or trifluoromethoxy.

18      X<sup>2</sup>    preferably represents hydrogen, nitro, cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, difluoromethyl, dichloromethyl, trifluoromethyl, trichloromethyl, chlorodifluoromethyl, fluorodichloromethyl, methoxy, ethoxy, n- or i-propoxy, difluoromethoxy or trifluoromethoxy.

22      5      X<sup>3</sup>    preferably represents hydrogen, nitro, cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, difluoromethyl, dichloromethyl, trifluoromethyl, trichloromethyl, chlorodifluoromethyl, fluorodichloromethyl, methoxy, ethoxy, n- or i-propoxy, difluoromethoxy or trifluoromethoxy.

26      R<sup>22</sup>    preferably represents hydrogen, methyl, ethyl, n- or i-propyl.

30      10      R<sup>23</sup>    preferably represents hydrogen, methyl, ethyl, n- or i-propyl.

34      R<sup>24</sup>    preferably represents hydrogen, or represents methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, methoxy, ethoxy, n- or i-propoxy, n-, i-, s- or t-butoxy, methylthio, ethylthio, n- or i-propylthio, n-, i-, s- or t-butylthio, methylamino, ethylamino, n- or i-propylamino, n-, i-, s- or t-butylamino, dimethylamino or diethylamino, each of which is optionally substituted by cyano, fluorine, chlorine, methoxy, ethoxy, n- or i-propoxy, or represents cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cyclopropyloxy, cyclobutyloxy, cyclopentyloxy, cyclohexyloxy, cyclopropylthio, cyclobutylthio, cyclopentylthio, cyclohexylthio, cyclopropylamino, cyclobutylamino, cyclopentylamino or cyclohexylamino, each of which is optionally substituted by cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl.

38      20      R<sup>25</sup>    preferably represents hydrogen, or represents methyl, ethyl, n- or i-propyl, n-, i- or s-butyl, each of which is optionally substituted by cyano, hydroxyl, fluorine, chlorine, methoxy, ethoxy, n- or i-propoxy, or represents propenyl, butenyl, propynyl or butynyl, each of which is optionally substituted by cyano, fluorine, chlorine or bromine, or represents cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl, each of which is optionally substituted by cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl.

42      25      R<sup>26</sup>    preferably represents hydrogen, or represents methyl, ethyl, n- or i-propyl, n-, i- or s-butyl, each of which is optionally substituted by cyano, hydroxyl, fluorine, chlorine, methoxy, ethoxy, n- or i-propoxy, or represents propenyl, butenyl, propynyl or butynyl, each of which is optionally substituted by cyano, fluorine, chlorine or bromine, or represents cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl, each of which is

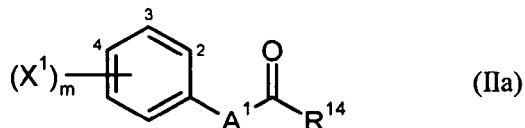
optionally substituted by cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, or represents phenyl which is optionally substituted by nitro, cyano, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, trifluoromethyl, methoxy, ethoxy, n- or i-propoxy, difluoromethoxy or trifluoromethoxy, or together with R<sup>25</sup> represents butane-1,4-diyl(trimethylene), pentane-1,5-diyl, 1-oxabutane-1,4-diyl or 3-oxapentane-1,5-diyl, each of which is optionally substituted by methyl or ethyl.

5      X<sup>4</sup>      preferably represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, trifluoromethyl, methoxy, ethoxy, n- or i-propoxy, difluoromethoxy or trifluoromethoxy.

10     X<sup>5</sup>      preferably represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s- or t-butyl, trifluoromethyl, methoxy, ethoxy, n- or i-propoxy, difluoromethoxy or trifluoromethoxy.

Examples of the compounds of the formula (IIa) which are very particularly preferred as herbicide safeners according to the invention are listed in the table which follows.

15     Table: Examples of the compounds of the formula (IIa)



Example No.	(Positions) (X¹)ₘ	A¹	R¹⁴
IIa-1	(2) Cl, (4) Cl		OCH <sub>3</sub>
IIa-2	(2) Cl, (4) Cl		OCH <sub>3</sub>

Example No.	(Positions) (X <sup>1</sup> ) <sub>m</sub>	A <sup>1</sup>	R <sup>14</sup>
IIa-3	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-4	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-5	(2) Cl		OCH <sub>3</sub>
IIa-6	(2) Cl, (4) Cl		OCH <sub>3</sub>
IIa-7	(2) F		OCH <sub>3</sub>
IIa-8	(2) F		OCH <sub>3</sub>
IIa-9	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>

Example No.	(Positions) (X <sup>1</sup> ) <sub>m</sub>	A <sup>1</sup>	R <sup>14</sup>
IIa-10	(2) Cl, (4) CF <sub>3</sub>		OCH <sub>3</sub>
IIa-11	(2) Cl		OCH <sub>3</sub>
IIa-12	-		OC <sub>2</sub> H <sub>5</sub>
IIa-13	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-14	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-15	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-16	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-17	(2) Cl, (4) Cl		OC <sub>2</sub> H <sub>5</sub>
IIa-18	-		OH

Examples of the compounds of the formula (IIb) which are very particularly preferred as herbicide safeners according to the invention are listed in the table which follows.

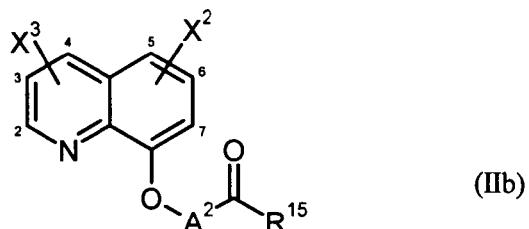
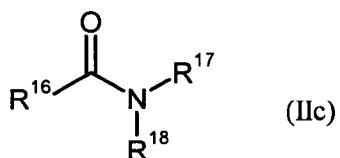


Table: Examples of the compounds of the formula (IIb)

Example No.	(Position) X²	(Position) X³	A²	R¹⁵
IIb-1	(5) Cl	-	CH₂	OH
IIb-2	(5) Cl	-	CH₂	OCH₃
IIb-3	(5) Cl	-	CH₂	OC₂H₅
IIb-4	(5) Cl	-	CH₂	OC₃H₇-n
IIb-5	(5) Cl	-	CH₂	OC₃H₇-i
IIb-6	(5) Cl	-	CH₂	OC₄H₉-n
IIb-7	(5) Cl	-	CH₂	OCH(CH₃)C₅H₁₁-n
IIb-8	(5) Cl	(2) F	CH₂	OH
IIb-9	(5) Cl	(2) Cl	CH₂	OH
IIb-10	(5) Cl	-	CH₂	OCH₂CH=CH₂
IIb-11	(5) Cl	-	CH₂	OC₄H₉-i

Example No.	(Position) $X^2$	(Position) $X^3$	$A^2$	$R^{15}$
IIb-12	(5) Cl	-	$CH_2$	$  \begin{array}{c}  CH_2 \\     \\  H_2C \\    \\  H_2C-O \\    \\  O-H-CH_3  \end{array}  $
IIb-13	(5) Cl	-	$  \begin{array}{c}  CH_2 \\     \\  H_2C \\    \\  O-C(=O) \\    \\  H  \end{array}  $	$OCH_2CH=CH_2$
IIb-14	(5) Cl	-	$  \begin{array}{c}  C_2H_5 \\    \\  O-C(=O) \\    \\  H  \end{array}  $	$OC_2H_5$
IIb-15	(5) Cl	-	$  \begin{array}{c}  CH_3 \\    \\  O-C(=O) \\    \\  H  \end{array}  $	$OCH_3$

Examples of the compounds of the formula (IIc) which are very particularly preferred as herbicide safeners according to the invention are listed in the table which follows.



5 Table: Examples of the compounds of the formula (IIc)

Example No.	$R^{16}$	$N(R^{17}, R^{18})$
IIc-1	$CHCl_2$	$N(CH_2CH=CH_2)_2$

Example No.	$\mathbf{R}^{16}$	$\mathbf{N}(\mathbf{R}^{17}, \mathbf{R}^{18})$
IIc-2	$\text{CHCl}_2$	
IIc-3	$\text{CHCl}_2$	
IIc-4	$\text{CHCl}_2$	
IIc-5	$\text{CHCl}_2$	
IIc-6	$\text{CHCl}_2$	
IIc-7	$\text{CHCl}_2$	

Examples of the compounds of the formula (IId) which are very particularly preferred as herbicide safeners according to the invention are listed in the table which follows.

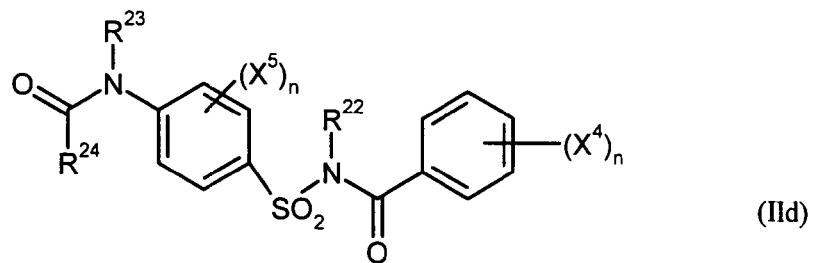
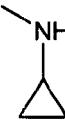


Table Examples of the compounds of the formula (IIId)

Example No.	R <sup>22</sup>	R <sup>23</sup>	R <sup>24</sup>	(Positions) (X <sup>4</sup> ) <sub>n</sub>	(Positions) (X <sup>5</sup> ) <sub>n</sub>
IIId-1	H	H	CH <sub>3</sub>	(2) OCH <sub>3</sub>	-
IIId-2	H	H	C <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub>	-
IIId-3	H	H	C <sub>3</sub> H <sub>7</sub> -n	(2) OCH <sub>3</sub>	-
IIId-4	H	H	C <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub>	-
IIId-5	H	H		(2) OCH <sub>3</sub>	-
IIId-6	H	H	CH <sub>3</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-7	H	H	C <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-8	H	H	C <sub>3</sub> H <sub>7</sub> -n	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-9	H	H	C <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-10	H	H		(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-11	H	H	OCH <sub>3</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-12	H	H	OC <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIId-13	H	H	OC <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-

Example No.	$\mathbf{R}^{22}$	$\mathbf{R}^{23}$	$\mathbf{R}^{24}$	(Positions) $(\mathbf{X}^4)_n$	(Positions) $(\mathbf{X}^5)_n$
IId-14	H	H	SCH <sub>3</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-15	H	H	SC <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-16	H	H	SC <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-17	H	H	NHCH <sub>3</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-18	H	H	NHC <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-19	H	H	NHC <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-20	H	H		(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IId-21	H	H	NHCH <sub>3</sub>	(2) OCH <sub>3</sub>	-
IId-22	H	H	NHC <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub>	-
IId-23	H	H	N(CH <sub>3</sub> ) <sub>2</sub>	(2) OCH <sub>3</sub>	-
IId-24	H	H	N(CH <sub>3</sub> ) <sub>2</sub>	(3) CH <sub>3</sub> (4) CH <sub>3</sub>	-
IId-25	H	H	CH <sub>2</sub> -O-CH <sub>3</sub>	(2) OCH <sub>3</sub>	-

Examples of the compounds of the formula (IIe) which are very particularly preferred as herbicide safeners according to the invention are listed in the table which follows.

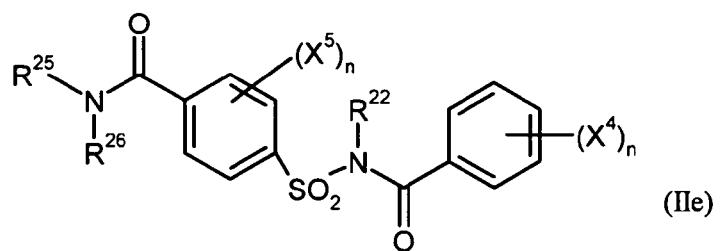


Table: Examples of the compounds of the formula (IIe)

Example No.	$\mathbf{R}^{22}$	$\mathbf{R}^{25}$	$\mathbf{R}^{26}$	(Positions) $(\mathbf{X}^4)_n$	(Positions) $(\mathbf{X}^5)_n$
IIe-1	H	H	CH <sub>3</sub>	(2) OCH <sub>3</sub>	-
IIe-2	H	H	C <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub>	-
IIe-3	H	H	C <sub>3</sub> H <sub>7</sub> -n	(2) OCH <sub>3</sub>	-
IIe-4	H	H	C <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub>	-
IIe-5	H	H		(2) OCH <sub>3</sub>	-
IIe-6	H	CH <sub>3</sub>	CH <sub>3</sub>	(2) OCH <sub>3</sub>	-
IIe-7	H	H	CH <sub>3</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIe-8	H	H	C <sub>2</sub> H <sub>5</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIe-9	H	H	C <sub>3</sub> H <sub>7</sub> -n	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIe-10	H	H	C <sub>3</sub> H <sub>7</sub> -i	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIe-11	H	H		(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-
IIe-12	H	CH <sub>3</sub>	CH <sub>3</sub>	(2) OCH <sub>3</sub> (5) CH <sub>3</sub>	-

5 Cloquintocet-mexyl, fenchlorazol-ethyl, isoxadifen-ethyl, mefenpyr-diethyl, furilazole, fenclorim, cumyluron, dymron, dimepiperate and the compounds IIe-5 and IIe-11 are most preferred as the compound which improves crop plant tolerance [component (b')], with cloquintocet-mexyl and mefenpyr-diethyl being especially preferred.

The compounds of the general formula (IIa) to be used according to the invention as safener are known and/or can be prepared by methods known per se (cf. WO-A-91/07874, WO-A-95/07897).

The compounds of the general formula (IIb) to be used according to the invention as safener are known and/or can be prepared by methods known per se (cf. EP-A-191736).

The compounds of the general formula (IIc) to be used according to the invention as safener are known and/or can be prepared by methods known per se (cf. DE-A-2218097, DE-A-5 2350547).

The compounds of the general formula (IId) to be used according to the invention as safener are known and/or can be prepared by methods known per se (cf. DE-A-19621522 / US-A-6235680).

10 The compounds of the general formula (IIe) to be used according to the invention as safener are known and/or can be prepared by methods known per se (cf. WO-A-99/66795 / US-A-6251827).

Examples of the selectively herbicidal combinations according to the invention of in each case one active compound of the formula (I) and in each case one of the above-defined safeners are listed in the table which follows.

15 **Table:** Examples of the combinations according to the invention

Active compounds of the formula (I)	Safener
I-1	cloquintocet-mexyl
I-1	fenchlorazole-ethyl
I-1	isoxadifen-ethyl
I-1	mefenpyr-diethyl
I-1	furilazole
I-1	fenclorim
I-1	cumyluron
I-1	daimuron/dymron
I-1	dimepiperate
I-1	IIe-11
I-1	IIe-5
I-2	cloquintocet-mexyl
I-2	fenchlorazole-ethyl

Active compounds of the formula (I)	Safener
I-2	isoxadifen-ethyl
I-2	mefenpyr-diethyl
I-2	furilazole
I-2	fenclorim
I-2	cumyluron
I-2	daimuron/dymron
I-2	dimepiperate
I-2	IIe-11
I-2	IIe-5
I-3	cloquintocet-mexyl
I-3	fenchlorazole-ethyl
I-3	isoxadifen-ethyl
I-3	mefenpyr-diethyl
I-3	furilazole
I-3	fenclorim
I-3	cumyluron
I-3	daimuron/dymron
I-3	dimepiperate
I-3	IIe-5
I-3	IIe-11
I-4	cloquintocet-mexyl
I-4	fenchlorazole-ethyl
I-4	isoxadifen-ethyl
I-4	mefenpyr-diethyl
I-4	furilazole
I-4	fenclorim
I-4	cumyluron
I-4	daimuron/dymron
I-4	dimepiperate
I-4	IIe-11
I-4	IIe-5

<b>Active compounds of the formula (I)</b>	<b>Safener</b>
I-5	cloquintocet-mexyl
I-5	fenchlorazole-ethyl
I-5	isoxadifen-ethyl
I-5	mefenpyr-diethyl
I-5	furilazole
I-5	fenclorim
I-5	cumyluron
I-5	daimuron/dymron
I-5	dimepiperate
I-5	IIe-5
I-5	IIe-11
I-6	cloquintocet-mexyl
I-6	fenchlorazole-ethyl
I-6	isoxadifen-ethyl
I-6	mefenpyr-diethyl
I-6	furilazole
I-6	fenclorim
I-6	cumyluron
I-6	daimuron/dymron
I-6	dimepiperate
I-6	IIe-5
I-6	IIe-11
I-7	cloquintocet-mexyl
I-7	fenchlorazole-ethyl
I-7	isoxadifen-ethyl
I-7	mefenpyr-diethyl
I-7	furilazole
I-7	fenclorim
I-7	cumyluron
I-7	daimuron/dymron
I-7	dimepiperate

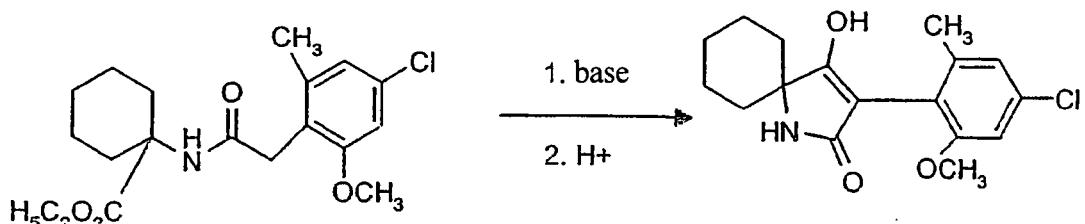
Active compounds of the formula (I)	Safener
I-7	IIe-5
I-7	IIe-11
I-8	cloquintocet-mexyl
I-8	fenchlorazole-ethyl
I-8	isoxadifen-ethyl
I-8	mefenpyr-diethyl
I-8	furilazole
I-8	fenclorim
I-8	cumyluron
I-8	daimuron/dymron
I-8	dimepiperate
I-8	IIe-5
I-8	IIe-11

Surprisingly, it has now been found that the above-defined active compound combinations of substituted cyclic ketoenols of the general formula (I) and safeners (antidotes) from the above group (b') are not only very well tolerated by useful plants, but also have a particularly high 5 herbicidal activity and can be used in a variety of crops, in particular in cereals (mainly wheat), but also in soybeans, potatoes, maize and rice, for the selective control of weeds.

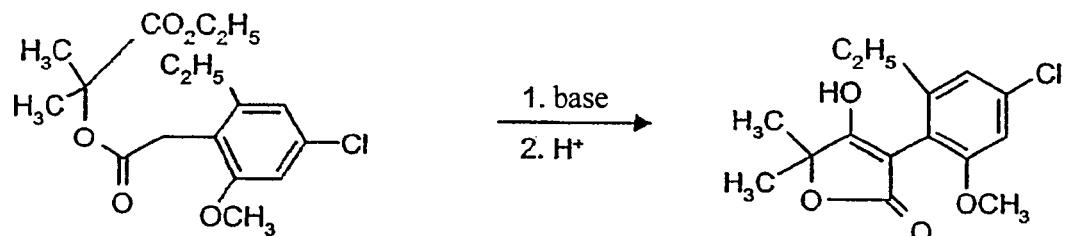
It must be considered as surprising that, from a multiplicity of known safeners or antidotes which are capable of antagonizing the damaging effect of a herbicide on the crop plants, it is precisely the abovementioned compounds of group (b') which are capable of virtually completely 10 compensating for the harmful effect of substituted cyclic ketoenols on the crop plants without adversely affecting the herbicidal activity towards the weeds to a substantial degree.

What must be emphasized in this context is the particularly advantageous activity of the particularly and most preferred combination partners from group (b'), in particular with regard to leaving cereal plants, such as, for example, wheat, barley and rye, but also maize and rice, as crop 15 plants unharmed.

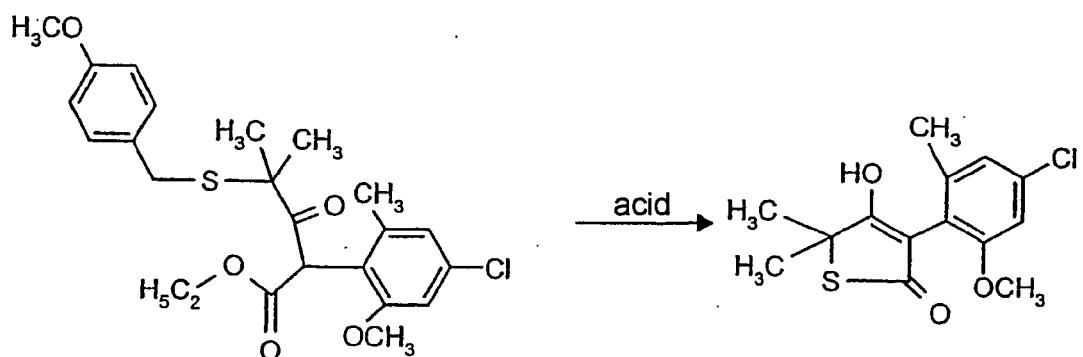
Using, for example, according to process (A), ethyl N-(2-methyl-4-chloro-6-methoxyphenyl-acetyl)-1-aminocyclohexanecarboxylate as starting material, the course of the process according to the invention can be represented by the reaction scheme below:



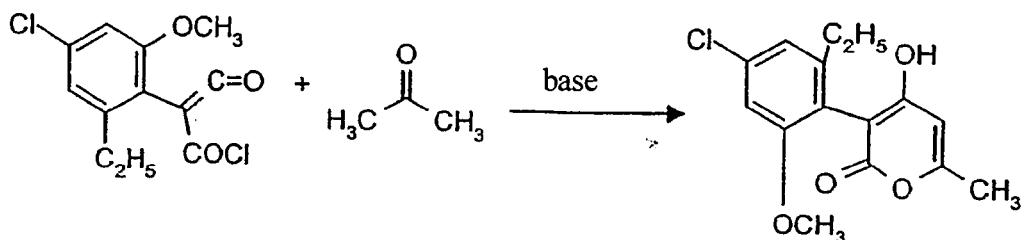
5 Using, for example, according to process (B), ethyl O-(2-ethyl-4-chloro-6-methoxyphenyl-acetyl)-2-hydroxyisobutyrate, the course of the process according to the invention can be represented by the reaction scheme below:



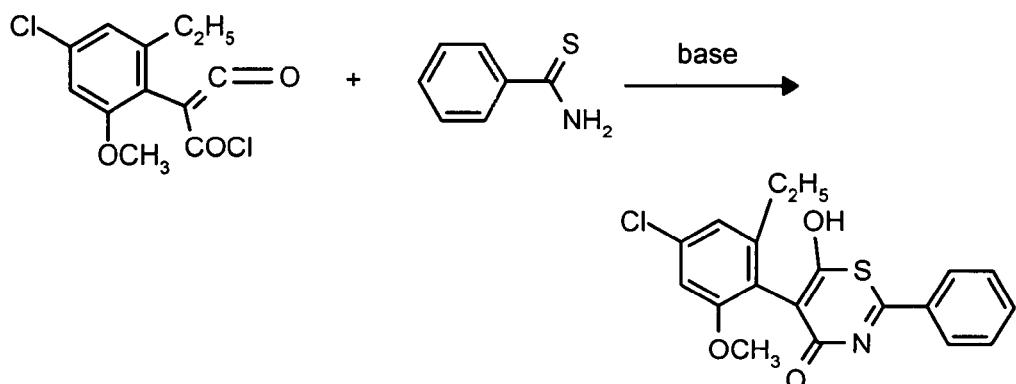
10 Using, for example, according to process (C), ethyl 2-(2-methyl-4-chloro-6-methoxyphenyl)-4-(4-methoxy)benzylmercapto-4-methyl-3-oxovalerate, the course of the process according to the invention can be represented by the reaction scheme below:



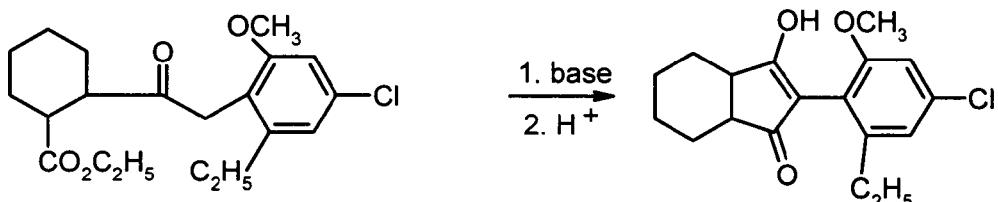
Using, for example, according to process (D), chlorocarbonyl 2-ethyl-4-chloro-6-methoxyphenyl ketene and acetone as starting materials, the course of the process according to the invention can be represented by the reaction scheme below:



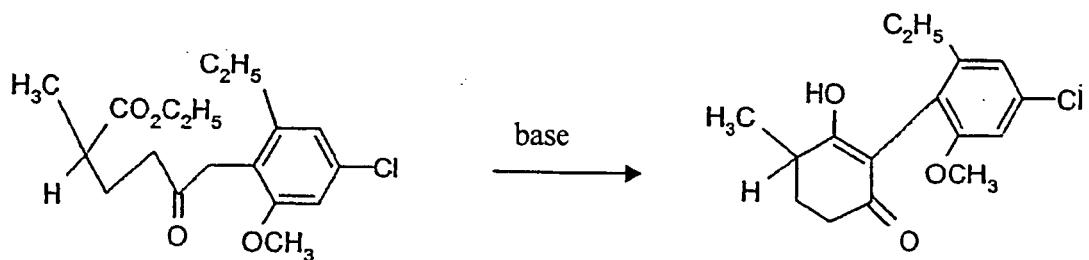
5 Using, for example, according to process (E), chlorocarbonyl 2-(2-ethyl-4-chloro-6-methoxyphenyl)ketene and thiobenzamide as starting materials, the course of the process according to the invention can be represented by the reaction scheme below:



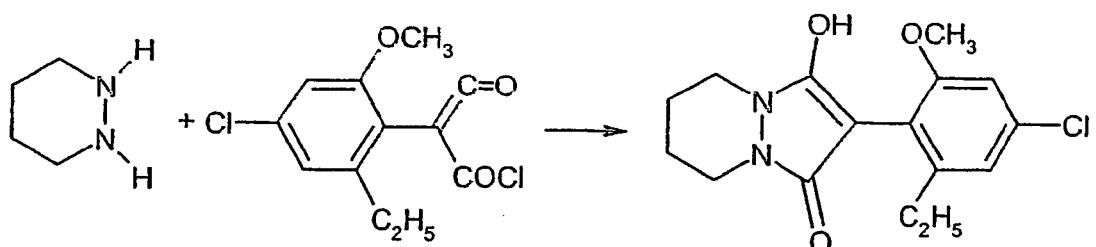
10 Using, for example, according to process (F), ethyl 5-(2-ethyl-4-chloro-6-methoxyphenyl)-2,3-tetramethylene-4-oxoalate, the course of the process according to the invention can be represented by the reaction scheme below:



15 Using, for example, according to process (G), ethyl 5-[(2-ethyl-4-chloro-6-methoxyphenyl)-2-methyl-5-oxohexanoate, the course of the process according to the invention can be represented by the reaction scheme below:

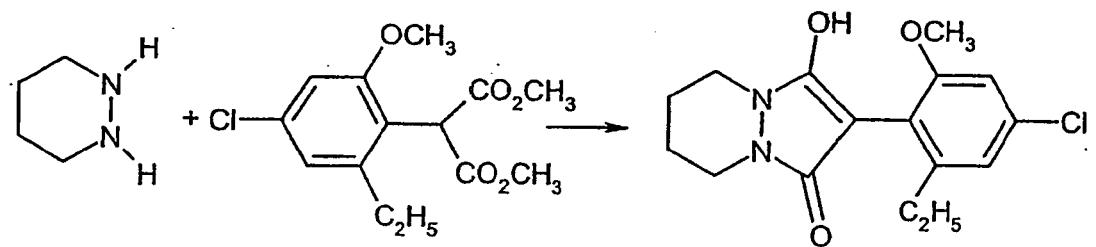


Using, for example, according to process (H $\alpha$ ), hexahydropyridazine and chlorocarbonyl 2-ethyl-4-chloro-6-methoxyphenyl] ketene as starting materials, the course of the process according to the invention can be represented by the reaction scheme below:

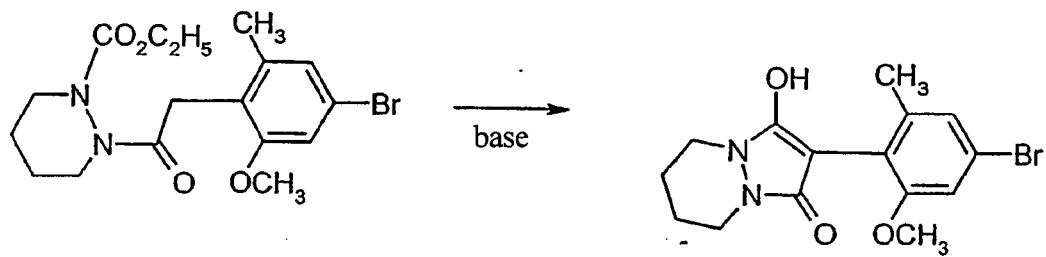


5

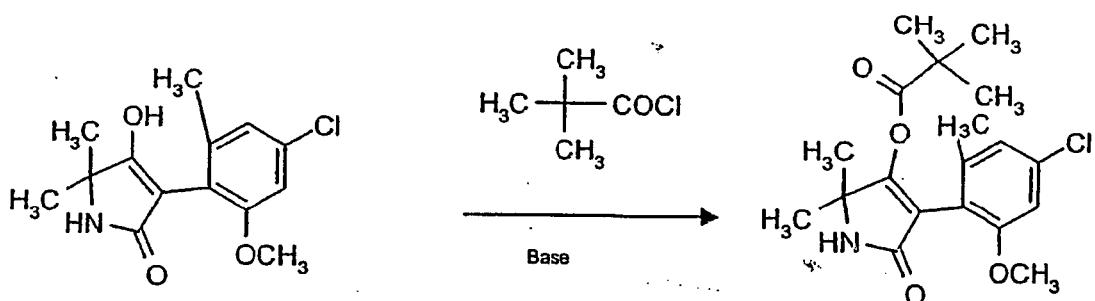
Using, for example, according to process (H $\beta$ ), hexahydropyridazine and dimethyl (2-ethyl-4-chloro-6-methoxy)phenylmalonate as starting materials, the course of the process according to the invention can be represented by the reaction scheme below:



10 Using, for example, according to process (H $\gamma$ ), 1-ethoxycarbonyl-2-[(2-methyl-4-bromo-6-methoxy)phenylacetyl]hexahdropyridazine as starting material, the course of the reaction can be represented by the scheme below:

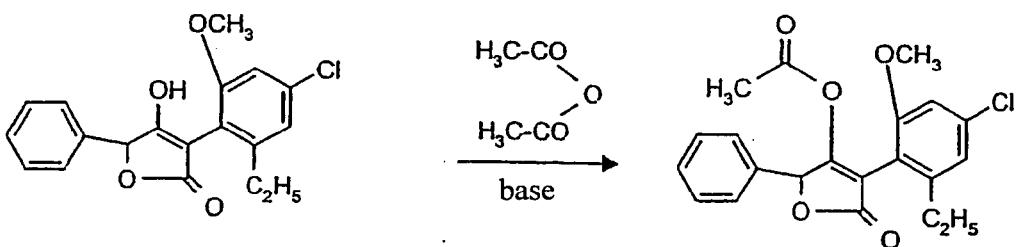


Using, for example, according to process (I $\alpha$ ), 3-(2-methyl-4-chloro-6-methoxyphenyl)-5,5-dimethylpyrrolidine-2,4-dione and pivaloyl chloride as starting materials, the course of the process according to the invention can be represented by the reaction scheme below:

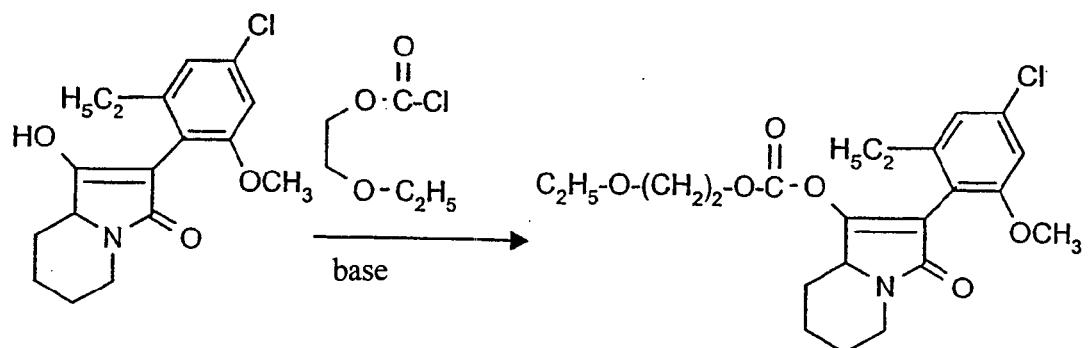


5

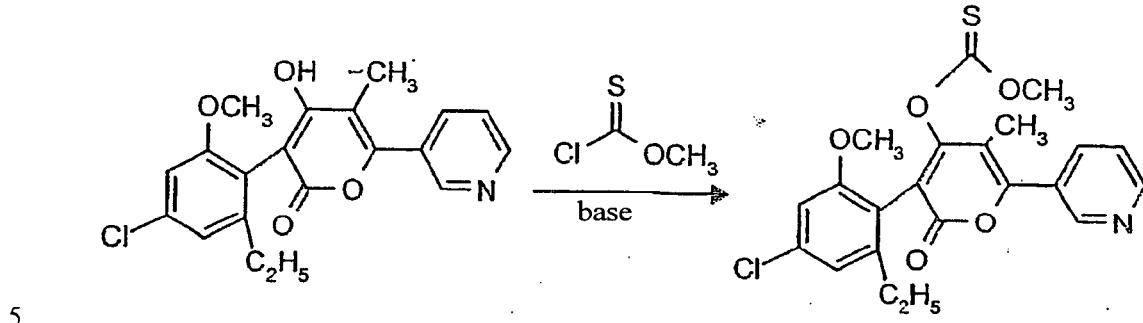
Using, for example, according to process (I $\beta$ ), 3-(2-ethyl-4-chloro-6-methoxyphenyl)-4-hydroxy-5-phenyl- $\Delta^3$ -dihydrofuran-2-one and acetic anhydride as starting materials, the course of the process according to the invention can be represented by the reaction below:



10 Using, for example, according to process (J), 8-[(2-ethyl-4-chloro-6-methoxyphenyl)-1-azabicyclo-(4,3,0<sup>1,6</sup>)-nonane-7,9-dione and ethoxyethyl chloroformate as starting materials, the course of the process according to the invention can be represented by the reaction scheme below:

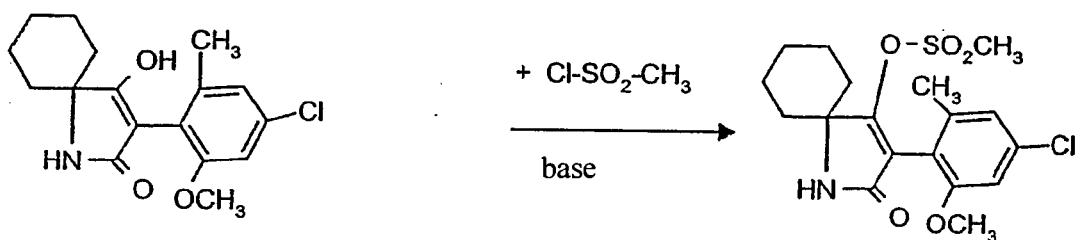


Using, for example, according to process (K), 3-(2-ethyl-4-chloro-6-methoxyphenyl)-4-hydroxy-5-methyl-6-(3-pyridyl)pyrone and methyl chloromonothioformate as starting materials, the course of the reaction can be represented as follows:

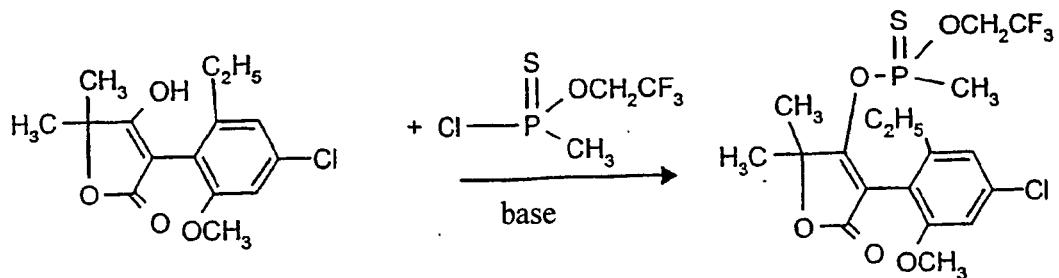


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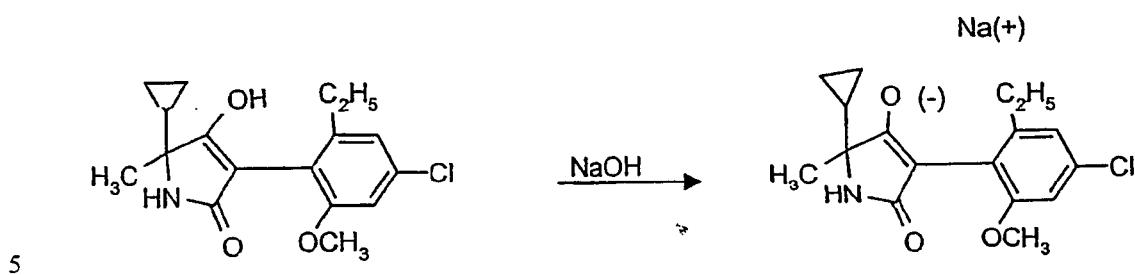
Using, for example, according to process (L), 3-(2-methyl-4-chloro-6-methoxyphenyl)-5,5-pentamethylenepyrrolidine-2,4-dione and methanesulphonyl chloride as starting materials, the course of the reaction can be represented by the reaction scheme below:



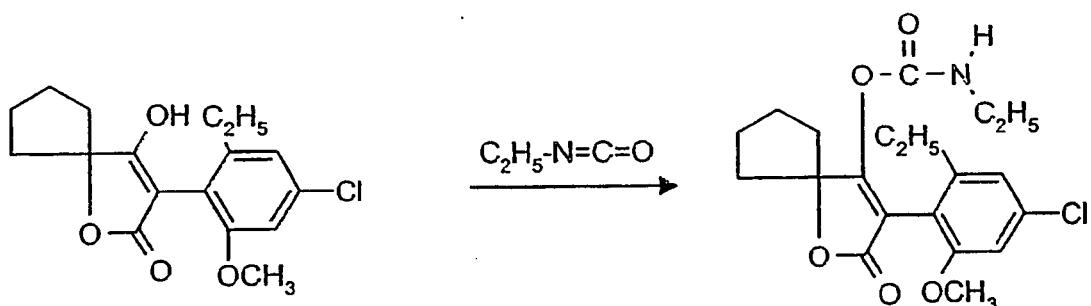
10 Using, for example, according to process (M), 3-(2-ethyl-4-chloro-6-methoxyphenyl)-4-hydroxy-5,5-dimethyl- $\Delta^3$ -dihydrofuran-2-one and 2,2,2-trifluoroethyl methanethiophosphonyl chloride as starting materials, the course of the reaction can be represented by the reaction scheme below:



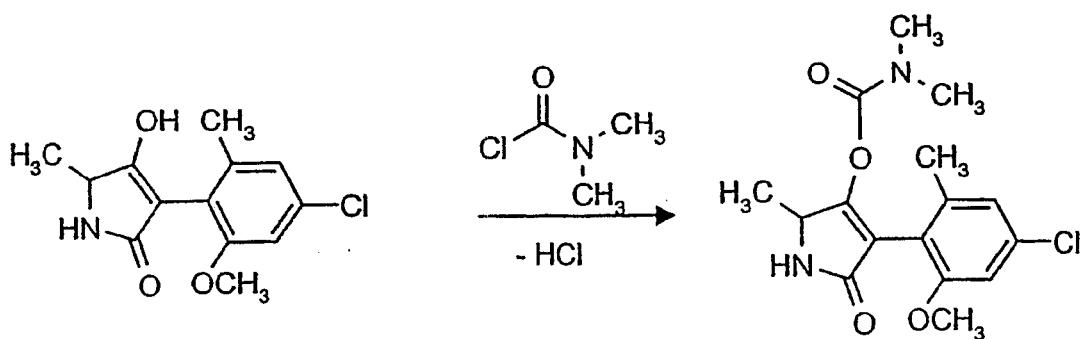
Using, for example, according to process (N), 3-(2-ethyl-4-chloro-6-methoxyphenyl)-5-cyclopropyl-5-methylpyrrolidine-2,4-dione and NaOH as components, the course of the process according to the invention can be represented by the reaction scheme below:



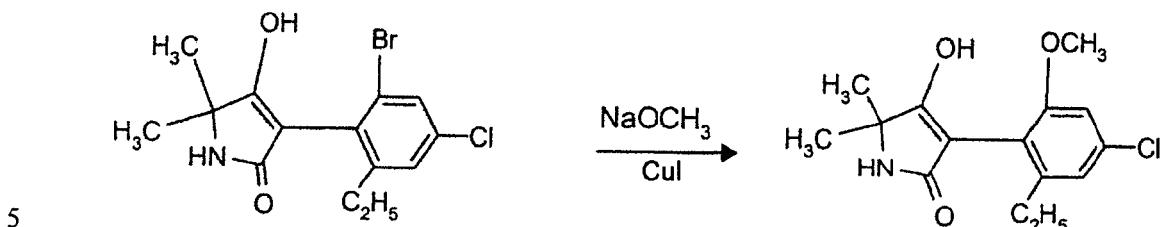
Using, for example, according to process (O), variant  $\alpha$ , 3-(2-ethyl-4-chloro-6-methoxyphenyl)-4-hydroxy-5-tetramethylene- $\Delta^3$ -dihydrofuran-2-one and ethyl isocyanate as starting materials, the course of the reaction can be represented by the reaction scheme below:



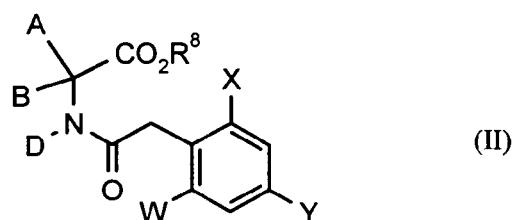
10 Using, for example, according to process (O), variant  $\beta$ , 3-(2-methyl-4-chloro-6-methoxyphenyl)-5-methylpyrrolidine-2,4-dione and dimethylcarbamoyl chloride as starting materials, the course of the reaction can be represented by the scheme below:



Using, for example, according to process (P), 3-(2-bromo-4-chloro-6-ethylphenyl)-5,5-dimethylpyrrolidine-2,4-dione and sodium methoxide as starting materials, the course of the reaction can be represented by the following scheme:



The compounds, required as starting materials in the process (a) according to the invention, of the formula (II)

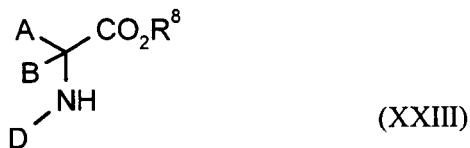


10 in which

A, B, D, W, X, Y and  $\text{R}^8$  are as defined above

are novel.

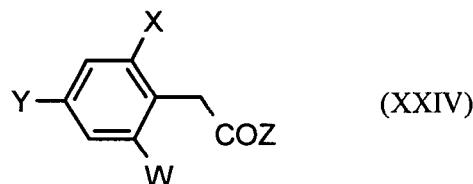
The acylamino acid esters of the formula (II) are obtained, for example, when amino acid derivatives of the formula (XXIII)



in which

A, B, R<sup>8</sup> and D are as defined above

are acylated with substituted phenylacetic acid derivatives of the formula (XXIV)



5

in which

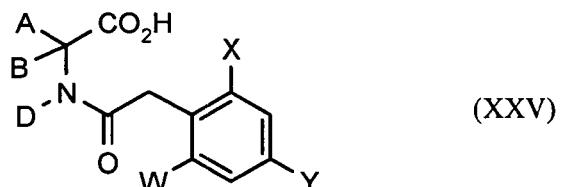
W, X and Y are as defined above and

Z represents a leaving group introduced by reagents that activate carboxylic acids, such as carbonyldiimidazole, carbonyldiimides (such as, for example, dicyclohexylcarbonyldiimide), phosphorylating reagents (such as, for example, POCl<sub>3</sub>, BOP-Cl), halogenating agents, for example thionyl chloride, oxalyl chloride, phosgene or chloroformic esters

10

(Chem. Reviews 52, 237-416 (1953); Bhattacharya, Indian J. Chem. 6, 341-5, 1968)

or when acylamino acids of the formula (XXV)



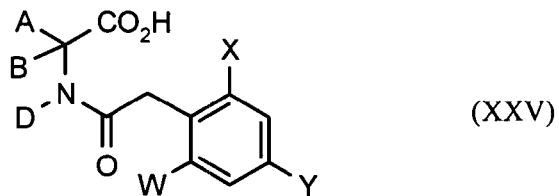
15

in which

A, B, D, W, X and Y are as defined above

are esterified (Chem. Ind. (London) 1568 (1968)).

The compounds of the formula (XXV)

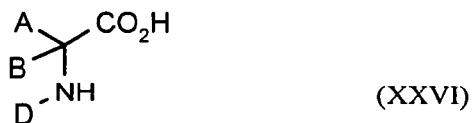


in which

5 A, B, D, W, X and Y are as defined above

are novel.

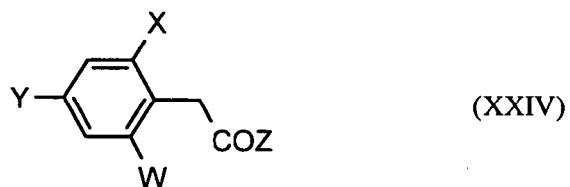
The compounds of the formula (XXV) are obtained when amino acids of the formula (XXVI)



in which

10 A, B and D are as defined above

are acylated with substituted phenyl acetic acid derivatives of the formula (XXIV)



in which

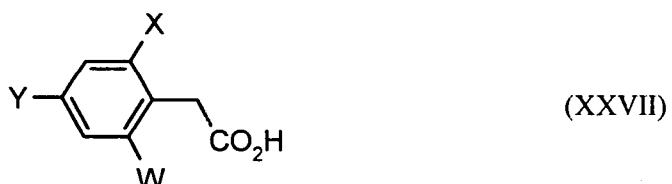
W, X and Y are as defined above and

15 Z is as defined above,

for example according to Schotten-Baumann (Organikum, VEB Deutscher Verlag der Wissenschaften, Berlin 1977, p. 505).

The compounds of the formula (XXIV) are novel. They can be prepared by processes known in principle and as shown in the Preparation Examples (see, for example, H. Henecka, Houben-  
5 Weyl, Methoden der Organischen Chemie [Methods of Organic Chemistry], Vol. 8, pp. 467-469 (1952)).

The compounds of the formula (XXIV) are obtained, for example, by reacting substituted phenyl acetic acids of the formula (XXVII)



10 in which

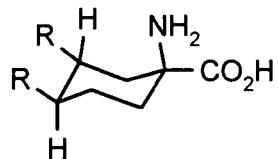
W, X and Y are as defined above

with halogenating agents (for example thionyl chloride, thionyl bromide, oxalyl chloride, phosgene, phosphorus trichloride, phosphorus tribromide or phosphorus pentachloride), phosphonylating reagents (such as, for example,  $\text{POCl}_3$ , BOP-Cl), carbonyldiimidazole, 15 carbonyldiimides (for example dicyclohexylcarbonyldiimide), if appropriate in the presence of a diluent (for example optionally chlorinated aliphatic or aromatic hydrocarbons, such as toluene or methylene chloride, or ethers, for example tetrahydrofuran, dioxane, methyl tert-butyl ether), at temperatures of from -20°C to 150°C, preferably from -10°C to 100°C.

Some of the compounds of the formulae (XXIII) and (XXVI) are known and/or can be 20 prepared by known processes (see, for example, Compagnon, Miocque Ann. Chim. (Paris) [14] 5, pp. 11-22, 23-27 (1970)).

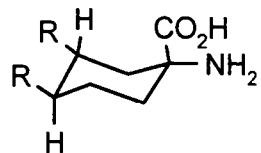
The substituted cyclic aminocarboxylic acids of the formula (XXVI) in which A and B form a ring are generally obtained by means of a Bucherer-Bergs synthesis or a Strecker synthesis, where they are obtained in each case in different isomeric forms. Thus, the conditions of the 25 Bucherer-Bergs synthesis give predominantly the isomers (for simplicity reasons referred to as  $\beta$  hereinbelow) in which the radicals R and the carboxyl group are in equatorial positions, while the conditions of the Strecker synthesis give predominantly the isomers (for simplicity

reasons referred to as  $\alpha$  hereinbelow) where the amino group and the radicals R are in equatorial positions.



Bucherer-Bergs synthesis

5 (B isomer)

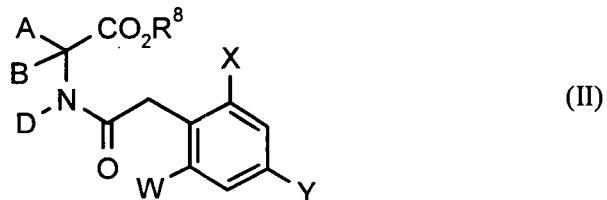


Strecker synthesis

( $\alpha$  isomer)

(L. Munday, J. Chem. Soc. 4372 (1961); J.T. Eward, C. Jitrangeri, Can. J. Chem. 53, 3339 (1975).

Furthermore, the starting materials, used in process (A) above, of the formula (II)



10 in which

A, B, D, W, X, Y and  $R^8$  are as defined above

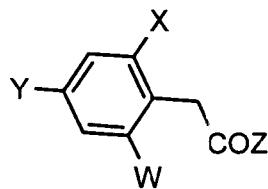
can be prepared by reacting aminonitriles of the formula (XXVIII)



in which

15 A, B and D are as defined above

with substituted phenylacetic acid derivatives of the formula (XXIV)

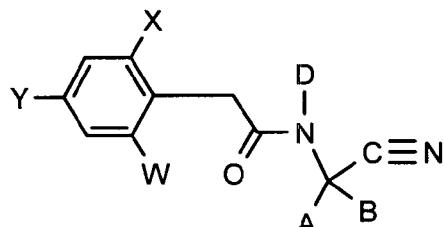


(XXIV)

in which

W, X, Y and Z are as defined above

to give compounds of the formula (XXIX)



(XXIX)

5

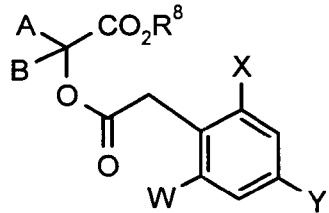
in which

A, B, D, W, X and Y are as defined above,

which are then subjected to an acidic alcoholysis.

The compounds of the formula (XXIX) are also novel.

10 The compounds, required as starting materials for the process (B) according to the invention, of the formula (III)



(III)

in which

A, B, W, X, Y and R<sup>8</sup> are as defined above

15 are novel.

They can be prepared by methods known in principle.

Thus, the compounds of the formula (III) are obtained, for example, when

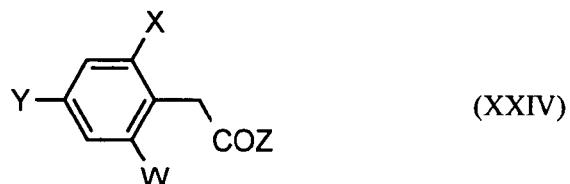
2-hydroxycarboxylic esters of the formula (XXX-A)



5 in which

A, B and R<sup>8</sup> are as defined above

are acylated with substituted phenyl acetic acid derivatives of the formula (XXIV)



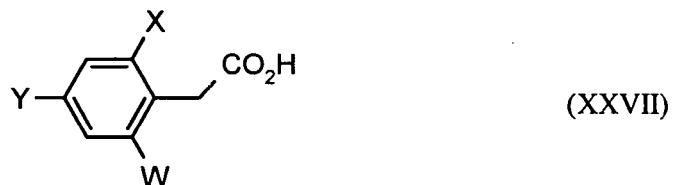
in which

10 W, X and Y are as defined above

(Chem. Reviews 52, 237-416 (1953)).

Furthermore, compounds of the formula (III) are obtained when

substituted phenylacetic acids of the formula (XXVII)



15 in which

W, X and Y are as defined above

are alkylated with  $\alpha$ -halocarboxylic esters of the formula (XXX-B)



in which

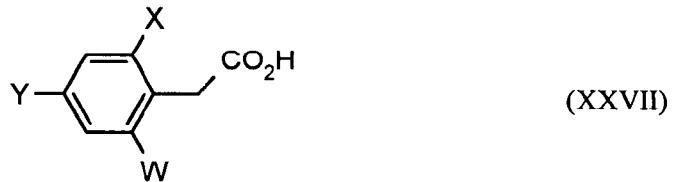
A, B and  $R^8$  are as defined above and

5 Hal represents chlorine or bromine.

The compounds of the formula (XXVII) are novel.

The compounds of the formula (XXX-B) are commercially available.

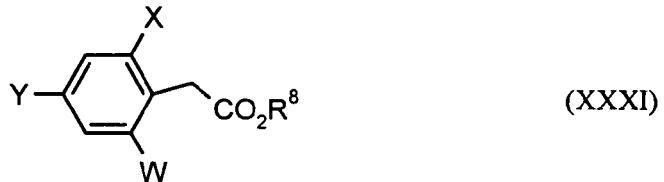
The compounds of the formula (XXVII)



10 in which

W, X and Y are as defined above

are obtained, for example, when phenylacetic esters of the formula (XXXI)



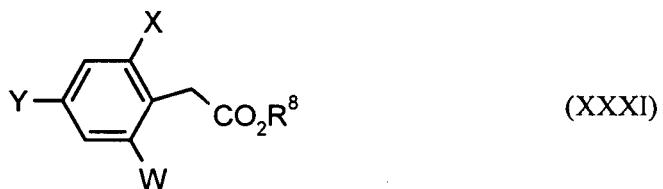
in which

15 W, X, Y and  $R^8$  are as defined above

are hydrolysed in the presence of acids or bases in the presence of a solvent under generally known standard conditions. Furthermore, phenylacetic acids of the formula (XXVII) are obtained by process (Q).

The compounds of the formula (XXXI) are novel.

5 The compounds of the formula (XXXI)

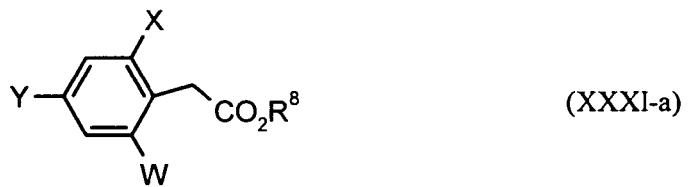


in which

W, X, Y and R<sup>8</sup> are as defined above

are obtained, for example, by the process (R) described in the examples

10 when phenylacetic esters of the formula (XXXI-a)



in which

R<sup>8</sup>, X and Y are as defined above and

W represents halogen (in particular bromine)

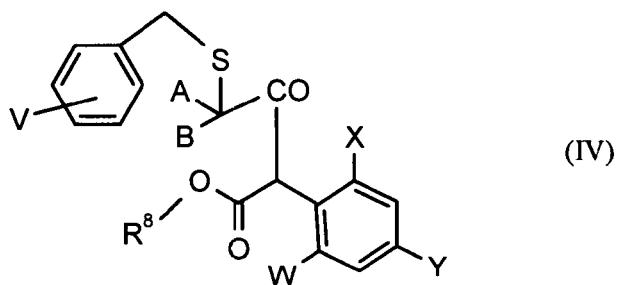
15 are reacted in the presence of an alcohol, in the presence of a base and, if appropriate, in the presence of a catalyst (preferably copper salts, such as, for example, copper(I) bromide).

The phenylacetic esters of the formula (XXXI-a) are known in principle from the Application WO 96/35 664 and DE-A-10 301 804 or can be prepared by the processes described therein.

Furthermore, phenylacetic esters of the formula (XXXI) are obtained by the process (Q) described below by esterifying, according to standard methods, the phenylacetic acids of the formula (XXVII) obtained in this process.

The compounds, required as starting materials in the above process (C), of the formula (IV)

5



in which

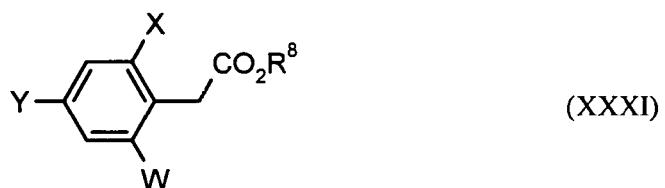
A, B, V, W, X, Y and R<sup>8</sup> are as defined above

are novel.

They can be prepared by methods known in principle.

10 The compounds of the formula (IV) are obtained, for example, when

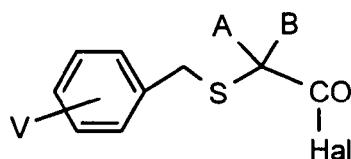
substituted phenylacetic esters of the formula (XXXI)



in which

W, X, Y and R<sup>8</sup> are as defined above

15 are acylated with 2-benzylthiocarbonyl halides of the formula (XXXII)



(XXXII)

in which

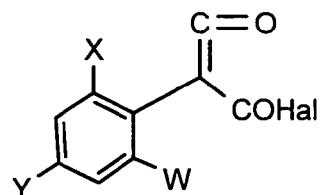
A, B and V are as defined above and

Hal represents halogen (in particular chlorine or bromine)

5 in the presence of strong bases (see, for example, M.S. Chambers, E.J. Thomas, D.J. Williams, J. Chem. Soc. Chem. Commun., (1987), 1228).

Some of the benzylthiocarbonyl halides of the formula (XXXII) are known, and/or they can be prepared by known processes (J. Antibiotics (1983), 26, 1589).

10 The halocarbonyl ketenes of the formula (VI) required as starting materials for the above processes (D), (E) and (H- $\alpha$ ) are novel. They can be prepared by methods known in principle (cf., for example, Org. Prep. Proced. Int., 7, (4), 155-158, 1975 and DE-A-1 945 703). Thus, for example, the compounds of the formula (VI)



(VI)

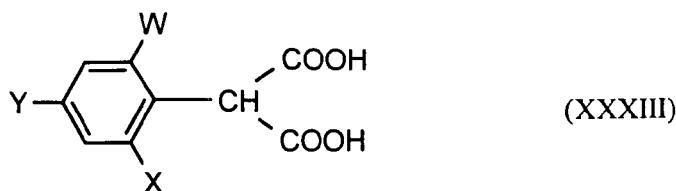
in which

15 W, X and Y are as defined above and

Hal represents chlorine or bromine

are obtained when

substituted phenylmalonic acids of the formula (XXXIII)



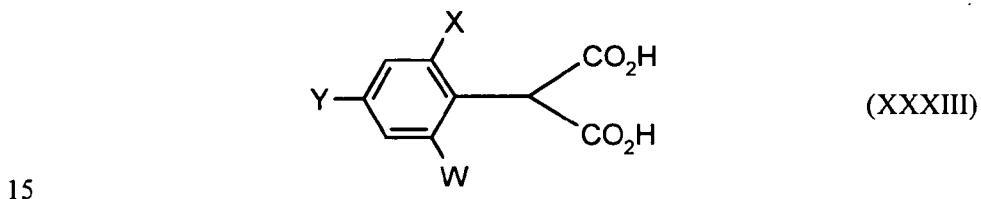
in which

W, X and Y are as defined above

are reacted with acid halides, such as, for example, thionyl chloride, phosphorus(V) chloride, 5 phosphorus(III) chloride, oxalyl chloride, phosgene or thionyl bromide, if appropriate in the presence of catalysts, such as, for example, diethylformamide, methylstearylformamide or triphenylphosphine and, if appropriate in the presence of bases, such as, for example, pyridine or triethylamine.

The substituted phenylmalonic acids of the formula (XXXIII) are novel. They can be prepared 10 in a simple manner by known processes (cf., for example, Organikum, VEB Deutscher Verlag der Wissenschaften, Berlin 1977, p. 517 ff, EP-A-528 156, WO 96/35 664, WO 97/02 243, WO 97/01535, WO 97/36868 and WO 98/05638).

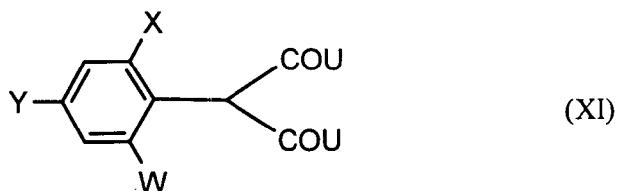
Thus, phenylmalonic acids of the formula (XXXIII)



in which

W, X and Y are as defined above

are obtained when phenylmalonic acid derivatives of the formula (XI)



in which

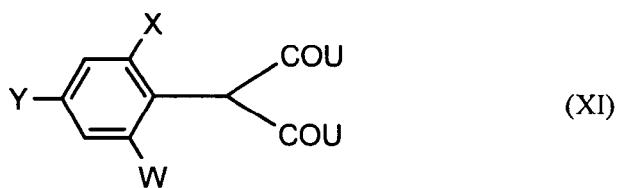
W, X and Y are as defined above and

U represents OR<sup>8</sup> or NH<sub>2</sub>,

5 where R<sup>8</sup> is as defined above,

are initially hydrolysed in the presence of a base and a solvent and then carefully acidified (EP-A-528 156, WO 96/35 664, WO 97/02 243).

The malonic acid derivatives of the formula (XI)



10 in which

W, X and Y are as defined above

and U represents OR<sup>8</sup> or NH<sub>2</sub>,

where R<sup>8</sup> is as defined above

are novel.

15 They can be prepared by generally known methods of organic chemistry (cf., for example, Tetrahedron Lett. 27, 2763 (1986), Organikum VEB Deutscher Verlag der Wissenschaften, Berlin 1977, p. 587 ff., WO 96/35664, WO 97/02243, WO 97/01535, WO 97/36868, WO 98/05638 and WO 99/47525).

The carbonyl compounds, required as starting materials for the process (D) according to the invention, of the formula (V)



in which

5 A and D are as defined above

or their silyl enol ethers of the formula (Va)



in which

A, D and R<sup>8</sup> are as defined above

10 are compounds which are commercially available, generally known or obtainable by known processes.

The preparation of the ketene acid chlorides of the formula (VI) required as starting materials for carrying out the process (E) according to the invention has already been described above.

15 The thioamides, required for carrying out the process (E) according to the invention, of the formula (VII)

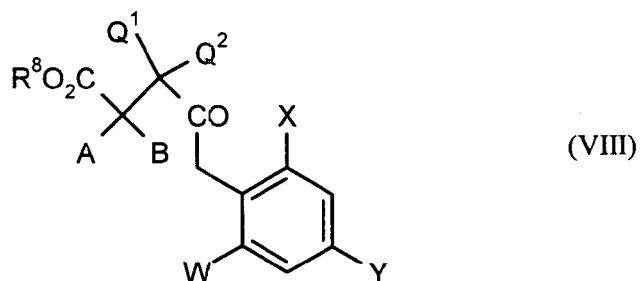


in which

A is as defined above

are compounds which are generally known in organic chemistry.

The compounds, required as starting materials for the above process (F), of the formula (VIII)



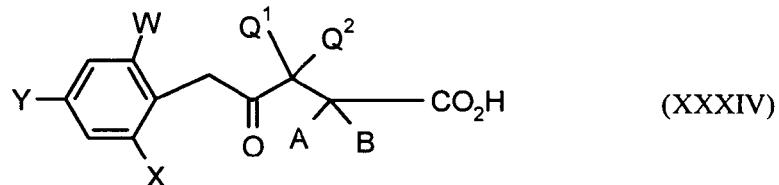
in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X, Y and R<sup>8</sup> are as defined above

5 are novel.

They can be prepared by methods known in principle.

The 5-aryl-4-ketocarboxylic esters of the formula (VIII) are obtained, for example, when 5-aryl-4-ketocarboxylic acids of the formula (XXXIV)

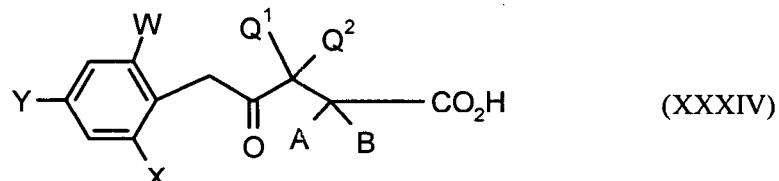


10 in which

W, X, Y, A, B, Q<sup>1</sup> and Q<sup>2</sup> are as defined above

are esterified (cf., for example, Organikum, 15th edition, Berlin, 1977, page 499) or alkylated (see Preparation Example).

The 5-aryl-4-ketocarboxylic acids of the formula (XXXIV)

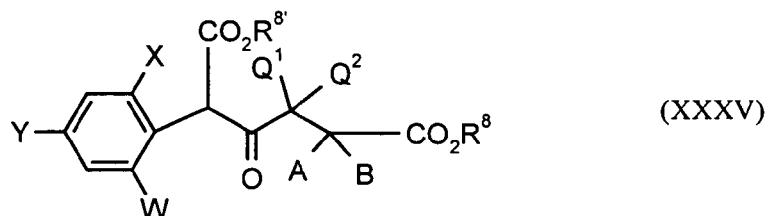


in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above

are novel, but can be prepared by methods known in principle (WO 96/01 798, WO 97/14667, WO 98/39281).

5 The 5-aryl-4-ketocarboxylic acids of the formula (XXXIV) are obtained, for example, when 2-phenyl-3-oxoadipic esters of the formula (XXXV)



in which

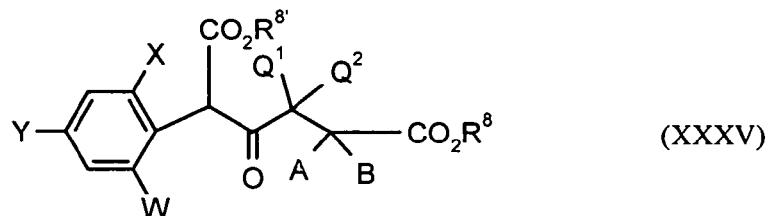
A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above and

10 R<sup>8</sup> and R<sup>8'</sup> represent alkyl (in particular C<sub>1</sub>-C<sub>8</sub>-alkyl) and in which,

if the compound of the formula (XXXVII-a) is used, R<sup>8</sup> represents hydrogen

are decarboxylated, if appropriate in the presence of a diluent and if appropriate in the presence of a base or an acid (cf., for example, Organikum, 15th edition, Berlin, 1977, pages 519 to 521).

15 The compounds of the formula (XXXV)



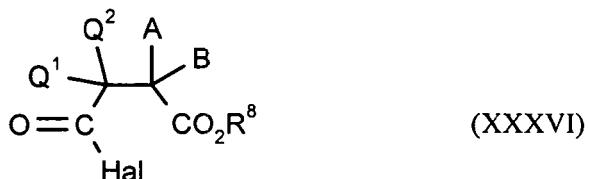
in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X, Y, R<sup>8</sup>, R<sup>8'</sup> are as defined above and in which,

if the compound of the formula (XXXVII-a) is used, R<sup>8</sup> represents hydrogen  
are novel.

The compounds of the formula (XXXV) are obtained, for example,

when dicarboxylic semiester chlorides of the formula (XXXVI),



5

in which

A, B, Q<sup>1</sup>, Q<sup>2</sup> and R<sup>8</sup> are as defined above and

Hal represents chlorine or bromine

or carboxylic anhydrides of the formula (XXXVII-a)

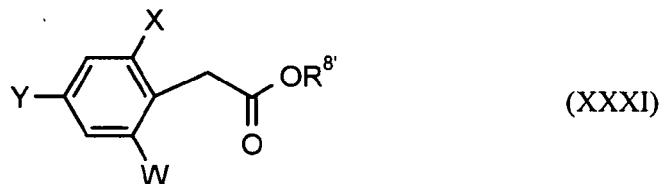


10

in which

A, B, Q<sup>1</sup> and Q<sup>2</sup> are as defined above

are acylated with a phenylacetic ester of the formula (XXXI)



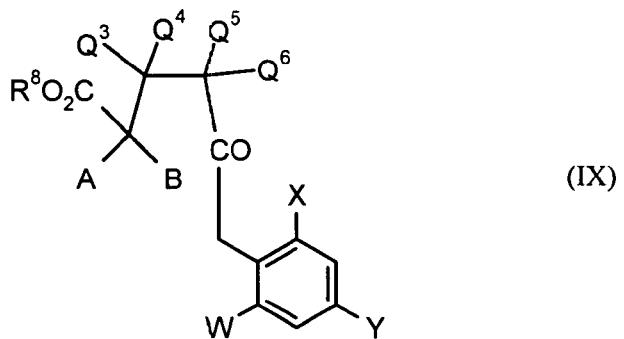
15 in which

W, X, Y and R<sup>8</sup> are as defined above

in the presence of a diluent and in the presence of an acid (cf., for example, M.S. Chambers, E. J. Thomas, D.J. Williams, J. Chem. Soc. Chem. Commun., (1987), 1228, cf. also the Preparation Examples).

5 Some of the compounds of the formulae (XXXVI) and (XXXVII-a) are known compounds of organic chemistry, and/or they can be prepared in a simple manner by methods known in principle.

The compounds, required as starting materials for the above process (G), of the formula (IX)



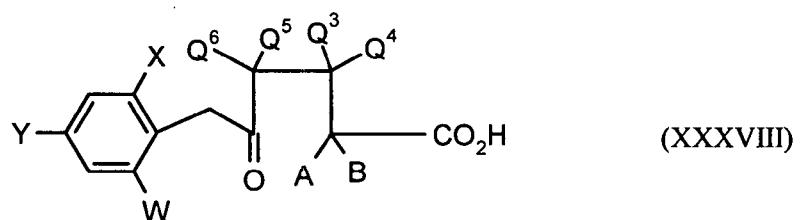
10 in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X, Y and R<sup>8</sup> are as defined above

are novel.

They can be prepared by methods known in principle.

15 The 6-aryl-5-ketocarboxylic esters of the formula (IX) are obtained, for example, when 6-aryl-5-ketocarboxylic acids of the formula (XXXVIII)

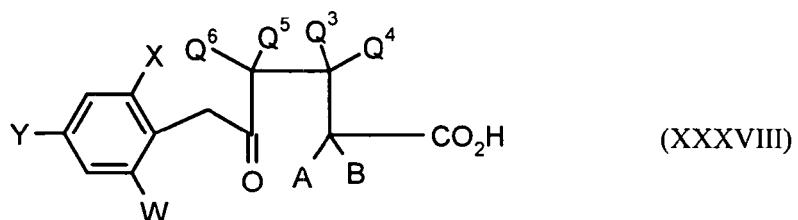


in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above

are esterified (cf., for example, Organikum, 15th edition, Berlin, 1977, page 499).

The 6-aryl-5-ketocarboxylic acids of the formula (XXXVIII)

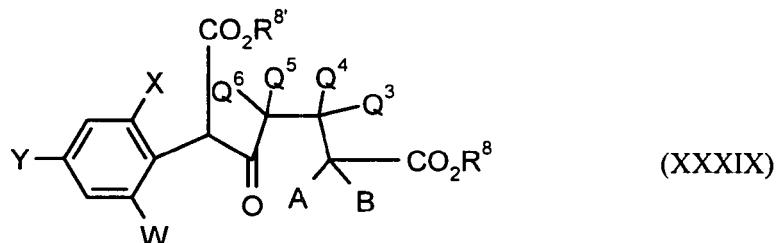


5 in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above

are novel. They can be prepared by methods known in principle (WO 99/43649, WO 99/48869), for example by

hydrolysing and decarboxylating substituted 2-phenyl-3-oxoheptanedioic esters of the formula  
10 (XXXIX)



in which

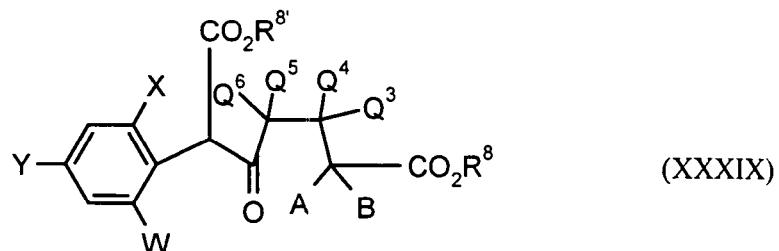
A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above and

R<sup>8</sup> and R<sup>8'</sup> represent alkyl (preferably C<sub>1</sub>-C<sub>6</sub>-alkyl) and in which,

15 if the compound of the formula (XXXVII-b) is used, R<sup>8</sup> represents hydrogen,

if appropriate in the presence of a diluent and if appropriate in the presence of a base or an acid (cf., for example, Organikum, 15. edition, Berlin, 1977, pages 519 to 521).

The compounds of the formula (XXXIX)

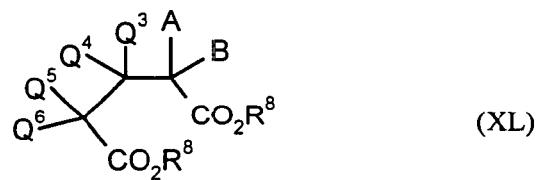


in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X, Y, R<sup>8</sup> and R<sup>8'</sup> are as defined above

5 are novel and can be obtained

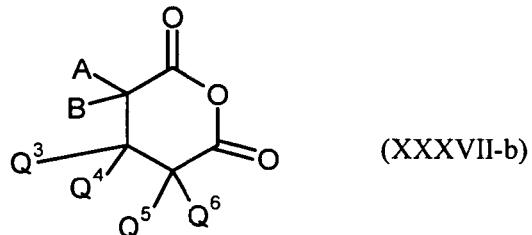
by condensing dicarboxylic esters of the formula (XL)



in which

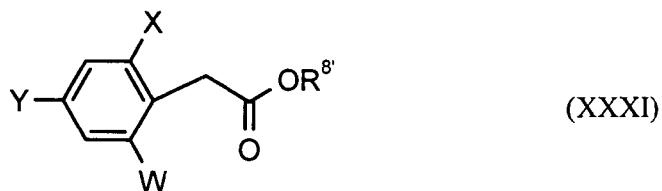
A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup> and R<sup>8</sup> are as defined above

10 or carboxylic anhydrides of the formula (XXXVII-b)



in which A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup> are as defined above

with a substituted phenylacetic ester of the formula (XXXI)



in which

W, X, Y and R<sup>8'</sup> are as defined above

in the presence of a diluent and in the presence of a base.

5 Some of the compounds of the formula (XL) are known, and/or they can be prepared by known processes.

Some of the hydrazines, required as starting materials for the processes (H- $\alpha$ ) and (H- $\beta$ ) according to the invention, of the formula (X)

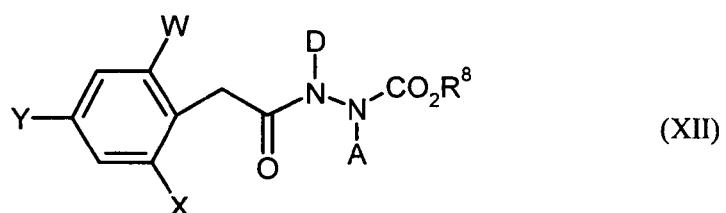


10 in which

A and D are as defined above

are known, and/or they can be prepared by methods known from the literature (cf., for example, Liebigs Ann. Chem. 585, 6 (1954); Reaktionen der organischen Synthese [Reactions of Organic Synthesis], C. Ferri, page 212, 513; Georg Thieme Verlag Stuttgart, 1978; Liebigs Ann. Chem. 443, 242 (1925); Chem. Ber. 98, 2551 (1965), EP-A-508 126, WO 92/16510, 15 WO 99/47 525, WO 01/17 972).

The compounds, required for the process (H- $\gamma$ ) according to the invention, of the formula (XII)

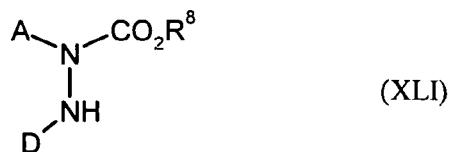


in which

A, D, W, X, Y and R<sup>8</sup> are as defined above

are novel.

The acylcarbazates of the formula (XII) are obtained, for example, when carbazates of the formula (XLI)

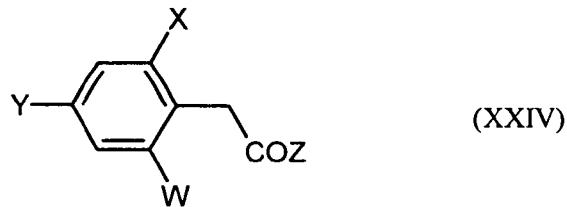


5

in which

A, R<sup>8</sup> and D are as defined above

are acylated with substituted phenylacetic acid derivatives of the formula (XXIV)



10 in which

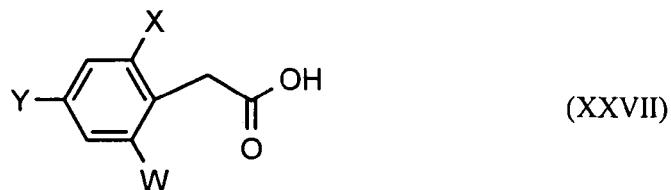
W, X, Y and Z are as defined above

(Chem. Reviews 52, 237-416 (1953); Bhattacharya, Indian J. Chem. 6, 341-5, 1968).

Some of the carbazates of the formula (XLI) are commercially available and some are known compounds, or they can be prepared by processes of organic chemistry known in principle.

15 The compounds of the formula (XXIV) have already been described under the precursors for process (A) and (B).

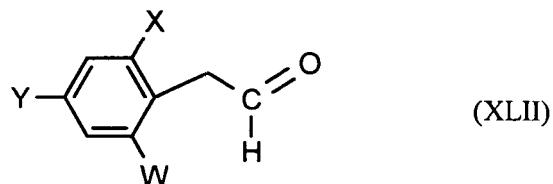
(Q) Furthermore, phenylacetic acids of the formula (XXVII),



in which

W, X and Y are as defined above

are obtained when phenylacetaldehydes of the formula (XLII)



5

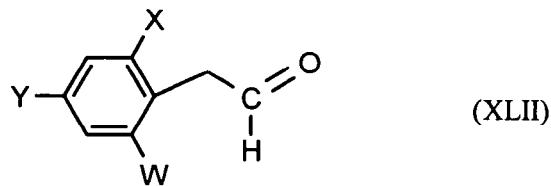
in which

W, X and Y are as defined above

are oxidized, if appropriate in the presence of a solvent, using suitable oxidizing agents (such as, for example, NaOCl).

10 The compounds of the formula (XLII) are novel.

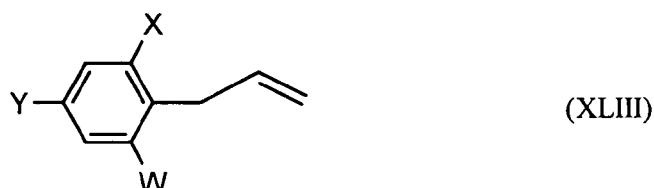
Compounds of the formula (XLII)



in which

W, X and Y are as defined above

are obtained when 3-phenylpropenes of the formula (XLIII)



in which

W, X and Y are as defined above

5 are ozonolysed in the presence of a solvent, and the ozonide obtained is worked up reductively using, for example, dimethyl sulphide.

The 2-alkoxy-substituted 3-phenylpropenes of the formula (XLIII) required for preparing the compounds of the formula (XLII) are compounds known in principle in organic chemistry and can be prepared according to standard processes by alkylating phenols with allyl halides, 10 followed by Claisen rearrangement and subsequent alkylation (WO 96/25 395).

The acid halides of the formula (XIII), carboxylic anhydrides of the formula (XIV), chloroformic esters or chloroformic thioesters of the formula (XV), chloromonothioformic esters or chlorodithioformic esters of the formula (XVI), sulphonyl chlorides of the formula (XVII), phosphorus compounds of the formula (XVIII) and metal hydroxides, metal alkoxides 15 or amines of the formulae (XIX) and (XX) and isocyanates of the formula (XXI) and carbamoyl chlorides of the formula (XXII) furthermore required as starting materials for carrying out the processes (I), (J), (K), (L), (M), (N) and (O) according to the invention are generally known compounds of organic or inorganic chemistry.

In addition, the compounds of the formulae (V), (VII), (XIII) to (XXII), (XXIII), (XXVI), 20 (XXVIII), (XXX-A), (XXX-B), (XXXII), (XXXVI), (XXXVII-a), (XXXVII-b), (XL) and (XLI) are known from the patent applications cited at the outset, and/or they can be prepared by the methods given therein.

The process (A) is characterized in that compounds of the formula (II) in which A, B, D, W, X, Y and R<sup>8</sup> are as defined above are, in the presence of a base, subjected to an intramolecular 25 condensation.

Suitable diluents for the process (A) according to the invention are all inert organic solvents. Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers, such as dibutyl ether, tetrahydrofuran, dioxane, glycol dimethyl ether and diglycol dimethyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide, 5 dimethylacetamide and N-methylpyrrolidone, and also alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol and tert-butanol.

Suitable bases (deprotonating agents) for carrying out the process (A) according to the invention are all customary proton acceptors. Preference is given to using alkali metal and alkaline earth metal oxides, hydroxides and carbonates, such as sodium hydroxide, potassium hydroxide, magnesium oxide, calcium oxide, sodium carbonate, potassium carbonate and calcium carbonate, which can also be used in the presence of phase-transfer catalysts, such as, for example, triethylbenzylammonium chloride, tetrabutylammonium bromide, Adogen 464 (= methyltrialkyl(C<sub>8</sub>-C<sub>10</sub>)ammonium chloride) or TDA 1 (= tris(methoxyethoxyethyl)amine). It is furthermore possible to use alkali metals such as sodium or potassium. Also suitable are 10 alkali metal and alkaline earth metal amides and hydrides, such as sodium amide, sodium hydride and calcium hydride, and additionally also alkali metal alkoxides, such as sodium methoxide, sodium ethoxide and potassium tert-butoxide.

When carrying out the process (A) according to the invention, the reaction temperatures can be varied within a relatively large range. In general, the process is carried out at temperatures 20 between 0°C and 250°C, preferably between 50°C and 150°C.

The process (A) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (A) according to the invention, the reaction components of the formula (II) and the deprotonating bases are generally employed in approximately doubly equimolar amounts. However, it is also possible to use a relatively large excess (up to 3 mol) 25 of one component or the other.

The process (B) is characterized in that compounds of the formula (III) in which A, B, W, X, Y and R<sup>8</sup> are as defined above are, in the presence of a diluent and in the presence of a base, subjected to an intramolecular condensation.

Suitable diluents for the process (B) according to the invention are all inert organic solvents. 30 Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers, such as dibutyl ether, tetrahydrofuran, dioxane, glycol dimethyl ether and diglycol dimethyl

ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide and N-methylpyrrolidone. It is furthermore possible to use alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol and tert-butanol.

Suitable bases (deprotonating agents) for carrying out the process (B) according to the invention are all customary proton acceptors. Preference is given to using alkali metal and alkaline earth metal oxides, hydroxides and carbonates, such as sodium hydroxide, potassium hydroxide, magnesium oxide, calcium oxide, sodium carbonate, potassium carbonate and calcium carbonate, which can also be used in the presence of phase-transfer catalysts, such as, for example, triethylbenzylammonium chloride, tetrabutylammonium bromide, Adogen 464 (= methyltrialkyl(C<sub>8</sub>-C<sub>10</sub>)ammonium chloride) or TDA 1 (= tris(methoxyethoxyethyl)amine). It is furthermore possible to use alkali metals, such as sodium or potassium. Also suitable are alkali metal and alkaline earth metal amides and hydrides, such as sodium amide, sodium hydride and calcium hydride, and additionally also alkali metal alkoxides, such as sodium methoxide, sodium ethoxide and potassium tert-butoxide.

When carrying out the process (B) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 250°C, preferably between 50°C and 150°C.

The process (B) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (B) according to the invention, the reaction components of the formula (III) and the deprotonating bases are generally employed in approximately equimolar amounts. However, it is also possible to use a relatively large excess (up to 3 mol) of one component or the other.

The process (C) is characterized in that compounds of the formula (IV) in which A, B, V, W, X, Y and R<sup>8</sup> are as defined above are, in the presence of an acid and, if appropriate, in the presence of a diluent, subjected to intramolecular cyclization.

Suitable diluents for the process (C) according to the invention are all inert organic solvents. Preference is given to using hydrocarbons, such as toluene and xylene, furthermore halogenated hydrocarbons, such as dichloromethane, chloroform, ethylene chloride, chlorobenzene, dichlorobenzene, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide and N-methylpyrrolidone. It is furthermore possible to use alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol, tert-butanol.

If appropriate, the acid used can also serve as diluent.

Suitable acids for the process (C) according to the invention are all customary inorganic and organic acids, such as, for example, hydrohalic acids, sulphuric acid, alkyl-, aryl- and haloalkylsulphonic acids, in particular halogenated alkylcarboxylic acids, such as, for example, 5 trifluoroacetic acid.

When carrying out the process (C) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 250°C, preferably between 50°C and 150°C.

The process (C) according to the invention is generally carried out under atmospheric pressure.

10 When carrying out the process (C) according to the invention, the reaction components of the formula (IV) and the acids are employed, for example, in equimolar amounts. However, it is, if appropriate, also possible to use the acid as solvent or as catalyst.

15 The process (D) according to the invention is characterized in that carbonyl compounds of the formula (V) or enol ethers thereof of the formula (V-a) are reacted with ketene acid halides of the formula (VI) in the presence of a diluent and, if appropriate, in the presence of an acid acceptor.

Suitable diluents for the process (D) according to the invention are all inert organic solvents. Preference is given to using optionally halogenated hydrocarbons, such as toluene, xylene, mesitylene, chlorobenzene and dichlorobenzene, furthermore ethers, such as dibutyl ether, 20 glycol dimethyl ether, diglycol dimethyl ether and diphenyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide or N-methylpyrrolidone.

Suitable acid acceptors for carrying out the process variant (D) according to the invention are all customary acid acceptors.

25 Preference is given to using tertiary amines, such as triethylamine, pyridine, diazabicyclooctane (DABCO), diazabicycloundecane (DBU), diazabicyclononene (DBN), Hünig base and N,N-dimethylaniline.

When carrying out the process variant (D) according to the invention, the reaction temperatures can be varied within a relatively wide range. The process variant is expediently carried out at temperatures between 0°C and 250°C, preferably between 50°C and 220°C.

The process (D) according to the invention is expediently carried out under atmospheric pressure.

When carrying out the process (D) according to the invention, the reaction components of the formulae (V) and (VI) in which A, D, W, X and Y are as defined above and Hal represents halogen and, if appropriate, the acid acceptors are generally employed in approximately equimolar amounts. However, it is also possible to use a relatively large excess (up to 5 mol) of one component or the other.

The process (E) according to the invention is characterized in that thioamides of the formula (VII) are reacted with ketene acid halides of the formula (VI) in the presence of a diluent and, if appropriate, in the presence of an acid acceptor.

Suitable diluents for the process variant (E) according to the invention are all inert organic solvents. Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers, such as dibutyl ether, glycol dimethyl ether and diglycol dimethyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide and N-methylpyrrolidone.

Suitable acid acceptors for carrying out the process (E) according to the invention are all customary acid acceptors.

Preference is given to using tertiary amines, such as triethylamine, pyridine, diazabicyclooctane (DABCO), diazabicycloundecane (DBU), diazabicyclononene (DBN), Hünig base and N,N-dimethylaniline.

When carrying out the process (E) according to the invention, the reaction temperatures can be varied within a relatively wide range. Expediently, the process is carried out at temperatures between 0°C and 250°C, preferably between 20°C and 220°C.

The process (E) according to the invention is expediently carried out under atmospheric pressure.

When carrying out the process (E) according to the invention, the reaction components of the formulae (VII) and (VI) in which A, W, X and Y are as defined above and Hal represents halogen and, if appropriate, the acid acceptors are generally employed in approximately

equimolar amounts. However, it is also possible to use a relatively large excess (up to 5 mol) of one component or the other.

The process (F) is characterized in that compounds of the formula (VIII) in which A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X, Y and R<sup>8</sup> are as defined above are, in the presence of a base, subjected to an 5 intramolecular condensation.

Suitable diluents for the process (F) according to the invention are all organic solvents which are inert towards the reactants. Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers, such as dibutyl ether, tetrahydrofuran, dioxane, glycol dimethyl ether and diglycol dimethyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide and N-methylpyrrolidone. It is furthermore possible to use alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol, tert-butanol. 10

Suitable bases (deprotonating agents) for carrying out the process (F) according to the invention are all customary proton acceptors. Preference is given to using alkali metal and alkaline earth metal oxides, hydroxides and carbonates, such as sodium hydroxide, potassium 15 hydroxide, magnesium oxide, calcium oxide, sodium carbonate, potassium carbonate and calcium carbonate, which can also be used in the presence of phase transfer catalysts, such as, for example, triethylbenzylammonium chloride, tetrabutylammonium bromide, Adogen 464 (methyltrialkyl(C<sub>8</sub>-C<sub>10</sub>)ammonium chloride) or TDA 1 (tris(methoxyethoxyethyl)amine). It is furthermore possible to use alkali metals, such as sodium or potassium. Also suitable are alkali 20 metal and alkaline earth metal amides and hydrides, such as sodium amide, sodium hydride and calcium hydride, and additionally also alkali metal alkoxides, such as sodium methoxide, sodium ethoxide and potassium tert-butoxide.

When carrying out the process (F) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures 25 between -75°C and 250°C, preferably between -50°C and 150°C.

The process (F) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (F) according to the invention, the reaction components of the formula (VIII) and the deprotonating bases are generally employed in approximately equimolar amounts. However, it is also possible to use a relatively large excess (up to 3 mol) of one component or the other. 30

The process (G) is characterized in that compounds of the formula (IX) in which A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X, Y and R<sup>8</sup> are as defined above are, in the presence of bases, subjected to an intramolecular condensation.

Suitable diluents for the process (G) according to the invention are all organic solvents which 5 are inert towards the reactants. Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers, such as dibutyl ether, tetrahydrofuran, dioxane, glycol dimethyl ether and diglycol dimethyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide and N-methylpyrrolidone. It is furthermore possible to use alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol, tert-butanol.

10 Suitable bases (deprotonating agents) for carrying out the process (G) according to the invention are all customary proton acceptors.

Preference is given to using alkali metal and alkaline earth metal oxides, hydroxides and carbonates, such as sodium hydroxide, potassium hydroxide, magnesium oxide, calcium oxide, sodium carbonate, potassium carbonate and calcium carbonate, which can also be used in the 15 presence of phase transfer catalysts, such as, for example, triethylbenzylammonium chloride, tetrabutylammonium bromide, Adogen 464 (methyltrialkyl(C<sub>8</sub>-C<sub>10</sub>)ammonium chloride) or TDA 1 (tris(methoxyethoxyethyl)amine). It is furthermore possible to use alkali metals, such as sodium or potassium. Also suitable are alkali metal and alkaline earth metal amides and hydrides, such as sodium amide, sodium hydride and calcium hydride, and additionally also 20 alkali metal alkoxides, such as sodium methoxide, sodium ethoxide and potassium tert-butoxide.

When carrying out the process (G) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 250°C, preferably between 50°C and 150°C.

25 The process (G) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (G) according to the invention, the reaction components of the formula (IX) and the deprotonating bases are generally employed in approximately equimolar amounts. However, it is also possible to use a relatively large excess (up to 3 mol) of one component or the other.

The process (H- $\alpha$ ) according to the invention is characterized in that hydrazines of the formula (X) or salts of these compounds are reacted with ketene acid halides of the formula (VI) in the presence of a diluent and, if appropriate, in the presence of an acid acceptor.

Suitable diluents for the process (H- $\alpha$ ) according to the invention are all inert organic solvents.

- 5 Preference is given to using optionally chlorinated hydrocarbons, such as, for example, mesitylene, chlorobenzene and dichlorobenzene, toluene, xylene, furthermore ethers, such as dibutyl ether, glycol dimethyl ether, diglycol dimethyl ether and diphenyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide or N-methylpyrrolidone.
- 10 Suitable acid acceptors for carrying out the process variant (H- $\alpha$ ) according to the invention are all customary acid acceptors.

Preference is given to using tertiary amines, such as triethylamine, pyridine, diazabicyclooctane (DABCO), diazabicycloundecane (DBU), diazabicyclononene (DBN), Hünig base and N,N-dimethylaniline.

- 15 When carrying out the process variant (H- $\alpha$ ) according to the invention, the reaction temperatures can be varied within a relatively wide range. The process variant is expediently carried out at temperatures between 0°C and 250°C, preferably between 50°C and 220°C.

The process (H- $\alpha$ ) according to the invention is expediently carried out under atmospheric pressure.

- 20 When carrying out the process (H- $\alpha$ ) according to the invention, the reaction components of the formulae (VI) and (X) in which A, D, W, X and Y are as defined above and Hal represents halogen and, if appropriate, the acid acceptors are generally employed in approximately equimolar amounts. However, it is also possible to use a relatively large excess (up to 5 mol) of one component or the other.
- 25 The process (H- $\beta$ ) is characterized in that hydrazines of the formula (X) or salts of this compound in which A and D are as defined above are, in the presence of a base, subjected to a condensation with malonic esters or malonamides of the formula (XI) in which U, W, X, Y and R<sup>8</sup> are as defined above.

Suitable diluents for the process (H-β) according to the invention are all inert organic solvents. Preference is given to using optionally halogenated hydrocarbons, such as toluene, xylene, mesitylene, chlorobenzene and dichlorobenzene, furthermore ethers, such as dibutyl ether, tetrahydrofuran, dioxane, diphenyl ether, glycol dimethyl ether and diglycol dimethyl ether, 5 moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide, dimethylacetamide and N-methylpyrrolidone, and also alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol and tert-butanol.

Suitable bases (deprotonating agents) for carrying out the process (H-β) according to the invention are all customary proton acceptors. Preference is given to using alkali metal and 10 alkaline earth metal oxides, hydroxides and carbonates, such as sodium hydroxide, potassium hydroxide, magnesium oxide, calcium oxide, sodium carbonate, potassium carbonate and calcium carbonate, and which can also be used in the presence of phase transfer catalysts, such as, for example, triethylbenzylammonium chloride, tetrabutylammonium bromide, Adogen 464 (= methyltrialkyl(C<sub>8</sub>-C<sub>10</sub>)ammonium chloride) or TDA 1 (= tris(methoxyethoxyethyl)amine). 15 It is furthermore possible to use alkali metals, such as sodium or potassium. Also suitable are alkali metal and alkaline earth metal amides and hydrides, such as sodium amide, sodium hydride and calcium hydride, and additionally also alkali metal alkoxides, such as sodium methoxide, sodium ethoxide and potassium tert-butoxide.

It is also possible to use tertiary amines, such as triethylamine, pyridine, diazabicyclooctane 20 (DABCO), diazabicycloundecane (DBU), diazabicyclononene (DBN), Hünig base and N,N-dimethylaniline.

When carrying out the process (H-β) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 280°C, preferably between 50°C and 180°C.

25 The process (H-β) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (H-β) according to the invention, the reaction components of the formulae (XI) and (X) are generally employed in approximately equimolar amounts. However, it is also possible to use a relatively large excess (up to 3 mol) of one component or 30 the other.

The process (H-γ) is characterized in that compounds of the formula (XII) in which A, D, W, X, Y and R<sup>8</sup> are as defined above are, in the presence of a base, subjected to an intramolecular condensation.

Suitable diluents for the process (H-γ) according to the invention are all inert organic solvents.

5 Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers such as dibutyl ether, tetrahydrofuran, dioxane, glycol dimethyl ether and diglycol dimethyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide and N-methylpyrrolidone, and also alcohols, such as methanol, ethanol, propanol, isopropanol, butanol, isobutanol and tert-butanol.

10 Suitable bases (deprotonating agents) for carrying out the process (H-γ) according to the invention are all customary proton acceptors. Preference is given to using alkali metal and alkaline earth metal oxides, hydroxides and carbonates, such as sodium hydroxide, potassium hydroxide, magnesium oxide, calcium oxide, sodium carbonate, potassium carbonate and calcium carbonate, and which can also be used in the presence of phase transfer catalysts, such as, for example, triethylbenzylammonium chloride, tetrabutylammonium bromide, Adogen 464 (= methyltrialkyl(C<sub>8</sub>-C<sub>10</sub>)ammonium chloride) or TDA 1 (= tris(methoxyethoxyethyl)amine). It is furthermore possible to use alkali metals, such as sodium or potassium. Also suitable are alkali metal and alkaline earth metal amides and hydrides, such as sodium amide, sodium hydride and calcium hydride, and additionally also alkali metal alkoxides, such as sodium 15 methoxide, sodium ethoxide and potassium tert-butoxide.

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When carrying out the process (H-γ) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 250°C, preferably between 50°C and 150°C.

25 The process (H-γ) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (H-γ) according to the invention, the reaction components of the formula (XII) and the deprotonating bases are generally employed in approximately doubly equimolar amounts. However, it is also possible to use a relatively large excess (up to 3 mol) of one component or the other.

The process (I- $\alpha$ ) is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are in each case reacted with carbonyl halides of the formula (XIII), if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder.

Suitable diluents for the process (I- $\alpha$ ) according to the invention are all solvents which are 5 inert towards the acid halides. Preference is given to using hydrocarbons, such as benzene, benzene, toluene, xylene and tetraline, furthermore halogenated hydrocarbons, such as methylene chloride, chloroform, carbon tetrachloride, chlorobenzene and o-dichlorobenzene, moreover ketones, such as acetone and methyl isopropyl ketone, furthermore ethers, such as diethyl ether, tetrahydrofuran and dioxane, additionally carboxylic esters, such as ethyl acetate, 10 and also strongly polar solvents, such as dimethyl sulphoxide and sulpholane. The hydrolytic stability of the acid halide permitting, the reaction can also be carried out in the presence of water.

Suitable acid binders for the reaction according to the process (I- $\alpha$ ) according to the invention are all customary acid acceptors. Preference is given to using tertiary amines, such as 15 triethylamine, pyridine, diazabicyclooctane (DABCO), diazabicycloundecene (DBU), diazabicyclononene (DBN), Hünig base and N,N-dimethylaniline, furthermore alkaline earth metal oxides, such as magnesium oxide and calcium oxide, moreover alkali metal and alkaline earth metal carbonates, such as sodium carbonate, potassium carbonate and calcium carbonate, and also alkali metal hydroxides, such as sodium hydroxide and potassium hydroxide.

20 In the process (I- $\alpha$ ) according to the invention, the reaction temperatures can be varied within a relatively wide range. In general, the process is carried out at temperatures between -20°C and +150°C, preferably between 0°C and 100°C.

When carrying out the process (I- $\alpha$ ) according to the invention, the starting materials of the formulae (I-1-a) to (I-8-a) and the carbonyl halide of the formula (XIII) are generally each 25 employed in approximately equivalent amounts. However, it is also possible to use a relatively large excess (up to 5 mol) of the carbonyl halide. Work-up is carried out by customary methods.

The process (I- $\beta$ ) is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are reacted with carboxylic anhydrides of the formula (XIV), if appropriate in the presence of a 30 diluent and if appropriate in the presence of an acid binder.

Suitable diluents for the process (I-β) according to the invention are, preferably, those diluents which are also preferred when using acid halides. Besides, it may also be possible for excess carboxylic anhydride to act simultaneously as diluent.

5 In process (I-β), suitable acid binders, which are added, if appropriate, are preferably those acid binders which are also preferred when using acid halides.

The reaction temperatures in the process (I-β) according to the invention can be varied within a relatively wide range. In general, the process is carried out at temperatures between -20°C and +150°C, preferably between 0°C and 100°C.

10 When carrying out the process (I-β) according to the invention, the starting materials of the formulae (I-1-a) to (I-8-a) and the carboxylic anhydride of the formula (XIV) are generally each employed in approximately equivalent amounts. However, it is also possible to use a relatively large excess (up to 5 mol) of the carboxylic anhydride. Work-up is carried out by customary methods.

15 In general, diluent and excess carboxylic anhydride and the carboxylic acid formed are removed by distillation or by washing with an organic solvent or with water.

The process (J) is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are in each case reacted with chloroformic esters or chloroformic thioesters of the formula (XV), if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder.

20 Suitable acid binders for the reaction according to the process (J) according to the invention are all customary acid acceptors. Preference is given to using tertiary amines, such as triethylamine, pyridine, DABCO, DBU, DBA, Hünig base and N,N-dimethylaniline, furthermore alkaline earth metal oxides, such as magnesium oxide and calcium oxide, moreover alkali metal and alkaline earth metal carbonates, such as sodium carbonate, potassium carbonate and calcium carbonate, and also alkali metal hydroxides, such as sodium 25 hydroxide and potassium hydroxide.

30 Suitable diluents for the process (J) according to the invention are all solvents which are inert towards the chloroformic esters or chloroformic thioesters. Preference is given to using hydrocarbons, such as benzene, benzene, toluene, xylene and tetriline, furthermore halogenated hydrocarbons, such as methylene chloride, chloroform, carbon tetrachloride, chlorobenzene and o-dichlorobenzene, moreover ketones, such as acetone and methyl isopropyl ketone,

furthermore ethers, such as diethyl ether, tetrahydrofuran and dioxane, additionally carboxylic esters, such as ethyl acetate, and also strongly polar solvents, such as dimethyl sulphoxide and sulpholane.

When carrying out the process (J) according to the invention, the reaction temperatures can be  
5 varied within a relatively wide range. If the process is carried out in the presence of a diluent and an acid binder, the reaction temperatures are generally between -20°C and +100°C, preferably between 0°C and 50°C.

The process (J) according to the invention is generally carried out under atmospheric pressure.

When carrying out the process (J) according to the invention, the starting materials of the  
10 formulae (I-1-a) to (I-8-a) and the appropriate chloroformic ester or chloroformic thioester of the formula (XIII) are generally each employed in approximately equivalent amounts. However, it is also possible to use a relatively large excess (up to 2 mol) of one component or the other. Work-up is carried out by customary methods. In general, precipitated salts are removed and the reaction mixture that remains is concentrated by removing the diluent under  
15 reduced pressure.

The process (K) according to the invention is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are in each case reacted with compounds of the formula (XVI), in the presence of a diluent and, if appropriate, in the presence of an acid binder.

In Preparation Process (K), about 1 mol of chloromonothioformic ester or chlorodithioformic ester of the formula (XVI) is reacted per mole of starting material of the formulae (I-1-a) to (I-8-a), at from 0 to 120°C, preferably from 20 to 60°C.

Suitable diluents, which are added, if appropriate, are all inert polar organic solvents, such as ethers, amides, sulphones, sulphoxides, and also halogenated alkanes.

Preference is given to using dimethyl sulphoxide, tetrahydrofuran, dimethylformamide or  
25 methylene chloride.

If, in a preferred embodiment, the enolate salt of the compounds (I-1-a) to (I-8-a) is prepared by the addition of strong deprotonating agents, such as, for example, sodium hydride or potassium tert-butoxide, the further addition of acid binders can be dispensed with.

If acid binders are used, these are customary inorganic or organic bases, for example sodium hydroxide, sodium carbonate, potassium carbonate, pyridine, triethylamine.

The reaction can be carried out under atmospheric pressure or under elevated pressure and is preferably carried out under atmospheric pressure. Work-up is carried out by customary methods.

5 The process (L) according to the invention is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are in each case reacted with sulphonyl chlorides of the formula (XVII), if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder.

10 In the Preparation Process (L), about 1 mol of sulphonyl chloride of the formula (XVII) is reacted per mole of starting material of the formula (I-1-a to I-8-a), at from -20 to 150°C, preferably from 20 to 70°C.

Suitable diluents, which are added, if appropriate, are all inert polar organic solvents, such as ethers, amides, nitriles, sulphones, sulphoxides or halogenated hydrocarbons, such as methylene chloride.

15 Preference is given to using dimethyl sulphoxide, tetrahydrofuran, dimethylformamide, methylene chloride.

If, in a preferred embodiment, the enolate salt of the compounds (I-1-a) to (I-8-a) is prepared by adding strong deprotonating agents (such as, for example, sodium hydride or potassium tert-butoxide), the further addition of acid binders can be dispensed with.

20 If acid binders are used, these are customary inorganic or organic bases, for example sodium hydroxide, sodium carbonate, potassium carbonate, pyridine, triethylamine.

The reaction can be carried out under atmospheric pressure or under elevated pressure and is preferably carried out under atmospheric pressure. Work-up is carried out by customary methods.

25 The process (M) according to the invention is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are in each case reacted with phosphorus compounds of the formula (XVIII), if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder.

In the Preparation Process (M), to obtain compounds of the formulae (I-1-e) to (I-8-e), 1 to 2, preferably 1 to 1.3 mol of the phosphorus compound of the formula (XVIII) are reacted to 1 mol of the compounds (I-1-a) to (I-8-a), at temperatures between -40°C and 150°C, preferably between -10 and 110°C.

5 Suitable diluents, which are added, if appropriate, are all inert polar organic solvents, such as ethers, amides, nitriles, alcohols, sulphides, sulphones, sulphoxides, etc.

Preference is given to using acetonitrile, dimethyl sulphoxide, tetrahydrofuran, dimethyl-formamide, methylene chloride.

10 Suitable acid binders, which are added, if appropriate, are customary inorganic or organic bases, such as hydroxides, carbonates or amines. Examples are sodium hydroxide, sodium carbonate, potassium carbonate, pyridine, triethylamine.

15 The reaction can be carried out under atmospheric pressure or under elevated pressure and is preferably carried out under atmospheric pressure. Work-up is carried out by customary methods of organic chemistry. The end products obtained are preferably purified by crystallization, chromatographic purification or by "incipient distillation", i.e. removal of the volatile components under reduced pressure.

The process (N) is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are reacted with metal hydroxides or metal alkoxides of the formula (XIX) or amines of the formula (XX), if appropriate in the presence of a diluent.

20 Suitable diluents for the process (N) according to the invention are, preferably, ethers, such as tetrahydrofuran, dioxane, diethyl ether, or else alcohols, such as methanol, ethanol, isopropanol, and also water.

The process (N) according to the invention is generally carried out under atmospheric pressure.

25 The reaction temperatures are generally between -20°C and 100°C, preferably between 0°C and 50°C.

The process (O) according to the invention is characterized in that compounds of the formulae (I-1-a) to (I-8-a) are in each case reacted with (O- $\alpha$ ) compounds of the formula (XXI), if appropriate in the presence of a diluent and if appropriate in the presence of a catalyst, or with

(O-β) compounds of the formula (XXII), if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder.

In Preparation Process (O-α), about 1 mol of isocyanate of the formula (XXI) is reacted per mole of starting material of the formulae (I-1-a) to (I-8-a), at from 0 to 100°C, preferably at 5 from 20 to 50°C.

Suitable diluents, which are added, if appropriate, are all inert organic solvents, such as ethers, amides, nitriles, sulphones, sulphoxides.

If appropriate, catalysts may be added to accelerate the reaction. Suitable catalysts are, very advantageously, organotin compounds, such as, for example, dibutyltin dilaurate. The reaction 10 is preferably carried out under atmospheric pressure.

In the Preparation Process (O-β), about 1 mol of carbamoyl chloride of the formula (XXII) is reacted per mole of starting material of the formulae (I-1-a) to (I-8-a), at from -20 to 150°C, preferably from 0 to 70°C.

Suitable diluents, which are added, if appropriate, are all inert polar organic solvents, such as 15 ethers, amides, sulphones, sulphoxides or halogenated hydrocarbons.

Preference is given to using dimethyl sulphoxide, tetrahydrofuran, dimethylformamide or methylene chloride.

If, in a preferred embodiment, the enolate salt of the compound (I-1-a) to (I-8-a) is prepared by adding strong deprotonating agents (such as, for example, sodium hydride or potassium tert-20 butoxide), the further addition of acid binders can be dispensed with.

If acid binders are used, these are customary inorganic or organic bases, for example sodium hydroxide, sodium carbonate, potassium carbonate, triethylamine or pyridine.

The reaction can be carried out under atmospheric pressure or under elevated pressure and is 25 preferably carried out under atmospheric pressure. Work-up is carried out by customary methods.

The process (P) is characterized in that compounds of the formulae (I-1-a') to (I-8-a') in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, X and Y are as defined above and W' preferably represents

bromine are reacted with alcohols of the formula W-OH in which W is as defined above, in the presence of a base and a Cu(I) salt (for example CuBr or Cul).

Suitable diluents for the process (P) according to the invention are all organic solvents which are inert to reaction participants. Preference is given to using hydrocarbons, such as toluene and xylene, furthermore ethers, such as dibutyl ether, tetrahydrofuran, dioxane, glycol dimethyl ether and diglycol dimethyl ether, moreover polar solvents, such as dimethyl sulphoxide, sulpholane, dimethylformamide, dimethylacetamide and N-methylpyrrolidone, esters, such as methyl acetate, ethyl acetate, propyl acetate, and also alcohols of the formula W-OH, such as, for example, methanol, ethanol, propanol, isopropanol, butanol and isobutanol.

5      10      15      Suitable bases (deprotonating agents) for carrying out the process (P) according to the invention are all customary proton acceptors. Preference is given to using alkali metals, such as sodium or potassium. It is also possible to use alkali metal and alkaline earth metal amids and hydrides, such as sodium amide, sodium hydride and calcium hydride, and, preferably, also alkali metal alkoxides, such as sodium methoxide, sodium ethoxide, sodium isopropoxide, sodium tert-butoxide and potassium tert-butoxide.

When carrying out the process (P) according to the invention, the reaction temperature can be varied within a relatively wide range. In general, the process is carried out at temperatures between 0°C and 250°C, preferably between 50°C and 150°C.

The process (P) according to the invention is generally carried out under atmospheric pressure.

20      When carrying out the process (P) according to the invention, the reaction components of the formulae (I-1-a') to (I-8-a') are generally reacted with an excess of the alcohol WOH and the base up to 20 mol, preferably 3 to 5 mol. The copper(I) salts are generally employed in catalytic amounts of from 0.001 to 0.5 mol, preferably from 0.01 to 0.2 mol. However, they can also be employed in equimolar amounts.

25      The active compounds are well tolerated by plants, have advantageous toxicity to warm-blooded species and are environmentally friendly; they can be employed for protecting plants and plant organs, for increasing yields, improving crop quality and for controlling animal pests, in particular insects, arachnids and nematodes encountered in agriculture, forests, gardens and leisure grounds, in the protection of stored products and materials and in the hygiene sector. They are preferably used as crop protection agents. They are active against normally sensitive and

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resistant species and against all or some stages of development. The abovementioned pests include:

From the order of the Isopoda, for example, *Oniscus asellus*, *Armadillidium vulgare* and *Porcellio scaber*.

From the order of the Diplopoda, for example, *Blaniulus guttulatus*.

From the order of the Chilopoda, for example, *Geophilus carpophagus* and *Scutigera* spp..

From the order of the Symphyla, for example, *Scutigerella immaculata*.

10 From the order of the Thysanura, for example, *Lepisma saccharina*.

From the order of the Collembola, for example, *Onychiurus armatus*.

From the order of the Orthoptera, for example, *Acheta domesticus*, *Gryllotalpa* spp., *Locusta migratoria migratorioides*, *Melanoplus* spp. and *Schistocerca gregaria*.

From the order of the Blattaria, for example, *Blatta orientalis*, *Periplaneta americana*, *Leucophaea maderae* and *Blattella germanica*.

20 From the order of the Dermaptera, for example, *Forficula auricularia*.

From the order of the Isoptera, for example, *Reticulitermes* spp..

From the order of the Phthiraptera, for example, *Pediculus humanus corporis*, *Haematopinus* spp.,  
25 *Linognathus* spp., *Trichodectes* spp., *Damalinia* spp..

From the order of the Thysanoptera, for example, *Hercinothrips femoralis*, *Thrips tabaci*, *Thrips palmi*, *Frankliniella occidentalis*.

30 From the order of the Heteroptera, for example, *Eurygaster* spp., *Dysdercus intermedius*, *Piesma quadrata*, *Cimex lectularius*, *Rhodnius prolixus* and *Triatoma* spp..

From the order of the Homoptera, for example, *Aleurodes brassicae*, *Bemisia tabaci*, *Trialeurodes vaporariorum*, *Aphis gossypii*, *Brevicoryne brassicae*, *Cryptomyzus ribis*, *Aphis fabae*, *Aphis pomi*, *Eriosoma lanigerum*, *Hyalopterus arundinis*, *Phylloxera vastatrix*, *Pemphigus spp.*, *Macrosiphum avenae*, *Myzus spp.*, *Phorodon humuli*, *Rhopalosiphum padi*, *Empoasca spp.*,

5 *Euscelis bilobatus*, *Nephrotettix cincticeps*, *Lecanium corni*, *Saissetia oleae*, *Laodelphax striatellus*, *Nilaparvata lugens*, *Aonidiella aurantii*, *Aspidiotus hederae*, *Pseudococcus spp.* and *Psylla spp..*

From the order of the Lepidoptera, for example, *Pectinophora gossypiella*, *Bupalus piniarius*,

10 *Cheimatobia brumata*, *Lithocolletis blancardella*, *Hyponomeuta padella*, *Plutella xylostella*, *Malacosoma neustria*, *Euproctis chrysorrhoea*, *Lymantria spp.*, *Bucculatrix thurberiella*, *Phylloconistis citrella*, *Agrotis spp.*, *Euxoa spp.*, *Feltia spp.*, *Earias insulana*, *Heliothis spp.*, *Mamestra brassicae*, *Panolis flammea*, *Spodoptera spp.*, *Trichoplusia ni*, *Carpocapsa pomonella*, *Pieris spp.*, *Chilo spp.*, *Pyrausta nubilalis*, *Epehestia kuehniella*, *Galleria mellonella*, *Tineola bisselliella*, *Tinea pellionella*, *Hofmannophila pseudospretella*, *Cacoecia podana*, *Capua reticulana*, *Choristoneura fumiferana*, *Clytia ambiguella*, *Homona magnanima*, *Tortrix viridana*, *Cnaphalocerus spp.* and *Oulema oryzae*.

From the order of the Coleoptera, for example, *Anobium punctatum*, *Rhizopertha dominica*,

20 *Bruchidius obtectus*, *Acanthoscelides obtectus*, *Hylotrupes bajulus*, *Agelastica alni*, *Leptinotarsa decemlineata*, *Phaedon cochleariae*, *Diabrotica spp.*, *Psylliodes chrysocephala*, *Epilachna varivestis*, *Atomaria spp.*, *Oryzaephilus surinamensis*, *Anthonomus spp.*, *Sitophilus spp.*, *Otiorrhynchus sulcatus*, *Cosmopolites sordidus*, *Ceuthorrhynchus assimilis*, *Hypera postica*, *Dermestes spp.*, *Trogoderma spp.*, *Anthrenus spp.*, *Attagenus spp.*, *Lyctus spp.*, *Meligethes aeneus*, *Ptinus spp.*, *Niptus hololeucus*, *Gibbium psylloides*, *Tribolium spp.*, *Tenebrio molitor*, *Agriotes spp.*, *Conoderus spp.*, *Melolontha melolontha*, *Amphimallon solstitialis*, *Costelytra zealandica* and *Lissorhoptrus oryzophilus*.

From the order of the Hymenoptera, for example, *Diprion spp.*, *Hoplocampa spp.*, *Lasius spp.*,

30 *Monomorium pharaonis* and *Vespa spp..*

From the order of the Diptera, for example, *Aedes spp.*, *Anopheles spp.*, *Culex spp.*, *Drosophila melanogaster*, *Musca spp.*, *Fannia spp.*, *Calliphora erythrocephala*, *Lucilia spp.*, *Chrysomyia spp.*, *Cuterebra spp.*, *Gastrophilus spp.*, *Hyppobosca spp.*, *Stomoxys spp.*, *Oestrus spp.*, *Hypoderma*

spp., *Tabanus* spp., *Tannia* spp., *Bibio hortulanus*, *Oscinella frit*, *Phorbia* spp., *Pegomyia hyoscyami*, *Ceratitis capitata*, *Dacus oleae*, *Tipula paludosa*, *Hylemyia* spp. and *Liriomyza* spp..

From the order of the Siphonaptera, for example, *Xenopsylla cheopis* and *Ceratophyllus* spp..

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From the order of the Arachnida, for example, *Scorpio maurus*, *Latrodectus mactans*, *Acarus siro*, *Argas* spp., *Ornithodoros* spp., *Dermanyssus gallinae*, *Eriophyes ribis*, *Phyllocoptura oleivora*, *Boophilus* spp., *Rhipicephalus* spp., *Amblyomma* spp., *Hyalomma* spp., *Ixodes* spp., *Psoroptes* spp., *Chorioptes* spp., *Sarcoptes* spp., *Tarsonemus* spp., *Bryobia praetiosa*, *Panonychus* spp.,  
10 *Tetranychus* spp., *Hemitarsonemus* spp. and *Brevipalpus* spp..

The plant-parasitic nematodes include, for example, *Pratylenchus* spp., *Radopholus similis*, *Ditylenchus dipsaci*, *Tylenchulus semipenetrans*, *Heterodera* spp., *Globodera* spp., *Meloidogyne* spp., *Aphelenchoides* spp., *Longidorus* spp., *Xiphinema* spp., *Trichodorus* spp.  
15 and *Bursaphelenchus* spp..

If appropriate, the compounds according to the invention may also be used in certain concentrations or application rates to act as herbicides and microbicides, for example as fungicides, antimycotic agents and bactericides. If appropriate, they can also be employed as  
20 intermediates or precursors for the synthesis of further active compounds.

All plants and plant parts can be treated in accordance with the invention. Plants are to be understood as meaning in the present context all plants and plant populations such as desired and undesired wild plants or crop plants (including naturally occurring crop plants). Crop  
25 plants can be plants which can be obtained by conventional plant breeding and optimization methods or by biotechnological and recombinant methods or by combinations of these methods, including the transgenic plants and inclusive of the plant cultivars protectable or not protectable by plant breeders' rights. Plant parts are to be understood as meaning all parts and organs of plants above and below the ground, such as shoot, leaf, flower and root, examples  
30 which may be mentioned being leaves, needles, stalks, stems, flowers, fruit bodies, fruits, seeds, roots, tubers and rhizomes. The plant parts also include harvested material, and vegetative and generative propagation material, for example cuttings, tubers, rhizomes, offsets and seeds.

The treatment according to the invention of the plants and plant parts with the active compounds is carried out directly or by allowing the compounds to act on the surroundings, environment or storage space by the customary treatment methods, for example by immersion, spraying, evaporation, fogging, scattering, painting on or injection and, in the case of propagation material, in particular in the case of seeds, also by applying one or more coats.

5 The active compounds can be converted into the customary formulations such as solutions, emulsions, wettable powders, suspensions, powders, dusts, pastes, soluble powders, granules, suspension-emulsion concentrates, natural and synthetic materials impregnated with active 10 compound, and microencapsulations in polymeric materials.

These formulations are produced in a known manner, for example by mixing the active compounds with extenders, that is, liquid solvents and/or solid carriers, optionally with the use of surfactants, that is, emulsifiers and/or dispersants, and/or foam formers.

15 If the extender used is water, it is also possible, for example, to use organic solvents as cosolvents. The following are essentially suitable as liquid solvents: aromatics such as xylene, toluene or alkynaphthalenes, chlorinated aromatics or chlorinated aliphatic hydrocarbons such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons such as cyclohexane or paraffins, for example mineral oil fractions, mineral and vegetable oils, 20 alcohols such as butanol or glycol and their ethers and esters, ketones such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents such as dimethylformamide and dimethyl sulphoxide, or else water.

25 Suitable solid carriers are:

for example ammonium salts and ground natural minerals such as kaolins, clays, talc, chalk, 30 quartz, attapulgite, montmorillonite or diatomaceous earth, and ground synthetic materials such as highly-disperse silica, alumina and silicates; suitable solid carriers for granules are: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, or else synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; suitable emulsifiers and/or foam formers are: for example nonionic and anionic emulsifiers such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl

polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates, or else protein hydrolysates; suitable dispersants are: for example lignin-sulphite waste liquors and methylcellulose.

- 5 Tackifiers such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, or else natural phospholipids such as cephalins and lecithins and synthetic phospholipids can be used in the formulations. Other additives can be mineral and vegetable oils.
- 10 It is possible to use colorants such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic colorants such as alizarin colorants, azo colorants and metal phthalocyanine colorants, and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.
- 15 The formulations generally comprise between 0.1 and 95% by weight of active compound, preferably between 0.5 and 90%.

The active compounds according to the invention, as such or in their formulations, can also be used as a mixture with known fungicides, bactericides, acaricides, nematicides or insecticides, for example in order to widen the spectrum of action or to prevent the development of resistances in this way. In many cases, synergistic effects result, i.e. the activity of the mixture exceeds the activity of the individual components.

Compounds which are suitable as components in the mixtures are, for example, the following:

25

**Fungicides:**

2-phenylphenol; 8-hydroxyquinoline sulphate; acibenzolar-S-methyl; aldimorph; amidoflumet; ampropylfos; ampropylfos-potassium; andoprim; anilazine; azaconazole; azoxystrobin; 30 benalaxyl; benodanil; benomyl; benthiavalicarb-isopropyl; benzamacril; benzamacril-isobutyl; bilanafos; binapacryl; biphenyl; bitertanol; blasticidin-S; bromuconazole; bupirimate; buthiobate; butylamine; calcium polysulphide; capsimycin; captafol; captan; carbendazim; carboxin; carpropamid; carvone; quinomethionate; chlobenthiazone; chlorfenazole; chloroneb; chlorothalonil; chlozolinate; clozylacon; cyazofamid; cyflufenamid; cymoxanil; cypro-

conazole; cyprodinil; cyprofuram; Dagger G; debacarb; dichlofluanid; dichlone; dichlorophen; diclocymet; diclomezine; dicloran; diethofencarb; difenoconazole; diflumetorim; dimethirimol; dimethomorph; dimoxystrobin; diniconazole; diniconazole-M; dinocap; diphenylamine; dipyrithione; ditalimfos; dithianon; dodine; drazoxolon; edifenphos; epoxiconazole; 5 ethaboxam; ethirimol; etridiazole; famoxadone; fenamidone; fenapanil; fenarimol; fenbuconazole; fenfuram; fenhexamid; fenitropan; fenoxanil; fenpiclonil; fenpropidin; fenpropimorph; ferbam; fluazinam; flubenzimine; fludioxonil; flumetover; flumorph; fluoromide; fluoxastrobin; fluquinconazole; flurprimidol; flusilazole; flusulfamide; flutolanil; flutriafol; folpet; fosetyl-Al; fosetyl-sodium; fuberidazole; furalaxyd; furametpyr; furcarbanil; 10 furmecyclox; guazatine; hexachlorobenzene; hexaconazole; hymexazol; imazalil; imibenconazole; iminoctadine triacetate; iminoctadine tris(albesilate); iodocarb; ipconazole; iprobenfos; iprodione; iprovalicarb; irumamycin; isoprothiolane; isovalledione; kasugamycin; kresoxim-methyl; mancozeb; maneb; meferimzone; mepanipyrim; mepronil; metalaxyl; metalaxyl-M; metconazole; methasulfocarb; methfuroxam; metiram; metominostrobin; 15 metsulfovax; mildiomycin; myclobutanil; myclozolin; natamycin; nicobifen; nitrothal-isopropyl; noviflumuron; nuarimol; ofurace; orysastrobin; oxadixyl; oxolinic acid; oxpoconazole; oxycarboxin; oxyfenthiin; paclobutrazol; pefurazoate; penconazole; pencycuron; phosdiphen; phthalide; picoxystrobin; piperalin; polyoxins; polyoxorim; probenazole; prochloraz; procymidone; propamocarb; propanosine-sodium; propiconazole; 20 propineb; proquinazid; prothioconazole; pyraclostrobin; pyrazophos; pyrifenoxy; pyrimethanil; pyroquilon; pyroxyfur; pyrrolnitrin; quinconazole; quinoxifen; quintozene; simeconazole; spiroxamine; sulphur; tebuconazole; tecloftalam; tecnazene; tetcyclacis; tetraconazole; thiabendazole; thicyofen; thifluzamide; thiophanate-methyl; thiram; tioxymid; tolclofos-methyl; tolylfluanid; triadimefon; triadimenol; triazbutil; triazoxide; tricyclamide; tricyclazole; 25 tridemorph; trifloxystrobin; triflumizole; triforine; triticonazole; uniconazole; validamycin A; vinclozolin; zineb; ziram; zoxamide; (2S)-N-[2-[4-[[3-(4-chlorophenyl)-2-propynyl]oxy]-3-methoxyphenyl]ethyl]-3-methyl-2-[(methylsulphonyl)amino]butanamide; 1-(1-naphthalenyl)-1H-pyrrole-2,5-dione; 2,3,5,6-tetrachloro-4-(methylsulphonyl)pyridine; 2-amino-4-methyl-N-phenyl-5-thiazolecarboxamide; 2-chloro-N-(2,3-dihydro-1,1,3-trimethyl-1H-inden-4-yl)-3-30 pyridinecarboxamide; 3,4,5-trichloro-2,6-pyridinedicarbonitrile; Actinovate; cis-1-(4-chlorophenyl)-2-(1H-1,2,4-triazole-1-yl)-cycloheptanol; methyl 1-(2,3-dihydro-2,2-dimethyl-1H-inden-1-yl)-1H-imidazole-5-carboxylate; monopotassium carbonate; N-(6-methoxy-3-pyridinyl)cyclopropanecarboxamide; N-butyl-8-(1,1-dimethylethyl)-1-oxaspiro[4.5]decan-3-amine; sodium tetrathiocarbonate;

and copper salts and preparations such as Bordeaux mixture; copper hydroxide; copper naphthenate; copper oxychloride; copper sulphate; cufraneb; cuprous oxide; mancopper; oxine-copper.

5

Bactericides:

bronopol, dichlorophen, nitrapyrin, nickel dimethyldithiocarbamate, kasugamycin, othilinone, furancarboxylic acid, oxytetracyclin, probenazole, streptomycin, tecloftalam, copper sulphate and other copper preparations.

10 Insecticides/Acaricides/Nematicides:

abamectin, ABG-9008, acephate, acequinocyl, acetamiprid, acetoprole, acrinathrin, AKD-1022, AKD-3059, AKD-3088, alanycarb, aldicarb, aldoxycarb, allethrin, alpha-cypermethrin (alphamethrin), amidoflumet, aminocarb, amitraz, avermectin, AZ-60541, azadirachtin, azamethiphos, azinphos-methyl, azinphos-ethyl, azocyclotin,

15 Bacillus popilliae, Bacillus sphaericus, Bacillus subtilis, Bacillus thuringiensis, Bacillus thuringiensis strain EG-2348, Bacillus thuringiensis strain GC-91, Bacillus thuringiensis strain NCTC-11821, baculoviruses, Beauveria bassiana, Beauveria tenella, benclothiaz, bendiocarb, benfuracarb, bensultap, benzoximate, beta-cyfluthrin, beta-cypermethrin, bifenazate, bifenthrin, binapacryl, bioallethrin, bioallethrin S-cyclopentyl isomer, bioethanomethrin,

20 biopermethrin, bioresmethrin, bistrifluron, BPMC, brofenprox, bromophos-ethyl, bromopropylate, bromfenvinfos (-methyl), BTG-504, BTG-505, bufencarb, buprofezin, butathiofos, butocarboxim, butoxycarboxim, butylpyridaben,

25 cadusafos, camphechlor, carbaryl, carbofuran, carbophenothion, carbosulfan, cartap, CGA-50439, quinomethionate, chlordane, chlordimeform, chloethocarb, chlorethoxyfos, chlorfena-pyr, chlorfenvinphos, chlorfluazuron, chlormephos, chlorobenzilate, chloropicrin, chlorproxifen, chlorpyrifos-methyl, chlorpyrifos (-ethyl), chlovaporthrin, chromafenozone, cis-cypermethrin, cis-resmethrin, cis-permethrin, clopythrin, cloethocarb, clofentezine, clothianidin, clothiazaben, codlemone, coumaphos, cyanofenphos, cyanophos, cyclopene, cycloprothrin, Cydia pomonella, cyfluthrin, cyhalothrin, cyhexatin, cypermethrin, cyphenothonin (1R-trans isomer), cyromazine,

DDT, deltamethrin, demeton-S-methyl, demeton-S-methylsulphone, diafenthiuron, dialfos, diazinon, dichlofenthion, dichlorvos, dicofol, dicrotophos, dicyclanil, diflubenzuron, dimefluthrin, dimethoate, dimethylvinphos, dinobuton, dinocap, dinotefuran, diofenolan, disulfoton, docusate-sodium, dofenapyn, DOWCO-439,

5 eflusilanate, emamectin, emamectin benzoate, empenthrin (1R isomer), endosulfan, Entomophthora spp., EPN, esfenvalerate, ethiofencarb, ethiprole, ethion, ethoprophos, etofenprox, etoxazole, etrimfos,

famphur, fenamiphos, fenazaquin, fenbutatin oxide, fenfluthrin, fenitrothion, fenobucarb, feno-thiocarb, fenoxacrim, fenoxy carb, fenpropathrin, fenpyrad, fenpyrithrin, fenpyroximate,

10 fensulfothion, fenthion, fentrifanil, fenvalerate, fipronil, flonicamid, fluacrypyrim, fluazuron, flubenzimine, flubrocythrinate, flucycloxuron, flucythrinate, flufennerim, flufenoxuron, flufenprox, flumethrin, flupyrazofos, flutenzin (flufenzine), fluvalinate, fonofos, formetanate, formothion, fosmethilan, fosthiazate, fubfenprox (fluproxyfen), furathiocarb,

gamma-cyhalothrin, gamma-HCH, gossyplure, grandlure, granulosis viruses,

15 halfenprox, halofenozide, HCH, HCN-801, heptenophos, hexaflumuron, hexythiazox, hydramethylnone, hydroprene,

IKA-2002, imidacloprid, imiprothrin, indoxacarb, iodofenphos, iprobenfos, isazofos, isofenphos, isoproc carb, isoxathion, ivermectin,

japonilure,

20 kadethrin, nuclear polyhedrosis viruses, kinoprene,

lambda-cyhalothrin, lindane, lufenuron,

malathion, mecarbam, mesulfenfos, metaldehyde, metam-sodium, methacrifos, methamidophos, Metarhizium anisopliae, Metarhizium flavoviride, methidathion, methiocarb, methomyl, methoprene, methoxychlor, methoxyfenozide, metofluthrin, metolcarb,

25 metoxadiazone, mevinphos, milbemectin, milbemycin, MKI-245, MON-45700, monocrotophos, moxidectin, MTI-800,

naled, NC-104, NC-170, NC-184, NC-194, NC-196, niclosamide, nicotine, nitenpyram, nithiazine, NNI-0001, NNI-0101, NNI-0250, NNI-9768, novaluron, noviflumuron,

OK-5101, OK-5201, OK-9601, OK-9602, OK-9701, OK-9802, omethoate, oxamyl, oxydemeton-methyl,

Paecilomyces fumosoroseus, parathion-methyl, parathion (-ethyl), permethrin (cis-, trans-), petroleum, PH-6045, phenothrin (1R-trans isomer), phentoate, phorate, phosalone, phosmet,

5 phosphamidon, phosphocarb, phoxim, piperonyl butoxide, pirimicarb, pirimiphos-methyl, pirimiphos-ethyl, potassium oleate, prallethrin, profenofos, profluthrin, promecarb, propaphos, propargite, propetamphos, propoxur, prothiofos, prothoate, protrifenbute, pymetrozine, pyraclofos, pyresmethrin, pyrethrum, pyridaben, pyridalyl, pyridaphenthion, pyridathion, pyrimidifen, pyriproxyfen,

10 quinalphos,

resmethrin, RH-5849, ribavirin, RU-12457, RU-15525,

S-421, S-1833, salithion, sebufos, SI-0009, silafluofen, spinosad, spirodiclofen, spiromesifen, sulfluramid, sulfotep, sulprofos, SZI-121,

tau-fluvalinate, tebufenozide, tebufenpyrad, tebupirimfos, teflubenzuron, tefluthrin, temephos,

15 temivinphos, terbam, terbufos, tetrachlorvinphos, tetradifon, tetramethrin, tetramethrin (1R isomer), tetrasul, theta-cypermethrin, thiacloprid, thiamethoxam, thiapronil, thiatriphos, thiocyclam hydrogen oxalate, thiodicarb, thifanox, thiometon, thiosultap-sodium, thuringiensin, tolfenpyrad, tralocythrin, tralomethrin, transfluthrin, triarathene, triazamate, triazophos, triazuron, trichlophenidine, trichlorfon, Trichoderma atroviride, triflumuron, tri-

20 methacarb,

vamidothion, vaniliprole, verbutin, *Verticillium lecanii*,

WL-108477, WL-40027,

YI-5201, YI-5301, YI-5302,

XMC, xylylcarb,

25 ZA-3274, zeta-cypermethrin, zolaprofos, ZXI-8901,

the compound 3-methylphenyl propylcarbamate (Tsumacide Z),

the compound 3-(5-chloro-3-pyridinyl)-8-(2,2,2-trifluoroethyl)-8-azabicyclo[3.2.1]octane-3-carbonitrile (CAS Reg. No. 185982-80-3) and the corresponding 3-endo isomer (CAS Reg. No. 185984-60-5) (cf. WO 96/37494, WO 98/25923),

5 and preparations which contain insecticidally active plant extracts, nematodes, fungi or viruses.

A mixture with other known active compounds, such as herbicides, or with fertilizers and growth regulators, safeners or semichemicals is also possible.

- 10 When used as insecticides in their commercially available formulations and in the use forms prepared with these formulations, the active compounds according to the invention can furthermore exist in the form of a mixture with synergists. Synergists are compounds by which the activity of the active compounds is increased without it being necessary for the synergist added to be active itself.
- 15 When used as insecticides in their commercially available formulations and in the use forms prepared with these formulations, the active compounds according to the invention can furthermore exist in the form of a mixture with inhibitors, which reduce the degradation of the active compound post-application in the plant's environment, on the surface of plant parts or in plant tissues.
- 20 The active compound content of the use forms prepared from the commercially available formulations can vary within broad ranges. The active compound concentration of the use forms can be from 0.0000001 up to 95% by weight of active compound, preferably between 0.0001 and 1% by weight.
- 25 They are applied in a customary manner adapted to suit the use forms.

When used against hygiene pests and pests of stored products, the active compound is distinguished by excellent residual action on wood and clay as well as good stability to alkali on limed substrates.

- 30 As already mentioned above, it is possible to treat all plants or their parts in accordance with the invention. In a preferred embodiment, wild plant species or plant varieties and plant cultivars which have been obtained by traditional biological breeding methods, such as hybridization or protoplast fusion, and the parts of these varieties and cultivars are treated. In a further preferred

embodiment, transgenic plants and plant cultivars which have been obtained by recombinant methods, if appropriate in combination with conventional methods (genetically modified organisms), and their parts are treated. The term "parts" or "parts of plants" or "plant parts" has been explained above.

5

Plants which are treated particularly preferably in accordance with the invention are those of the plant cultivars which are in each case commercially available or in use. Plant cultivars are understood as meaning plants with new traits which have been bred either by conventional breeding, by mutagenesis or by recombinant DNA techniques. They may take the form of 10 cultivars, biotypes and genotypes.

Depending on the plant species or plant cultivars, their location and growth conditions (soils, 15 climate, vegetation period, nutrition), the treatment according to the invention may also result in superadditive ("synergistic") effects. Thus, for example, reduced application rates and/or a widened activity spectrum and/or an increase in the activity of the substances and compositions which can be used in accordance with the invention, better plant growth, increased tolerance to high or low temperatures, increased tolerance to drought or to salinity in the water or soil, increased flowering performance, facilitated harvesting, accelerated maturation, higher yields, 20 higher quality and/or better nutritional value of the harvested products, better storage characteristics and/or processability of the harvested products are possible which exceed the effects which were actually to be expected.

The preferred transgenic plants or plant cultivars (those obtained by recombinant methods) to be 25 treated in accordance with the invention include all those plants which, owing to the process of recombinant modification, were given genetic material which confers particular, advantageous, valuable traits to these plants. Examples of such properties are better plant growth, increased tolerance to high or low temperatures, increased tolerance to drought or to salinity in the water or soil, increased flowering performance, facilitated harvesting, accelerated maturation, higher yields, higher quality and/or higher nutritional value of the harvested products, better storage 30 characteristics and/or better processability of the harvested products. Further examples of such traits, examples which must be mentioned especially, are better defence of the plants against animal and microbial pests, such as against insects, mites, phytopathogenic fungi, bacteria and/or viruses and an increased tolerance of the plants to certain herbicidal active compounds. Examples of transgenic plants which may be mentioned are the important crop plants, such as cereals

(wheat, rice), maize, soybeans, potato, cotton, tobacco, oilseed rape and fruit plants (with the fruits apples, pears, citrus fruits and grapes), with particular emphasis on maize, soybeans, potatoes, cotton, tobacco and oilseed rape. Traits which are especially emphasized are the increased defence of the plants against insects, arachnids, nematodes and slugs and snails, owing 5 to toxins being formed in the plants, in particular toxins which are generated in the plants by the genetic material of *Bacillus thuringiensis* (for example by the genes CryIA(a), CryIA(b), CryIA(c), CryIIA, CryIIIA, CryIIB2, Cry9c Cry2Ab, Cry3Bb and CryIF and their combinations; hereinbelow "Bt plants"). Other traits which are particularly emphasized are the increased 10 defence of plants against fungi, bacteria and viruses by the systemic acquired resistance (SAR), systemin, phytoalexins, elicitors and resistance genes and correspondingly expressed proteins and toxins. Other traits which are especially emphasized are the increased tolerance of the plants to certain herbicidal active compounds, for example imidazolinones, sulphonylureas, glyphosate or phosphinotricin (for example "PAT" gene). The genes which confer the desired traits in each case 15 may also be present in the transgenic plants in combination with one another. Examples of "Bt plants" which may be mentioned are maize cultivars, cotton cultivars, soybean cultivars and potato cultivars which are commercially available under the trade names YIELD GARD® (for example maize, cotton, soybeans), KnockOut® (for example maize), StarLink® (for example maize), Bollgard® (cotton), Nucotn® (cotton) and NewLeaf® (potato). Examples of herbicide-tolerant plants which may be mentioned are maize cultivars, cotton cultivars and soybean 20 cultivars which are commercially available under the trade names Roundup Ready® (tolerance to glyphosate, for example maize, cotton, soybean), Liberty Link® (tolerance to phosphinotricin, for example oilseed rape), IMI® (tolerance to imidazolinones) and STS® (tolerance to sulphonylureas, for example maize). Herbicide-resistant plants (plants bred in a conventional manner for herbicide tolerance) which may be mentioned include also the varieties commercially 25 available under the name Clearfield® (for example maize). Naturally, these statements also apply to plant cultivars having these genetic traits or genetic traits still to be developed, which plant cultivars will be developed and/or marketed in the future.

The plants listed can be treated particularly advantageously according to the invention with the compounds of the general formula I or the active compound mixtures according to the invention. 30 The preferred ranges stated above for the active compounds and mixtures also apply to the treatment of these plants. Particular emphasis may be given to the treatment of plants with the compounds or mixtures specifically mentioned in the present text.

The active compounds according to the invention are not only active against plant, hygiene and stored-product pests, but also, in the veterinary medicine sector, against animal parasites (ectoparasites), such as ixodid ticks, argasid ticks, scab mites, trombi-culid mites, flies (stinging and sucking), parasitic fly larvae, lice, hair lice, bird lice and fleas. These parasites include:

5

From the order of the Anoplurida, for example, *Haematopinus* spp., *Linognathus* spp., *Pediculus* spp., *Phtirus* spp., *Solenopotes* spp..

10

From the order of the Mallophagida and the sub-orders Amblycerina and Ischnocerina, for example, *Trimenopon* spp., *Menopon* spp., *Trinoton* spp., *Bovicola* spp., *Werneckiella* spp., *Lepikentron* spp., *Damalina* spp., *Trichodectes* spp., *Felicola* spp..

15

From the order of the Diptera and the sub-orders Nematocerina and Brachycerina, for example, *Aedes* spp., *Anopheles* spp., *Culex* spp., *Simulium* spp., *Eusimulium* spp., *Phlebotomus* spp., *Lutzomyia* spp., *Culicoides* spp., *Chrysops* spp., *Hybomitra* spp., *Atylotus* spp., *Tabanus* spp., *Haematopota* spp., *Philipomyia* spp., *Braula* spp., *Musca* spp., *Hydrotaea* spp., *Stomoxys* spp., *Haematobia* spp., *Morellia* spp., *Fannia* spp., *Glossina* spp., *Calliphora* spp., *Lucilia* spp., *Chrysomyia* spp., *Wohlfahrtia* spp., *Sarcophaga* spp., *Oestrus* spp., *Hypoderma* spp., *Gasterophilus* spp., *Hippobosca* spp., *Lipoptena* spp. and *Melophagus* spp..

20

From the order of the Siphonapterida, for example, *Pulex* spp., *Ctenocephalides* spp., *Xenopsylla* spp. and *Ceratophyllus* spp..

25

From the order of the Heteropterida, for example, *Cimex* spp., *Triatoma* spp., *Rhodnius* spp. and *Panstrongylus* spp..

From the order of the Blattarida, for example, *Blatta orientalis*, *Periplaneta americana*, *Blattella germanica* and *Supella* spp..

30

From the sub-class of the Acaria (Acarida) and the orders of the Meta- and Mesostigmata, for example, *Argas* spp., *Ornithodoros* spp., *Otobius* spp., *Ixodes* spp., *Amblyomma* spp., *Boophilus* spp., *Dermacentor* spp., *Haemophysalis* spp., *Hyalomma* spp., *Rhipicephalus* spp., *Dermanyssus* spp., *Raillietia* spp., *Pneumonyssus* spp., *Sternostoma* spp. and *Varroa* spp..

From the order of the Actinedida (Prostigmata) and Acaridida (Astigmata), for example, *Acarapis* spp., *Cheyletiella* spp., *Ornithocheyletia* spp., *Myobia* spp., *Psorergates* spp., *Demodex* spp., *Trombicula* spp., *Listrophorus* spp., *Acarus* spp., *Tyrophagus* spp., *Caloglyphus* spp., *Hypodectes* spp., *Pterolichus* spp., *Psoroptes* spp., *Chorioptes* spp.,

5 *Otodectes* spp., *Sarcoptes* spp., *Notoedres* spp., *Knemidocoptes* spp., *Cytodites* spp. and *Laminoziptes* spp..

The active compounds of the general formula (I) according to the invention are also suitable for controlling arthropods which attack agricultural livestock, such as, for example, cattle, sheep, goats, horses, pigs, donkeys, camels, buffaloes, rabbits, chickens, turkeys, ducks, geese, 10 honeybees, other domestic animals, such as, for example, dogs, cats, cage birds, aquarium fish, and so-called experimental animals, such as, for example, hamsters, guinea-pigs, rats and mice. By combating these arthropods, it is intended to reduce deaths and decreased performances (in meat, milk, wool, hides, eggs, honey and the like), so that more economical and simpler animal keeping is made possible by using the active compounds according to the invention.

15 In the veterinary sector, the active compounds according to the invention are used in a known manner by enteral administration, for example in the form of tablets, capsules, drinks, drenches, granules, pastes, boli, the feed-through method, suppositories, by parenteral administration, such as, for example, by means of injections (intramuscular, subcutaneous, intravenous, intraperitoneal and the like), implants, by nasal application, by dermal 20 administration, for example in the form of dipping or bathing, spraying, pouring-on and spotting-on, washing, dusting, and with the aid of shaped articles which comprise active compound, such as collars, ear tags, tail marks, limb bands, halters, marking devices and the like.

When administered to livestock, poultry, domestic animals and the like, the active compounds 25 of the formula (I) can be used as formulations (for example powders, emulsions, flowables) which comprise the active compounds in an amount of 1 to 80% by weight, either directly or after dilution by a factor of 100 to 10 000, or they may be used in the form of a chemical bath.

Furthermore, it has been found that the compounds according to the invention have a potent insecticidal action against insects which destroy industrial materials.

30 The following insects may be mentioned by way of example and as being preferred, but without any limitation:

Beetles, such as

5 *Hylotrupes bajulus*, *Chlorophorus pilosis*, *Anobium punctatum*, *Xestobium rufovillosum*,  
*Ptilinus pecticornis*, *Dendrobium pertinex*, *Ernobius mollis*, *Priobium carpini*, *Lyctus brunneus*, *Lyctus africanus*, *Lyctus planicollis*, *Lyctus linearis*, *Lyctus pubescens*, *Trogoxylon aequale*, *Minthes rugicollis*, *Xyleborus* spec., *Tryptodendron* spec., *Apate monachus*,  
*Bostrychus capucins*, *Heterobostrychus brunneus*, *Sinoxylon* spec., *Dinoderus minutus*.

Dermapterans, such as

*Sirex juvencus*, *Urocerus gigas*, *Urocerus gigas taignus*, *Urocerus augur*.

Termites, such as

10 *Kalotermes flavicollis*, *Cryptotermes brevis*, *Heterotermes indicola*, *Reticulitermes flavipes*,  
*Reticulitermes santonensis*, *Reticulitermes lucifugus*, *Mastotermes darwiniensis*, *Zootermopsis nevadensis*, *Coptotermes formosanus*.

Bristletails, such as *Lepisma saccharina*.

15 Industrial materials are to be understood as meaning, in the present context, non-live materials,  
such as, preferably, synthetic materials, glues, sizes, paper and board, leather, wood and timber products, and paint.

The materials to be very particularly preferably protected against attack by insects are wood and timber products.

20 Wood and timber products which can be protected by the composition according to the invention or mixtures comprising such a composition are to be understood as meaning, for example:

25 construction timber, wooden beams, railway sleepers, bridge components, jetties, wooden vehicles, boxes, pallets, containers, telephone poles, wood cladding, windows and doors made of wood, plywood, particle board, joiner's articles, or wood products which, quite generally, are used in the construction of houses or in joinery.

The active compounds can be used as such, in the form of concentrates or generally customary formulations, such as powders, granules, solutions, suspensions, emulsions or pastes.

The formulations mentioned can be prepared in a manner known per se, for example by mixing the active compounds with at least one solvent or diluent, emulsifier, dispersant and/or binder or fixative, water repellent, if appropriate desiccants and UV stabilizers and, if appropriate, colorants and pigments and other processing auxiliaries.

5 The insecticidal compositions or concentrates used for the protection of wood and wooden materials comprise the active compound according to the invention in a concentration of 0.0001 to 95% by weight, in particular 0.001 to 60% by weight.

10 The amount of the compositions or concentrates employed depends on the species and the occurrence of the insects and on the medium. The optimum rate of application can be determined upon use in each case by a test series. However, in general, it suffices to employ 0.0001 to 20% by weight, preferably 0.001 to 10% by weight, of the active compound, based on the material to be protected.

15 The solvent and/or diluent used is an organochemical solvent or solvent mixture and/or an oily or oil-type organochemical solvent or solvent mixture of low volatility and/or a polar organochemical solvent or solvent mixture and/or water and, if appropriate, an emulsifier and/or wetting agent.

20 Organochemical solvents which are preferably employed are oily or oil-type solvents having an evaporation number of above 35 and a flashpoint of above 30°C, preferably above 45°C. Substances which are used as such oily and oil-type solvents which have low volatility and are insoluble in water are suitable mineral oils or their aromatic fractions, or mineral-oil-containing solvent mixtures, preferably white spirit, petroleum and/or alkylbenzene.

25 Substances which are advantageously used are mineral oils with a boiling range of 170 to 220°C, white spirit with a boiling range of 170 to 220°C, spindle oil with a boiling range of 250 to 350°C, petroleum or aromatics of boiling range 160 to 280°C, essence of terpentine and the like.

30 In a preferred embodiment, liquid aliphatic hydrocarbons with a boiling range of 180 to 210°C or high-boiling mixtures of aromatic and aliphatic hydrocarbons with a boiling range of 180 to 220°C and/or spindle oil and/or monochloronaphthalene, preferably  $\alpha$ -monochloronaphthalene, are used.

The organic oily or oil-type solvents of low volatility having an evaporation number of above 35 and a flashpoint of above 30°C, preferably above 45°C, can be partially replaced by organochemical solvents of high or medium volatility, with the proviso that the solvent mixture also has an evaporation number of above 35 and a flashpoint of above 30°C, preferably above 5 45°C, and that the insecticide/fungicide mixture is soluble or emulsifiable in this solvent mixture.

In a preferred embodiment, part of the organochemical solvent or solvent mixture is replaced by an aliphatic polar organochemical solvent or solvent mixture. Substances which are 10 preferably used are aliphatic organochemical solvents having hydroxyl and/or ester and/or ether groups, such as, for example, glycol ethers, esters and the like.

The organochemical binders used within the scope of the present invention are the synthetic 15 resins and/or binding drying oils which are known per se and can be diluted with water and/or are soluble or dispersible or emulsifiable in the organochemical solvents employed, in particular binders composed of, or comprising, an acrylate resin, a vinyl resin, for example polyvinyl acetate, polyester resin, polycondensation or polyaddition resin, polyurethane resin, alkyd resin or modified alkyd resin, phenol resin, hydrocarbon resin, such as indene/cumarone resin, silicone resin, drying vegetable and/or drying oils and/or physically drying binders based 20 on a natural and/or synthetic resin.

The synthetic resin used as the binder can be employed in the form of an emulsion, dispersion or solution. Up to 10% by weight of bitumen or bituminous substances can also be used as 25 binders. In addition, colorants, pigments, water repellents, odour-masking substances and inhibitors or anticorrosives known per se and the like can also be employed.

The composition or the concentrate preferably comprises, in accordance with the invention, at 30 least one alkyd resin or modified alkyd resin and/or a drying vegetable oil as the organochemical binder. Preferably used according to the invention are alkyd resins with an oil content of over 45% by weight, preferably 50 to 68% by weight.

All or some of the abovementioned binder can be replaced by a fixative (mixture) or a plasticizer (mixture). These additives are intended to prevent volatilization of the active 35 compounds and crystallization or precipitation. They preferably replace 0.01 to 30% of the binder (based on 100% of binder employed).

The plasticizers are from the chemical classes of the phthalic esters, such as dibutyl phthalate, dioctyl phthalate or benzyl butyl phthalate, the phosphoric esters, such as tributyl phosphate, the adipic esters, such as di(2-ethylhexyl) adipate, the stearates, such as butyl stearate or amyl stearate, the oleates, such as butyl oleate, the glycerol ethers or relatively high-molecular-weight glycol ethers, glycerol esters and p-toluenesulphonic esters.

Fixatives are chemically based on polyvinyl alkyl ethers, such as, for example, polyvinyl methyl ether, or ketones, such as benzophenone or ethylenebenzophenone.

10 Particularly suitable as a solvent or diluent is also water, if appropriate as a mixture with one or more of the abovementioned organochemical solvents or diluents, emulsifiers and dispersants.

Particularly effective protection of wood is achieved by large-scale industrial impregnation processes, for example vacuum, double-vacuum or pressure processes.

If appropriate, the ready-to-use compositions can additionally comprise other insecticides and, if appropriate, additionally one or more fungicides.

20 Suitable additional components which may be admixed are, preferably, the insecticides and fungicides mentioned in WO 94/29 268. The compounds mentioned in that document are expressly part of the present application.

Very particularly preferred components which may be admixed are insecticides, such as chlorpyriphos, phoxim, silafluofin, alphamethrin, cyfluthrin, cypermethrin, deltamethrin, permethrin, imidacloprid, NI-25, flufenoxuron, hexaflumuron, transfluthrin, thiacycloprid, methoxyphenoxid, triflumuron, clothianidin, spinosad, tefluthrin, and fungicides, such as epoxyconazole, hexaconazole, azaconazole, propiconazole, tebuconazole, cyproconazole, metconazole, imazalil, dichlofuanid, tolylfluanid, 3-iodo-2-propynylbutyl carbamate, N-octylisothiazolin-3-one and 4,5-dichloro-N-octylisothiazolin-3-one.

The compounds according to the invention can at the same time be employed for protecting objects which come into contact with salt water or brackish water, in particular hulls, screens, nets, buildings, moorings and signalling systems, against fouling.

Fouling by sessile Oligochaeta, such as Serpulidae, and by shells and species from the

5     Ledamorpha group (goose barnacles), such as various Lepas and Scalpellum species, or by species from the Balanomorpha group (acorn barnacles), such as Balanus or Pollicipes species, increases the frictional drag of ships and, as a consequence, leads to a marked increase in operation costs owing to higher energy consumption and additionally frequent residence in the dry dock.

10    Apart from fouling by algae, for example Ectocarpus sp. and Ceramium sp., fouling by sessile Entomostraka groups, which come under the generic term Cirripedia (cirriped crustaceans), is of particular importance.

Surprisingly, it has now been found that the compounds according to the invention, alone or in

15    combination with other active compounds, have an outstanding antifouling action.

Using the compounds according to the invention, alone or in combination with other active compounds, allows the use of heavy metals such as, for example, in bis(trialkyltin) sulphides, tri-*n*-butyltin laurate, tri-*n*-butyltin chloride, copper(I) oxide, triethyltin chloride, tri-*n*-butyl-(2-phenyl-4-chlorophenoxy)tin, tributyltin oxide, molybdenum disulphide, antimony oxide, polymeric butyl titanate, phenyl(bispyridine)bismuth chloride, tri-*n*-butyltin fluoride, manganese ethylenebisthiocarbamate, zinc dimethyldithiocarbamate, zinc ethylenebisthiocarbamate, zinc salts and copper salts of 2-pyridinethiol 1-oxide, bisdimethyldithiocarbamoylzinc ethylene-bisthiocarbamate, zinc oxide, copper(I) ethylene-bisdithiocarbamate, copper

20    thiocyanate, copper naphthenate and tributyltin halides to be dispensed with, or the concentration of these compounds to be substantially reduced.

25

If appropriate, the ready-to-use antifouling paints can additionally comprise other active compounds, preferably algicides, fungicides, herbicides, molluscicides, or other antifouling

30    active compounds.

Preferably suitable components in combination with the antifouling compositions according to the invention are:

algicides such as

2-*tert*-butylamino-4-cyclopropylamino-6-methylthio-1,3,5-triazine, dichlorophen, diuron, endothal, fentin acetate, isoproturon, methabenzthiazuron, oxyfluorfen, quinoclamine and terbutryn;

5 fungicides such as

benzo[*b*]thiophenecarboxylic acid cyclohexylamide S,S-dioxide, dichlofluanid, fluorfolpet, 3-iodo-2-propynyl butylcarbamate, tolylfluanid and azoles such as

azaconazole, cyproconazole, epoxyconazole, hexaconazole, metconazole, propiconazole and tebuconazole;

10 molluscicides such as

fentin acetate, metaldehyde, methiocarb, niclosamid, thiodicarb and trimethacarb, Fe chelate;

or conventional antifouling active compounds such as

15 4,5-dichloro-2-octyl-4-isothiazolin-3-one, diiodomethylparatryl sulphone, 2-(N,N-dimethylthiocarbamoylthio)-5-nitrothiazyl, potassium, copper, sodium and zinc salts of 2-pyridinethiol 1-oxide, pyridinetriphenylborane, tetrabutyltinannoane, 2,3,5,6-tetrachloro-4-(methylsulphonyl)pyridine, 2,4,5,6-tetrachloroisophthalonitrile, tetramethylthiuram disulphide and 2,4,6-trichlorophenylmaleimide.

20 The antifouling compositions used comprise the active compound according to the invention of the compounds according to the invention in a concentration of 0.001 to 50% by weight, in particular 0.01 to 20% by weight.

25 Moreover, the antifouling compositions according to the invention comprise the customary components such as, for example, those described in Ungerer, *Chem. Ind.* 1985, 37, 730-732 and Williams, *Antifouling Marine Coatings*, Noyes, Park Ridge, 1973.

Besides the algicidal, fungicidal, molluscicidal active compounds and insecticidal active compounds according to the invention, antifouling paints comprise, in particular, binders.

Examples of recognized binders are polyvinyl chloride in a solvent system, chlorinated rubber in a solvent system, acrylic resins in a solvent system, in particular in an aqueous system, vinyl chloride/vinyl acetate copolymer systems in the form of aqueous dispersions or in the form of organic solvent systems, butadiene/styrene/acrylonitrile rubbers, drying oils such as linseed oil, 5 resin esters or modified hardened resins in combination with tar or bitumens, asphalt and epoxy compounds, small amounts of chlorine rubber, chlorinated polypropylene and vinyl resins.

If appropriate, paints also comprise inorganic pigments, organic pigments or colorants which 10 are preferably insoluble in salt water. Paints may furthermore comprise materials such as rosin to allow controlled release of the active compounds. Furthermore, the paints may comprise plasticizers, modifiers which affect the rheological properties and other conventional constituents. The compounds according to the invention or the abovementioned mixtures may also be incorporated into self-polishing antifouling systems.

15 The active compounds are also suitable for controlling animal pests, in particular insects, arachnids and mites, which are found in enclosed spaces such as, for example, dwellings, factory halls, offices, vehicle cabins and the like. They can be employed in domestic insecticide products for controlling these pests alone or in combination with other active compounds and auxiliaries. They are active against sensitive and resistant species and against 20 all development stages. These pests include:

From the order of the Scorpionidea, for example, *Buthus occitanus*.

From the order of the Acarina, for example, *Argas persicus*, *Argas reflexus*, *Bryobia* ssp., *Dermanyssus gallinae*, *Glyciphagus domesticus*, *Ornithodoros moubat*, *Rhipicephalus* 25 *sanguineus*, *Trombicula alfreddugesi*, *Neutrombicula autumnalis*, *Dermatophagoides pteronissimus*, *Dermatophagoides farinae*.

From the order of the Araneae, for example, *Aviculariidae*, *Araneidae*.

30 From the order of the Opiliones, for example, *Pseudoscorpiones chelifer*, *Pseudoscorpiones cheiridium*, *Opiliones phalangium*.

From the order of the Isopoda, for example, *Oniscus asellus*, *Porcellio scaber*.

From the order of the Diplopoda, for example, *Blaniulus guttulatus*, *Polydesmus* spp..

From the order of the Chilopoda, for example, *Geophilus* spp..

5

From the order of the Zygentoma, for example, *Ctenolepisma* spp., *Lepisma saccharina*, *Lepismodes inquilinus*.

10 From the order of the Blattaria, for example, *Blatta orientalis*, *Blattella germanica*, *Blattella asahinai*, *Leucophaea madera*ae, *Panchlora* spp., *Parcoblatta* spp., *Periplaneta australasiae*, *Periplaneta americana*, *Periplaneta brunnea*, *Periplaneta fuliginosa*, *Supella longipalpa*.

From the order of the Saltatoria, for example, *Acheta domesticus*.

15 From the order of the Dermaptera, for example, *Forficula auricularia*.

From the order of the Isoptera, for example, *Kalotermes* spp., *Reticulitermes* spp..

From the order of the Psocoptera, for example, *Lepinatus* spp., *Liposcelis* spp..

20 From the order of the Coleoptera, for example, *Anthrenus* spp., *Attagenus* spp., *Dermestes* spp., *Latheticus oryzae*, *Necrobia* spp., *Ptinus* spp., *Rhizopertha dominica*, *Sitophilus granarius*, *Sitophilus oryzae*, *Sitophilus zeamais*, *Stegobium paniceum*.

25 From the order of the Diptera, for example, *Aedes aegypti*, *Aedes albopictus*, *Aedes taeniorhynchus*, *Anopheles* spp., *Calliphora erythrocephala*, *Chrysozona pluvialis*, *Culex quinquefasciatus*, *Culex pipiens*, *Culex tarsalis*, *Drosophila* spp., *Fannia canicularis*, *Musca domestica*, *Phlebotomus* spp., *Sarcophaga carnaria*, *Simulium* spp., *Stomoxys calcitrans*, *Tipula paludosa*.

30 From the order of the Lepidoptera, for example, *Achroia grisella*, *Galleria mellonella*, *Plodia interpunctella*, *Tinea cloacella*, *Tinea pellionella*, *Tineola bisselliella*.

From the order of the Siphonaptera, for example, *Ctenocephalides canis*, *Ctenocephalides felis*, *Pulex irritans*, *Tunga penetrans*, *Xenopsylla cheopis*.

From the order of the Hymenoptera, for example, *Camponotus herculeanus*, *Lasius fuliginosus*, *Lasius niger*, *Lasius umbratus*, *Monomorium pharaonis*, *Paravespula spp.*, *Tetramorium caespitum*.

5

From the order of the Anoplura, for example, *Pediculus humanus capitis*, *Pediculus humanus corporis*, *Phthirus pubis*.

From the order of the Heteroptera, for example, *Cimex hemipterus*, *Cimex lectularius*,  
10 *Rhodinus prolixus*, *Triatoma infestans*.

They are used in the household insecticides sector alone or in combination with other suitable active compounds such as phosphoric esters, carbamates, pyrethroids, neonicotinoids, growth regulators or active compounds from other known classes of insecticides.

15 They are used in aerosols, pressure-free spray products, for example pump and atomizer sprays, automatic fogging systems, foggers, foams, gels, evaporator products with evaporator tablets made of cellulose or polymer, liquid evaporators, gel and membrane evaporators, propeller-driven evaporators, energy-free, or passive, evaporation systems, moth papers, moth bags and moth gels, as granules or dusts, in baits for spreading or in bait stations.

20 The active compounds according to the invention can also be used as defoliants, desiccants, haulm killers and, in particular, as weed killers. Weeds in the broadest sense are understood as meaning all plants which grow at locations where they are undesired. Whether the substances according to the invention act as nonselective or selective herbicides depends essentially on the application rate.

25 The active compounds according to the invention can be used for example in the following plants:

Dicotyledonous weeds of the genera: *Abutilon*, *Amaranthus*, *Ambrosia*, *Anoda*, *Anthemis*, *Aphanes*, *Atriplex*, *Bellis*, *Bidens*, *Capsella*, *Carduus*, *Cassia*, *Centaurea*, *Chenopodium*, *Cirsium*, *Convolvulus*, *Datura*, *Desmodium*, *Emex*, *Erysimum*, *Euphorbia*, *Galeopsis*,  
30 *Galinsoga*, *Galium*, *Hibiscus*, *Ipomoea*, *Kochia*, *Lamium*, *Lepidium*, *Lindernia*, *Matricaria*, *Mentha*, *Mercurialis*, *Mullugo*, *Myosotis*, *Papaver*, *Pharbitis*, *Plantago*, *Polygonum*, *Portulaca*, *Ranunculus*, *Raphanus*, *Rorippa*, *Rotala*, *Rumex*, *Salsola*, *Senecio*, *Sesbania*, *Sida*, *Sinapis*,

Solanum, Sonchus, Sphenoclea, Stellaria, Taraxacum, Thlaspi, Trifolium, Urtica, Veronica, Viola, Xanthium.

Dicotyledonous crops of the genera: Arachis, Beta, Brassica, Cucumis, Cucurbita, Helianthus, 5 Daucus, Glycine, Gossypium, Ipomoea, Lactuca, Linum, Lycopersicon, Nicotiana, Phaseolus, Pisum, Solanum, Vicia.

Monocotyledonous weeds of the genera: Aegilops, Agropyron, Agrostis, Alopecurus, Apera, Avena, Brachiaria, Bromus, Cenchrus, Commelina, Cynodon, Cyperus, Dactyloctenium, Digitaria, Echinochloa, Eleocharis, Eleusine, Eragrostis, Eriochloa, Festuca, Fimbristylis, 10 Heteranthera, Imperata, Ischaemum, Leptochloa, Lolium, Monochoria, Panicum, Paspalum, Phalaris, Phleum, Poa, Rottboellia, Sagittaria, Scirpus, Setaria, Sorghum.

Monocotyledonous crops of the genera: Allium, Ananas, Asparagus, Avena, Hordeum, Oryza, Panicum, Saccharum, Secale, Sorghum, Triticale, Triticum, Zea.

15 However, the use of the active compounds according to the invention is in no way restricted to these genera, but extends in the same manner to other plants.

Depending on the concentration, the active compounds according to the invention are suitable for the nonselective weed control on, for example, industrial terrains and railway tracks and on 20 paths and locations with and without trees. Likewise the active compounds according to the invention can be employed for controlling weeds in perennial crops, for example forests, ornamental tree plantings, orchards, vineyards, citrus groves, nut orchards, banana plantations, coffee plantations, tea plantations, rubber plantations, oil palm plantations, cocoa plantations, soft fruit plantations and hop fields, on lawns, turf and pastureland, and for the selective 25 control of weeds in annual crops.

The compounds of the formula (I) according to the invention have strong herbicidal activity and a broad activity spectrum when used on the soil and on aerial plant parts. To a certain extent, they are also suitable for the selective control of monocotyledonous and dicotyledonous weeds in monocotyledonous and dicotyledonous crops, both pre- and post-emergence.

30 At certain concentrations or application rates, the active compounds according to the invention can also be employed for controlling animal pests and fungal or bacterial plant diseases. If

appropriate, they can also be used as intermediates or precursors for the synthesis of other active compounds.

The active compounds can be converted into the customary formulations, such as solutions, emulsions, wettable powders, suspensions, powders, dusting agents, pastes, soluble powders, granules, 5 suspoemulsion concentrates, natural and synthetic materials impregnated with active compound, and very fine capsules in polymeric substances.

These formulations are produced in a known manner, for example by mixing the active compounds with extenders, that is liquid solvents and/or solid carriers, optionally with the use of surfactants, that is emulsifiers and/or dispersants and/or foam-formers.

10 If the extender used is water, it is also possible to use, for example, organic solvents as auxiliary solvents. Suitable liquid solvents are essentially: aromatics, such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics and chlorinated aliphatic hydrocarbons, such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons, such as cyclohexane or paraffins, for example petroleum fractions, mineral and vegetable oils, alcohols, such as butanol or glycol, 15 and also their ethers and esters, ketones, such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, such as dimethylformamide and dimethyl sulphoxide, and also water.

Suitable solid carriers are: for example ammonium salts and ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and ground 20 synthetic minerals, such as finely divided silica, alumina and silicates, suitable solid carriers for granules are: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, and also synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; suitable emulsifiers and/or foam-formers are: for example non-ionic and anionic emulsifiers, such as poly-25 oxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates and protein hydrolysates; suitable dispersants are: for example lignosulphite waste liquors and methylcellulose.

Tackifiers such as carboxymethylcellulose and natural and synthetic polymers in the form of 30 powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, and also natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Other possible additives are mineral and vegetable oils.

It is possible to use colorants such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyestuffs, such as alizarin dyestuffs, azo dyestuffs and metal phthalocyanine dyestuffs, and trace nutrients such as salts of iron, manganese, boron, copper, 5 cobalt, molybdenum and zinc.

The formulations generally comprise between 0.1 and 95 per cent by weight of active compound, preferably between 0.5 and 90%.

10 The active compounds according to the invention, as such or in their formulations, can also be used for weed control purposes as a mixture with known herbicides and/or with substances which improve crop plant tolerance ("safeners"), ready mixes or tank mixes being possible. Mixtures with herbicide products which contain one or more known herbicides and a safener are hence also possible.

15

Herbicides which are suitable for the mixtures are known herbicides, for example

acetochlor, acifluorfen (-sodium), aclonifen, alachlor, aloxydim (-sodium), ametryne, amicarbazone, amidochlor, amidosulfuron, anilofos, asulam, atrazine, azafenidin, azimsulfuron, beflubutamid, benazolin (-ethyl), benfuresate, bensulfuron (-methyl), bentazone, benzfendizone, benzobicyclon, benzofenap, benzoylprop (-ethyl), bialaphos, bifenox, bispyribac (-sodium), bromobutide, bromofenoxim, bromoxynil, butachlor, butafenacil (-allyl), butroxydim, butylate, cafenstrole, caloxydim, carbetamide, carfentrazone (-ethyl), chlomethoxyfen, chloraben, chloridazon, chlorimuron (-ethyl), chlornitrofen, chlorsulfuron, chlortoluron, cinidon (-ethyl), 20 cinmethylin, cinosulfuron, clefoxydim, clethodim, clodinafop (-propargyl), clomazone, clomeprop, clopyralid, clopyrasulfuron (-methyl), cloransulam (-methyl), cumyluron, cyanazine, cybutryne, cycloate, cyclosulfamuron, cycloxydim, cyhalofop (-butyl), 2,4-D, 2,4-DB, desmedipham, diallate, dicamba, dichlorprop (-P), diclofop (-methyl), diclosulam, diethatyl (-ethyl), difenzoquat, diflufenican, diflufenzopyr, dimefuron, dimepiperate, dimethachlor, 25 dimethametryn, dimethenamid, dimexyflam, dinitramine, diphenamid, diquat, dithiopyr, diuron, dymron, epropadan, EPTC, esprocarb, ethalfluralin, ethametsulfuron(-methyl), ethofumesate, ethoxyfen, ethoxysulfuron, etobenzanid, fenoxaprop (-P-ethyl), fentrazamide, flamprop (-isopropyl, -isopropyl-L, -methyl), flazasulfuron, florasulam, fluazifop (-P-butyl), fluazolate, flu-30 carbazole (-sodium), flufenacet, flumetsulam, flumiclorac (-pentyl), flumioxazin, flumipropyn,

flumetsulam, fluometuron, fluorochloridone, fluoroglycofen (-ethyl), flupoxam, flupropacil, flurpyrsulfuron (-methyl, -sodium), flurenol (-butyl), fluridone, fluroxypyr (-butoxypropyl, -meptyl), flurprimidol, flurtamone, fluthiacet (-methyl), fluthiamide, fomesafen, foramsulfuron, glufosinate (-ammonium), glyphosate (-isopropylammonium), halosafen, haloxyfop (-ethoxyethyl, -P-methyl), hexazinone, imazamethabenz (-methyl), imazamethapyr, imazamox, imazapic, imazapyr, imazaquin, imazethapyr, imazosulfuron, iodosulfuron (-methyl, -sodium), ioxynil, isopropalin, isoproturon, isouron, isoxaben, isoxachlortole, isoxaflutole, isoxapryifop, lactofen, lenacil, linuron, MCPA, mecoprop, mefenacet, mesotrione, metamitron, metazachlor, methabenzthiazuron, metobenzuron, metobromuron, (alpha-) metolachlor, metosulam, metoxuron, metribuzin, metsulfuron (-methyl), molinate, monolinuron, naproanilide, napropamide, neburon, nicosulfuron, norflurazon, orbencarb, oryzalin, oxadiargyl, oxadiazon, oxasulfuron, oxaziclofone, oxyfluorfen, paraquat, pelargonic acid, pendimethalin, pendralin, pentoxazone, phenmedipham, picolinafen, pinoxaden, piperophos, pretilachlor, primisulfuron (-methyl), profluazol, prometryn, propachlor, propanil, propaquizafop, propisochlor, propoxycarbazone (-sodium), propyzamide, prosulfocarb, prosulfuron, pyraflufen (-ethyl), pyrazogyl, pyrazolate, pyrazosulfuron (-ethyl), pyrazoxyfen, pyribenzoxim, pyributicarb, pyridate, pyridatol, pyriftalide, pyriminobac (-methyl), pyrithiobac (-sodium), quinchlorac, quinmerac, quinoclamine, quizalofop (-P-ethyl, -P-tefuryl), rimsulfuron, sethoxydim, simazine, simetryn, sulcotrione, sulfentrazone, sulfometuron (-methyl), sulfosate, sulfosulfuron, tebutam, tebuthiuron, tepraloxydim, terbutylazine, terbutryn, thenylchlor, thiafluamide, thiazopyr, thidiazimin, thifensulfuron (-methyl), thiobencarb, tiocarbazil, tralkoxydim, triallate, triasulfuron, tribenuron (-methyl), triclopyr, tridiphane, trifluralin, trifloxsulfuron, triflusulfuron (-methyl), tritosulfuron.

Also suitable for the mixtures are known safeners, for example:

25 AD-67, BAS-145138, benoxacor, cloquintocet (-mexyl), cyometrinil, 2,4-D, DKA-24, dichlormid, dymron, fenclorim, fenchlorazol (-ethyl), flurazole, fluxofenim, furilazole, isoxadifen (-ethyl), MCPA, mecoprop (-P), mefenpyr (-diethyl), MG-191, oxabetrinil, PPG-1292, R-29148.

A mixture with other known active compounds, such as fungicides, insecticides, acaricides, nematicides, bird repellents, plant nutrients and soil conditioners, is also possible.

30 The active compounds can be applied as such, in the form of their formulations or the use forms prepared therefrom by further dilution, such as ready-to-use solutions, suspensions,

emulsions, powders, pastes and granules. They are applied in the customary manner, for example by pouring, spraying, atomizing, spreading.

The active compounds according to the invention can be applied both before and after plant emergence. They can also be incorporated into the soil prior to planting.

- 5 The application rate of active compound can vary within a substantial range. Essentially, it depends on the nature of the desired effect. In general, the application rates are between 1 g and 10 kg of active compound per hectare of soil area, preferably between 5 g and 5 kg per ha.

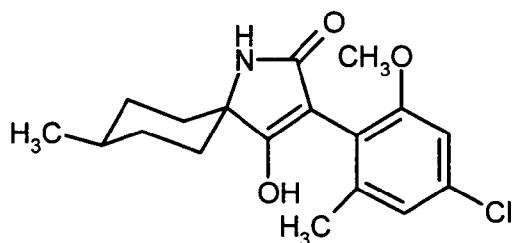
The preparation and the use of the active compounds according to the invention are illustrated by the examples below.

**Preparation Examples**

**Process A**

**Example I-1-a-1**

5

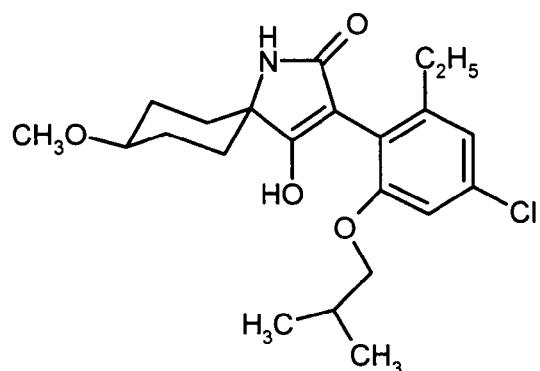


6.7 g of the compound of Preparation Example II-1 in 40 ml of anhydrous toluene are added dropwise to 5.43 g (0.047 mol) of potassium tert-butoxide in 18 ml of anhydrous tetrahydrofuran at reflux temperature.

- 10 The reaction mixture is stirred under reflux for 1.5 h. Then, 60 ml of water are added, the aqueous phase is separated off and the organic phase is extracted with water. The aqueous phases are washed once more with toluene and brought to pH 1 with concentrated hydrochloric acid at 0-20°C. The precipitate is filtered off with suction, washed and dried. Purification is by column chromatography on silica gel (dichloromethane:ethyl acetate, 5:1).
- 15 Yield: 3.2 g/52% of theory). M.p.: > 220°C.

**Process P**

**Example No. I-1-a-18**



5

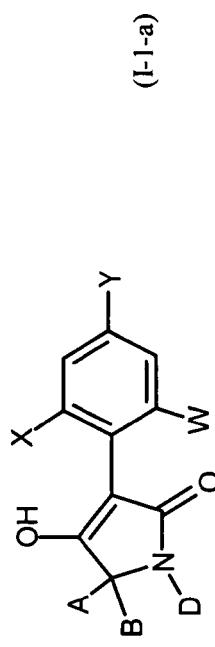
At 0°C to 5°C, add 3.54 g of potassium tert-butoxide (95%) to 12.12 g of iso-butanol; heat briefly. Then add the copper(I) iodide (0.571 g; 3 mmol) and 1.34 g of the compound of Example I-a-10 (DE-A-10301804); then heat at 110°C. The mixture is stirred for 24 hours at 100°C to 110°C. The mixture is filtered with suction over Celite, the solids are discarded and 10 the filtrate is acidified and evaporated on a rotary evaporator.

15 A separation by flash column chromatography on silica gel is carried out, using ethyl acetate. The fractions which, according to LC/MS, contained the product were subjected to RP column chromatography with a gradient programme. The column was preconditioned with a 50:50 mixture of water and methanol.

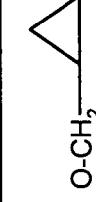
15 Yield: 190 mg of white powder = 15% of theory.

M.p. = 117°C

The following compounds of the formula (I-1-a) are obtained analogously to Example (I-1-a-1) and in accordance with the general preparation instructions



Ex. No.	W	X	Y	D	A	B	M.p.°C	Isomer
I-1-a-2	OCH <sub>3</sub>	CH <sub>3</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> O-(CH <sub>2</sub> ) <sub>2</sub> -		>220	-
I-1-a-3	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		223	β
I-1-a-4	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		232	β
I-1-a-5	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	CH <sub>3</sub>	CH <sub>3</sub>	141	-
I-1-a-6	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H		-(CH <sub>2</sub> ) <sub>5</sub> -	236	-
I-1-a-7	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	—CH—CH—CH <sub>2</sub> —  (CH <sub>2</sub> ) <sub>3</sub>	H		169	Isomer mixture
I-1-a-8	OCH <sub>3</sub>	CH <sub>3</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		318	β
I-1-a-9	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		96	β

Ex. №.	W	X	Y	D	A	B	M.p.°C	Isomer
I-1-a-12	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	C <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	H	176-178	-
I-1-a-13	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	c-C <sub>6</sub> H <sub>11</sub>	CH <sub>3</sub>	H	184	-
I-1-a-14	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl		H	H	154-157	-
I-1-a-15	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	CH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	H	*1)	-
I-1-a-16	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl		-(CH <sub>2</sub> ) <sub>3</sub> -	H	Decomp.	-
I-1-a-17	OC <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		202	β
I-1-a-18 1)	O-i-C <sub>4</sub> H <sub>9</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		117	β
I-1-a-19 1)	O-CH <sub>2</sub> 	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		Wax *2)	β
I-1-a-20 1)	O-CH <sub>2</sub> -CH <sub>2</sub> -OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		61	β
I-1-a-21 1)	OC <sub>3</sub> H <sub>7</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		Wax *3)	β

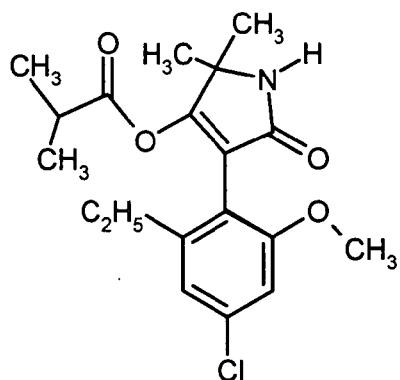
\*1) <sup>1</sup>H-NMR (400 MHz, d<sub>6</sub>-DMSO): δ = 2.43 (m, 2-H, Ar-CH<sub>2</sub>-CH<sub>3</sub>), 2.77 (s, 3H, N-CH<sub>3</sub>) ppm

\*2) <sup>1</sup>H-NMR (400 MHz, d<sub>6</sub>-DMSO): δ = 2.42 (m, 2-H, Ar-CH<sub>2</sub>-CH<sub>3</sub>), 3.82 (m, 2H, O-CH<sub>2</sub>CH<sub>2</sub>) ppm

\*3) <sup>1</sup>H-NMR (400 MHz, d<sub>6</sub>-DMSO): δ = 0.27-0.3, 0.42-0.45 (2m, 4H, cyclopropyl-CH<sub>2</sub>), 1.02 (t, 3H, Ar CH<sub>2</sub>-CH<sub>3</sub>) ppm

1) Process P

Example No. I-1-b-1

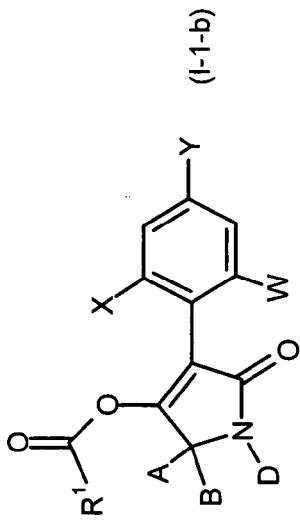


200 mg (0.57 mol) of the compound of Example I-1-a-5 are introduced into 5 ml of anhydrous  
5 ethyl acetate and treated with 0.94 ml (0.57 mmol) of triethylamine. 0.71 ml (0.57 mmol) of  
isobutyryl chloride in 1 ml of ethyl acetate are added under reflux and the mixture is heated for  
2.5 h under reflux.

The reaction solution is cooled and concentrated and the residue is chromatographed on silica  
gel with a heptane/ethyl acetate gradient of from 100/0 to 0/100.

10 Yield: 90 mg (43% of theory) M.p. 131°C.

The following compounds of the formula (I-1-b) are obtained analogously to Example (I-1-b-1) and following the general preparation instructions

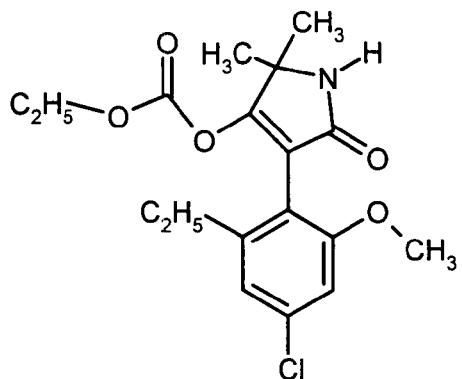


Ex. No.	W	X	Y	D	A	B	R¹	M.p. °C	Isomer
I-1-b-2	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H		-	i-C <sub>3</sub> H <sub>7</sub>	221	-
I-1-b-3	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H		-	i-C <sub>3</sub> H <sub>7</sub>	161	β
I-1-b-4	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H		-	i-C <sub>4</sub> H <sub>9</sub>	169	β
I-1-b-5	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	CH <sub>3</sub>	CH <sub>3</sub>	i-C <sub>4</sub> H <sub>9</sub>	148	-
I-1-b-6	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H		-	i-C <sub>3</sub> H <sub>7</sub>	201	β
I-1-b-7	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	CH <sub>3</sub>		H <sub>3</sub> C-O-CH <sub>2</sub>	130	-
I-1-b-8	OCH <sub>3</sub>	CH <sub>3</sub>	Cl	H	CH <sub>3</sub>		H <sub>3</sub> C-O-CH <sub>2</sub>	149-153	-
I-1-b-9	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl		H		i-C <sub>4</sub> H <sub>9</sub>	*1.07(s,9H,t-Bu)-	-
								2.40(m,2H,CH <sub>2</sub> -Ar)	

Ex. №.	W	X	Y	D	A	B	R'	M.p. °C	Isomer
I-1-b-10	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	CH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	H	t-C <sub>4</sub> H <sub>9</sub> -	Oil	-
I-1-b-11	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	i-C <sub>3</sub> H <sub>7</sub> -	226-229		β
I-1-b-12	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	C <sub>4</sub> H <sub>9</sub> -CH- C <sub>2</sub> H <sub>5</sub>	138		β
I-1-b-13	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	C <sub>4</sub> H <sub>9</sub> -CH- C <sub>2</sub> H <sub>5</sub>	171		β
I-1-b-14	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	C <sub>2</sub> H <sub>5</sub> -C(CH <sub>3</sub> ) <sub>2</sub> -	216-218		β
I-1-b-15	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	C <sub>2</sub> H <sub>5</sub> -C(CH <sub>3</sub> ) <sub>2</sub> -	237-239		β
I-1-b-16	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	H <sub>5</sub> C <sub>2</sub> -O-CH <sub>2</sub>	154-159		β
I-1-b-17	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	(C <sub>8</sub> H <sub>17</sub> -CH=CH- C <sub>7</sub> H <sub>14</sub> -)	*3.21(m,1H,CHOCH <sub>3</sub> ) 5.35(m,2H,CH=CH)		β

\* <sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>) : shifts δ in ppm

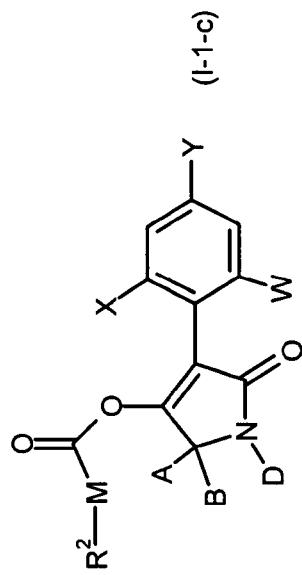
Example No. I-1-c-1



5 200 mg (0.57 mmol) of the compound of Example I-1-a-5 are introduced into 5 ml of anhydrous  $\text{CH}_2\text{Cl}_2$  and treated with 0.94 ml (0.57 mmol) of triethylamine. 0.64 ml (0.57 mmol) of ethyl chloroformate in 1 ml of  $\text{CH}_2\text{Cl}_2$  are added at 10 to 20°C and the mixture is stirred for 1.5 h at room temperature. The reaction solution was concentrated and the residue was chromatographed on silica gel with a heptane/ethyl acetate gradient of from 100/0 to 0/100.

Yield: 0.19 g (95 % of theory) M.p. 222°C.

The following compounds of the formula (I-1-c) are obtained analogously to Example (I-1-c-1) and following the general preparation instructions

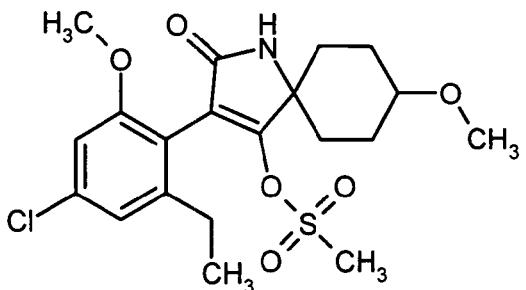


Ex. No.	W	X	Y	D	A	B	M	R <sup>2</sup>	M.p. °C	Isomer
I-1-c-2	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H			O	C <sub>2</sub> H <sub>5</sub>	208	-
I-1-c-3	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H			O	C <sub>2</sub> H <sub>5</sub>	187	β
I-1-c-4	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H			O	C <sub>2</sub> H <sub>5</sub>	161	β
I-1-c-5	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	CH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	H	O	C <sub>2</sub> H <sub>5</sub>	*2.98(s,3H,N <u>CH<sub>3</sub></u> )- 3.71 (s,3H,O <u>CH<sub>3</sub></u> )-	-
I-1-c-6	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	c-C <sub>6</sub> H <sub>11</sub>	CH <sub>3</sub>	H	O	C <sub>2</sub> H <sub>5</sub>	*4.2 (m,2H,O <u>CH<sub>2</sub></u> )	-
I-1-c-7	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	C <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	H	O	C <sub>2</sub> H <sub>5</sub>	*4.2 (m,2H,O <u>CH<sub>2</sub></u> )	

Ex. No.	W	X	Y	D	A	B	M	R <sup>2</sup>	M.p. °C	Isomer
I-1-c-8	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	C1		H	H	O	C <sub>2</sub> H <sub>5</sub>	*2.8 (m,1H, <u>H</u> ) <del>2.8</del>	-
I-1-c-9	OCH <sub>3</sub>	CH <sub>3</sub>	C1	H	CH <sub>3</sub>	CH <sub>3</sub>	O	C <sub>2</sub> H <sub>5</sub>	141-145	-
I-1-c-10	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	C1	H	CH <sub>3</sub>	CH <sub>3</sub>	O	C <sub>2</sub> H <sub>5</sub>	*1.46 (d,6H,C(CH <sub>3</sub> ) <sub>2</sub> )	-
I-1-c-11	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	C1	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	O	C <sub>2</sub> H <sub>5</sub>		188-191	β
I-1-c-12	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	C1	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	O	CH <sub>2</sub> =CH-CH <sub>2</sub> -		159-161	β
I-1-c-13	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	C1	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	O	CH <sub>2</sub> =CH-CH <sub>2</sub> -		138-140	β
I-1-c-14	OCH <sub>3</sub>	CH <sub>3</sub>	C1	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	O	C <sub>2</sub> H <sub>5</sub>		170	β
I-1-c-15	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	C1	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	O	C <sub>4</sub> H <sub>9</sub> -CH(C <sub>2</sub> H <sub>5</sub> )-CH <sub>2</sub> -		98-101	β
I-1-c-16	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	C1	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	O	C <sub>4</sub> H <sub>9</sub> -CH(C <sub>2</sub> H <sub>5</sub> )-CH <sub>2</sub> -	114		β
I-1-c-17	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	C1		-(CH <sub>2</sub> ) <sub>3</sub> -	H	O	C <sub>2</sub> H <sub>5</sub>	*4.2 (m,2H,OCH <sub>2</sub> )-	-

\* <sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>) : shifts δ in ppm

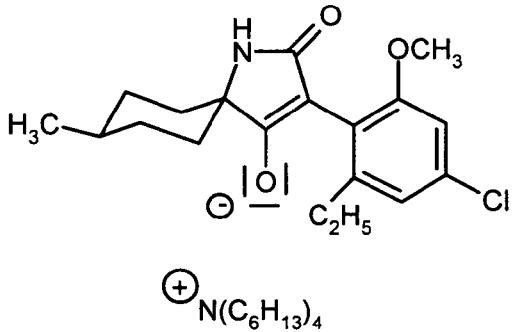
Example I-d-1



First, 0.09 ml of triethylamine and then 0.069 g (0.601 mmol) of methanesulphonyl chloride are added to a solution of 0.2 g (0.547 mmol) of the compound of Example I-1-a-3 in 5 anhydrous  $\text{CH}_2\text{Cl}_2$ . After the mixture has been stirred overnight at room temperature, it is treated with 10 ml of sodium hydrogen carbonate solution, the phases are separated and the organic phase is subsequently dried with sodium sulphate and then freed from solvent in vacuo. The residue thus obtained is chromatographed on silica gel with an n-heptane/ethyl acetate gradient of from 100/0 to 0/100.

10 Yield: 0.14 g (58% of theory) M.p.: 210-214°C.

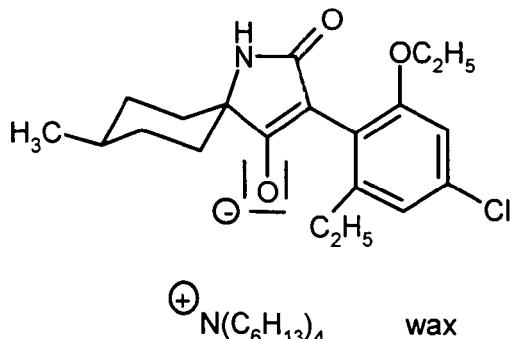
Example I-1-f-1



9 ml of a 10% strength solution of tetrahexylammonium hydroxide in methanol are added to a 15 solution of 0.75 g of the compound of Example I-1-a-3 (1.95 mmol) in 20 ml of anhydrous methanol and stirring is continued for 30 minutes at room temperature. The mixture is freed in vacuo from solvent and treated with a total of three more portions of 50 ml of methanol and the solvent is removed, which gives 1.44 g (yield 97%) in the form of a waxy solid.

$^1\text{H}$  NMR (400 MHz,  $d_6$ -DMSO):  $\delta$  = 0.88 (t, 12, 4  $\text{CH}_3$ ), 3.56 (s, 3H,  $\text{OCH}_3$ ) ppm

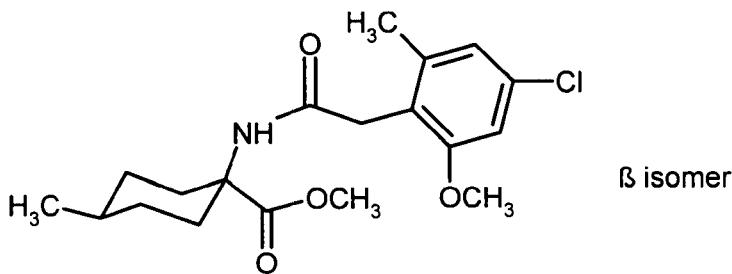
20 In Example I-1-f-2,



is obtained analogously to Example I-1-f-1.

$^1\text{H}$  NMR (400 MHz,  $\text{d}_6\text{-DMSO}$ ):  $\delta = 0.88$  (t, 12, 4  $\text{CH}_3$ ), 3.83 (s, 2H,  $\text{OCH}_2$ ) ppm

**Example No. II-1**



5

5.2 g of 4-chloro-2-methoxy-6-methylphenylacetic acid and 5.4 ml (0.073 mol) of thionyl chloride are stirred at 50°C until the evolution of gas has ceased.

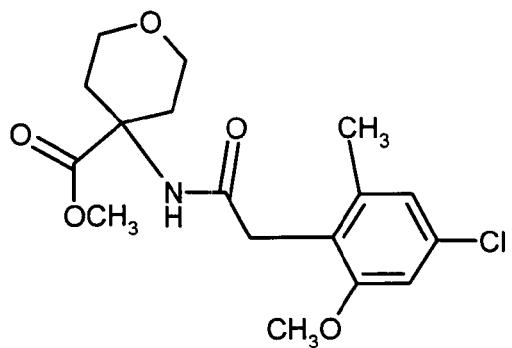
Excess thionyl chloride is evaporated on a rotary evaporator at 50°C, the residue is taken up in 50 ml of anhydrous toluene, and excess thionyl chloride is again evaporated on a rotary evaporator. The residue is taken up in 30 ml of anhydrous tetrahydrofuran (solution 1). 5.1 g of methyl 1-amino-4-methylcyclohexanecarboxylate hydrochloride are introduced into 50 ml of anhydrous tetrahydrofuran, and 7.5 ml (0.053 mol) of triethylamine are added. Then, solution 1 is added dropwise at 0-10°C.

Stirring is continued for 1 h at room temperature.

15 The solvent is evaporated on a rotary evaporator, the residue is taken up in a 0.5 N solution of hydrochloric acid in dichloromethane, the mixture is extracted, the extract is dried and the solvent is distilled off. The residue is recrystallized from MTB ether/n-hexane.

Yield: 6.7 g (68% of theory), m.p.: 166°C.

**Example No. II-2**

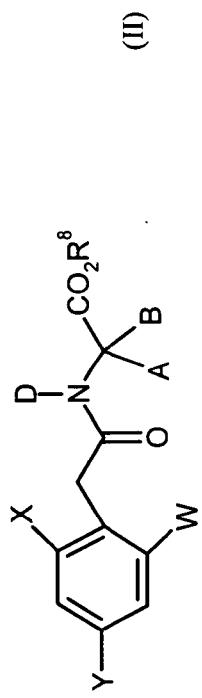


6.4 g of the compound of Preparation Example No. XXIX-1 in 60 ml of methylene chloride are  
5 added to 9.8 g (0.1 mol) of concentrated sulphuric acid at an internal temperature of 30-40°C. The mixture is stirred for 2 h at 30-40°C. Then, 13.5 ml of anhydrous methanol are added in such a way that an internal temperature of 40°C is established. Stirring is continued for 6 h at 40-70°C.

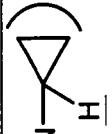
10 The reaction solution is poured onto 0.1 kg of ice, extracted with dichloromethane and washed with NaHCO<sub>3</sub> solution. The mixture is then dried, the solvent is distilled off and the residue is recrystallized from MTB ether/n-hexane.

Yield: 5.9 g (83% of theory), m.p.: 156°C.

The following compounds of the formula II are obtained analogously to Examples II-1 and II-2 and following the general preparation instructions



Ex. №.	W	X	Y	D	A	B	R <sup>8</sup>	Isomer	M.p.°C
II-3	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	CH <sub>3</sub>		β	105
II-4	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-(CH <sub>2</sub> ) <sub>2</sub> -CH-CH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	CH <sub>3</sub>		β	131
II-5	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	CH <sub>3</sub>	CH <sub>3</sub>		-	163
II-6	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-	-(CH <sub>2</sub> ) <sub>5</sub> -	CH <sub>3</sub>	-	124
II-7	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-CH <sub>2</sub> -CH-CH <sub>2</sub> - (CH <sub>2</sub> ) <sub>3</sub>	H		C <sub>2</sub> H <sub>5</sub>	Isomer mixture	Oil
II-8	OCH <sub>3</sub>	CH <sub>3</sub>	Cl	H	-	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub>	CH <sub>3</sub>	β	127
II-9	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	-	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub>	CH <sub>3</sub>	β	100
II-10	OCH <sub>3</sub>	CH <sub>3</sub>	Cl	H	CH <sub>3</sub>		CH <sub>3</sub>	-	157
II-11	OC <sub>2</sub> H <sub>5</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	H	CH <sub>3</sub>	CH <sub>3</sub>	CH <sub>3</sub>	-	118
II-12	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	C <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	H	C <sub>2</sub> H <sub>5</sub>	-	*1.47 (d, 3H, CH(C <sub>2</sub> H <sub>5</sub> ))
II-13	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	c-C <sub>6</sub> H <sub>11</sub>	CH <sub>3</sub>	H	C <sub>2</sub> H <sub>5</sub>	-	*1.44 (d, 3H, CH(C <sub>2</sub> H <sub>5</sub> ))

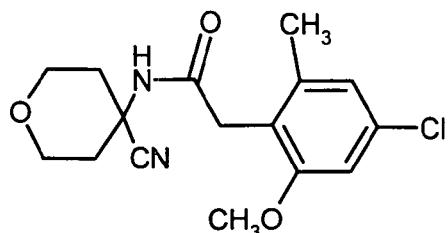
Ex. No.	W	X	Y	D	A	B	R <sup>8</sup>	Isomer	M.p.°C
II-14	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	△	H	H	C <sub>2</sub> H <sub>5</sub>	-	*3.03 (m, 1H, N-  )
II-15	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	CH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	H	C <sub>2</sub> H <sub>5</sub>	-	*2.59 (q, 2H, Ar-CH <sub>2</sub> )
II-16	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-	-(CH <sub>2</sub> ) <sub>3</sub> -	H	CH <sub>3</sub>	-	** 1.13 (t, 3H, ArCH <sub>2</sub> -CH <sub>3</sub> ), 3.76 (s, 3H, Ar O <u>CH<sub>3</sub></u> )
II-17	OC <sub>2</sub> H <sub>5</sub>	CH <sub>3</sub>	Cl	H	-	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -	CH <sub>3</sub>	β	*** 1.31 (t, 3H, Ar-O-CH <sub>2</sub> -CH <sub>3</sub> ), 4.00 (q, 2H, Ar-O-CH <sub>2</sub> -CH <sub>3</sub> )

\* <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>): shifts δ in ppm

\*\* <sup>1</sup>H NMR (400 MHz, d<sub>6</sub>-DMSO): shifts δ in ppm

\*\*\* <sup>1</sup>H NMR (400 MHz, CD<sub>3</sub>CN): shifts δ in ppm

Example No. XXIX-1



5.2 g of 4-chloro-2-methoxy-6-methylphenylacetic acid and 5.4 ml (0.073 mol) of thionyl  
5 chloride are stirred at 50°C until the evolution of gas has ceased.

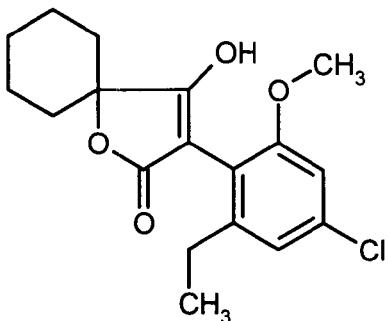
Excess thionyl chloride is evaporated on a rotary evaporator at 50°C, the residue is taken up in  
50 ml of anhydrous toluene and excess thionyl chloride is again evaporated on a rotary  
evaporator. The residue is taken up in 30 ml of anhydrous tetrahydrofuran (solution 1). 6.11 g  
of 4-aminotetrahydropyran-4-carbonitrile are introduced into 50 ml of anhydrous  
10 tetrahydrofuran, 3.4 ml of triethylamine are added and solution 1 is added dropwise at 0-10°C.

Stirring is continued for 1 h at room temperature.

The solvent is evaporated on a rotary evaporator and the residue is taken up in a 0.5 N strength  
solution of hydrochloric acid in dichloromethane, the mixture is extracted, the extract is dried  
and the solvent is distilled off. The residue is recrystallized from MTB ether/n-hexane.

15 Yield: 6.4 g (82% of theory), m.p.: 149°C

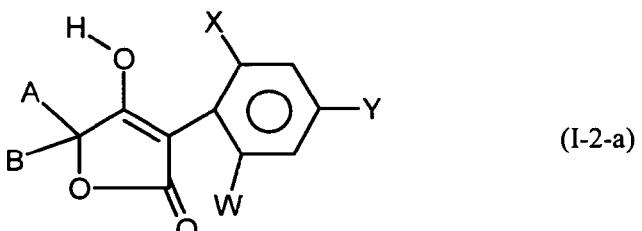
**Example I-2-a-1**



4.2 g of the compound of Example III-1, dissolved in DMF (5 ml), are added dropwise at 0 to 10°C to 1.84 g of KOtBu in 5 ml of DMF at 0°C. The mixture is stirred overnight at room 5 temperature and the DMF is removed by vacuum distillation. The residue is stirred with water, acidified with HCl, and the precipitate is filtered off with suction and dried.

Yield: 2.8 g (59% of theory), m.p. 90°C.

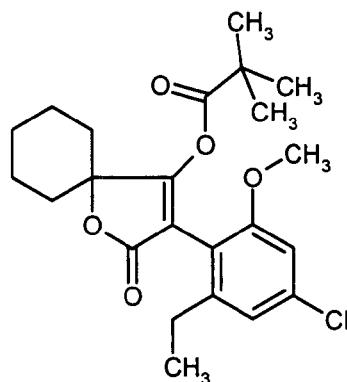
The following compounds of the formula (I-2-a) are obtained analogously to Example (I-2-a-1) and following the general preparation instructions



10

Ex. No.	W	X	Y	A	B	M.p.°C
I-2-a-2	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		90-95

**Example I-2-b-1**

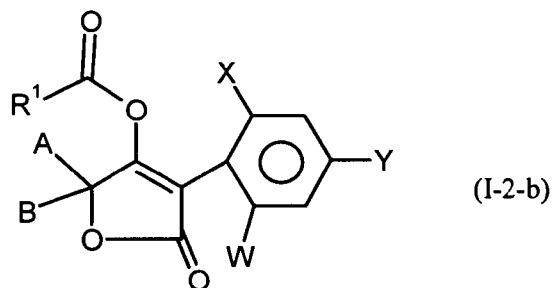


5      0.34 g of the compound of Example I-2-a-1 are introduced into dichloromethane (10 ml) and triethylamine (0.15 ml), and 0.13 g of pivaloyl chloride is added, with ice-cooling. The mixture is stirred overnight at room temperature and the solution is washed with 10% citric acid and 10% NaOH, separated, dried and concentrated.

Yield 0.3 g (57% of theory).

$^1\text{H-NMR}$  (400 MHz,  $\text{CD}_3\text{CN}$ ):  $\delta = 1.11$  (s, 9H,  $\text{C}(\text{CH}_3)_3$ ), 3.72 (s, 3H,  $\text{ArOCH}_3$ ) ppm.

10     The following compounds of the formula (I-2-b) are obtained analogously to Example (I-2-b-1) and following the general preparation instructions

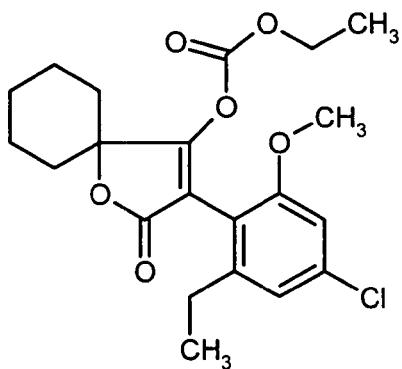


Ex. No.	W	X	Y	A	B	$\text{R}^1$	M.p. °C
I-2-b-2	$\text{OCH}_3$	$\text{C}_2\text{H}_5$	Cl	$-(\text{CH}_2)_5-$		$\text{H}_5\text{C}_2\text{-C}(\text{CH}_3)_2$	* 1.07, 1.19, (2s, 6H, $\text{C}(\text{CH}_3)_2$ ), 3.72, (s, 3H, $\text{OCH}_3$ )

Ex. No.	W	X	Y	A	B	R <sup>1</sup>	M.p. °C
I-2-b-3	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> ) <sub>5</sub> -		i-C <sub>3</sub> H <sub>7</sub>	*2.66 (m, 1H, -CH(CH <sub>3</sub> ) <sub>2</sub> , 3.72 (s, 3H, OCH <sub>3</sub> )
I-2-b-4	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> - (CH <sub>2</sub> ) <sub>2</sub> -	H <sub>5</sub> C <sub>2</sub> -C(CH <sub>3</sub> ) <sub>2</sub> -		*3.28, 3.33 (2s, 3H, CH-OCH <sub>3</sub> )
I-2-b-5	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> - (CH <sub>2</sub> ) <sub>2</sub> -	i-C <sub>3</sub> H <sub>7</sub>		*3.30, 3.32 (2s, 3H, CH-OCH <sub>3</sub> )
I-2-b-6	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> ) <sub>2</sub> -CHOCH <sub>3</sub> - (CH <sub>2</sub> ) <sub>2</sub> -	t-C <sub>4</sub> H <sub>9</sub>		*3.29, 3.33 (2s, 3H, CHOCH <sub>3</sub> ), 1.11, 1.12 (2s, 9H, C(CH <sub>3</sub> ) <sub>3</sub> )

\* <sup>1</sup>H NMR (400 MHz, CD<sub>3</sub>CN): shifts δ in ppm

**Example I-2-c-1**

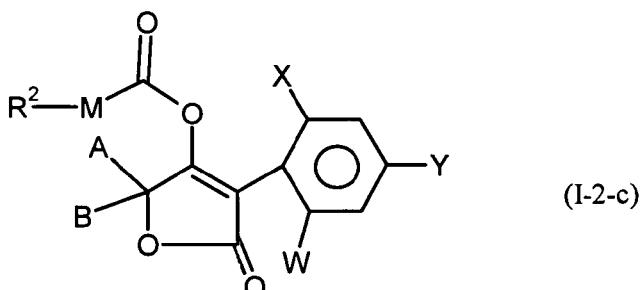


0.67 g of the compound of Example I-2-a-1 are introduced into dichloromethane (10 ml) and 5 triethylamine (0.31 ml), and 0.239 g of ethyl chloroformate is added, with ice-cooling. The mixture is stirred overnight at room temperature and the solution is washed with 10% citric acid and 10% NaOH, separated, dried and concentrated.

Yield: 0.76 g (73% of theory).

10 <sup>1</sup>H NMR (400 MHz, CD<sub>3</sub>CN): δ = 3.73 (s, 3H, OCH<sub>3</sub>), 4.03 (q, 2H, OCH<sub>2</sub>CH<sub>3</sub>), 6.87 (d, 1H, Ar-H), 6.95 (d, 1H, Ar-H) ppm.

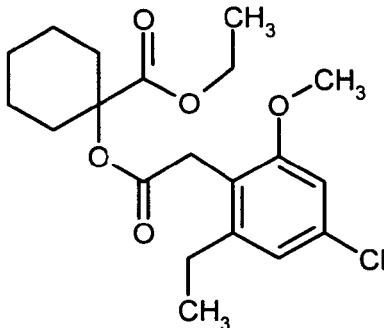
The following compounds of formula (I-2-c) are obtained analogously to Example (I-2-c-1) and following the general preparation instructions



Ex. No.	W	X	Y	A	B	M	R <sup>2</sup>	M.p. °C
I-2-c-2	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> )-CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		O	C <sub>2</sub> H <sub>5</sub>	*3.31, 3.33 (2s, 3H, CHOCH <sub>3</sub> ), 3.73 (s, 3H, OCH <sub>3</sub> )

\* <sup>1</sup>H NMR (400 MHz, CD<sub>3</sub>CN): shifts δ in ppm

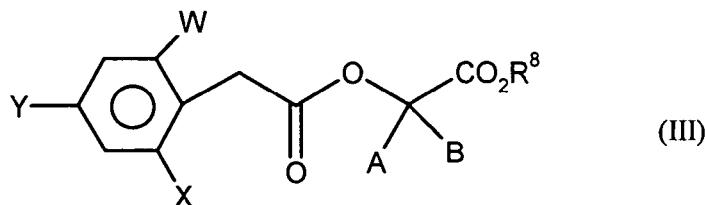
### 5 Example III-1



2.09 g of ethyl 1-hydroxycyclohexanecarboxylate and 3 g of the compound of Example XXIV-1 are heated at 120°C in an oil bath, stirred until the evolution of gas has ceased and then heated briefly at 140°C. Yield: 42 g (59% of theory).

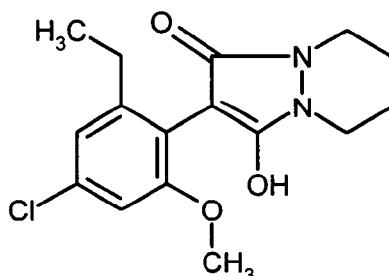
10 <sup>1</sup>H NMR (400 MHz, CD<sub>3</sub>CN): δ = 2.58 (q, 2H, CH<sub>2</sub>-Ar), 3.77 (s, 3H, OCH<sub>3</sub>), 4.05 (m, 2H, O-CH<sub>2</sub>-CH<sub>3</sub>) ppm.

The following compounds of formula (III) are obtained analogously to Example III-1 and following the general preparation instructions



Ex. No.	W	X	Y	A	B	R <sup>8</sup>	M.p. °C
III-2	OCH <sub>3</sub>	C <sub>2</sub> H <sub>5</sub>	Cl	-(CH <sub>2</sub> ) <sub>2</sub> CHOCH <sub>3</sub> -(CH <sub>2</sub> ) <sub>2</sub> -		C <sub>2</sub> H <sub>5</sub>	* 2.58 (q, 2H, <u>CH<sub>2</sub>-Ar</u> ), 4.06 (m, 2H, <u>O-CH<sub>2</sub>-CH<sub>3</sub></u> ), 6.88 (d, 1H, Ar-H), 6.91 (d, 1H, Ar-H)

**Example I-8-a-1**



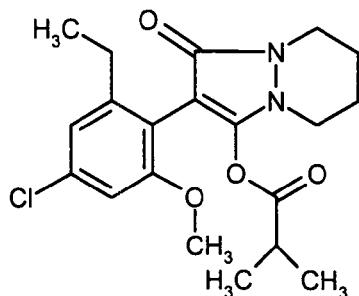
5

2.5 g (0.007 mol) of the compound of Example XII-1 and 1.673 g (0.015 mol) of potassium tert-butoxide are heated in 100 ml of N,N-dimethylacetamide to 60 to 120°C. The mixture is cooled, acidified, diluted with water and extracted 3 times with toluene. The organic phase is dried, the solvent is removed by vacuum distillation and the residue is filtered through silica gel. This gives 0.9 g of product.

The aqueous phase was reextracted with ethyl acetate and the extract was purified analogously. This gave a further 0.48 g of product.

Total yield: 1.38 g (60% of theory), m.p. 163°C.

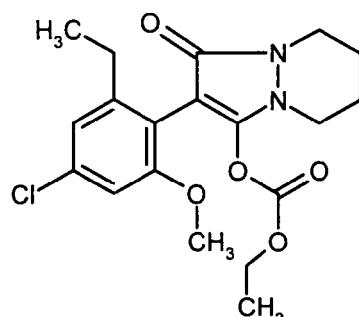
Example I-8-b-1



0.14 g of the compound of Example I-8-a-1 and 0.08 ml of triethylamine are introduced into 25 ml of dichloromethane. After 0.05 ml of isobutyryl chloride has been added dropwise, the mixture is 5 stirred for 1 hour at room temperature and then diluted with water, the organic phase is separated off and the solvent is distilled off. The reaction mixture is stirred with n-hexane and a little toluene, and the precipitate is filtered off with suction.

Yield: 120 mg (70% of theory), m.p.: 127.5°C.

Example I-8-c-1

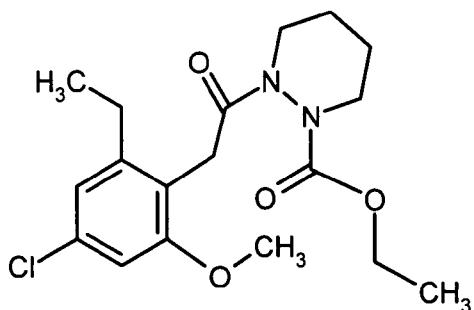


10

0.15 g of the compound of Example I-8-a-1 and 0.08 ml of triethylamine are introduced into 35 ml of dichloromethane, 0.04 ml of ethyl chloroformate is added dropwise and the mixture is stirred for 1 hour at room temperature. The reaction solution is diluted with water, the organic phase is separated off and dried and the solvent is distilled off. The residue is stirred with n-15 hexane and a little toluene and the precipitate is filtered off with suction.

Yield: 110 mg (60% of theory), m.p.: 110°C.

**Example XII-1**



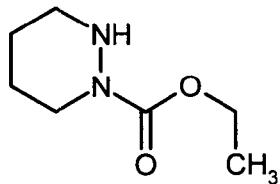
1.9 g of the compound of Example XXVII-2 in 50 ml of dichloromethane are treated with 2.10 g of oxalyl dichloride, the mixture is refluxed for 30 minutes, 1 ml of dimethylformamide 5 is added, the mixture is stirred for a further 30 minutes under reflux, cooled under N<sub>2</sub> atmosphere, the solvent is distilled off and the residue is dissolved in acetonitrile (solution A).

1.31 g of the compound of Example XLI-2 and 1.38 g of potassium carbonate are introduced into 100 ml of acetonitrile, solution A is added dropwise at room temperature and stirring is continued for 4 hours at room temperature. The solids are filtered off, the solvent is evaporated 10 and the residue is filtered through silica gel.

Yield: 2.5 g (83% of theory).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>): δ = 6.85 (d, 1H); 6.70 (d, 1H); 4.50 (ddbr, 1H); 4.30-4.10 (m, 3H); 3.90 (d, 1H); 3.75 (s, 3H); 3.50 (d, 1H); 2.70 (mbr, 2H); 2.60 (q, 2H); 1.65 (mbr, 4H); 1.30 (tr, 3H); 1.20 (tr, 3H) ppm.

15    **Example XLI-1**



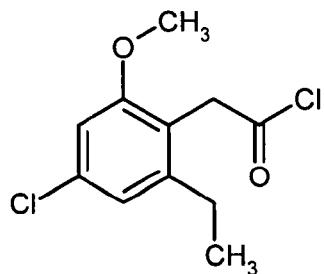
5 g (0.031 mol) of hexahydropyridazine are introduced into 35 ml of dichloromethane, the mixture is treated with 32 ml of water and 0.1 g of tetra-n-butylammonium bromide is added. 4.1 g (0.104 mmol) of sodium hydroxide in 32 ml of water are metered in, while cooling in an 20 ice bath. 3.0 ml of ethyl chloroformate in 30 ml of dichloromethane are added dropwise at 0°C

and the mixture is stirred for 2 hours at 0°C. After the mixture has been stirred for 8 hours at room temperature, the organic phase is separated off, the aqueous phase is extracted with dichloromethane and the organic phase is concentrated by evaporation on a rotary evaporator. The reaction mixture is stirred with water, acidified slightly and washed twice with diethyl ether, and the aqueous phase is basified, extracted with dichloromethane, dried and concentrated by evaporation on a rotary evaporator.

5 Yield: 3.1 g (63% of theory)

$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ):  $\delta$  = 4.20 (q, 2H); 3.55 (tr, br, 2H); 2.90 (tr, br, 2H); 1.65 (m, 4H); 1.30 (tr, 3H) ppm.

10 **Example XXIV-1**

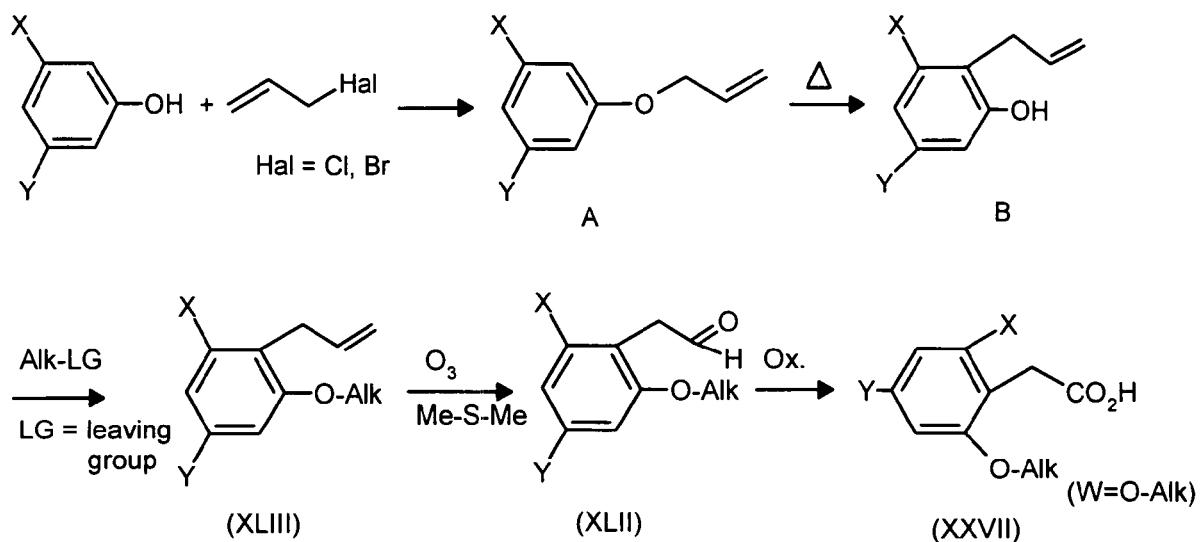


5.78 g of the compound of Example XXVII-2 are introduced into 50 ml of toluene and one drop of DMF. 3.6 g of thionyl chloride are added dropwise at room temperature, and the mixture is stirred overnight under reflux, cooled, concentrated and degassed.

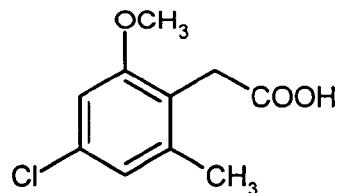
15 Yield: 6.17 g (98% of theory).

The product was used without further purification, for example for the preparation of Examples III-1 and III-2.

Process Q



5    Ex. No. XXVII-1

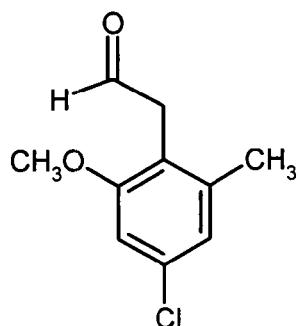


34 g (0.11 mol) of the compound of Preparation Example XLII-1 are introduced, at room temperature, into 350 ml of tert-butanol and 115 g of 2-methyl-2-butene. A solution of 456 ml of water, 155.9 g of  $\text{NaH}_2\text{PO}_4$  and 53.9 g of sodium chlorite as a 20% strength solution is then 10 added dropwise at room temperature. Continue stirring for 4 h at room temperature.

The reaction solution is stirred into ethyl acetate, and the organic phase is separated off and extracted twice with ethyl acetate. It is subsequently dried and the solvent is distilled off. The residue is taken up in water, rendered alkaline and extracted. The aqueous phase is acidified and the precipitate is filtered off with suction and dried.

15    Yield: 11.2 g (47.5% of theory), m.p.: 130-135°C

Example No. XLII-1



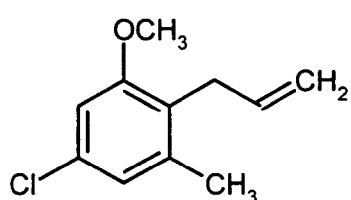
22 g (0.11 mol) of the compound of Preparation Example XLIII-1 is introduced into 60 ml of  $\text{CH}_2\text{Cl}_2$  at  $-70^\circ\text{C}$ . Then, ozone is passed in for 2 hours until uptake is no longer discernible

5 (KI solution turns yellowish-brown). The mixture is flushed with oxygen. When the reaction has ended, 19.4 g of dimethyl sulphide are added dropwise at  $-70^\circ\text{C}$  using a pipette, and stirring is continued for 30 minutes. The mixture is allowed to slowly come to room temperature and stirring is continued for 30 minutes at room temperature. The solvent is evaporated in *vacuo* on a rotary evaporator in a hood.

10 The residue is now purified by chromatography on silica gel (petroleum ether:ethyl acetate, 15:1).

Yield: 34 g (40% of theory).

Example No. XLIII-1

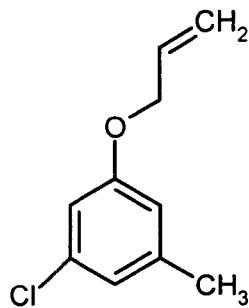


15 28 g (0.15 mol) of 3-chloro-6-allyl-5-methylphenol of Example B together with 7.4 g (0.18 mol) of NaOH are introduced into 70 ml of  $\text{H}_2\text{O}$ . 20.4 g (0.165 mol) of dimethyl sulphate are added dropwise at 20-30°C and stirring is continued for 7 h at 100°C. The aqueous phase is extracted 3 times with diethyl ether and the organic phase is washed twice with 1N NaOH solution and water. It is dried, the solvent is evaporated on a rotary evaporator and the residue

20 is distilled in *vacuo*.

Yield: 22 g (b.p.: 65°C; 0.2 mbar, 76% of theory).

**Example A**

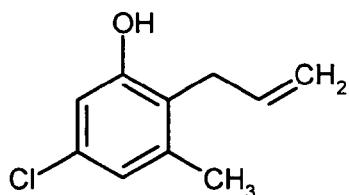


5 50 g (0.35 mol) of 3-chloro-5-methylphenol, 46.7 g (0.38 mol) of brompropene and 50 g of potassium carbonate are introduced into 80 ml of anhydrous acetone at room temperature. The mixture is refluxed overnight.

10 The reaction mixture is cooled, treated with 150 ml of water and extracted twice with methyl tert-butyl ether. The organic phase is subsequently washed with 10% strength NaOH solution and dried over potassium carbonate. The solvent is evaporated on a rotary evaporator and the residue is distilled in vacuo.

Yield: 54 g (b.p.: 105°C at 0.1 mbar; 85% of theory)

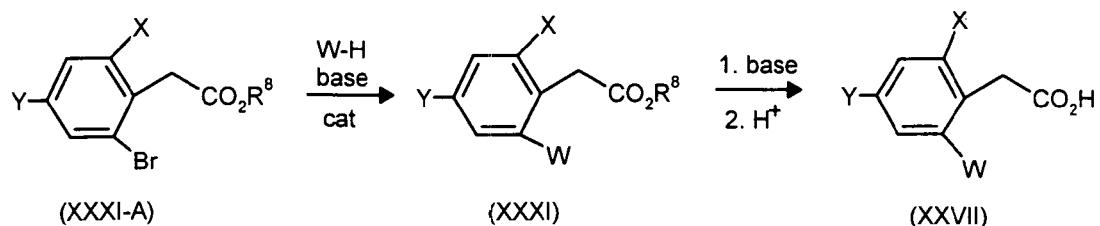
**Example B**



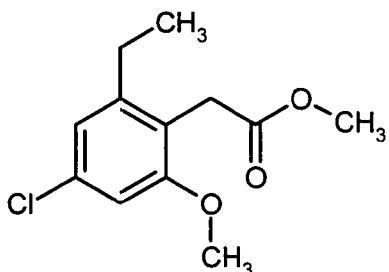
15 To 53 g (0.29 mol) of the compound of Preparation Example A, add 150 ml of mesitylene at room temperature and reflux for 1-2 days. After the reaction has ended (TLC check), the solvent is evaporated in vacuo on a rotary evaporator. Precision distillation of 110 g of crude product in vacuo gives two isomers, which are introduced into the subsequent reaction for the preparation of Ex. XLIII-1 without further purification.

Yield: 28 g (b.p.: 84°C; 0.12 mbar, 53% of theory) (crude product).

### Process R



**Example No. XXXI-1**



5

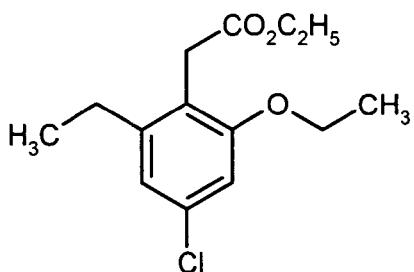
30.1 g (103 mmol) of methyl 2-bromo-4-chloro-6-ethylphenylacetate, 3 g (21 mmol) of copper(I) bromide, 30 ml of ethyl acetate and 210 ml (1105 mmol) of 30 % strength sodium methoxide solution are refluxed overnight. The solvent is subsequently evaporated on a rotary evaporator, the residue is taken up in water/dichloromethane, the mixture is extracted, the extract is dried and the solvent is evaporated on a rotary evaporator.

Yield: 9.4 g (38% of theory)

<sup>1</sup>H NMR {400 MHz, DMSO-d<sub>6</sub>} : 1.09 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 2.55 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, CH<sub>2</sub>); 3.58 (s, 3H, OCH<sub>3</sub>); 3.61 (s, 2H, CH<sub>2</sub>) 3.78 (s, 3H, OCH<sub>2</sub>); 6.89 (s, 1H, Ph-H); 6.94 (s, 1H, Ph-H).

15 MS/CI: 243 (M+1)

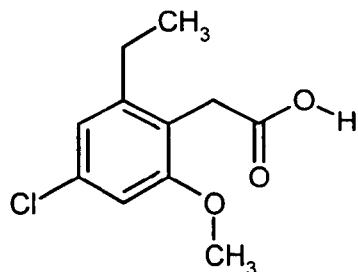
Ethyl 2-ethyl-6-ethoxy-4-chlorophenylacetate (XXX-2) is obtained analogously to Example XXX-1



<sup>1</sup>H NMR {400 MHz, DMSO-d<sub>6</sub>} : 1.10 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 1.18 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 1.27 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 2.54 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, CH<sub>2</sub>); 3.58 (s, 2H, CH<sub>2</sub>); 4.01 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, OCH<sub>2</sub>); 4.09 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, OCH<sub>2</sub>); 6.86 (s, 1H, Ph-H); 6.88 5 (s, 1H, Ph-H) ppm.

MS/CI 271 (M+1).

**Example No. XXVII-2**



9.4 g (38 mmol) of the compound of Example XXXI-1 are added to 6.5 g (116 mmol) of KOH, 10 30 ml of water and 40 ml of methanol and the mixture is refluxed overnight. The solvent is then removed in vacuo, and the residue is taken up in water and precipitated with concentrated HCl. The precipitate is filtered, washed with a little water and dried in vacuo.

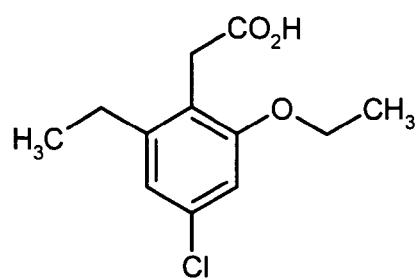
Yield: 8.6 g (97% of theory)

<sup>1</sup>H NMR {400 MHz, DMSO-d<sub>6</sub>} : 1.08 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 2.53 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, CH<sub>2</sub>); 3.51 (s, 3H, CH<sub>2</sub>); 3.76 (s, 3H, OCH<sub>3</sub>); 6.86 (s, 1H, Ph-H); 6.89 (s, 1H, Ph-H); 12.2 (s, 1H, CO<sub>2</sub>H).

MS/CI: 229 (M+1)

2-Ethyl-6-ethoxy-4-chlorophenylacetic acid XXXVII-3 is obtained analogously to Example XXVII-2

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<sup>1</sup>H NMR {400 MHz, DMSO-d<sub>6</sub>} : 1.09 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 1.28 (t, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 3H, CH<sub>3</sub>); 2.54 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, CH<sub>2</sub>); 3.51 (s, 2H, CH<sub>2</sub>); 4.01 (q, <sup>3</sup>J<sub>HH</sub> = 7 Hz, 2H, OCH<sub>2</sub>); 6.85 (s, 1H, Ph-H); 6.87 (s, 1H, Ph-H); 12.2 (s 1H, CO<sub>2</sub>H) ppm.

5 MS/CI:243 (M+1).

**Use examples:**

**Example A**

Post-emergence test

Solvent: 5 parts by weight of acetone

5 Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To prepare a suitable active compound preparation, 1 part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added, and the concentrate is diluted with water to the desired concentration.

10 Test plants with a height of 5 - 15 cm are sprayed with the active compound preparation in such a way that the amounts of active compound desired in each case are applied per unit area. The concentration of the spray mixture is chosen in such a way that the amounts of active compound desired in each case are applied in 1 000 l of water/ha.

After three weeks, the degree of damage of the plants is scored in % damage in comparison with the development of the untreated control.

15 The figures denote:

0 % = no effect (like untreated control)

100 % = total destruction

**Example B**

Pre-emergence test

Solvent: 5 parts by weight of acetone

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

5 To prepare a suitable active compound preparation, 1 part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added, and the concentrate is diluted with water to the desired concentration.

10 Seeds of the test plant are sown in normal soil. After approximately 24 hours, the soil is sprayed with the active compound preparation in such a way that the amounts of active compound desired in each case are applied per unit area. The concentration of the spray mixture is chosen in such a way that the amounts of active compound desired in each case are applied in 1 000 l of water/ha.

After three weeks, the degree of damage of the plants is scored in % damage in comparison with the development of the untreated control.

15 The figures denote:

0 % = no effect (like untreated control)

100 % = total destruction

post-emergence	greenhouse	g.a.i./ha	sugar beet	Alopecurus	Avena fatua	Echinochloa	Setaria	Abutilon	Sinapis
Ex. I-1-a-3		250	0	100	100	100	100	70	80

post-emergence	greenhouse	g.a.i./ha	sugar beet	Alopecurus	Avena fatua	Echinochloa	Setaria	Abutilon	Sinapis
Ex. I-1-a-4		250	0	100	100	100	100	100	100

post-emergence	greenhouse	g.a.i./ha	Alopecurus	Avena fatua	Echinochloa	Setaria	Sinapis
Ex. I-1-a-5		250	100	100	100	100	80
Ex. I-1-a-6		250	90	100	100	-	80

post-emergence	greenhouse	g.a.i./ha	sugar beet	Alopecurus	Avena fatua	Setaria	Amaranthus
Ex. I-1-a-1		250	0	100	100	100	-
Ex. I-1-a-2		250	0	-	100	100	90

pre-emergence	greenhouse	g.a.i./ha	Alopecurus	Avena fatua	Echinochloa	Setaria	Abutilon	Sinapis
Ex. I-1-a-3		250	80	100	100	100	80	80
Ex. I-1-a-4		250	90	100	100	100	-	90
Ex. I-1-a-5		250	90	100	100	100	100	
pre-emergence	greenhouse	g.a.i./ha	Alopecurus	Avena fatua	Echinochloa	Setaria	Matricaria	Viola
Ex. I-1-a-1		125	0	100	100	100	100	90
Ex. I-1-a-2		250	0	100	100	80	80	

### Example C

#### Post-emergence crop plant tolerance

Seeds of monocotyledonous and dicotyledonous weed and crop plants are placed in sandy loam in wood fibre pots or in plastic pots, covered with soil and grown in the greenhouse or, during the 5 vegetation period, in the open outside the greenhouse, under good growth conditions. 2 to 3 weeks after sowing, the test plants are treated in the one- to three-leaf stage. The test compounds, which are formulated as wettable powder (WP) or as a fluid (EC), are sprayed onto the plants and the soil surface at various dosage rates with a water application rate of 300 l/ha (converted), with added wetter (0.2 to 0.3%). 3 to 4 weeks after the treatment of the test plants, the effect of the 10 preparations is scored visually in comparison with untreated controls (herboidal activity in per cent (%): 100% activity = plants have died, 0% activity = like control plants).

#### Use of safeners

If it is additionally desired to test whether safeners are capable of improving the plant tolerance of test substances with regard to the crop plants, the following options for applying the safeners are 15 used:

- Prior to application of the test substances, the crop plants are sprayed with safener at a particular application rate per hectare (usually 1 day prior to application of the test substances).
- The safener is applied together with the test substance in the form of a tank mix (the 20 amount of safener being indicated in g/ha or as a safener:herbicide ratio).

The activity of the safener substance can be assessed in comparison with untreated control plants by comparing the effect of test substances on crop plants which have been treated without and with safener.

Results of greenhouse experiments with safener/pretreatment (safener mefenpyr (100 g a.i./ha), one day prior to post-emergence treatment with the herbicide)

**Table 1'**

	Application rate g a.i./ha	Spring barley observed (%)
Example I-1-c-7	50	85
	25	30
	13	15
Example I-1-c-7 + mefenpyr	500 + 100	50
	25 + 100	10
	13 + 100	5

5 **Table 2'**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-1-c-8	100		55
	50	97	50
	25	35	
Example I-1-c-8 + mefenpyr	100 + 100		20
	50 + 100	50	15
	25 + 100	15	

**Table 3'**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-a-1	100	20	30
	50	15	20
	25	10	20
Example I-2-a-1 + mefenpyr	100 + 100	10	15
	50 + 100	0	10
	25 + 100	0	5

**Table 4'**

	Application rate g a.i./ha	Spring barley observed (%)
Example I-2-a-2	100	97
	50	60
	25	60
Example I-2-a-2 + mefenpyr	100 + 100	40
	50 + 100	30
	25 + 100	20

**Table 5'**

	Application rate g a.i./ha	Spring wheat observed (%)
Example I-2-c-1	100	30
	50	20
Example I-2-c-1 + mefenpyr	100 + 100	10
	50 + 100	5

5 **Table 6'**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-b-1	100	20	60
	50	10	40
	25		20
Example I-2-b-1 + mefenpyr	100 + 100	10	15
	50 + 100	0	10
	25 + 100		5

**Table 7'**

	Application rate g a.i./ha	Spring barley observed (%)
Example I-2-b-6	100	98
	50	97
	25	50
Example I-2-b-6 + mefenpyr	100 + 100	20
	50 + 100	15
	25 + 100	10

**Table 8'**

	Application rate g a.i./ha	Spring wheat observed (%)
Example I-1-c-1	100	70
	50	20
	25	20
Example + mefenpyr	100 + 100	55
	50 + 100	5
	25 + 100	5

5 **Table 9'**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-b-4	100	80	100
	25		
Example I-2-b-4 + mefenpyr	100 + 100	20	20
	25 + 100		

**Table 10'**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-b-5	100	100	
	50	97	
	25	50	99
Example I-2-b-5 + mefenpyr	100 + 100	30	
	50 + 100	20	
	25 + 100	10	20

**Greenhouse experiment with cereals with 100 g a.i./ha mefenpyr, post-emergence; evaluation 21 days after application**

5 **Table 11'**

	Application rate g a.i./ha	Winter barley (%)	Winter wheat (%)
Example I-1-a-6	50	20	10
Example I-1-a-6 + mefenpyr	50 + 100	0	3

**Container experiments with cereals outside the greenhouse**

**Herbicide : mefenpyr 1:2 tank mix**

**Table F'-1**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-a-2	50	20	95
Example I-2-a-2 + mefenpyr	50 + 100	5	15

**Table F'-2**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-c-1	100	15	40
Example I-2-c-1 + mefenpyr	100 + 200	0	5

**Table F'- 3**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-c-2	100	100	100
Example I-2-c-2 + mefenpyr	100 + 200	15	70

5 **Table F'-4**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-b-1	100	20	30
Example I-2-b-1 + mefenpyr	100 + 200	0	0

**Table F'-5**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-b-6	50	40	100
Example I-2-b-6 + mefenpyr	50 + 100	10	15

**Table F'-6**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-1-c-1	100	98	98
Example I-1-c-1 + mefenpyr	100 + 200	20	65

**Table F'-7**

	Application rate g a.i./ha	Spring barley observed (%)
Example I-1-b-4	50	60
Example I-1-b-4 + mefenpyr	50 + 100	15

## 5 Container experiments with cereals outside the greenhouse

**Herbicide : mefenpyr g a.i./ha : 50 g a.i./ha**

>

**Table F'-8**

	Application rate g a.i./ha	Spring barley observed (%)
Example I-2-c-2	100	98
Example I-2-c-2 + mefenpyr	100 + 50	25

**Table F'-9**

	Application rate g a.i./ha	Spring barley observed (%)	Spring wheat observed (%)
Example I-2-c-1	100	50	65
Example I-2-c-1 + mefenpyr	100 + 50	5	5

**Example D**

**Aphis test, contact action**

Solvent: 7 parts by weight of dimethylformamide

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

- 5 To prepare a suitable active compound preparation, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier and the concentrate is diluted with water to the desired concentration.

- 10 Shoots of young field bean plants (*Vicia faba*) which are severely infested with black bean aphids (*Aphis fabae*) are treated by being dipped into the active compound preparation of the desired concentration.

After the desired period of time, the destruction is determined in %. 100% means that all of the aphids have been destroyed; 0% means that no aphids have been destroyed.

In this test, for example the following compounds of the Preparation Examples show a good activity:

**Table D**

Plant-injurious insects

**Aphis fabae contact test**

Active compounds	Active compound concentration in ppm	Destruction in % after 6 d
Ex. I-1-a-1	1000	100

**Example E**

**Meloidogyne test**

Solvent: 7 parts by weight of dimethylformamide

Emulsifier 1 part by weight of alkylaryl polyglycol ether

5 To prepare a suitable active compound preparation, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier and the concentrate is diluted with water to the desired concentration.

Containers are filled with sand, active compound solution, Meloidogyne incognita egg/larval suspension and lettuce seeds. The lettuce seeds germinate and the plantlets develop. The galls 10 develop on the roots.

After the desired time, the nematicidal efficacy is determined I n% with reference to gall formation. 100% means that no galls were found; 0% means that the number of galls on the treated plants corresponds to that of the untreated control.

In this test, good activity is shown, for example, by the following compounds of the Preparation  
15 Examples:

**Table E**

Plant-injurious nematodes

**Meloidogyne test**

Active compounds	Active compound concentration in ppm	Destruction in % after 14 d
Ex. I-1-a-3	20	98
Ex. I-1-a-4	20	98

**Example F**

**Myzus test**

Solvent: 7 parts by weight of dimethylformamide

Emulsifier 1 part by weight of alkylaryl polyglycol ether

5 To prepare a suitable active compound preparation, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier and the concentrate is diluted with emulsifier-containing water to the desired concentration.

10 Cabbage leaves (*Brassica oleracea*), which are severely infested with the green peach aphid (*Myzus persicae*) are treated by immersing them into the active compound preparation of the desired concentration.

After the desired time, the destruction rate is determined in %. 100% means that all of the aphids have been destroyed; 0% means that none of the aphids have been destroyed.

In this test, good activity is shown, for example, by the following compounds of the Preparation Examples:

**Table F**

Plant-injurious insects

**Myzus test**

Active compounds	Active compound concentration in ppm	Destruction in % after 6 d
Ex. I-1-a-1	1000	95
Ex. I-1-a-2	1000	100
Ex. I-1-a-3	1000	90

**Example G**

**Nephrotettix test**

5 Solvent: 7 parts by weight of dimethylformamide

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

10 To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

15 Rice seedlings (*Oryza sativa*) are treated by being dipped into the preparation of active compound of the desired concentration and are infested with the green rice leafhopper (*Nephrotettix cincticeps*) while the leaves are still moist.

After the desired time, the destruction in % is determined. 100% means that all the leafhoppers have been killed; 0% means that none of the leafhoppers have been killed.

20 In this test, for example the following compounds of the preparation examples show good effectiveness:

**Table G**

Plant-injurious insects

**Nephrotettix test**

Active compounds	Active compound concentration in ppm	Destruction in % after 6 d
Ex. I-1-a-1	1000	100
Ex. I-1-a-2	1000	100

**Example H**

**Phaedon larvae test**

Solvent: 7 parts by weight of dimethylformamide

5 Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

10

Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of active compound of the desired concentration and are infested with the larvae of the mustard beetle (*Phaedon cochleariae*) while the leaves are still moist.

15 After the desired time, the destruction in % is determined. 100% means that all the beetle larvae have been killed; 0% means that none of the beetle larvae have been killed.

In this test, for example the following compounds of the preparation examples show good effectiveness:

**Table H**

Plant-injurious insects

**Phaedon larvae test**

Active compounds	Active compound concentration in ppm	Destruction in % after 7 d
Ex. I-1-a-1	1000	100
Ex. I-1-a-2	1000	100
Ex. I-1-a-3	1000	80
Ex. I-1-a-4	1000	100
Ex. I-1-a-6	1000	90

**Example I**

**Plutella test**

5 Solvent: 7 parts by weight of dimethylformamide

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

10 To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

15 Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of active compound of the desired concentration and are infested with caterpillars of the diamond-back moth (*Plutella xylostella*) while the leaves are still moist.

After the desired time, the destruction in % is determined. 100% means that all the caterpillars have been killed; 0% means that none of the caterpillars have been killed.

20 In this test, for example the following compounds of the preparation examples show good effectiveness:

**Table I**

Plant-injurious insects

**Plutella test**

Active compounds	Active compound concentration in ppm	Destruction in % after 7 d
Ex. I-1-a-1	1000	100
Ex. I-1-a-2	1000	100

Example J

**Spodoptera frugiperda test**

Solvent: 7 parts by weight of dimethylformamide

5 Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

10

Cabbage leaves (*Brassica oleracea*) are treated by being dipped into the preparation of active compound of the desired concentration and are infested with caterpillars of the armyworm (*Spodoptera frugiperda*) while the leaves are still moist.

15 After the desired time, the destruction in % is determined. 100% means that all the caterpillars have been killed; 0% means that none of the caterpillars have been killed.

In this test, for example the following compounds of the preparation examples show good effectiveness:

20

**Table J**

Plant-injurious insects

**Spodoptera frugiperda test**

Active compounds	Active compound concentration in ppm	Destruction in % after 7 d
Ex. I-1-a-1	1000	100

**Example K**

**Tetranychus test (OP-resistant/immersion treatment)**

5 Solvent: 7 parts by weight of dimethylformamide

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

10 To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amounts of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration.

15 Bean plants (*Phaseolus vulgaris*) which are severely infested with all stages of the greenhouse red spider mite (*Tetranychus urticae*) are dipped into a preparation of the active compound of the desired concentration.

After the desired time, the activity in % is determined. 100% means that all the spider mites have been killed; 0% means that none of the spider mites have been killed.

20 In this test, for example the following compounds of the preparation examples show good effectiveness:

**Table K**

Plant-injurious mites

**Tetranychus test (OP-resistant/immersion treatment)**

Active compounds	Active compound concentration in ppm	Destruction in % after 7 d
Ex. I-1-a-1	1000	100
Ex. I-1-a-2	1000	95
Ex. I-1-a-3	100	80

**Example L**

Critical concentration test/soil insects – treatment of transgenic plants

Test insect: Diabrotica balteata – larvae in soil

Solvent: 7 parts by weight of acetone

5 Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

10 The preparation of active compound is poured onto the soil. Here, the concentration of active compound in the preparation is virtually immaterial, only the amount by weight of active compound per volume unit of soil, which is stated in ppm (mg/l), matters. The soil is filled into 0.25 l pots, and these are allowed to stand at 20°C.

15 Immediately after the preparation, 5 pregerminated maize corns of the cultivar YIELD GUARD (trade mark of Monsanto Comp., USA) are placed into each pot. After 2 days, the appropriate test insects are placed into the treated soil. After a further 7 days, the efficacy of the active compound is determined by counting the maize plants that have emerged (1 plant = 20% activity).

**Example M**

Heliothis virescens Test – treatment of transgenic plants

Solvent: 7 parts by weight of acetone

Emulsifier: 1 part by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and the stated amount of emulsifier, and the concentrate is diluted with water to the desired concentration.

Soybean shoots (Glycine max) of the cultivar Roundup Ready (trade mark of Monsanto Comp., USA) are treated by being dipped into the preparation of active compound of the desired concentration and are populated with the tobacco bud worm Heliothis virescens while the leaves are still moist.

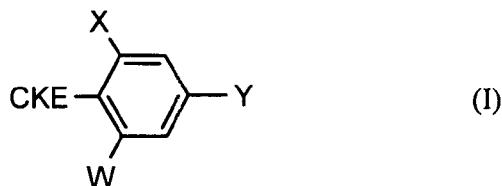
After the desired period of time, the kill of the insects is determined.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

**Patent claims**

## 1. Compounds of the formula (I)



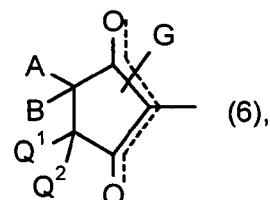
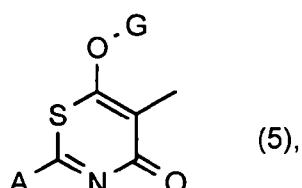
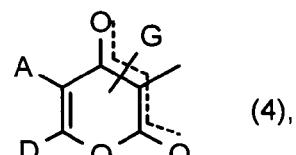
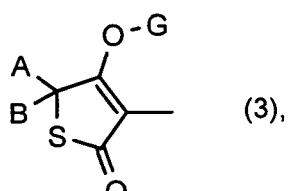
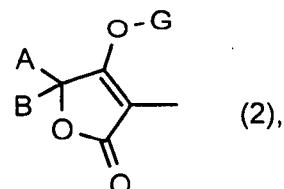
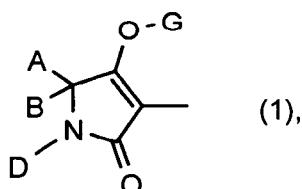
in which

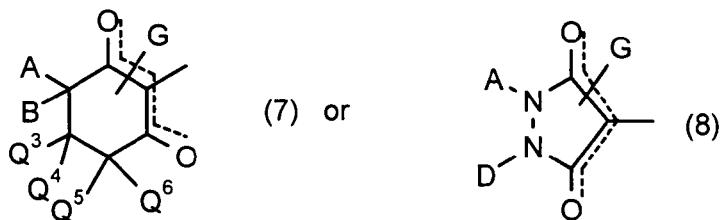
5            W        represents alkoxy, haloalkoxy, alkoxyalkyloxy, alkoxybisalkyloxy or optionally substituted cycloalkylalkanediyoxy which may optionally be interrupted by heteroatoms,

10           X        represents alkyl,

Y        represents chlorine, bromine or iodine,

10           CKE    represents one of the groups





in which

5            A        represents hydrogen, in each case optionally halogen-substituted alkyl, alkenyl, alkoxalkyl, alkylthioalkyl, saturated or unsaturated, optionally substituted cycloalkyl in which optionally at least one ring atom is replaced by a heteroatom, or in each case optionally halogen-, alkyl-, haloalkyl-, alkoxy-, haloalkoxy-, cyano- or nitro-substituted aryl, arylalkyl or hetaryl,

10            B        represents hydrogen, alkyl or alkoxyalkyl, or

              A and B together with the carbon atom to which they are attached represent a saturated or unsaturated, unsubstituted or substituted cycle which optionally contains at least one heteroatom,

15            D        represents hydrogen or an optionally substituted radical from the group consisting of alkyl, alkenyl, alkynyl, alkoxyalkyl, saturated or unsaturated cycloalkyl in which optionally one or more ring members are replaced by heteroatoms, arylalkyl, aryl, hetarylalkyl or hetaryl or

              A and D together with the atoms to which they are attached represent a saturated or unsaturated cycle which optionally contains at least one (in the case of CKE = 8, a further) heteroatom and which is unsubstituted or substituted in the A,D moiety, or

20            A and Q<sup>1</sup> together represent alkanediyl or alkenediyl optionally substituted by hydroxyl or by in each case optionally substituted alkyl, alkoxy, alkylthio, cycloalkyl, benzyloxy or aryl or

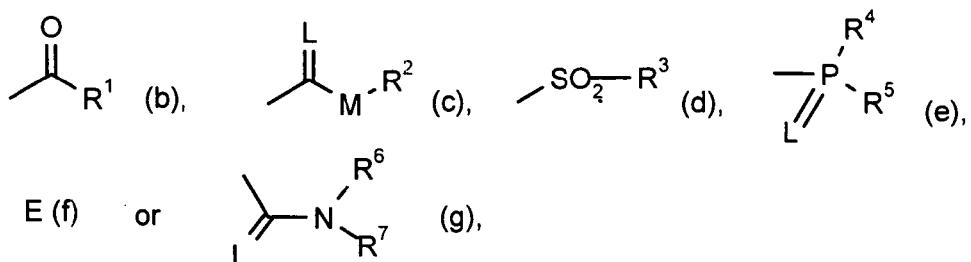
              Q<sup>1</sup>      represents hydrogen or alkyl,

              Q<sup>2</sup>, Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another represent hydrogen or alkyl,

25            Q<sup>3</sup>      represents hydrogen, represents optionally substituted alkyl, alkoxyalkyl, alkylthioalkyl, optionally substituted cycloalkyl (in which optionally one methylene group is replaced by oxygen or sulphur) or optionally substituted phenyl, or

$Q^3$  and  $Q^4$  together with the carbon atom to which they are attached represent a saturated or unsaturated, unsubstituted or substituted cycle which optionally contains a heteroatom,

G represents hydrogen (a) or represents one of the groups



in which

E represents a metal ion equivalent or an ammonium ion,

L represents oxygen or sulphur,

10 M represents oxygen or sulphur,

$R^1$  represents in each case optionally halogen-substituted alkyl, alkenyl, alkoxyalkyl, alkylthioalkyl, polyalkoxyalkyl or optionally halogen-, alkyl- or alkoxy-substituted cycloalkyl which may be interrupted by at least one heteroatom, in each case optionally substituted phenyl, phenylalkyl, hetaryl, phenoxyalkyl or hetaryloxyalkyl,

15  $R^2$  represents in each case optionally halogen-substituted alkyl, alkenyl, alkoxyalkyl, polyalkoxyalkyl or represents in each case optionally substituted cycloalkyl, phenyl or benzyl,

20  $R^3$ ,  $R^4$  and  $R^5$  independently of one another represent in each case optionally halogen-substituted alkyl, alkoxy, alkylamino, dialkylamino, alkylthio, alkenylthio, cycloalkylthio or represent in each case optionally substituted phenyl, benzyl, phenoxy or phenylthio,

25  $R^6$  and  $R^7$  independently of one another represent hydrogen, in each case optionally halogen-substituted alkyl, cycloalkyl, alkenyl, alkoxy, alkoxyalkyl, represent optionally substituted phenyl, represent optionally

substituted benzyl, or together with the N atom to which they are attached represent a cycle which is optionally interrupted by oxygen or sulphur.

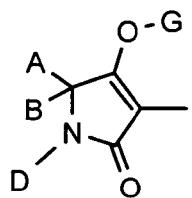
2. Compounds of the formula (I) according to Claim 1 in which

W represents  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -haloalkoxy,  $C_1$ - $C_4$ -alkoxy- $C_2$ - $C_4$ -alkyloxy,  $C_1$ - $C_4$ -alkoxy-bis- $C_2$ - $C_4$ -alkyloxy or  $C_3$ - $C_6$ -cycloalkyl- $C_1$ - $C_3$ -alkanediylxy which is optionally mono- to trisubstituted by fluorine, chlorine,  $C_1$ - $C_3$ -alkyl or  $C_1$ - $C_3$ -alkoxy and in which optionally one methylene group of the ring may be interrupted by oxygen or sulphur,

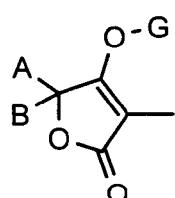
5 X represents  $C_1$ - $C_6$ -alkyl,

10 Y represents chlorine, bromine or iodine,

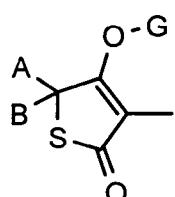
CKE represents one of the groups



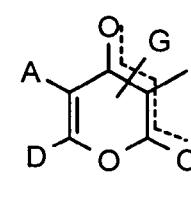
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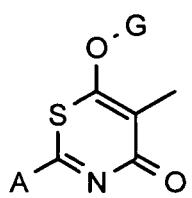
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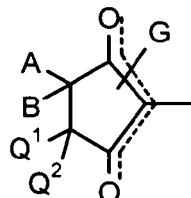
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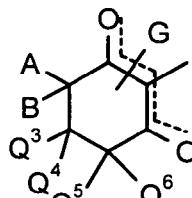
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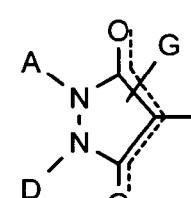
(5),



(6),



(7),



(8),

5           A   represents hydrogen or in each case optionally halogen-substituted C<sub>1</sub>-C<sub>12</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-alkenyl, C<sub>1</sub>-C<sub>10</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>10</sub>-alkylthio-C<sub>1</sub>-C<sub>6</sub>-alkyl, optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl- or C<sub>1</sub>-C<sub>6</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one or two not directly adjacent ring members are replaced by oxygen and/or sulphur or represents in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-, cyano- or nitro-substituted phenyl, naphthyl, hetaryl having 5 to 6 ring atoms, phenyl-C<sub>1</sub>-C<sub>6</sub>-alkyl or naphthyl-C<sub>1</sub>-C<sub>6</sub>-alkyl,

10           B   represents hydrogen, C<sub>1</sub>-C<sub>12</sub>-alkyl or C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>6</sub>-alkyl, or

15           A, B   and the carbon atom to which they are attached represent saturated C<sub>3</sub>-C<sub>10</sub>-cycloalkyl or unsaturated C<sub>5</sub>-C<sub>10</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur and which are optionally mono- or disubstituted by C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>10</sub>-cycloalkyl, C<sub>1</sub>-C<sub>8</sub>-haloalkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>1</sub>-C<sub>8</sub>-alkylthio, halogen or phenyl or

20           A, B   and the carbon atom to which they are attached represent C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is substituted by an alkylidendithiyl or by an alkylenedioxyl or by an alkylenediyl group which optionally contains one or two not directly adjacent oxygen and/or sulphur atoms and which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, which, together with the carbon atom to which it is attached, forms a further five- to eight-membered ring or

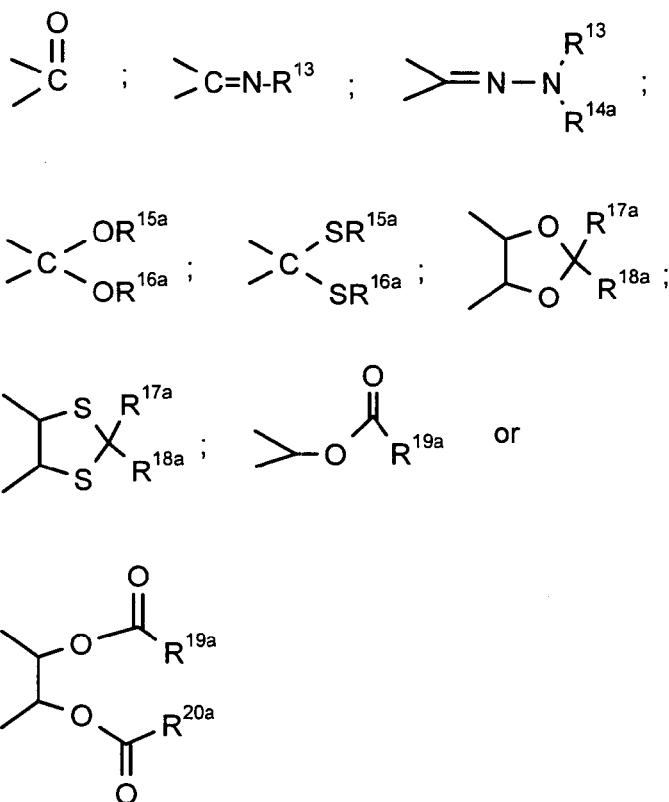
25           A, B   and the carbon atom to which they are attached represent C<sub>3</sub>-C<sub>8</sub>-cycloalkyl or C<sub>5</sub>-C<sub>8</sub>-cycloalkenyl in which two substituents together with the carbon atoms to which they are attached represent in each case optionally C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy- or halogen-substituted C<sub>2</sub>-C<sub>6</sub>-alkanediyl, C<sub>2</sub>-C<sub>6</sub>-alkenediyl or C<sub>4</sub>-C<sub>6</sub>-alkanedienediyl in which optionally one methylene group is replaced by oxygen or sulphur,

30           D   represents hydrogen, in each case optionally halogen-substituted C<sub>1</sub>-C<sub>12</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-alkenyl, C<sub>3</sub>-C<sub>8</sub>-alkynyl, C<sub>1</sub>-C<sub>10</sub>-alkoxy-C<sub>2</sub>-C<sub>8</sub>-alkyl, optionally halogen-, C<sub>1</sub>-C<sub>4</sub>-alkyl-, C<sub>1</sub>-C<sub>4</sub>-alkoxy- or C<sub>1</sub>-C<sub>4</sub>-haloalkyl-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur or in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-, cyano- or nitro-substituted phenyl, hetaryl having 5 or 6 ring atoms, phenyl-C<sub>1</sub>-C<sub>6</sub>-alkyl or hetaryl-C<sub>1</sub>-C<sub>6</sub>-alkyl having 5 or 6 ring atoms, or

A and D together represent in each case optionally substituted C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>3</sub>-C<sub>6</sub>-alkenediyl in which optionally one methylene group is replaced by a carbonyl group, oxygen or sulphur,

possible substituents being in each case:

5 halogen, hydroxyl, mercapto or in each case optionally halogen-substituted C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>3</sub>-C<sub>7</sub>-cycloalkyl, phenyl or benzyloxy, or a further C<sub>3</sub>-C<sub>6</sub>-alkanediyl grouping, C<sub>3</sub>-C<sub>6</sub>-alkenediyl grouping or a butadienyl grouping which is optionally substituted by C<sub>1</sub>-C<sub>6</sub>-alkyl or in which optionally two adjacent substituents together with the carbon atoms to which they are attached form a further saturated or unsaturated cycle having 5 or 6 ring atoms  
 10 (in the case of the compound of the formula (I-1), A and D together with the atoms to which they are attached then represent, for example, the groups AD-1 to AD-10 mentioned below) which may contain oxygen or sulphur, or which optionally contains one of the following groups

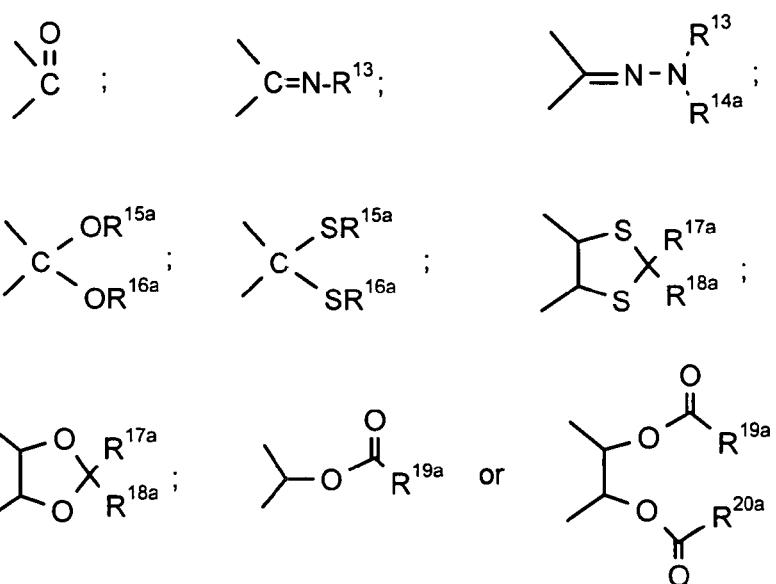


15

or

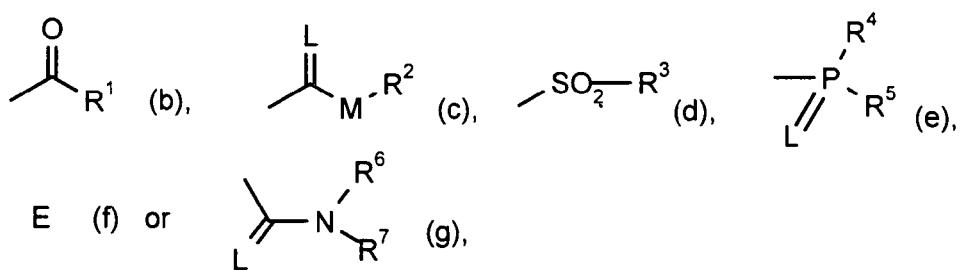
A and Q<sup>1</sup> together represent C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>4</sub>-C<sub>6</sub>-alkenediyl, each of which is optionally mono- or disubstituted by identical or different substituents from the

5 group consisting of halogen, hydroxyl, of C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>3</sub>-C<sub>7</sub>-cycloalkyl each of which is optionally mono- to trisubstituted by identical or different halogen, and of benzyloxy and phenyl, each of which is optionally mono- to trisubstituted by identical or different substituents from the group consisting of halogen, C<sub>1</sub>-C<sub>6</sub>-alkyl and C<sub>1</sub>-C<sub>6</sub>-alkoxy, which C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>4</sub>-C<sub>6</sub>-alkenediyl moreover optionally contains one of the groups below



or is bridged by a C<sub>1</sub>-C<sub>2</sub>-alkanediyl group or by an oxygen atom or

10 Q<sup>1</sup> represents hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,  
 Q<sup>2</sup>, Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another represent hydrogen or C<sub>1</sub>-C<sub>4</sub>-alkyl,  
 Q<sup>3</sup> represents hydrogen, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy-C<sub>1</sub>-C<sub>2</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkylthio-C<sub>1</sub>-C<sub>2</sub>-alkyl, optionally C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one methylene group is replaced by oxygen or sulphur or represents phenyl which is optionally substituted by halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>2</sub>-haloalkyl, C<sub>1</sub>-C<sub>2</sub>-haloalkoxy, cyano or nitro, or  
 15 Q<sup>3</sup> and Q<sup>4</sup> together with the carbon atom to which they are attached represent a C<sub>3</sub>-C<sub>7</sub>-ring which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>2</sub>-haloalkyl and in which optionally one ring member is replaced by oxygen or sulphur,  
 20 G represents hydrogen (a) or represents one of the groups



in which

E represents a metal ion equivalent or an ammonium ion,

L represents oxygen or sulphur and

5 M represents oxygen or sulphur,

10 R¹ represents in each case optionally halogen-substituted C<sub>1</sub>-C<sub>20</sub>-alkyl, C<sub>2</sub>-C<sub>20</sub>-alkenyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>8</sub>-alkylthio-C<sub>1</sub>-C<sub>8</sub>-alkyl, poly-C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl or optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl- or C<sub>1</sub>-C<sub>6</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one or more not directly adjacent ring members are replaced by oxygen and/or sulphur,

15 represents optionally halogen-, cyano-, nitro-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-, C<sub>1</sub>-C<sub>6</sub>-alkylthio- or C<sub>1</sub>-C<sub>6</sub>-alkylsulphonyl-substituted phenyl,

20 represents optionally halogen-, nitro-, cyano-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl- or C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-substituted phenyl-C<sub>1</sub>-C<sub>6</sub>-alkyl,

represents optionally halogen- or C<sub>1</sub>-C<sub>6</sub>-alkyl-substituted 5- or 6-membered hetaryl,

represents optionally halogen- or C<sub>1</sub>-C<sub>6</sub>-alkyl-substituted phenoxy-C<sub>1</sub>-C<sub>6</sub>-alkyl or

25 represents optionally halogen-, amino- or C<sub>1</sub>-C<sub>6</sub>-alkyl-substituted 5- or 6-membered hetaryloxy-C<sub>1</sub>-C<sub>6</sub>-alkyl,

R² represents in each case optionally halogen-substituted C<sub>1</sub>-C<sub>20</sub>-alkyl, C<sub>2</sub>-C<sub>20</sub>-alkenyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>2</sub>-C<sub>8</sub>-alkyl, poly-C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>2</sub>-C<sub>8</sub>-alkyl,

represents optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl- or C<sub>1</sub>-C<sub>6</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl or

represents in each case optionally halogen-, cyano-, nitro-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>6</sub>-haloalkyl- or C<sub>1</sub>-C<sub>6</sub>-haloalkoxy-substituted phenyl or benzyl,

5           R<sup>3</sup> represents optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl or represents in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, cyano- or nitro-substituted phenyl or benzyl,

10           R<sup>4</sup> and R<sup>5</sup> independently of one another represent in each case optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>1</sub>-C<sub>8</sub>-alkylamino, di-(C<sub>1</sub>-C<sub>8</sub>-alkyl)amino, C<sub>1</sub>-C<sub>8</sub>-alkylthio, C<sub>2</sub>-C<sub>8</sub>-alkenylthio, C<sub>3</sub>-C<sub>7</sub>-cycloalkylthio or represent in each case optionally halogen-, nitro-, cyano-, C<sub>1</sub>-C<sub>4</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, C<sub>1</sub>-C<sub>4</sub>-alkylthio-, C<sub>1</sub>-C<sub>4</sub>-haloalkylthio-, C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-haloalkyl-substituted phenyl, phenoxy or phenylthio,

15           R<sup>6</sup> and R<sup>7</sup> independently of one another represent hydrogen, represent in each case optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>3</sub>-C<sub>8</sub>-cycloalkyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy, C<sub>3</sub>-C<sub>8</sub>-alkenyl, C<sub>1</sub>-C<sub>8</sub>-alkoxy-C<sub>1</sub>-C<sub>8</sub>-alkyl, represent optionally halogen-, C<sub>1</sub>-C<sub>8</sub>-haloalkyl-, C<sub>1</sub>-C<sub>8</sub>-alkyl- or C<sub>1</sub>-C<sub>8</sub>-alkoxy-substituted phenyl, represent optionally halogen-, C<sub>1</sub>-C<sub>8</sub>-alkyl-, C<sub>1</sub>-C<sub>8</sub>-haloalkyl- or C<sub>1</sub>-C<sub>8</sub>-alkoxy-substituted benzyl or together represent an optionally C<sub>1</sub>-C<sub>4</sub>-alkyl-substituted C<sub>3</sub>-C<sub>6</sub>-alkylene radical in which optionally one carbon atom is replaced by oxygen or sulphur,

20           R<sup>13</sup> represents hydrogen, represents in each case optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl or C<sub>1</sub>-C<sub>8</sub>-alkoxy, represents optionally halogen-, C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy-substituted C<sub>3</sub>-C<sub>8</sub>-cycloalkyl in which optionally one methylene group is replaced by oxygen or sulphur or represents in each case optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, nitro- or cyano-substituted phenyl, phenyl-C<sub>1</sub>-C<sub>4</sub>-alkyl or phenyl-C<sub>1</sub>-C<sub>4</sub>-alkoxy,

25           R<sup>14a</sup> represents hydrogen or C<sub>1</sub>-C<sub>8</sub>-alkyl, or  
R<sup>13</sup> and R<sup>14a</sup> together represent C<sub>4</sub>-C<sub>6</sub>-alkanediyl,  
R<sup>15a</sup> and R<sup>16a</sup> are identical or different and represent C<sub>1</sub>-C<sub>6</sub>-alkyl, or  
30           R<sup>15a</sup> and R<sup>16a</sup> together represent a C<sub>2</sub>-C<sub>4</sub>-alkanediyl radical which is optionally substituted by C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-haloalkyl or by optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, nitro- or cyano-substituted phenyl,

R<sup>17a</sup> and R<sup>18a</sup> independently of one another represent hydrogen, represent optionally halogen-substituted C<sub>1</sub>-C<sub>8</sub>-alkyl or represent optionally halogen-, C<sub>1</sub>-C<sub>6</sub>-alkyl-, C<sub>1</sub>-C<sub>6</sub>-alkoxy-, C<sub>1</sub>-C<sub>4</sub>-haloalkyl-, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy-, nitro- or cyano-substituted phenyl, or

5 R<sup>17a</sup> and R<sup>18a</sup> together with the carbon atom to which they are attached represent a carbonyl group or represent optionally halogen-, C<sub>1</sub>-C<sub>4</sub>-alkyl- or C<sub>1</sub>-C<sub>4</sub>-alkoxy-substituted C<sub>5</sub>-C<sub>7</sub>-cycloalkyl in which optionally one methylene group is replaced by oxygen or sulphur,

10 R<sup>19a</sup> and R<sup>20a</sup> independently of one another represent C<sub>1</sub>-C<sub>10</sub>-alkyl, C<sub>2</sub>-C<sub>10</sub>-alkenyl, C<sub>1</sub>-C<sub>10</sub>-alkoxy, C<sub>1</sub>-C<sub>10</sub>-alkylamino, C<sub>3</sub>-C<sub>10</sub>-alkenylamino, di-(C<sub>1</sub>-C<sub>10</sub>-alkyl)amino or di-(C<sub>3</sub>-C<sub>10</sub>-alkenyl)amino.

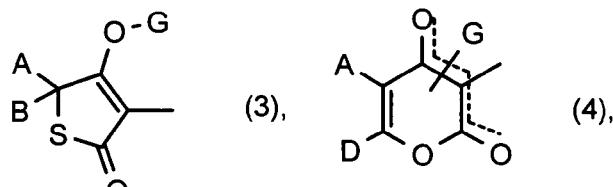
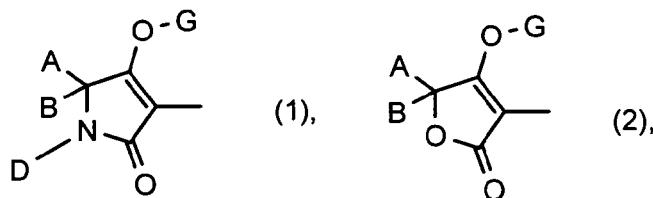
3. Compounds of the formula (I) according to Claim 1 in which

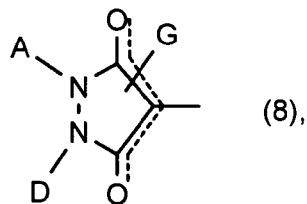
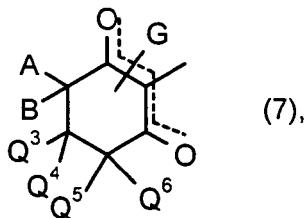
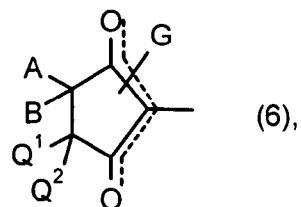
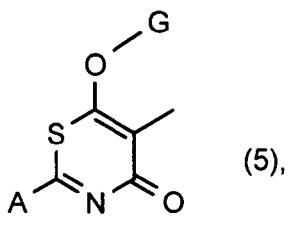
15 W represents C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, C<sub>1</sub>-C<sub>3</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyloxy, C<sub>1</sub>-C<sub>2</sub>-alkoxy-bis-C<sub>2</sub>-C<sub>3</sub>-alkyloxy or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl-C<sub>1</sub>-C<sub>2</sub>-alkanediylxy in which optionally one methylene group of the ring may be replaced by oxygen,

X represents C<sub>1</sub>-C<sub>3</sub>-alkyl,

Y represents chlorine or bromine,

CKE represents one of the groups





5            A    represents hydrogen, represents  $C_1$ - $C_6$ -alkyl or  $C_1$ - $C_4$ -alkoxy- $C_1$ - $C_2$ -alkyl, each of which is optionally mono- to trisubstituted by fluorine or chlorine, represents  $C_3$ - $C_6$ -cycloalkyl which is optionally mono- to disubstituted by  $C_1$ - $C_2$ -alkyl or  $C_1$ - $C_2$ -alkoxy or (but not in the case of the compounds of the formulae (I-3), (I-4), (I-6) and (I-7)) represents phenyl or benzyl, each of which is mono- to disubstituted optionally by fluorine, chlorine, bromine,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_2$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy,  $C_1$ - $C_2$ -haloalkoxy, cyano or nitro,

10          B    represents hydrogen,  $C_1$ - $C_4$ -alkyl or  $C_1$ - $C_2$ -alkoxy- $C_1$ - $C_2$ -alkyl, or

15          A, B   and the carbon atom to which they are attached represent saturated or unsaturated  $C_5$ - $C_7$ -cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur and which is optionally mono- to disubstituted by  $C_1$ - $C_6$ -alkyl, trifluoromethyl or  $C_1$ - $C_6$ -alkoxy, with the proviso that in this case  $Q^3$  represents hydrogen or methyl, or

20          A, B   and the carbon atom to which they are attached represent  $C_5$ - $C_6$ -cycloalkyl which is optionally substituted by an alkylenedithiol group or by an alkylenedioxyl group or by an alkylenediyl group which optionally contains one or two not directly adjacent oxygen or sulphur atoms and which is optionally substituted by methyl or ethyl, which group, together with the carbon atom to which it is attached, forms a further five- or six-membered ring, with the proviso that in this case  $Q^3$  represents hydrogen or methyl,

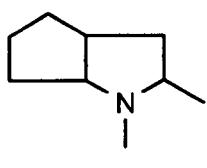
25          A, B   and the carbon atom to which they are attached represent  $C_3$ - $C_6$ -cycloalkyl or  $C_5$ - $C_6$ -cycloalkenyl in which two substituents together with the carbon atoms to which they are attached represent in each case optionally  $C_1$ - $C_2$ -alkyl- or  $C_1$ - $C_2$ -

alkoxy-substituted C<sub>2</sub>-C<sub>4</sub>-alkanediyl, C<sub>2</sub>-C<sub>4</sub>-alkenediyl or butadienediyl, with the proviso that in this case Q<sup>3</sup> particularly preferably represents hydrogen or methyl,

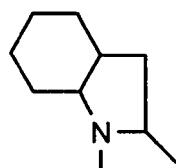
D represents hydrogen, represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine, 5 represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally mono- to disubstituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>2</sub>-haloalkyl and in which optionally one methylene group is replaced by oxygen or (but not in the case of the compounds of the formula (I-1)) represents phenyl or pyridyl, each of which is optionally mono- to disubstituted by fluorine, chlorine, bromine, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, or 10

A and D together represent optionally mono- to disubstituted C<sub>3</sub>-C<sub>5</sub>-alkanediyl in which one methylene group may be replaced by a carbonyl group (but not in the case of the compounds of the formula (I-1)), oxygen or sulphur, possible substituents being C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy, or

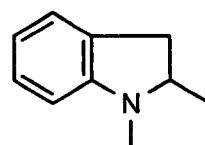
15 A and D (in the case of the compounds of the formula (I-1)) together with the atoms to which they are attached represent one of the groups AD-1 to AD-10:



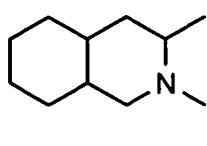
AD-1



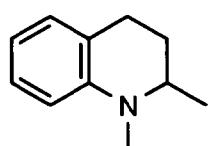
AD-2



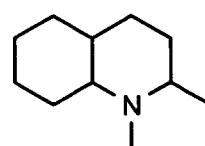
AD-3



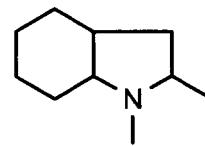
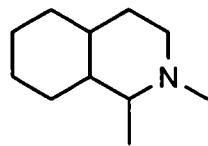
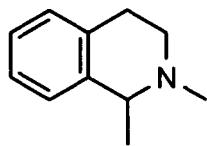
AD-4



AD-5



AD-6



AD-7

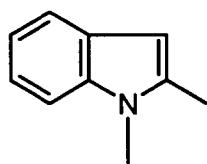
AD-8

AD-9

AD-7

AD-8

AD-9



AD-10

or

A and Q<sup>1</sup> together represent C<sub>3</sub>-C<sub>4</sub>-alkanediyl which is optionally mono- or disubstituted by identical or different substituents from the group consisting of C<sub>1</sub>-C<sub>2</sub>-alkyl and C<sub>1</sub>-C<sub>2</sub>-alkoxy or

5

Q<sup>1</sup> represents hydrogen,

Q<sup>2</sup> represents hydrogen,

Q<sup>4</sup>, Q<sup>5</sup> and Q<sup>6</sup> independently of one another represent hydrogen or C<sub>1</sub>-C<sub>3</sub>-alkyl,

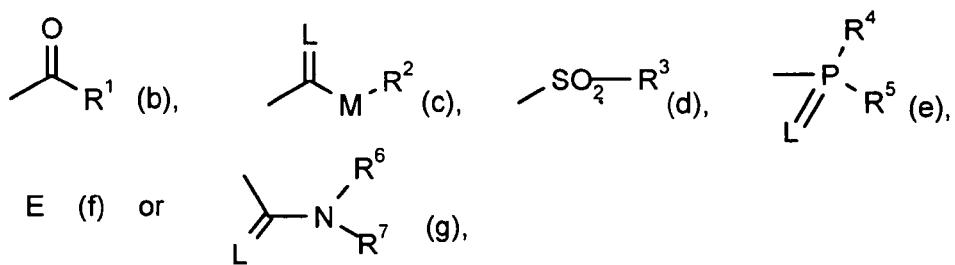
10

Q<sup>3</sup> represents hydrogen, C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally mono- to disubstituted by methyl or methoxy, or

Q<sup>3</sup> and Q<sup>4</sup> together with the carbon to which they are attached represent a saturated C<sub>5</sub>-C<sub>6</sub>-ring which is optionally substituted by C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy and in which optionally one ring member is replaced by oxygen or sulphur, with the proviso that in this case A represents hydrogen or methyl, or

15

G represents hydrogen (a) or represents one of the groups



in which

E represents a metal ion equivalent or an ammonium ion,

L represents oxygen or sulphur and

M represents oxygen or sulphur,

5 R<sup>1</sup> represents C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>2</sub>-C<sub>18</sub>-alkenyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>2</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkylthio-C<sub>1</sub>-C<sub>2</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine or chlorine, or C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally mono- to disubstituted by fluorine, chlorine, C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy and in which optionally one or two not directly adjacent ring members are replaced by oxygen,

10 represents phenyl which is optionally mono- to disubstituted by fluorine, chlorine, bromine, cyano, nitro, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>2</sub>-haloalkyl or C<sub>1</sub>-C<sub>2</sub>-haloalkoxy,

15 R<sup>2</sup> represents C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>2</sub>-C<sub>8</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>4</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine,

represents C<sub>3</sub>-C<sub>6</sub>-cycloalkyl which is optionally monosubstituted by C<sub>1</sub>-C<sub>2</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy or

20 represents phenyl or benzyl, each of which is optionally mono- to disubstituted by fluorine, chlorine, bromine, cyano, nitro, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>3</sub>-alkoxy, trifluoromethyl or trifluoromethoxy,

R<sup>3</sup> represents C<sub>1</sub>-C<sub>6</sub>-alkyl which is optionally mono- to trisubstituted by fluorine or

25 represents phenyl which is optionally monosubstituted by fluorine, chlorine, bromine, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, trifluoromethyl, trifluoromethoxy, cyano or nitro,

R<sup>4</sup> represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylamino, di-(C<sub>1</sub>-C<sub>6</sub>-alkyl)amino, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>3</sub>-C<sub>4</sub>-alkenylthio, C<sub>3</sub>-C<sub>6</sub>-cycloalkylthio or represents phenyl, phenoxy or phenylthio, each of which is optionally monosubstituted by fluorine, chlorine, bromine, nitro, cyano, C<sub>1</sub>-C<sub>3</sub>-alkoxy, C<sub>1</sub>-C<sub>3</sub>-haloalkoxy, C<sub>1</sub>-C<sub>3</sub>-alkylthio, C<sub>1</sub>-C<sub>3</sub>-haloalkylthio, C<sub>1</sub>-C<sub>3</sub>-alkyl or trifluoromethyl,

R<sup>5</sup> represents C<sub>1</sub>-C<sub>6</sub>-alkoxy or C<sub>1</sub>-C<sub>6</sub>-alkylthio,

30 R<sup>6</sup> represents hydrogen, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>3</sub>-C<sub>6</sub>-alkenyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, represents phenyl which is optionally

monosubstituted by fluorine, chlorine, bromine, trifluoromethyl, C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy, represents benzyl which is optionally monosubstituted by fluorine, chlorine, bromine, C<sub>1</sub>-C<sub>4</sub>-alkyl, trifluoromethyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy,

$R^7$  represents  $C_1$ - $C_6$ -alkyl,  $C_3$ - $C_6$ -alkenyl or  $C_1$ - $C_6$ -alkoxy- $C_1$ - $C_4$ -alkyl,

5  $R^6$  and  $R^7$  together represent a C<sub>4</sub>-C<sub>5</sub>-alkylene radical which is optionally substituted by methyl or ethyl and in which optionally one methylene group is replaced by oxygen or sulphur.

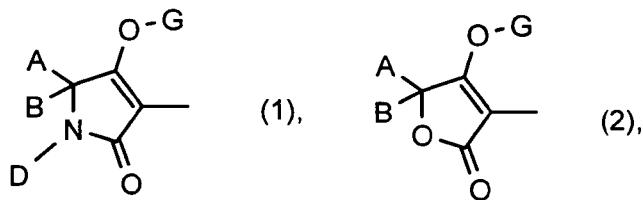
4. Compounds of the formula (I) according to Claim 1 in which

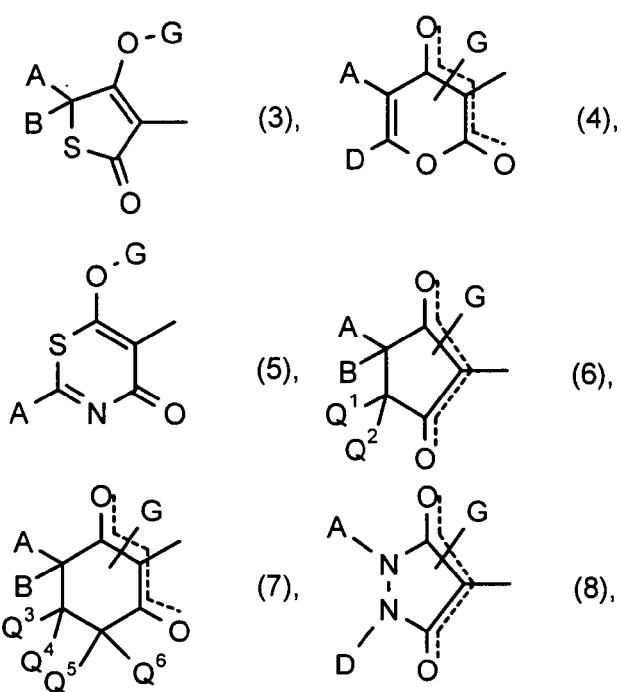
10 W represents methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy, methoxyethoxy, ethoxyethoxy, cyclopropylmethoxy, cyclopentylmethoxy or cyclohexylmethoxy,

**X** represents methyl or ethyl,

Y represents chlorine or bromine,

CKE represents one of the groups





5 A represents hydrogen, represents C<sub>1</sub>-C<sub>4</sub>-alkyl or C<sub>1</sub>-C<sub>2</sub>-alkoxy-C<sub>1</sub>-C<sub>2</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine, represents cyclopropyl, cyclopentyl or cyclohexyl and (only in the case of the compounds of the formula (I-5)) represents phenyl which is optionally substituted by fluorine, chlorine, bromine, methyl, ethyl, n-propyl, isopropyl, methoxy, ethoxy, trifluoromethyl, trifluoromethoxy, cyano or nitro,

10 B represents hydrogen, methyl or ethyl, or

15 A, B and the carbon atom to which they are attached represent saturated C<sub>5</sub>-C<sub>6</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen or sulphur and which is optionally monosubstituted by methyl, ethyl, propyl, isopropyl, trifluoromethyl, methoxy, ethoxy, propoxy or butoxy, with the proviso that in this case Q<sup>3</sup> represents hydrogen, or

20 A, B and the carbon atom to which they are attached represent C<sub>6</sub>-cycloalkyl which is optionally substituted by an alkylenedioxyl group having two not directly adjacent oxygen atoms, with the proviso that in this case Q<sup>3</sup> represents hydrogen, or

A, B and the carbon atom to which they are attached represent C<sub>5</sub>-C<sub>6</sub>-cycloalkyl or C<sub>5</sub>-C<sub>6</sub>-cycloalkenyl in which two substituents together with the carbon atoms to which they are attached represent C<sub>2</sub>-C<sub>4</sub>-alkanediyl or C<sub>2</sub>-C<sub>4</sub>-alkenediyl or butadienediyl, with the proviso that in this case Q<sup>3</sup> represents hydrogen,

D represents hydrogen, represents C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>4</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyl, each of which is optionally mono- to trisubstituted by fluorine, represents cyclopropyl, cyclopentyl or cyclohexyl or (but not in the case of the compounds of the formula (I-1)) represents phenyl or pyridyl, each of which is optionally monosubstituted by fluorine, chlorine, methyl, ethyl, n-propyl, isopropyl, methoxy, ethoxy or trifluoromethyl,

or

A and D together represent C<sub>3</sub>-C<sub>5</sub>-alkanediyl which is optionally monosubstituted by methyl or methoxy and in which optionally one carbon atom is replaced by oxygen or sulphur, or represents the group AD-1.

A and Q<sup>1</sup> together represent C<sub>3</sub>-C<sub>4</sub>-alkanediyI which is optionally mono- or disubstituted by methyl or methoxy, or

$Q^1$  represents hydrogen,

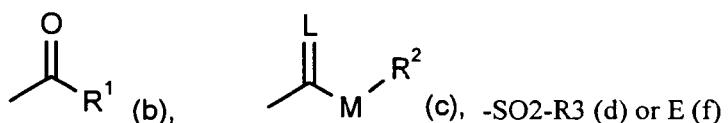
$Q^2$  represents hydrogen,

15  $Q^4$ ,  $Q^5$  and  $Q^6$  independently of one another represent hydrogen or methyl,

**Q<sup>3</sup>** represents hydrogen, methyl, ethyl or propyl, or

$Q^3$  and  $Q^4$  together with the carbon to which they are attached represent a saturated  $C_5$ - $C_6$ -ring which is optionally monosubstituted by methyl or methoxy, with the proviso that in this case A represents hydrogen,

20 G represents hydrogen (a) or represents one of the groups



in which

L represents oxygen or sulphur,

M represents oxygen or sulphur and

25 E represents an ammonium ion,

R<sup>1</sup> represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>17</sub>-alkenyl, C<sub>1</sub>-C<sub>2</sub>-alkoxy-C<sub>1</sub>-alkyl, C<sub>1</sub>-C<sub>2</sub>-alkylthio-C<sub>1</sub>-alkyl or represents cyclopropyl or cyclohexyl, each of which is optionally monosubstituted by fluorine, chlorine, methyl or methoxy,

5 represents phenyl which is optionally monosubstituted by fluorine, chlorine, bromine, cyano, nitro, methyl, methoxy, trifluoromethyl or trifluoromethoxy,

R<sup>2</sup> represents phenyl or benzyl, C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>2</sub>-C<sub>3</sub>-alkyl, each of which is optionally monosubstituted by fluorine,

R<sup>3</sup> represents C<sub>1</sub>-C<sub>8</sub>-alkyl.

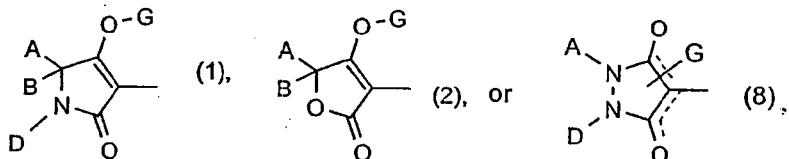
5. Compounds of the formula (I) according to Claim 1 in which

10 W represents methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, sec-butoxy, methoxyethoxy, ethoxyethoxy or cyclopropylmethoxy,

X represents methyl or ethyl,

Y represents chlorine,

CKE represents one of the groups



15

A represents hydrogen, methyl, ethyl, cyclopropyl, isopropyl, n-propyl, isobutyl n-butyl, t-butyl or s-butyl,

B represents hydrogen, methyl or ethyl,

20 A, B and the carbon atom to which they are attached represent saturated C<sub>5</sub>-C<sub>6</sub>-cycloalkyl in which optionally one ring member is replaced by oxygen and which is optionally monosubstituted by methyl, methoxy, ethoxy, n-propoxy, n-butoxy or trifluoromethyl,

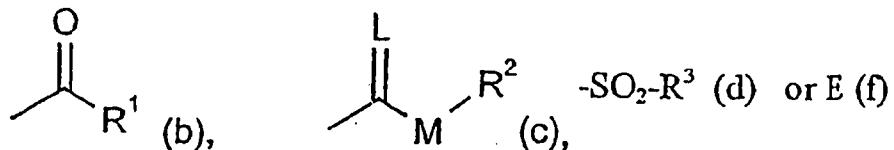
D represents hydrogen, methyl, ethyl, isopropyl, cyclopropyl or cyclohexyl,

or

- 237 -

A and D together represent C<sub>3</sub>-C<sub>5</sub>-alkanediyl or the group AD-1,

G represents hydrogen (a) or represents one of the groups



in which

L represents oxygen,

M represents oxygen and

E represents an ammonium ion (N<sup>+</sup>(C<sub>6</sub>H<sub>13</sub>)<sub>4</sub>),

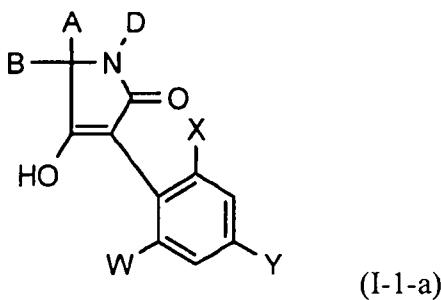
R<sup>1</sup> represents C<sub>1</sub>-C<sub>8</sub>-alkyl, C<sub>1</sub>-C<sub>2</sub>-alkoxy-C<sub>1</sub>-alkyl or C<sub>2</sub>-C<sub>17</sub>-alkenyl,

R<sup>2</sup> represents C<sub>1</sub>-C<sub>8</sub>-alkyl or C<sub>2</sub>-C<sub>6</sub>-alkenyl,

R<sup>3</sup> represents C<sub>1</sub>-C<sub>4</sub>-alkyl.

6. A process for preparing compounds of the formula (I) according to claim 1, wherein to obtain

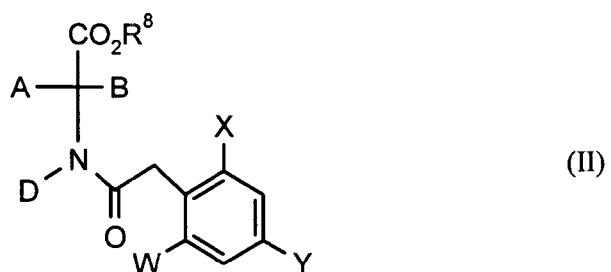
(B) compounds of the formula (I-1-a)



in which

A, B, D, W, X and Y are as defined above,

compounds of the formula (II)



in which

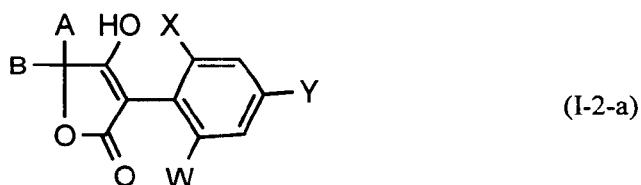
A, B, D, W, X and Y are as defined above,

and

5 R<sup>8</sup> represents alkyl,

are condensed intramolecularly in the presence of a diluent and in the presence of a base,

(B) compounds of the formula (I-2-a)

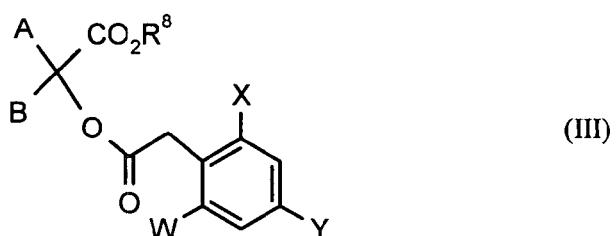


10

in which

A, B, W, X and Y are as defined above,

compounds of the formula (III)



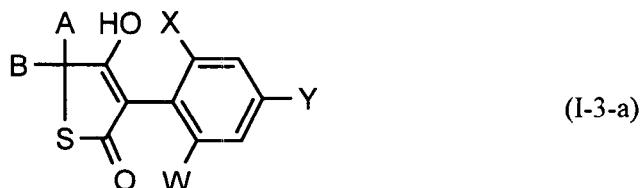
in which

15

A, B, W, X, Y and R<sup>8</sup> are as defined above,

are condensed intramolecularly in the presence of a diluent and in the presence of a base,

(C) compounds of the formula (I-3-a)

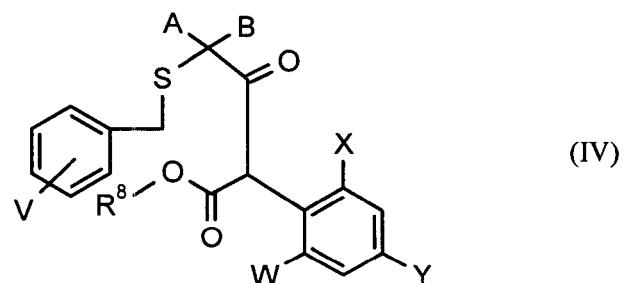


5

in which

A, B, W, X and Y are as defined above,

compounds of the formula (IV)



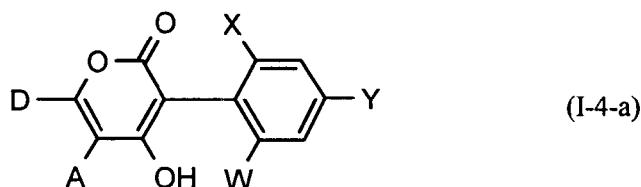
in which

10 A, B, W, X, Y and R<sup>8</sup> are as defined above and

V represents hydrogen, halogen, alkyl or alkoxy,

are cyclized intramolecularly, if appropriate in the presence of a diluent and in the presence of an acid,

(D) compounds of the formula (I-4-a)

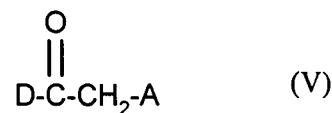


15

in which

A, D, W, X and Y are as defined above,

compounds of the formula (V)



in which

5 A and D are as defined above,

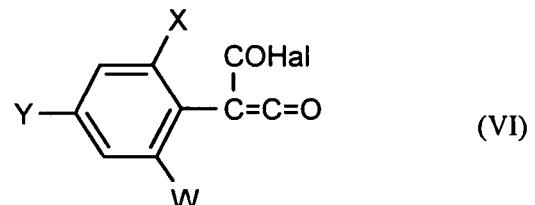
or their silylenol ethers of the formula (Va)



in which

A, D and R<sup>8</sup> are as defined above,

10 are reacted with compounds of the formula (VI)



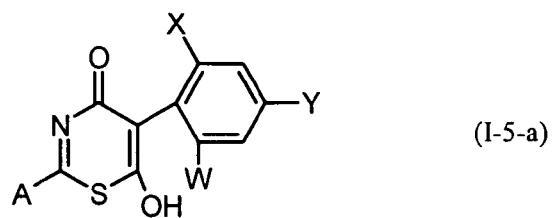
in which

W, X and Y are as defined above and

Hal represents halogen,

15 if appropriate in the presence of a diluent and if appropriate in the presence of an acid acceptor,

(E) compounds of the formula (I-5-a)



in which

A, W, X and Y are as defined above,

compounds of the formula (VII)

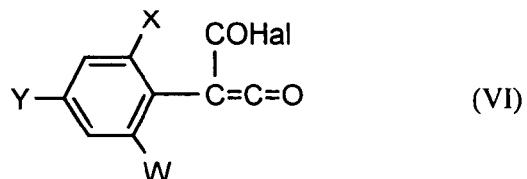


5

in which

A is as defined above,

are reacted with compounds of the formula (VI)



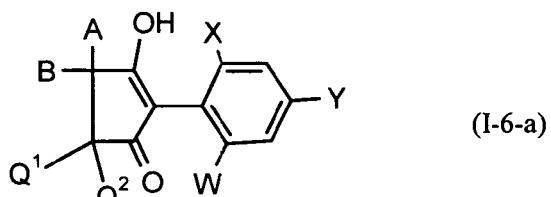
10

in which

Hal, W, X and Y are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid acceptor,

(F) compounds of the formula (I-6-a)

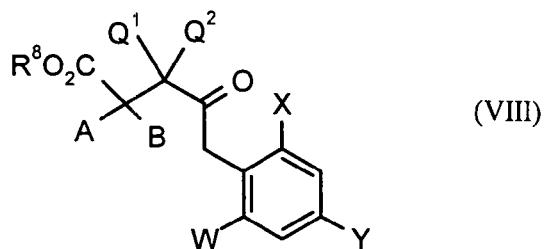


15

in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above,

compounds of the formula (VIII)



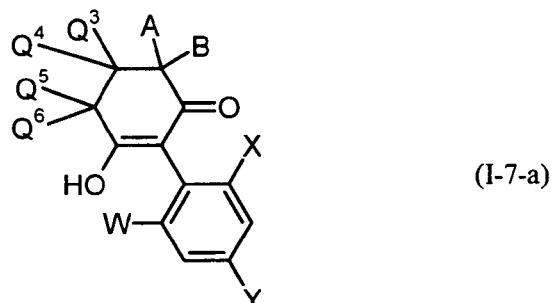
in which

5 A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above, and

R<sup>8</sup> represents alkyl,

are cyclized intramolecularly, if appropriate in the presence of a diluent and if appropriate in the presence of a base,

(G) compounds of the formula (I-7-a)

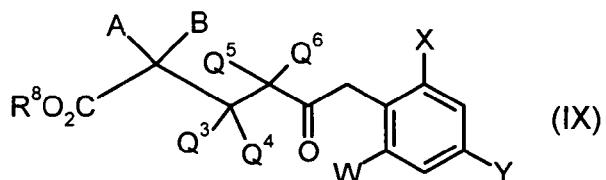


10

in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above,

compounds of the formula (IX)



15

in which

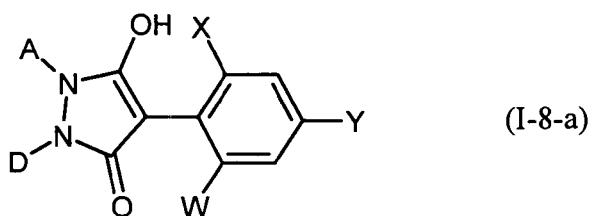
A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above

and

R<sup>8</sup> represents alkyl,

are condensed intramolecularly in the presence of a diluent and in the presence of  
5 a base,

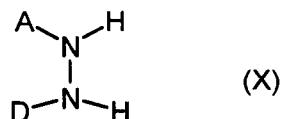
(I) compounds of the formula (I-8-a)



in which

A, D, W, X and Y are as defined above,

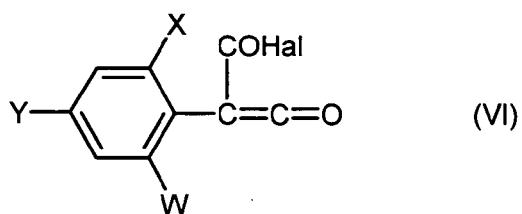
10 compounds of the formula (X)



in which

A and D are as defined above,

α) are reacted with compounds of the formula (VI)



15

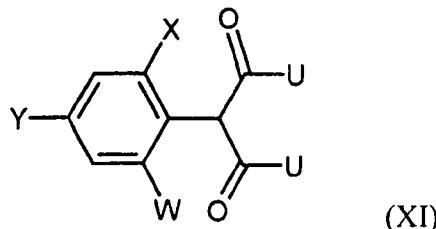
in which

Hal, X, Y and W are as defined above,

- 244 -

if appropriate in the presence of a diluent and if appropriate in the presence of an acid acceptor, or

$\beta)$  are reacted with compounds of the formula (XI)

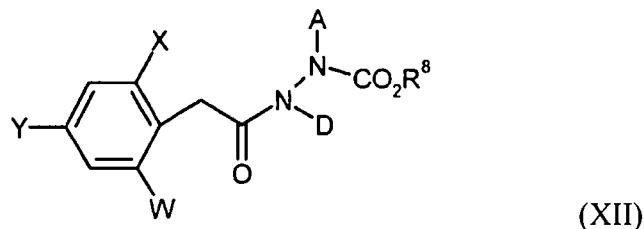


in which

W, X, and Y are as defined above, and U is  $OR_8$  or  $NH_2$ , wherein  $R^8$  is as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of a base, or

$\gamma)$  are reacted with compounds of the formula (XII)



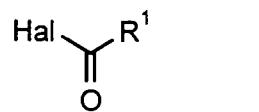
in which

A, D, W, X, Y and  $R^8$  are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of a base,

(I) compounds of the formulae (I-1-b) to (I-8-b) shown above in which A, B, D,  $Q^1$ ,  $Q^2$ ,  $Q^3$ ,  $Q^4$ ,  $Q^5$ ,  $Q^6$ ,  $R^1$ , W, X and Y are as defined above, compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $Q^1$ ,  $Q^2$ ,  $Q^3$ ,  $Q^4$ ,  $Q^5$ ,  $Q^6$ , W, X and Y are as defined above are in each case

$\alpha)$  reacted with acid halides of the formula (XIII)



(XIII)

in which

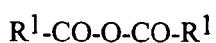
R<sup>1</sup> is as defined above and

Hal represents halogen,

5

or

(B) reacted with carboxylic anhydrides of the formula (XIV)



(XIV)

in which

R<sup>1</sup> is as defined above,

10

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

15

(J) compounds of the formulae (I-1-c) to (I-8-c) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, R<sup>2</sup>, M, W, X and Y are as defined above and L represents oxygen, compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above are in each case

reacted with chloroformic esters or chloroformic thioesters of the formula (XV)



(XV)

in which

R<sup>2</sup> and M are as defined above,

20

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

25

(K) compounds of the formulae (I-1-c) to (I-8-c) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, R<sup>2</sup>, M, W, X and Y are as defined above and L represents sulphur, compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above are in each case

reacted with chloromonothioformic esters or chlorodithioformic esters of the formula (XVI)



in which

5            M and  $\text{R}^2$         are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

and

10            (L)        compounds of the formulae (I-1-d) to (I-8-d) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ ,  $\text{R}^3$ , W, X and Y are as defined above, compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ , W, X and Y are as defined above are in each case

reacted with sulphonyl chlorides of the formula (XVII)



15            in which

$\text{R}^3$         is as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder,

20            (M)        compounds of the formulae (I-1-e) to (I-8-e) shown above in which A, B, D, L,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ ,  $\text{R}^4$ ,  $\text{R}^5$ , W, X and Y are as defined above, compounds of the formulae (I-1-a) to (I-8-a) shown above in which A, B, D,  $\text{Q}^1$ ,  $\text{Q}^2$ ,  $\text{Q}^3$ ,  $\text{Q}^4$ ,  $\text{Q}^5$ ,  $\text{Q}^6$ , W, X and Y are as defined above are in each case

reacted with phosphorus compounds of the formula (XVIII)



in which

L, R<sup>4</sup> and R<sup>5</sup> are as defined above and

Hal represents halogen,

if appropriate in the presence of a diluent and if appropriate in the presence of an  
5 acid binder,

(N) compounds of the formulae (I-1-f) to (I-8-f) shown above in which A, B, D, E, Q<sup>1</sup>,  
Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above, compounds of the formulae  
(I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X  
and Y are as defined above are in each case

10 reacted with metal compounds or amines of the formulae (XIX) and (XX),  
respectively,



in which

Me represents a mono- or divalent metal,

15 t represents the number 1 or 2 and

R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> independently of one another represent hydrogen or alkyl,

if appropriate in the presence of a diluent,

(O) compounds of the formulae (I-1-g) to (I-8-g) shown above in which A, B, D, L,  
Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, R<sup>6</sup>, R<sup>7</sup>, W, X and Y are as defined above, compounds of  
20 the formulae (I-1-a) to (I-8-a) shown above in which A, B, D, Q<sup>1</sup>, Q<sup>2</sup>, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>,  
Q<sup>6</sup>, W, X and Y are as defined above are in each case

(α) reacted with isocyanates or isothiocyanates of the formula (XXI)



in which

25 R<sup>6</sup> and L are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of a catalyst, or

(β) reacted with carbamoyl chlorides or thiocarbamoyl chlorides of the formula (XXII)



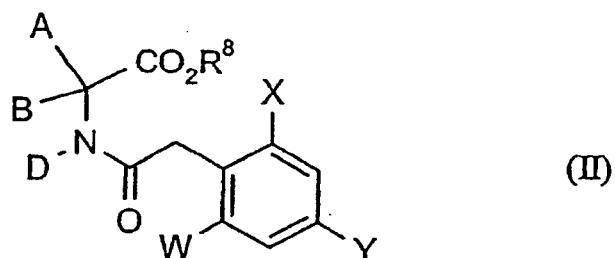
5

in which

L, R<sup>6</sup> and R<sup>7</sup> are as defined above,

if appropriate in the presence of a diluent and if appropriate in the presence of an acid binder.

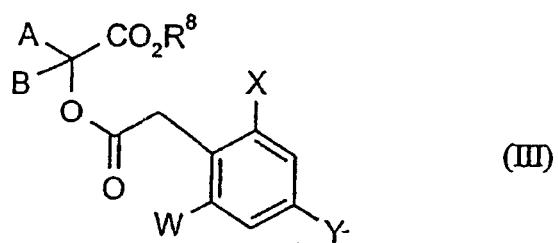
10 7. Compounds of the formula (II)



in which

A, B, D, W, X, Y and R<sup>8</sup> are as defined above.

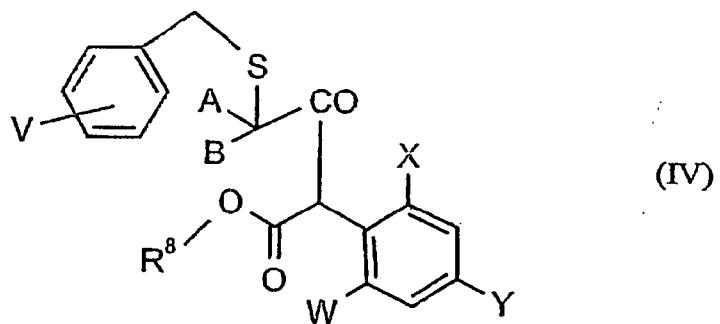
8. Compounds of the formula (III)



in which

A, B, W, X, Y and  $R^8$  are as defined above.

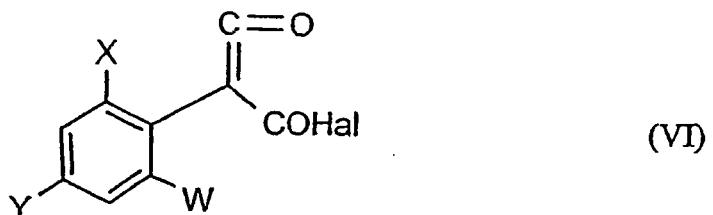
5 9. Compounds of the formula (IV)



in which

A, B, V, W, X, Y and  $R^8$  are as defined above.

10. Compounds of the formula (VI)

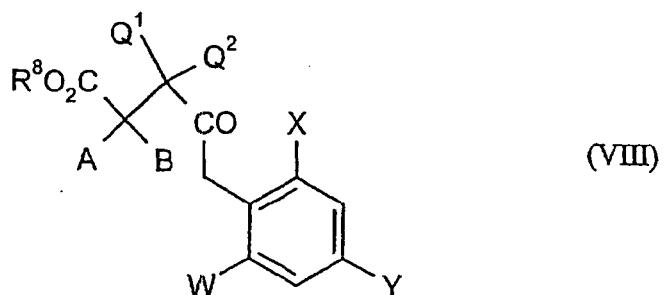


10

in which

Hal, W, X and Y are as defined above.

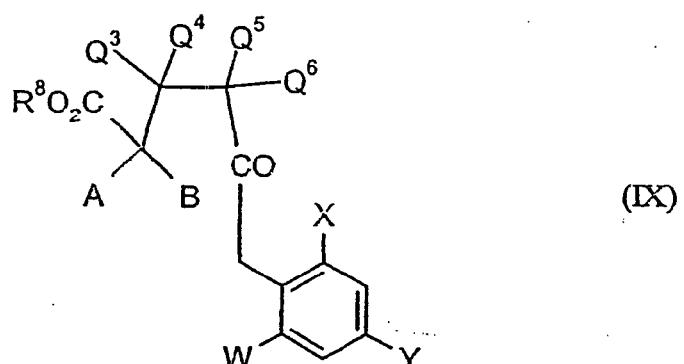
11. Compounds of the formula (VIII)



in which

5 A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X, Y and R<sup>8</sup> are as defined above.

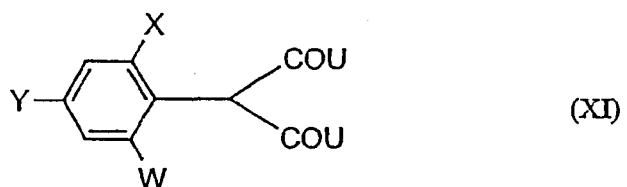
12. Compounds of the formula (IX)



in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X, Y and R<sup>8</sup> are as defined above.

10 13. Compounds of the formula (XI)

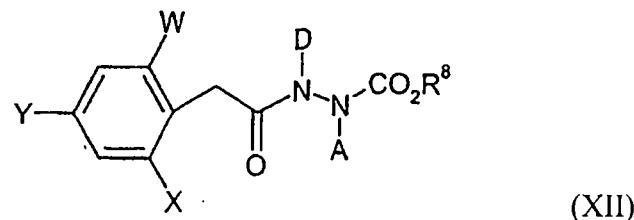


in which

- 251 -

W, X, and Y are as defined above, and U is OR<sub>8</sub> or NH<sub>2</sub>, wherein R<sup>8</sup> is as defined above.

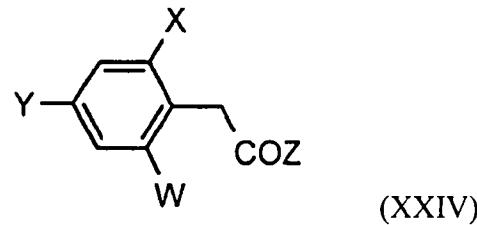
14. Compounds of the formula (XII)



in which

A, D, W, X, Y and R<sup>8</sup> are as defined above.

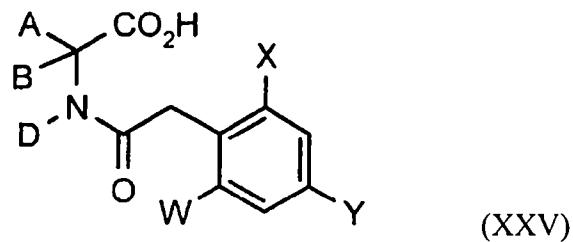
15. Compounds of the formula (XXIV)



in which

W, X, Y and Z are as defined above.

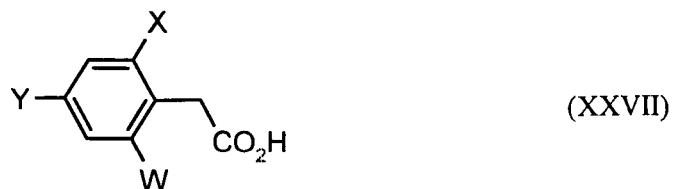
16. Compounds of the formula (XXV)



in which

A, B, D, W, X and Y are as defined above.

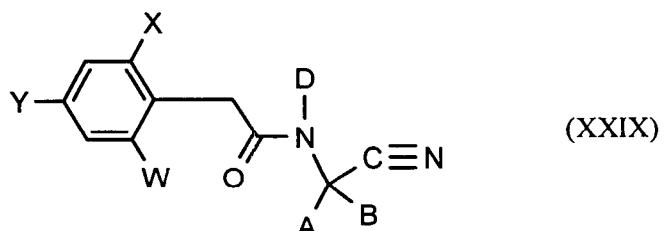
17. Compounds of the formula (XXVII)



in which

W, X and Y are as defined above.

18. Compounds of the formula (XXIX)

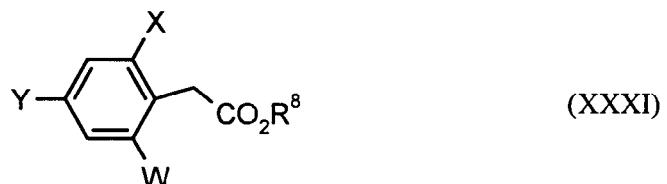


5

in which

A, B, D, W, X and Y are as defined above.

19. Compounds of the formula (XXXI)

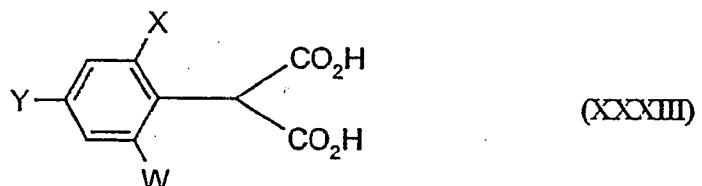


10

in which

W, X, Y and R<sup>8</sup> are as defined above.

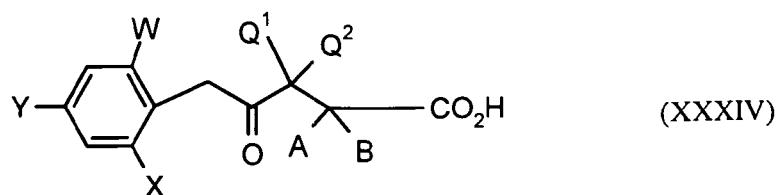
20. Compounds of the formula (XXXIII)



in which

W, X and Y are as defined above.

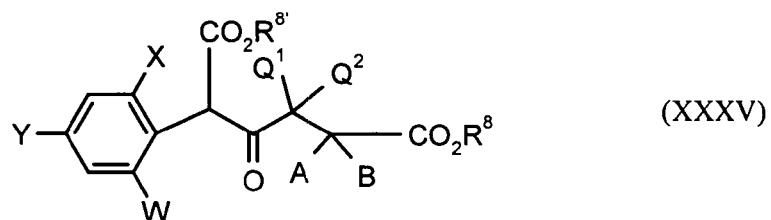
## 21. Compounds of the formula (XXXIV)



in which

5 A, B, Q<sup>1</sup>, Q<sup>2</sup>, W, X and Y are as defined above.

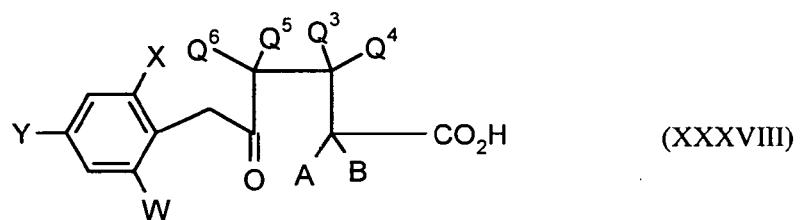
## 22. Compounds of the formula (XXXV)



in which

A, B, Q<sup>1</sup>, Q<sup>2</sup>, R<sup>8</sup>, R<sup>8'</sup>, W, X and Y are as defined above.

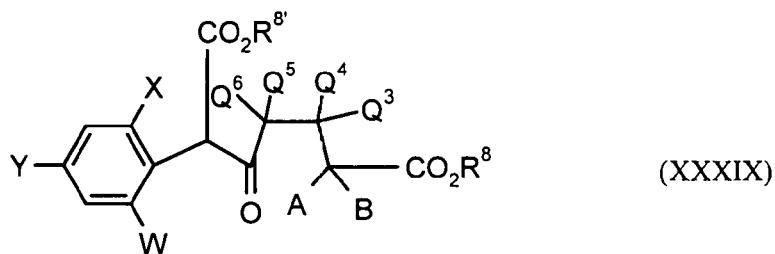
## 10 23. Compounds of the formula (XXXVIII)



in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, W, X and Y are as defined above.

## 24. Compounds of the formula (XXXIX)



in which

A, B, Q<sup>3</sup>, Q<sup>4</sup>, Q<sup>5</sup>, Q<sup>6</sup>, R<sup>8</sup>, R<sup>8'</sup> W, X and Y are as defined above.

25. Compositions, comprising an effective amount of an active compound combination comprising as components

5 a') at least one substituted cyclic ketoenol of the formula (I) according to Claim 1 in which CKE, W, X and Y are as defined above

and

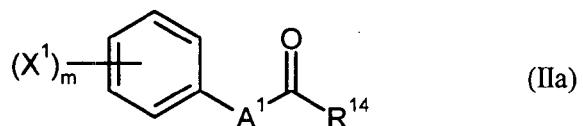
10 (b') at least one compound which improves crop plant tolerance and which is selected from the following group of compounds:

4-dichloroacetyl-1-oxa-4-aza-spiro[4.5]-decane (AD-67, MON-4660), 1-dichloroacetylhexahydro-3,3,8a-trimethylpyrrolo[1,2-a]-pyrimidin-6(2H)-one (dicyclonon, BAS-145138), 4-dichloroacetyl-3,4-dihydro-3-methyl-2H-1,4-benzoxazine (benoxacor), 1-methyl-hexyl 5-chloro-quinolin-8-oxy-acetate (cloquintocet-mexyl - cf. also related compounds in EP-A-86750, EP-A-94349, EP-A-191736, EP-A-492366), 3-(2-chloro-benzyl)-1-(1-methyl-1-phenyl-ethyl)-urea (cumyluron),  $\alpha$ -(cyanomethoximino)-phenylacetonitrile (cyometrinil), 2,4-dichlorophenoxyacetic acid (2,4-D), 4-(2,4-dichloro-phenoxy)-butyric acid (2,4-DB), 1-(1-methyl-1-phenyl-ethyl)-3-(4-methyl-phenyl)-urea (daimuron, dymron), 3,6-dichloro-2-methoxy-benzoic acid (dicamba), S-1-methyl-1-phenyl-ethyl piperidine-1-thiocarboxylate (dimepiperate), 2,2-dichloro-N-(2-oxo-2-(2-propenylamino)-ethyl)-N-(2-propenyl)-acetamide (DKA-24), 2,2-dichloro-N,N-di-2-propenyl-acetamide (dichlormid), 4,6-dichloro-2-phenyl-pyrimidine (fenclorim), ethyl 1-(2,4-dichloro-phenyl)-5-trichloromethyl-1H-1,2,4-triazole-3-carboxylate (fen-chlorazole-ethyl - cf. also related compounds in EP-A-174562 and EP-A-346620), phenylmethyl 2-chloro-4-trifluoromethyl-thiazole-5-carboxylate (flurazole), 4-chloro-N-(1,3-dioxolan-2-yl-methoxy)- $\alpha$ -trifluoro-acetophenone oxime (fluxofenim), 3-dichloroacetyl-5-(2-furanyl)-2,2-dimethyl-oxazolidine (furilazole,

MON-13900), ethyl 4,5-dihydro-5,5-diphenyl-3-isoxazolecarboxylate (isoxadifen-ethyl – cf. also related compounds in WO-A-95/07897), 1-(ethoxycarbonyl)-ethyl-3,6-dichloro-2-methoxybenzoate (lactidichlor), (4-chloro-o-tolyloxy)-acetic acid (MCPA), 2-(4-chloro-o-tolyloxy)-propionic acid (mecoprop), diethyl 1-(2,4-dichloro-phenyl)-4,5-dihydro-5-methyl-1H-pyrazole-3,5-dicarboxylate (mefenpyrdiethyl - cf. also related compounds in WO-A-91/07874), 2-dichloromethyl-2-methyl-1,3-dioxolane (MG-191), 2-propenyl-1-oxa-4-azaspiro[4.5]decane 4-carbodithioate (MG-838), 1,8-naphthalic anhydride,  $\alpha$ -(1,3-dioxolan-2-yl-methoximino)-phenylacetonitrile (oxabetrinil), 2,2-dichloro-N-(1,3-dioxolan-2-yl-methyl)-N-(2-propenyl)-acetamide (PPG-1292), 3-dichloroacetyl-2,2-dimethyl-oxazolidine (R-28725), 3-dichloroacetyl-2,2,5-trimethyl-oxazolidine (R-29148), 4-(4-chloro-o-tolyl)-butyric acid, 4-(4-chloro-phenoxy)-butyric acid, diphenyl-methoxyacetic acid, methyl diphenylmethoxyacetate, ethyl diphenyl-methoxyacetate, methyl 1-(2-chloro-phenyl)-5-phenyl-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-methyl-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-isopropyl-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-(1,1-dimethyl-ethyl)-1H-pyrazole-3-carboxylate, ethyl 1-(2,4-dichloro-phenyl)-5-phenyl-1H-pyrazole-3-carboxylate (cf. also related compounds in EP-A-269806 and EP-A-333131), ethyl 5-(2,4-dichloro-benzyl)-2-isoxazoline-3-carboxylate, ethyl 5-phenyl-2-isoxazoline-3-carboxylate, ethyl 5-(4-fluoro-phenyl)-5-phenyl-2-isoxazoline-3-carboxylate (cf. also related compounds in WO-A-91/08202), 1,3-dimethyl-but-1-yl 5-chloro-quinolin-8-oxy-acetate, 4-allyloxy-butyl 5-chloro-quinolin-8-oxy-acetate, 1-allyloxy-prop-2-yl 5-chloro-quinolin-8-oxy-acetate, methyl 5-chloro-quinoxalin-8-oxy-acetate, ethyl 5-chloro-quinolin-8-oxy-acetate, allyl 5-chloro-quinoxalin-8-oxy-acetate, 2-oxo-prop-1-yl 5-chloro-quinolin-8-oxy-acetate, diethyl 5-chloro-quinolin-8-oxy-malonate, diallyl 5-chloro-quinoxalin-8-oxy-malonate, diethyl 5-chloro-quinolin-8-oxy-malonate (cf. also related compounds in EP-A-582198), 4-carboxy-chroman-4-yl-acetic acid (AC-304415, cf. EP-A-613618), 4-chloro-phenoxy-acetic acid, 3,3'-dimethyl-4-methoxy-benzophenone, 1-bromo-4-chloromethylsulphonyl-benzene, 1-[4-(N-2-methoxybenzoylsulphamoyl)-phenyl]-3-methyl-urea (alias N-(2-methoxybenzoyl)-4-[(methylamino-carbonyl)-amino]-benzenesulphonamide), 1-[4-(N-2-methoxybenzoylsulphamoyl)-phenyl]-3,3-dimethyl-urea, 1-[4-(N-4,5-dimethylbenzoylsulphamoyl)-phenyl]-3-methyl-urea, 1-[4-(N-naphthylsulphamoyl)-phenyl]-3,3-dimethyl-urea, N-(2-methoxy-5-methyl-benzoyl)-4-(cyclopropyl-aminocarbonyl)-benzenesulphonamide,

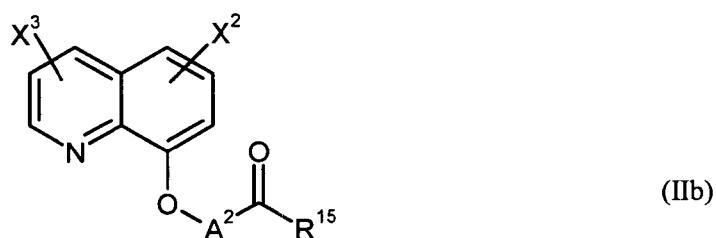
and/or one of the following compounds (defined by general formulae)

of the general formula (IIa)

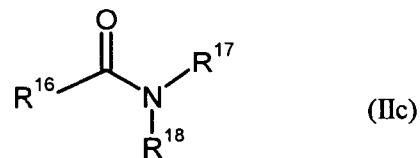


5

or of the general formula (IIb)



or of the formula (IIc)

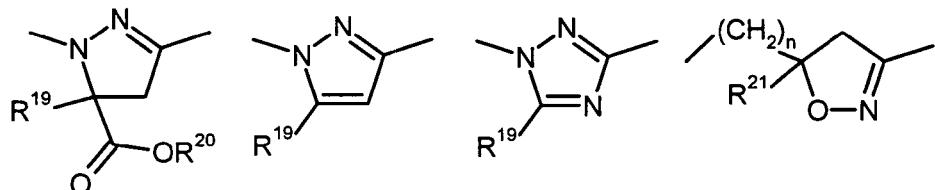


10

where

n is a number between 0 and 5,

A¹ represents one of the divalent heterocyclic groups outlined hereinbelow,



n is a number between 0 and 5,

15 A² represents alkanediyl having 1 or 2 carbon atoms which is optionally substituted by C₁-C₄-alkyl and/or C₁-C₄-alkoxy-carbonyl,

R<sup>14</sup> represents hydroxyl, mercapto, amino, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylamino or di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)amino,

R<sup>15</sup> represents hydroxyl, mercapto, amino, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylamino or di-(C<sub>1</sub>-C<sub>4</sub>-alkyl)amino,

5 R<sup>16</sup> represents C<sub>1</sub>-C<sub>4</sub>-alkyl which is in each case optionally substituted by fluorine, chlorine and/or bromine,

10 R<sup>17</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>2</sub>-C<sub>6</sub>-alkynyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, dioxolanyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, furyl, furyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, thienyl, thiazolyl, piperidinyl, each of which is optionally substituted by fluorine, chlorine and/or bromine, or represents phenyl which is optionally substituted by fluorine, chlorine and/or bromine or C<sub>1</sub>-C<sub>4</sub>-alkyl,

15 R<sup>18</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>2</sub>-C<sub>6</sub>-alkenyl or C<sub>2</sub>-C<sub>6</sub>-alkynyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy-C<sub>1</sub>-C<sub>4</sub>-alkyl, dioxolanyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, furyl, furyl-C<sub>1</sub>-C<sub>4</sub>-alkyl, thienyl, thiazolyl, piperidinyl, each of which is optionally substituted by fluorine, chlorine and/or bromine, or represents phenyl which is optionally substituted by fluorine, chlorine and/or bromine or C<sub>1</sub>-C<sub>4</sub>-alkyl, or together with R<sup>17</sup> represents C<sub>3</sub>-C<sub>6</sub>-alkanediyl or C<sub>2</sub>-C<sub>5</sub>-oxaalkanediyl, each of which is optionally substituted by C<sub>1</sub>-C<sub>4</sub>-alkyl, phenyl, furyl, a fused benzene ring or by two substituents which, together with the C atom to which they are bonded, form a 5- or 6-membered carbocycle,

20 R<sup>19</sup> represents hydrogen, cyano, halogen, or represents C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or phenyl, each of which is optionally substituted by fluorine, chlorine and/or bromine,

25 R<sup>20</sup> represents hydrogen, or represents C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or tri(C<sub>1</sub>-C<sub>4</sub>-alkyl)silyl, which is optionally substituted by hydroxyl, cyano, halogen or C<sub>1</sub>-C<sub>4</sub>-alkoxy,

R<sup>21</sup> represents hydrogen, cyano, halogen, or represents C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>3</sub>-C<sub>6</sub>-cycloalkyl or phenyl, each of which is optionally substituted by fluorine, chlorine and/or bromine,

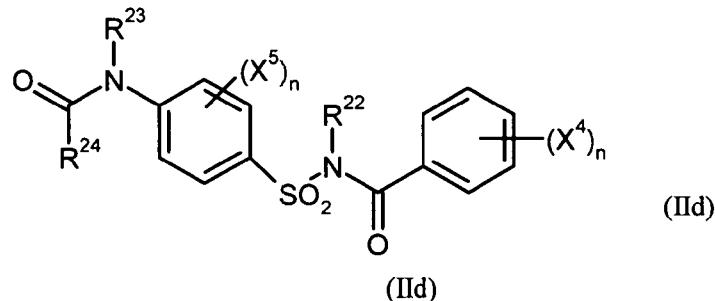
30 X<sup>1</sup> represents nitro, cyano, halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy or C<sub>1</sub>-C<sub>4</sub>-haloalkoxy,

$X^2$  represents hydrogen, cyano, nitro, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy,

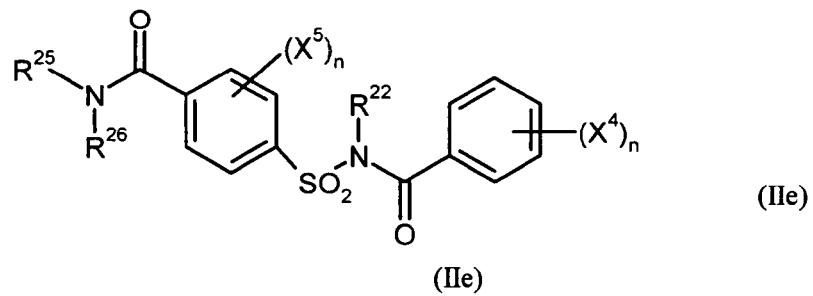
$X^3$  represents hydrogen, cyano, nitro, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy,

5 and/or the following compounds (defined by general formulae)

of the general formula (IId)



or of the general formula (IIe)



where

$n$  is between 0 and 5,

$R^{22}$  represents hydrogen or  $C_1$ - $C_4$ -alkyl,

15  $R^{23}$  represents hydrogen or  $C_1$ - $C_4$ -alkyl,

$R^{24}$  represents hydrogen, or represents  $C_1$ - $C_6$ -alkyl,  $C_1$ - $C_6$ -alkoxy,  $C_1$ - $C_6$ -alkylthio,  $C_1$ - $C_6$ -alkylamino or di-( $C_1$ - $C_4$ -alkyl)amino, each of which is optionally substituted by cyano, halogen or  $C_1$ - $C_4$ -alkoxy, or represents  $C_3$ - $C_6$ -cycloalkyl,  $C_3$ - $C_6$ -cycloalkyloxy,  $C_3$ - $C_6$ -cycloalkylthio or  $C_3$ - $C_6$ -cycloalkylamino, each of which is optionally substituted by cyano, halogen or  $C_1$ - $C_4$ -alkyl,

20

25       $R^{25}$  represents hydrogen, or represents  $C_1$ - $C_6$ -alkyl which is optionally substituted by cyano, hydroxyl, halogen or  $C_1$ - $C_4$ -alkoxy, or represents  $C_3$ - $C_6$ -alkenyl or  $C_3$ - $C_6$ -alkynyl, each of which is optionally substituted by cyano or halogen, or represents  $C_3$ - $C_6$ -cycloalkyl which is optionally substituted by cyano, halogen or  $C_1$ - $C_4$ -alkyl,

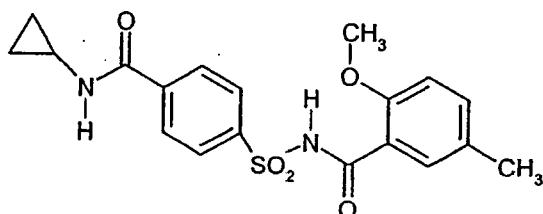
5       $R^{26}$  represents hydrogen, or represents  $C_1$ - $C_6$ -alkyl which is optionally substituted by cyano, hydroxyl, halogen or  $C_1$ - $C_4$ -alkoxy, or represents  $C_3$ - $C_6$ -alkenyl or  $C_3$ - $C_6$ -alkynyl, each of which is optionally substituted by cyano or halogen, or represents  $C_3$ - $C_6$ -cycloalkyl which is optionally substituted by cyano, halogen or  $C_1$ - $C_4$ -alkyl, or represents phenyl which is optionally substituted by nitro, cyano, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy, or together with  $R^{25}$  represents  $C_2$ - $C_6$ -alkanediyl or  $C_2$ - $C_5$ -oxaalkanediyl, each of which is optionally substituted by  $C_1$ - $C_4$ -alkyl,

10       $X^4$  represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy,

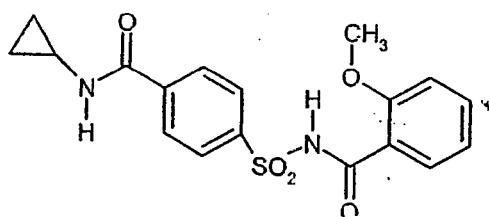
15       $X^5$  represents nitro, cyano, carboxyl, carbamoyl, formyl, sulphamoyl, hydroxyl, amino, halogen,  $C_1$ - $C_4$ -alkyl,  $C_1$ - $C_4$ -haloalkyl,  $C_1$ - $C_4$ -alkoxy or  $C_1$ - $C_4$ -haloalkoxy.

26.      Composition according to Claim 25, in which the compound which improves crop plant tolerance is selected from the following group of compounds:

20      cloquintocet-mexyl, fenchlorazole-ethyl, isoxadifen-ethyl, mefenpyr-diethyl, furilazole, fenclorim, cumyluron, dymron or the compounds



and



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27. Compositions according to claim 25 or claim 26 in which the compound which improves crop plant tolerance is cloquintocet-mexyl or mefenpyr-diethyl.
28. Pesticides or herbicides which comprise at least one compound of the formula (I) according to claim 1.
29. A method for controlling animal pests or unwanted vegetation, the method comprising allowing compounds of the formula (I) according to claim 1 to act on the animal pests and/or their habitat, or on the unwanted vegetation.
30. Use of a compound of the formula (I) according to claim 1 for controlling animal pests or unwanted vegetation.
31. A process for preparing a pesticide or herbicide, wherein compounds of the formula (I) according to claim 1 are mixed with extenders and/or surfactants.
32. Use of a compound of the formula (I) according to claim 1 for preparing pesticides and/or herbicides.
33. A method for controlling unwanted vegetation, the method comprising allowing a composition according to claim 25 to act on the unwanted vegetation or its habitat.
34. Use of a composition according to claim 25 for controlling unwanted vegetation.
35. A method for controlling undesired vegetation, wherein a compound of the formula (I) according to claim 1 and a compound which improves crop plant tolerance according to Claim 25, are allowed to act separately at short intervals on the undesired vegetation or its environment.
36. Compounds of the formula (I), as defined in claim 1, substantially as hereinbefore described with reference to the Examples.