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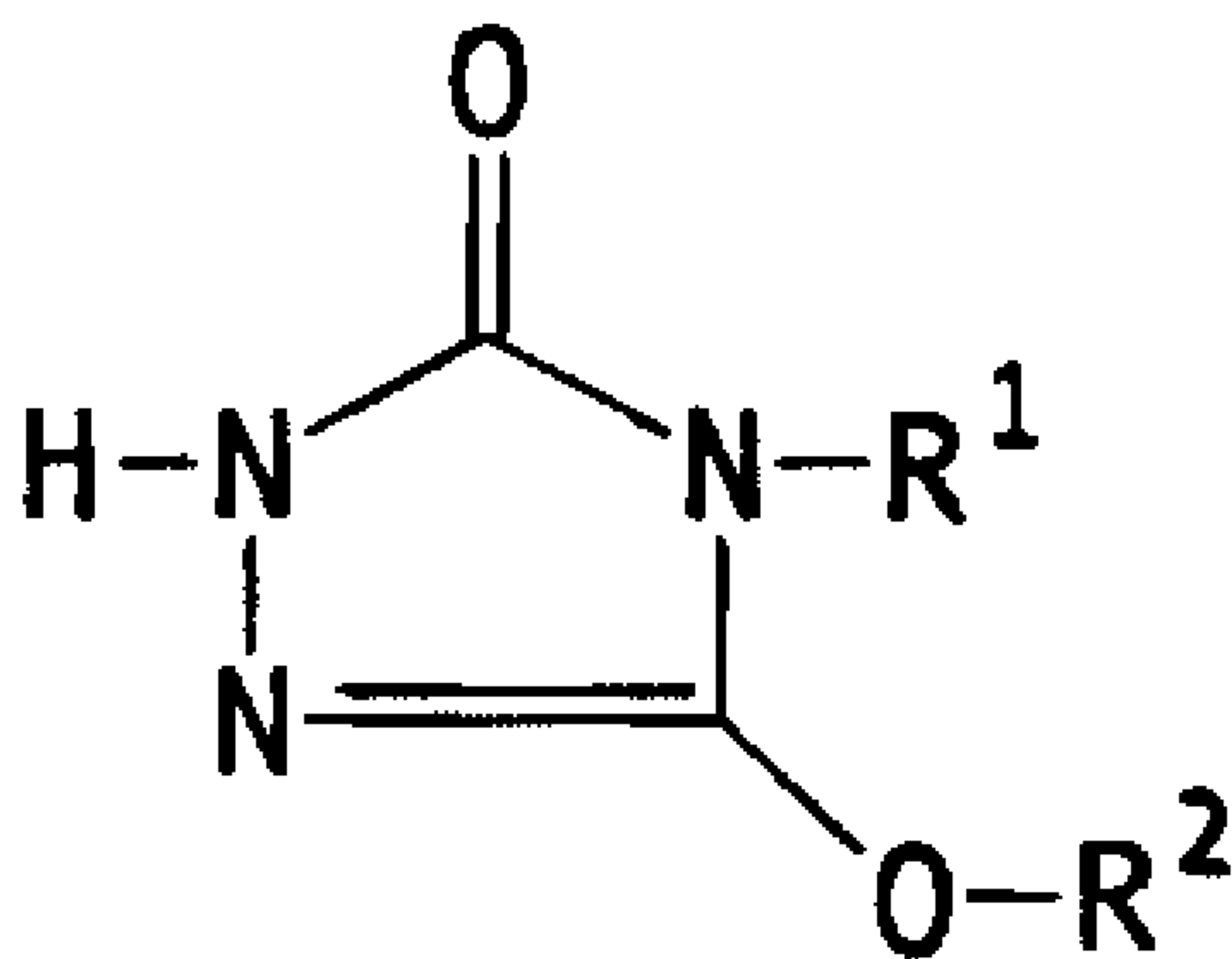
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(54) Titre : SULFONYLAMINOCARBONYLTRIAZOLINONES RENFERMANT DES SUBSTITUANTS LIES PAR
L'OXYGENE

(54) Title: SULPHONYLAMINOCARBONYLTRIAZOLINONES HAVING SUBSTITUTENTS BONDED VIA OXYGEN



(57) **Abrégé/Abstract:**

The invention relates to novel intermediates of formula II useful in the preparation of sulphonylaminocarbonyltriazolinones herbicides having substituents bonded via oxygen and to salts thereof and to processes for preparing the intermediates:

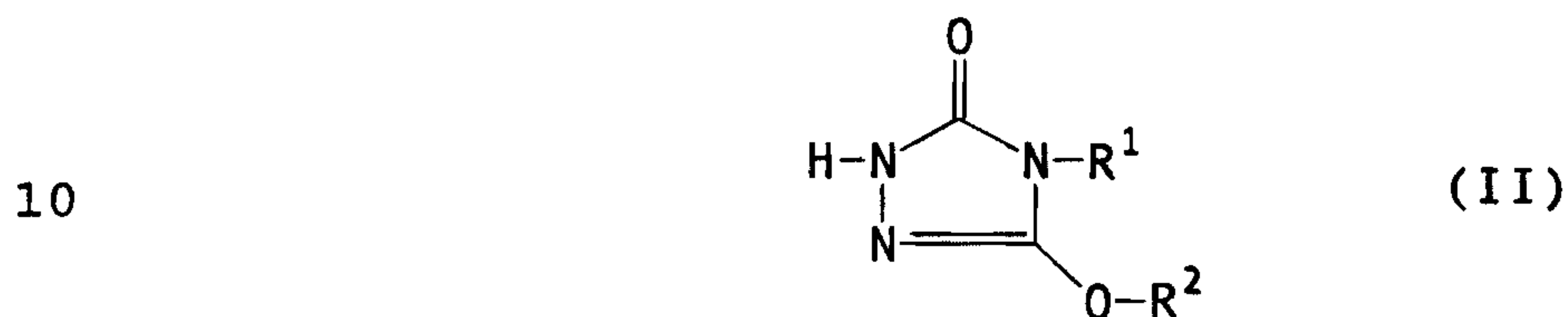
(see formula II) in which R¹ represents amino, C₁-C₄-alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C₃-C₆-cycloalkyl, benzyl, phenyl, C₁-C₃-alkylamino, C₃-C₆-cycloalkylamino or di-(C₁-C₃-alkyl)-amino, and R² represents C₃-C₆-cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl.

23189-7322E

Sulphonylaminocarbonyltriazolinones having substituents
bonded via oxygen

Abstract

The invention relates to novel intermediates of
5 formula II useful in the preparation of sulphonylamino-
carbonyltriazolinones herbicides having substituents bonded
via oxygen and to salts thereof and to processes for
preparing the intermediates:



in which R¹ represents amino, C₁-C₄-alkyl which is
optionally substituted by fluorine, cyano, methoxy or
15 ethoxy, or represents allyl, C₃-C₆-cycloalkyl, benzyl,
phenyl, C₁-C₃-alkylamino, C₃-C₆-cycloalkylamino or
di-(C₁-C₃-alkyl)-amino, and R² represents C₃-C₆-cycloalkyl, or
represents phenyl or benzyl which is optionally substituted
by fluorine, chlorine and/or methyl.

23189-7322E

This application is a divisional application of copending application 2,189,593, filed November 5, 1996, which is a divisional application of parent application Serial No. 2,064,636, filed April 1, 1992, and issued
5 December 23, 1997.

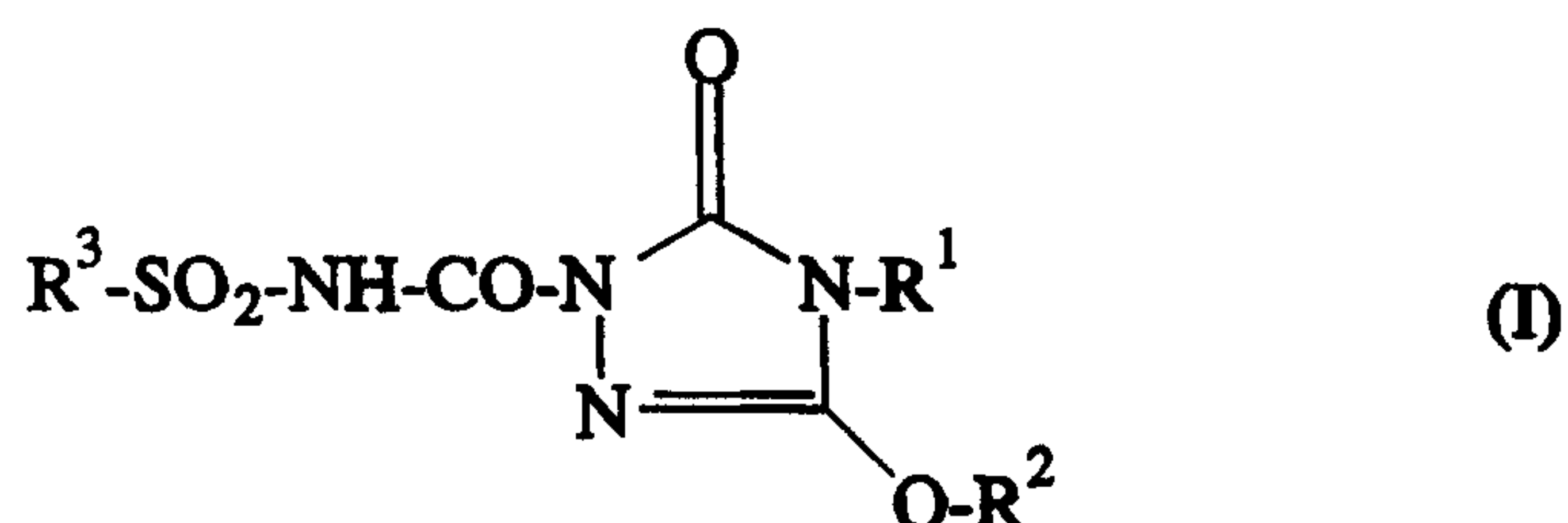
The invention of the parent application relates to compounds of formula I, processes for preparing compounds of formula I, herbicidal compositions containing compounds of formula I and uses of the compounds of formula I, and
10 compositions thereof, as herbicides.

The invention relates to new sulphonyl-aminocarbonyltriazolinones having substituents bonded via oxygen, to a plurality of processes and novel intermediates for their preparation, and to their use as herbicides.

15 It has been disclosed that certain substituted sulphonylaminocarbonyltriazolinones such as, for example, 2-(2-chloro-phenylsulphonylaminocarbonyl)-4,5-dimethyl-2,4-dihydro-3H-1,2,4-triazol-3-one have herbicidal properties (cf. EP-A 341,489). However, the action of these compounds
20 is not satisfactory in all respects.

Further sulphonylaminocarbonyltriazolinones such as, for example, 2-(2-methoxycarbonyl-phenylsulphonylamino-carbonyl)-4-methyl-5-methoxy-2,4-dihydro-3H-1,2,4-triazol-3-one are the subject of an earlier, but non-prior-published
25 Patent Application (cf. German Patent 3,934,081 dated 12.10.1989).

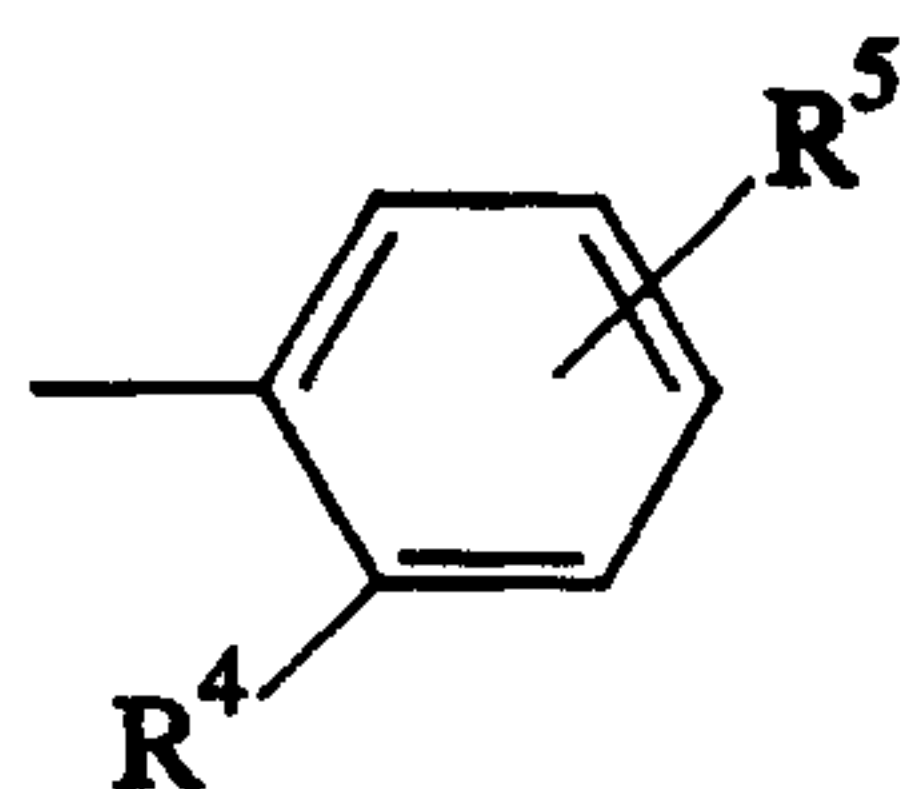
In accordance with one aspect of the parent application, there is provided a sulphonylaminocarbonyl-triazolinone having a substituent bonded via oxygen, of the general formula (I)



in which

R^1 represents hydrogen, amino, $\text{C}_1\text{-C}_4$ -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, $\text{C}_3\text{-C}_6$ -cycloalkyl, benzyl, phenyl, $\text{C}_1\text{-C}_3$ -alkylamino, $\text{C}_3\text{-C}_6$ -cycloalkylamino or di- $(\text{C}_1\text{-C}_3\text{-alkyl})$ -amino,

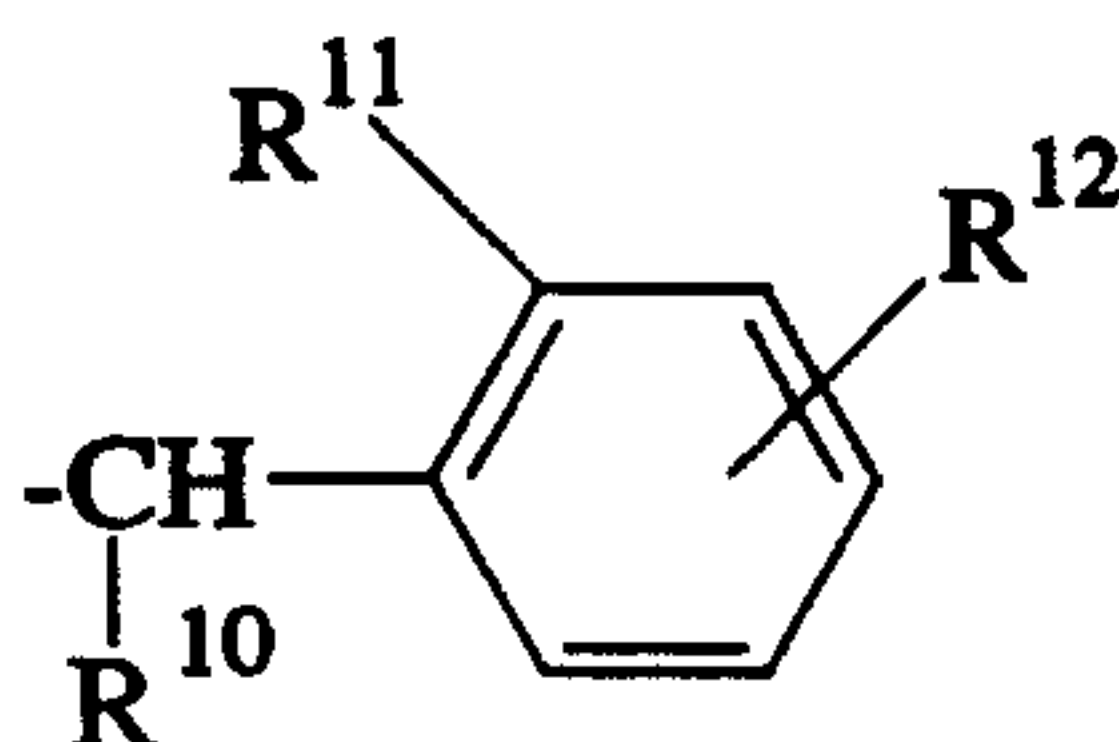
R^2 represents hydrogen, $\text{C}_1\text{-C}_4$ -alkyl which is optionally substituted by fluorine and/or chlorine, methoxy or ethoxy, or represents $\text{C}_3\text{-C}_4$ -alkenyl which is optionally substituted by fluorine and/or chlorine, or represents $\text{C}_3\text{-C}_6$ -cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl, and R^3 represents the group



where

R^4 represents fluorine, chlorine, bromine, methyl, trifluoromethyl, methoxy, difluoromethoxy, trifluoromethoxy, 2-chloro-ethoxy, 2-methoxy-ethoxy, C_1 - C_3 -alkylthio, C_1 - C_3 -alkyl-sulphinyl, C_1 - C_3 -alkylsulphonyl, dimethylaminosulphonyl, diethylaminosulphonyl, N-methoxy-N-methylaminosulphonyl, methoxyaminosulphonyl, phenyl, phenoxy or C_1 - C_3 -alkoxy-carbonyl and

R^5 represents hydrogen, fluorine, chlorine or bromine, furthermore R^3 represents the radical



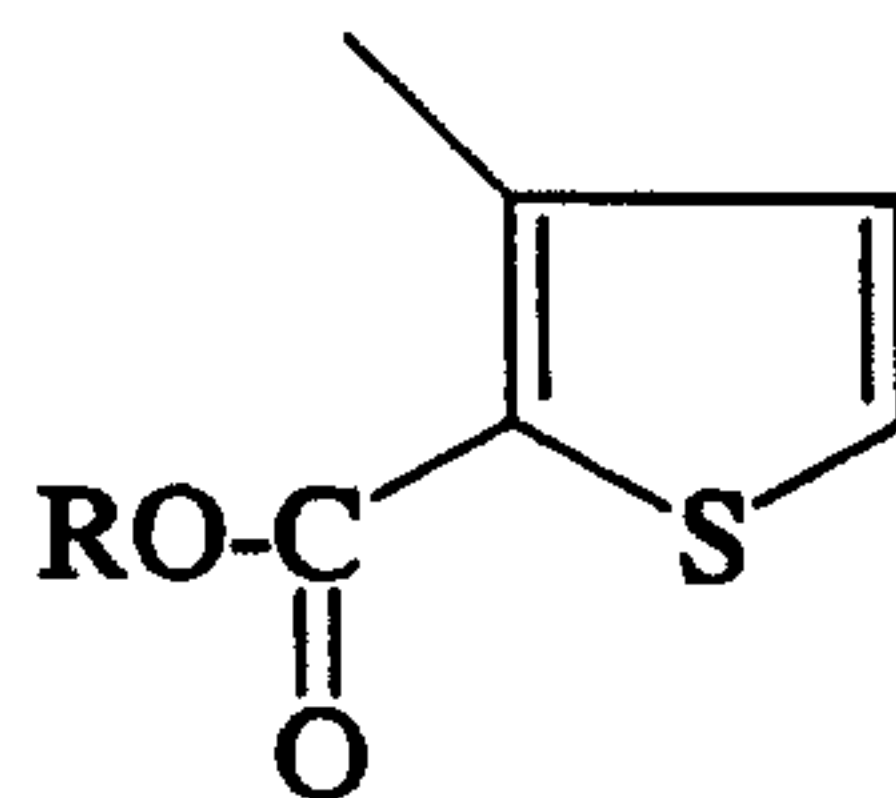
where

R^{10} represents hydrogen,

R^{11} represents fluorine, chlorine, bromine, methyl, methoxy, difluoromethoxy, trifluoromethoxy, ethoxy, methoxycarbonyl, ethoxycarbonyl, methylsulphonyl or dimethylaminosulphonyl and

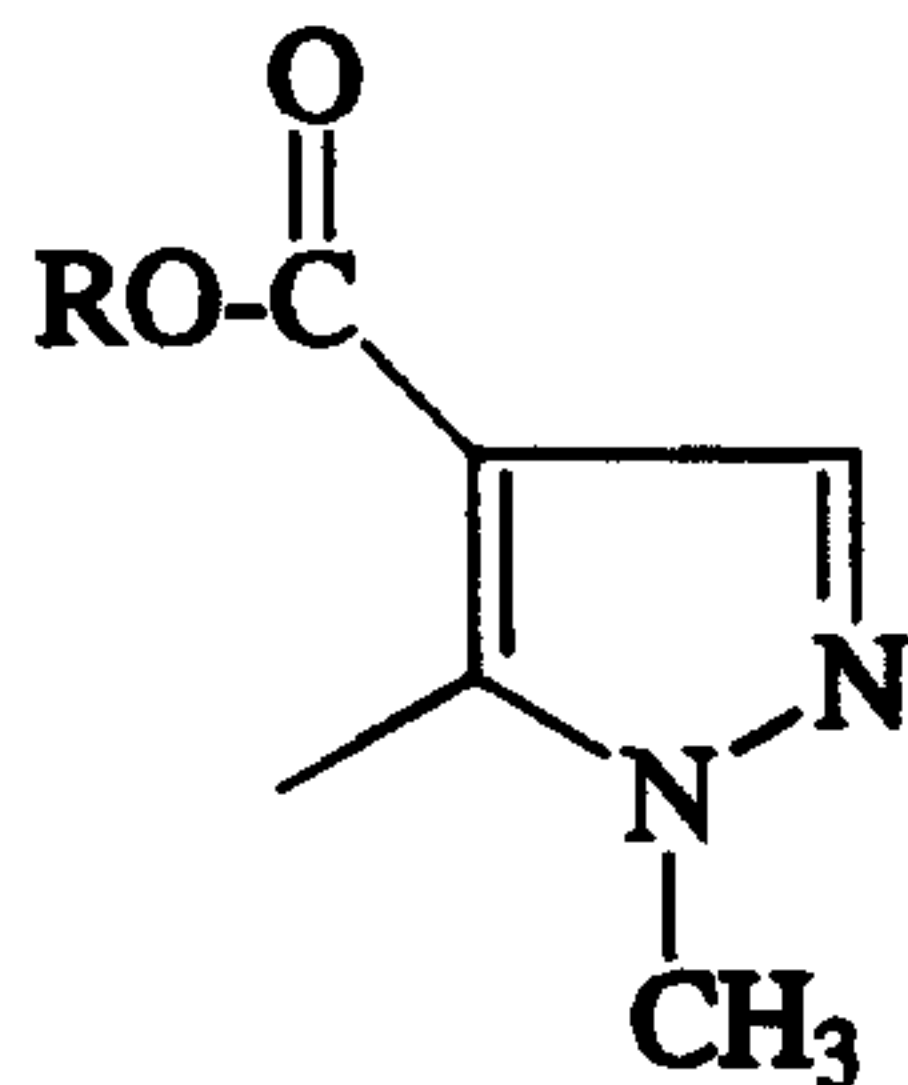
R^{12} represents hydrogen;

furthermore R^3 represents the radical



where

R represents C_1 - C_4 -alkyl or represents the radical



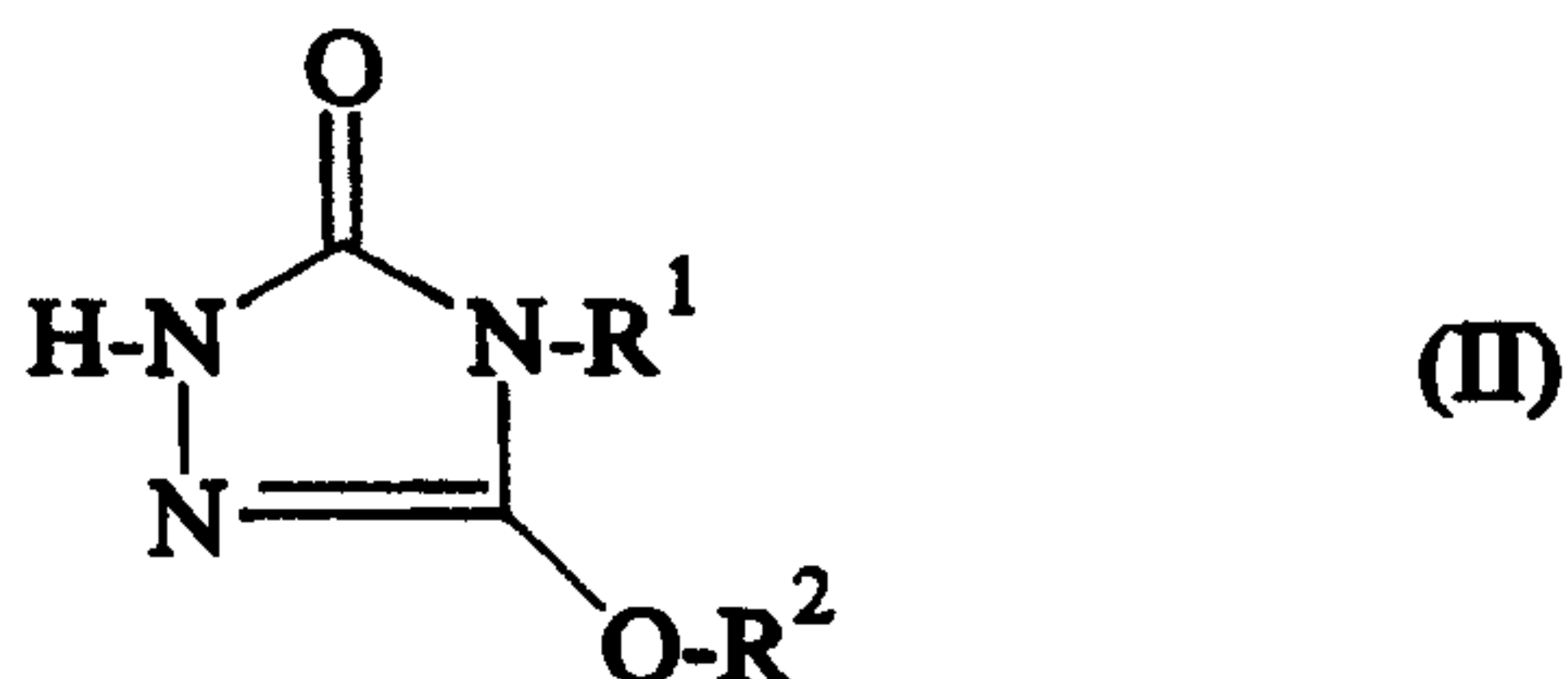
where

R represents C_1 - C_4 -alkyl

or a salt thereof, with the exception of the compounds 2-(2-methoxycarbonyl-phenylsulphonylaminocarbonyl)-4-methyl-5-methoxy-2,4-dihydro-3H-1,2,4-triazol-3-one, 2-(2-trifluoromethoxy-phenylsulphonylaminocarbonyl)-4-cyclopropyl-5-methoxy-2,4-dihydro-3H-1,2,4-triazol-3-one and 2-(2-difluoromethoxy-phenylsulphonylaminocarbonyl)-4-cyclobutyl-5-ethoxy-2,4-dihydro-3H-1,2,4-triazol-3-one.

In accordance with another aspect of the parent application there is provided a process for preparing a compound of formula I as defined above which process comprises

(a) reacting a triazolinone of the general formula (II)



in which

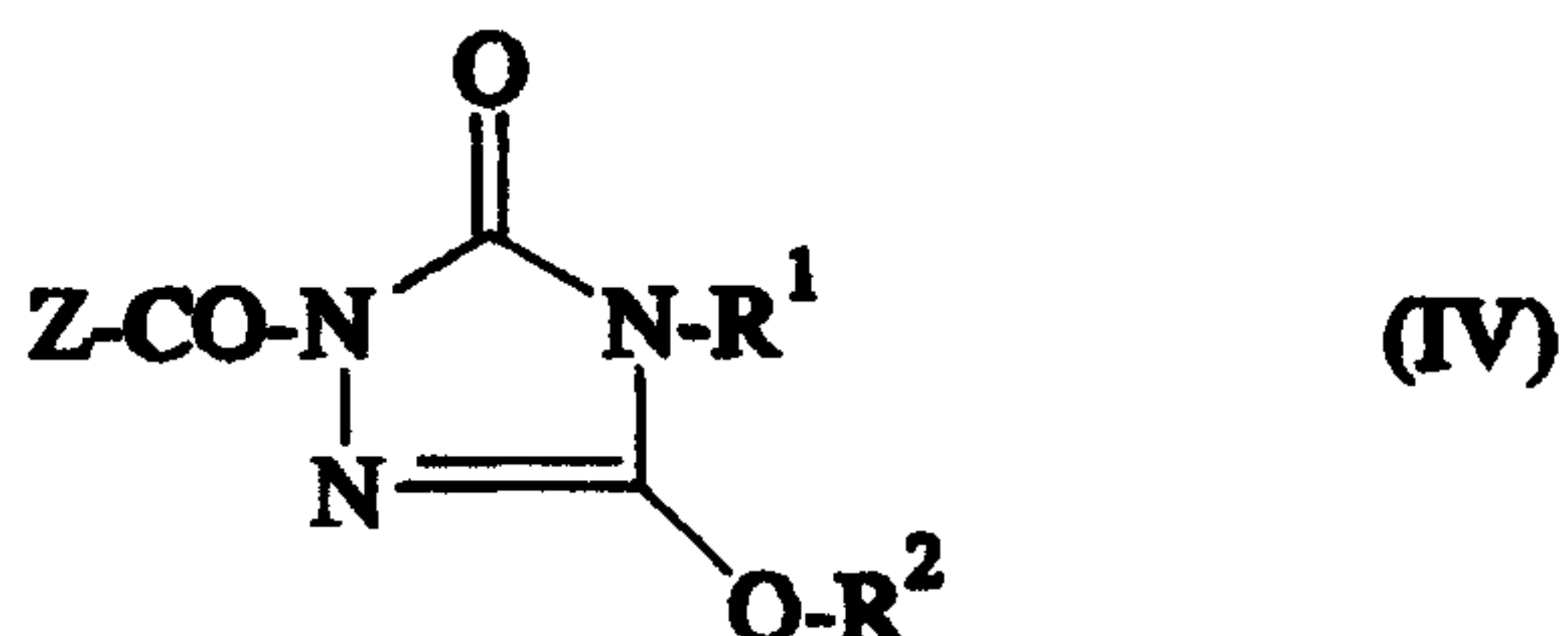
R^1 and R^2 have the meanings given above with a sulphonyl isocyanate of the general formula (III)



in which

R^3 has the meaning given above, or

(b) reacting a triazolinone derivative of the general formula (IV)



in which

R^1 and R^2 have the meanings given above, and

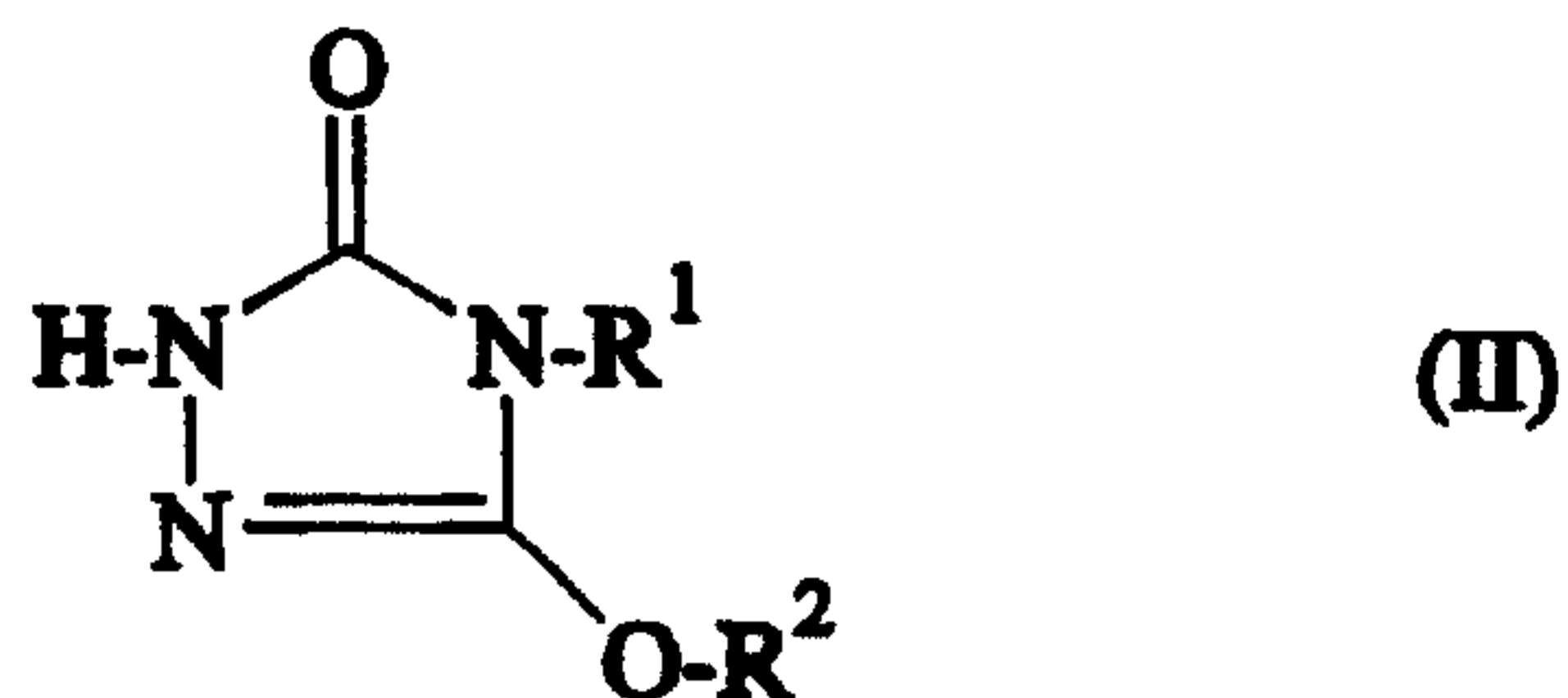
Z represents chlorine, C_1-C_4 -alkoxy, benzyloxy or phenoxy, with a sulphonamide of the general formula (V)



in which

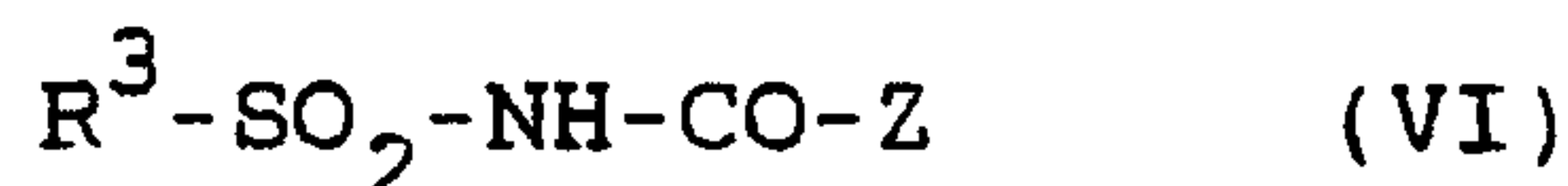
R^3 has the meaning given above, or

(c) reacting a triazolinone of the general formula (II)



in which

R^1 and R^2 have the meanings given above with a sulphonamide derivative of the general formula (VI)

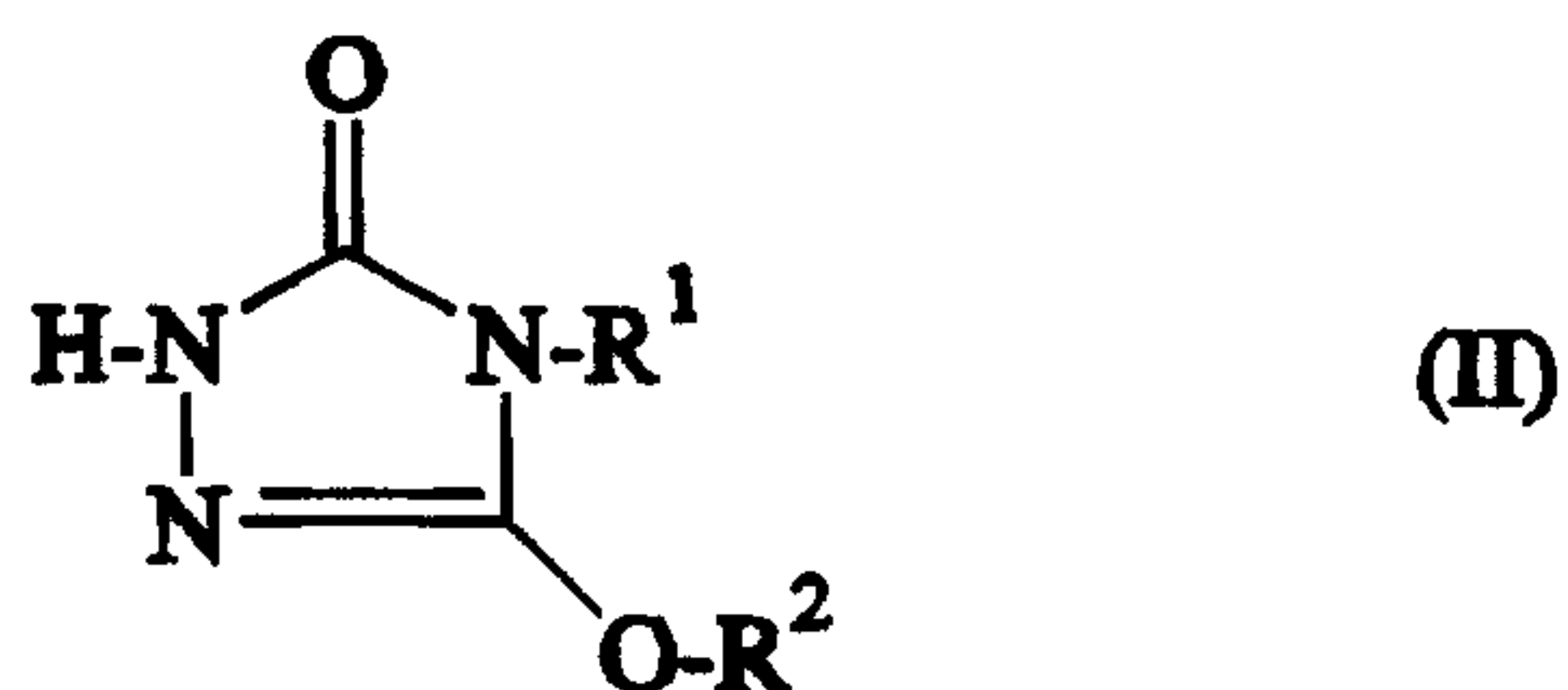


in which

R^3 has the meaning given above and

Z represents chlorine, C_1-C_4 -alkoxy, benzyloxy or phenoxy, and, where required, forming a salt thereof.

In accordance with one aspect of the divisional application, there is provided a triazolinone of the general formula (II)



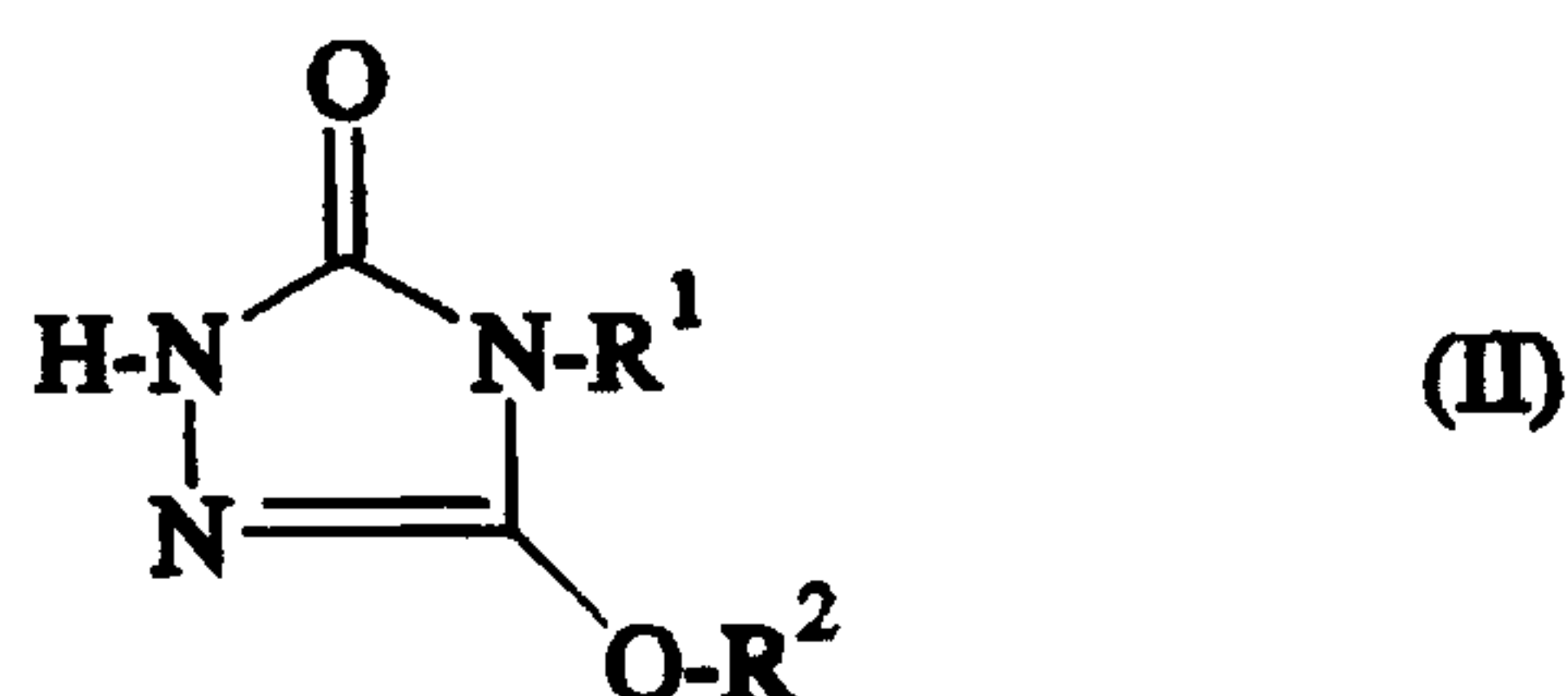
in which

R^1 represents amino, C_1-C_4 -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C_3-C_6 -cycloalkyl, benzyl, phenyl, C_1-C_3 -alkylamino, C_3-C_6 -cycloalkylamino or di- $(C_1-C_3$ -alkyl)-amino,

and

R^2 represents C_3 - C_6 -cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl.

In accordance with another aspect of the divisional application there is provided a process for preparing a triazolinone of the general formula (II)

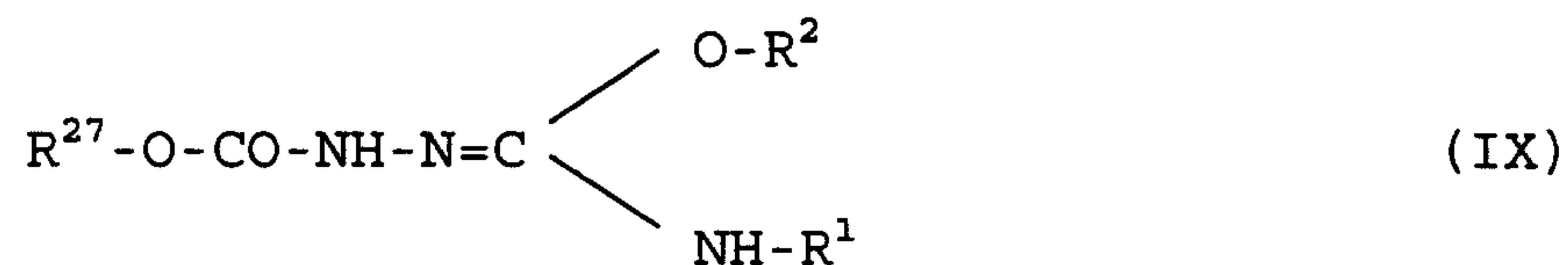


in which

R^1 represents hydrogen, amino, C_1 - C_4 -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C_3 - C_6 -cycloalkyl, benzyl, phenyl, C_1 - C_3 -alkylamino, C_3 - C_6 -cycloalkylamino or di- $(C_1$ - C_3 -alkyl)-amino, and

R^2 represents hydrogen, C_1 - C_4 -alkyl, which is optionally substituted by fluorine and/or chlorine, methoxy or ethoxy, or represents C_3 - C_4 -alkenyl which is optionally substituted by fluorine and/or chlorine, or represents C_3 - C_6 -cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl,

which process comprises heating a compound of the general formula (IX)



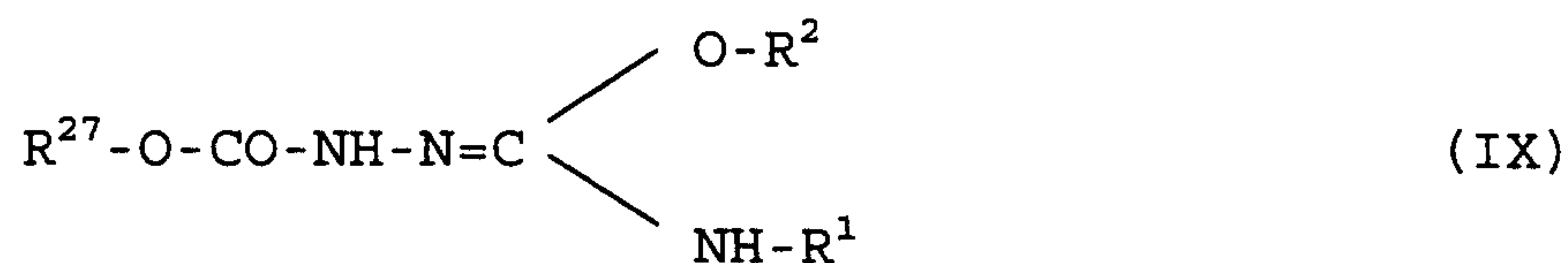
in which

5 R^1 represents hydrogen, amino, C_1 - C_4 -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C_3 - C_6 -cycloalkyl, benzyl, phenyl, C_1 - C_3 -alkylamino, C_3 - C_6 -cycloalkylamino or di- $(\text{C}_1$ - C_3 -alkyl)-amino;

10 R^2 represents hydrogen, C_1 - C_4 -alkyl which is optionally substituted by fluorine and/or chlorine, methoxy or ethoxy, or represents C_3 - C_4 -alkenyl which is optionally substituted by fluorine and/or chlorine, or represents C_3 - C_6 -cycloalkyl, or represents phenyl or benzyl which is
 15 optionally substituted by fluorine, chlorine and/or methyl; and

R^{27} represents methyl, ethyl or phenyl, at a temperature of from 50°C to 150°C .

In accordance with another aspect of the
 20 divisional application there is provided a compound of the general formula (IX)



25 in which R^1 represents hydrogen, amino, C_1 - C_4 -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C_3 - C_6 -cycloalkyl, benzyl, phenyl, C_1 - C_3 -alkylamino, C_3 - C_6 -cycloalkylamino or di- $(\text{C}_1$ - C_3 -alkyl)-amino; and

R² represents hydrogen, C₁-C₄-alkyl which is optionally substituted by fluorine and/or chlorine, methoxy or ethoxy, or represents C₃-C₄-alkenyl which is optionally substituted by fluorine and/or chlorine, or represents C₃-C₆-
5 cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl; and

R²⁷ represents methyl, ethyl or phenyl.

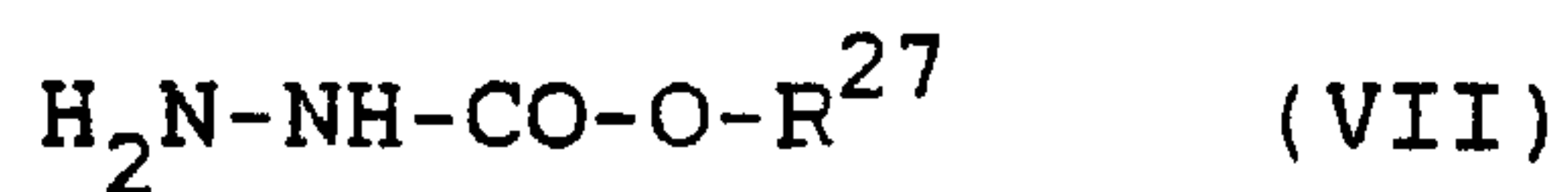
In accordance with another aspect of the
10 divisional application there is provided a process for preparing a compound of the general formula (IX) as defined above

wherein

R^1 represents hydrogen, amino, C_1 - C_4 -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C_3 - C_6 -cycloalkyl, benzyl, phenyl, C_1 - C_3 -alkylamino, C_3 - C_6 -cycloalkylamino or di- $(C_1$ - C_3 -alkyl)-amino, and

R^2 represents hydrogen, C_1 - C_4 -alkyl, which is optionally substituted by fluorine and/or chlorine, methoxy or ethoxy, or represents C_3 - C_4 -alkenyl which is optionally substituted by fluorine and/or chlorine, or represents C_3 - C_6 -cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl, and

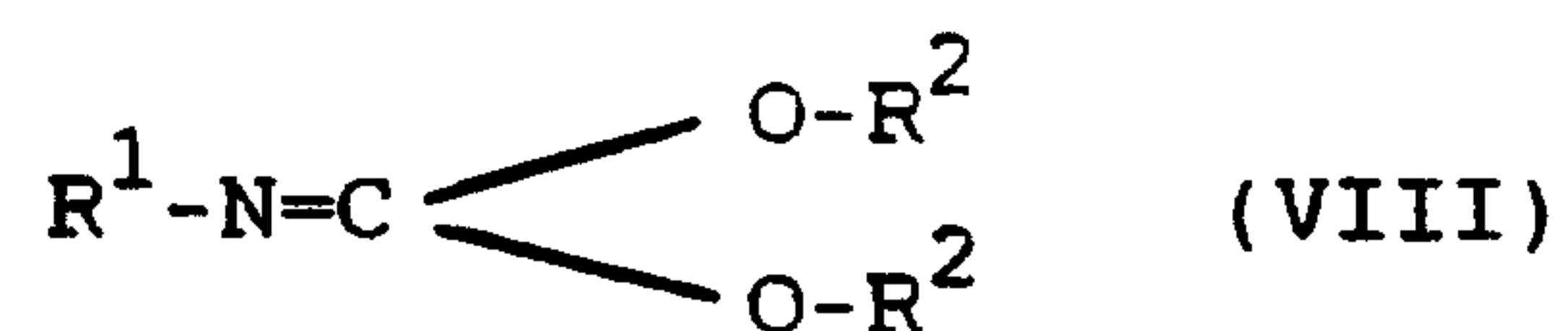
R^{27} represents methyl, ethyl or phenyl, which process comprises reacting a hydrazinoformic ester of the general formula (VII)



in which

R^{27} is as defined above,

with an alkyliminocarbonic diester of the general formula (VIII)



in which

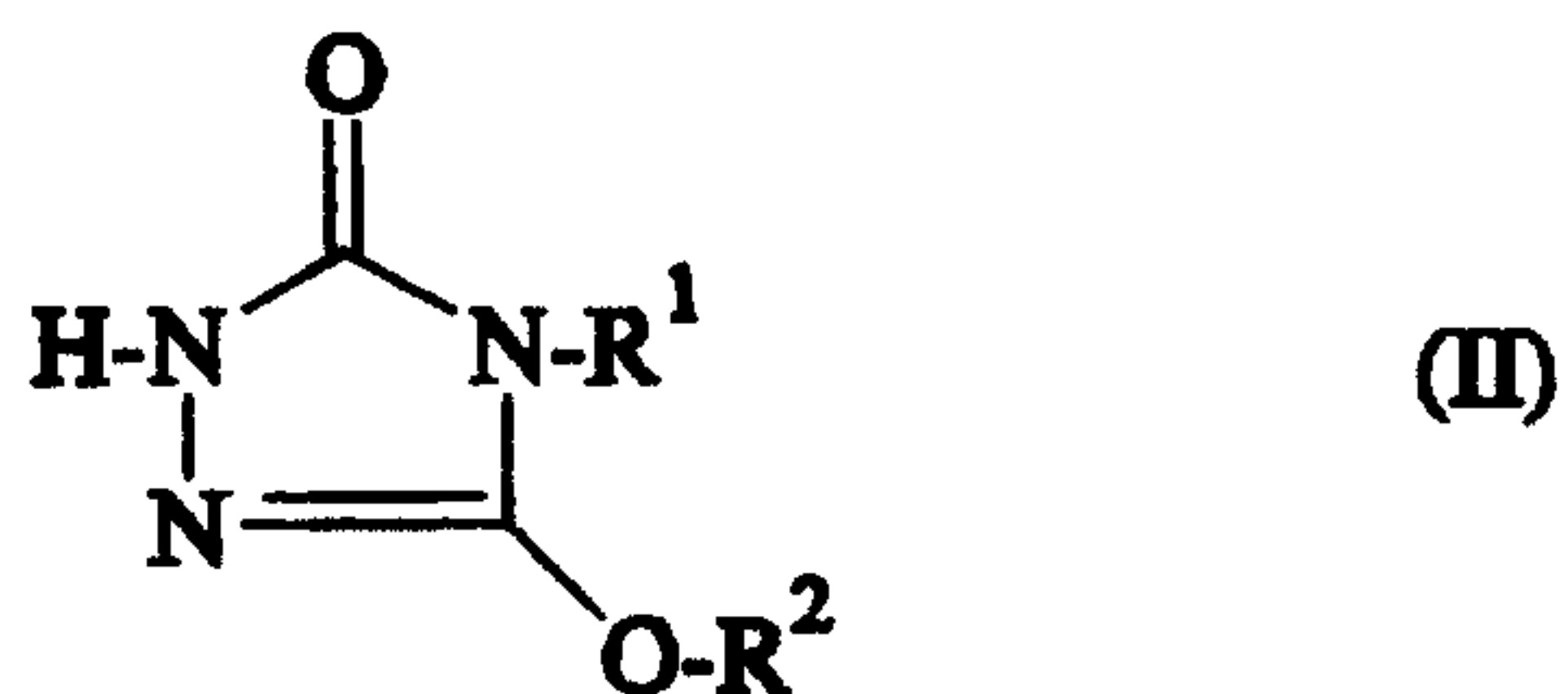
R^1 and R^2 are as defined above,

at a temperature of from 0°C to 50°C.

The compound 2-(2-methoxycarbonyl-phenylsulphonyl-aminocarbonyl)-4-methyl-5-methoxy-2,4-dihydro-3H-1,2,4-triazol-3-one is disclosed in German Patent 3,934,081.

The new sulphonylaminocarbonyltriazolinones having substituents bonded via oxygen, of the general formula (I), are obtained when

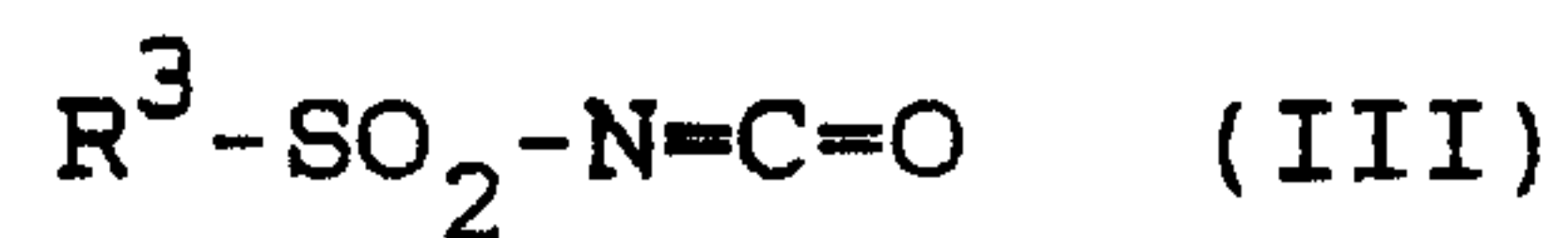
(a) triazolinones of the general formula (II)



in which

R^1 and R^2 have the abovementioned meanings

are reacted with sulphonyl isocyanates of the general formula
(III)



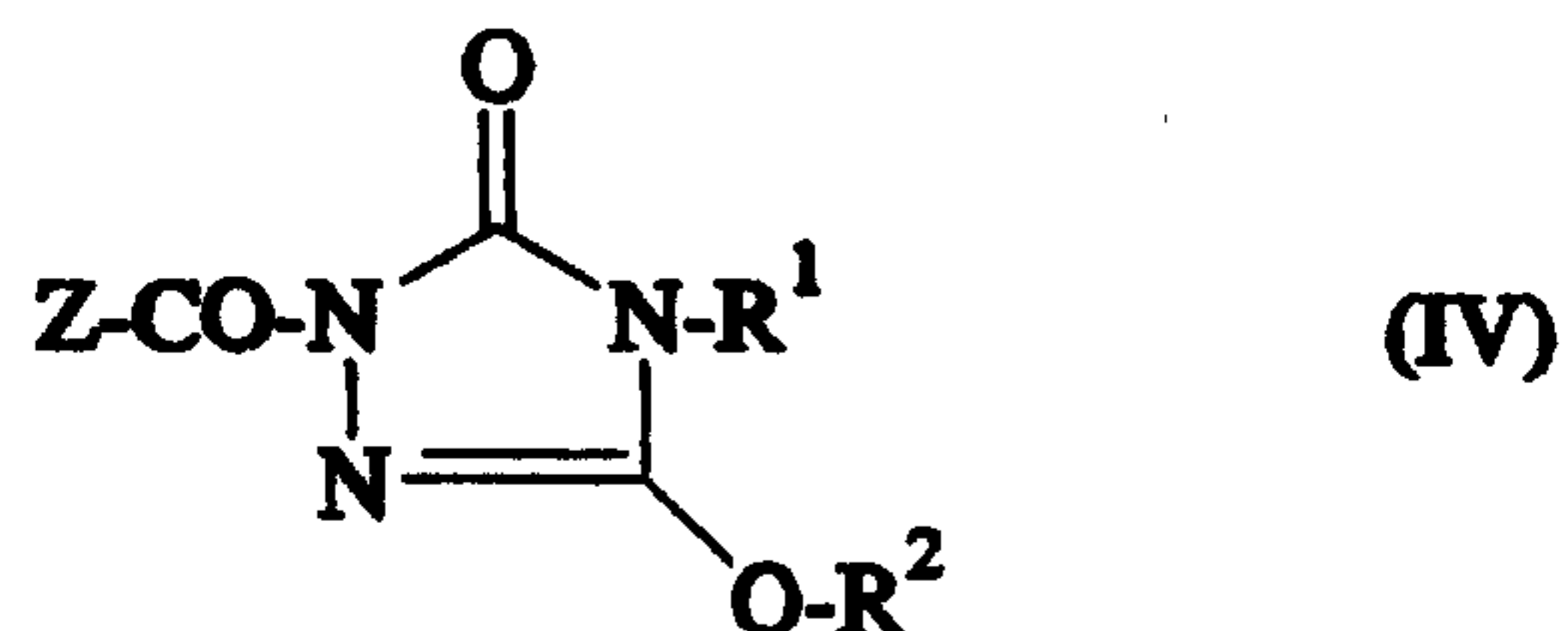
in which

R^3 has the abovementioned meaning,

if appropriate in the presence of a diluent, or when

(b) triazolinone derivatives of the general formula

(IV)



in which

R^1 and R^2 have the abovementioned meanings and

Z represents halogen, alkoxy, aralkoxy or aryloxy,

are reacted with sulphonamides of the general formula (V),



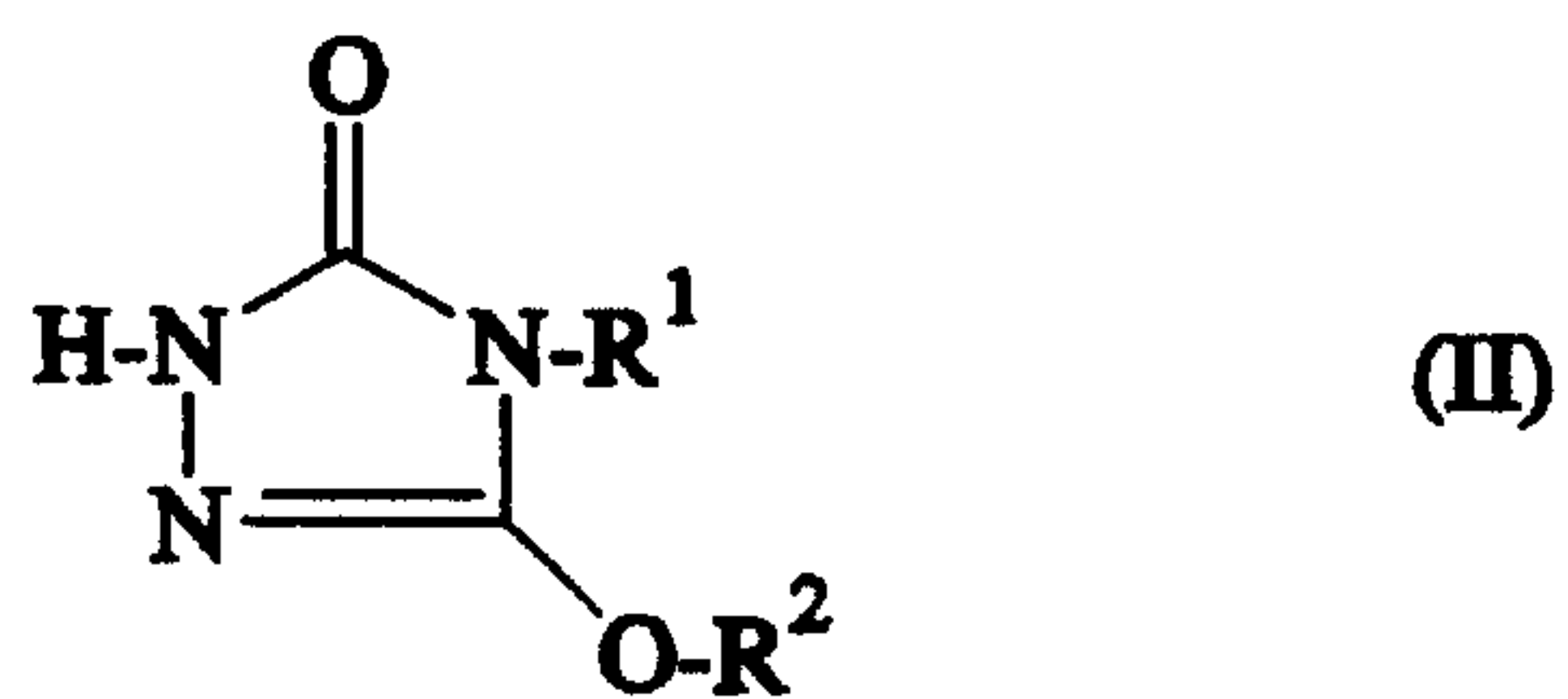
in which

R^3 has the abovementioned meaning,

if appropriate in the presence of an acid acceptor and if

appropriate in the presence of a diluent, or when

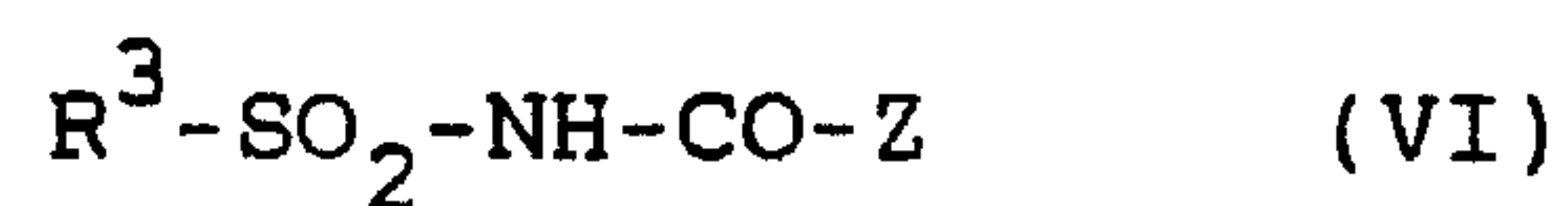
(c) triazolinones of the general formula (II)



in which

R^1 and R^2 have the abovementioned meanings

are reacted with sulphonamide derivatives of the general formula (VI)



in which

R^3 has the abovementioned meaning and

Z represents halogen, alkoxy, aralkoxy or aryloxy, if appropriate in the presence of an acid acceptor and if appropriate in the presence of a diluent and, if appropriate, salts are formed, by customary methods, of the compounds of the formula (I) which have been prepared by process (a), (b) or (c).

The new sulphonylaminocarbonyltriazolinones having substituents bonded via oxygen, of the general formula (I), and their salts are distinguished by a powerful herbicidal activity.

Surprisingly, the new compounds of the formula (I) show a considerably better herbicidal action than the known compound 2-(2-chlorophenylsulphonylaminocarbonyl)4,5-dimethyl-2,4-dihydro-3H-1,2,4-triazol-3-one, which has a similar structure.

Preferred salts are sodium, potassium, magnesium, calcium, ammonium, C₁-C₄-alkyl-ammonium, di-(C₁-C₄-alkyl)-ammonium, tri-(C₁-C₄-alkyl)-ammonium, C₅- or C₆-cycloalkyl-ammonium and di-(C₁-C₂-alkyl)-benzyl-ammonium salts of compounds of the formula (I) in which R¹, R² and R³ have the meanings mentioned above as being preferred.

The abovementioned definitions of radicals, in general or mentioned in preferred ranges, can be combined with each other in any desired way, that is to say also between the particular preferred ranges.

Examples of the compounds are listed in Table 1 below - cf. also the Preparation Examples.

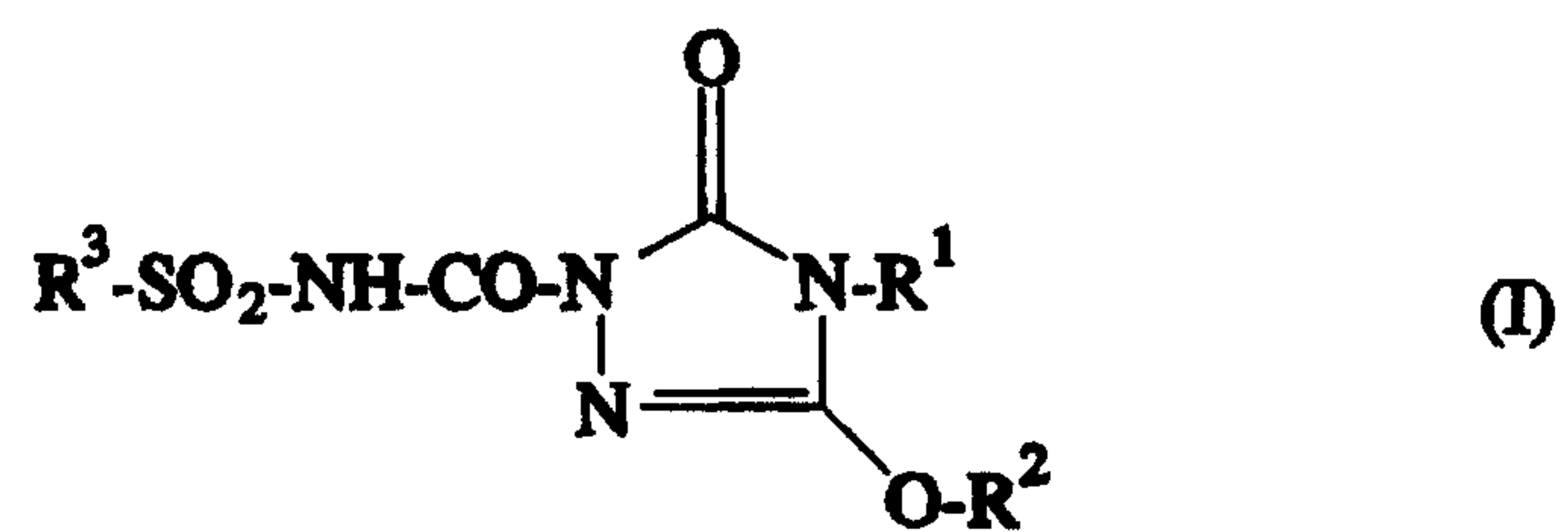


Table 1: Examples of the compounds of the formula (I)

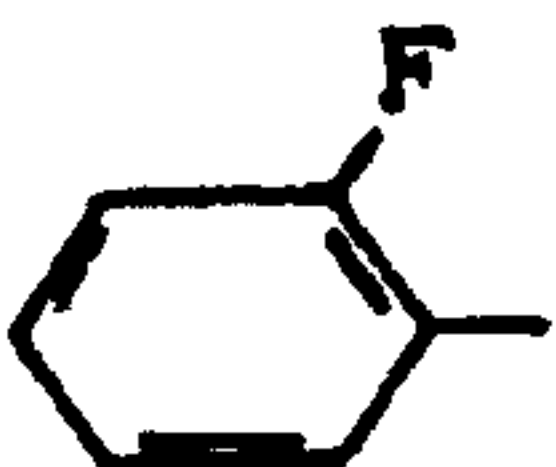
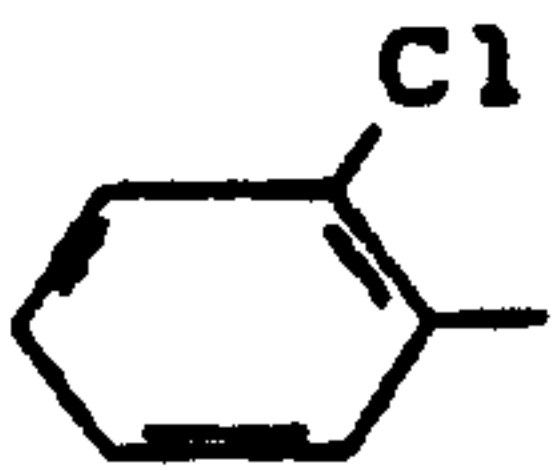
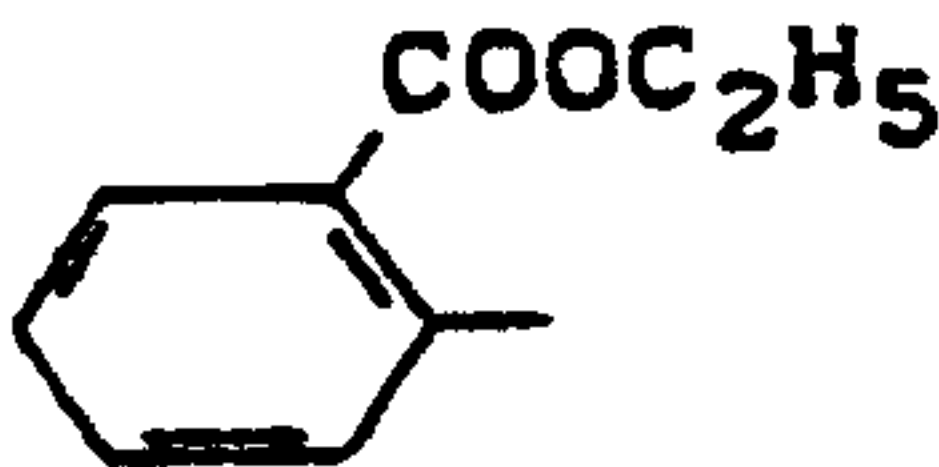
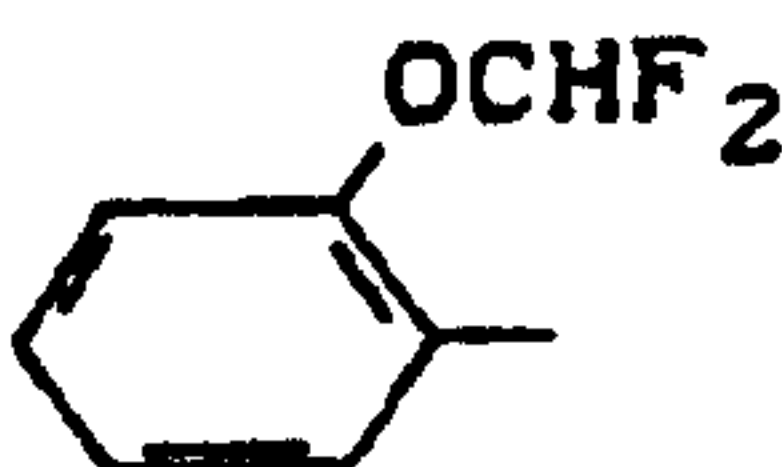
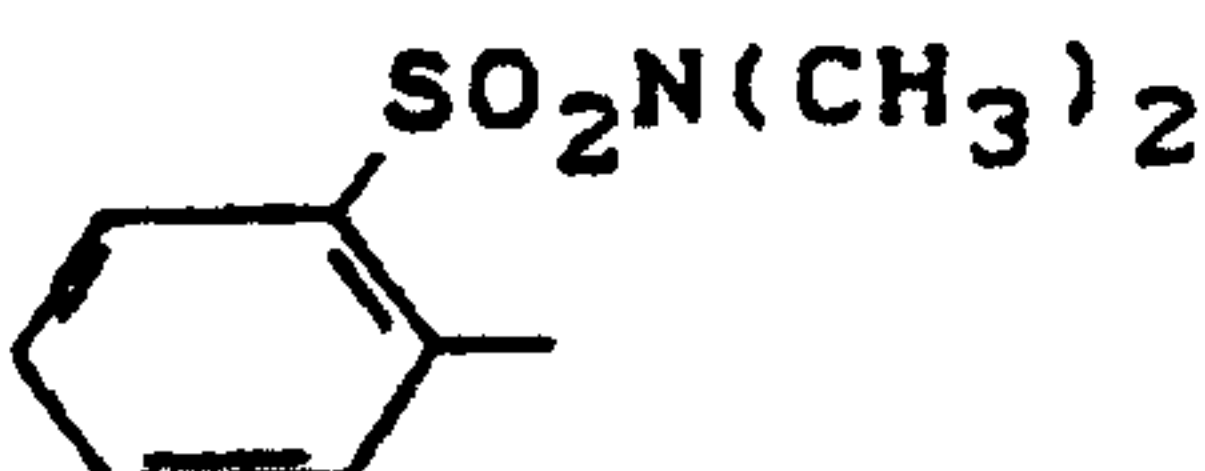
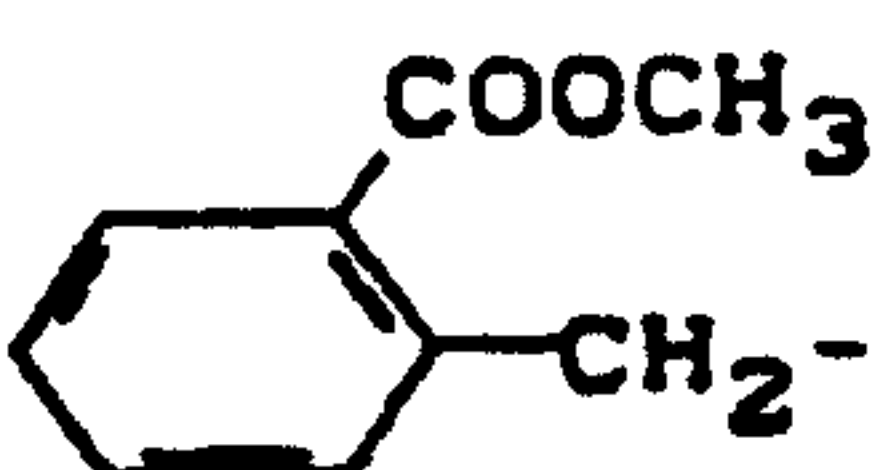
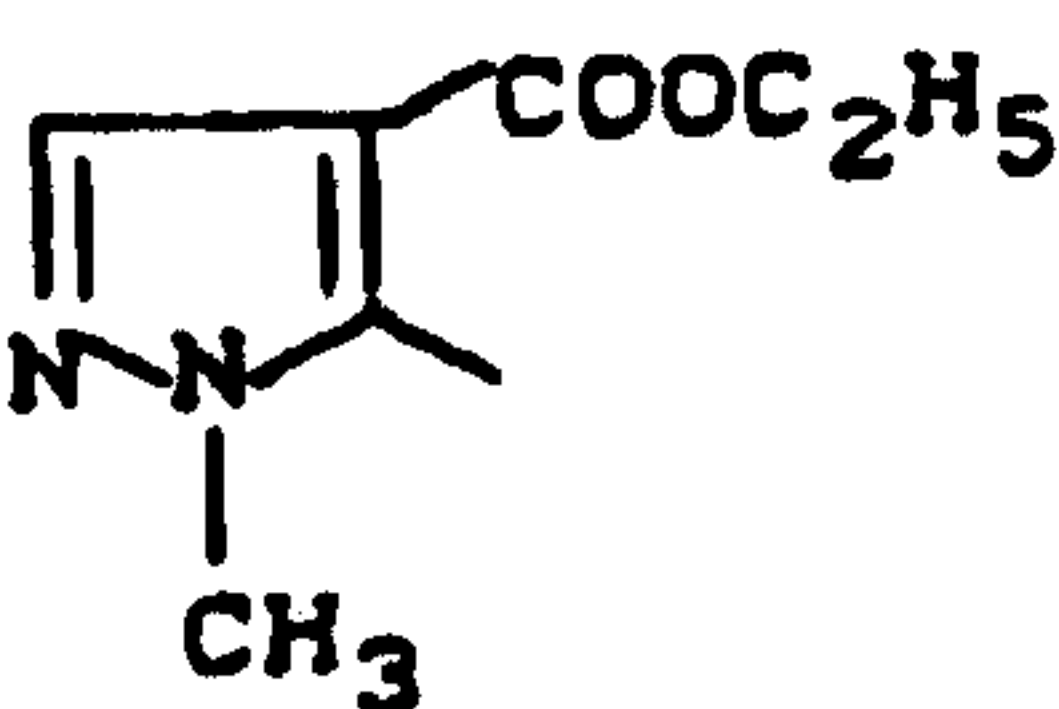
R^1	R^2	R^3
	CH_3	
	CH_3	
CH_3	C_2H_5	
CH_3	$CH_2-CH=CH_2$	
CH_3	CH_3	
CH_3	CH_3	
CH_3	C_2H_5	

Table 1: (Continuation)

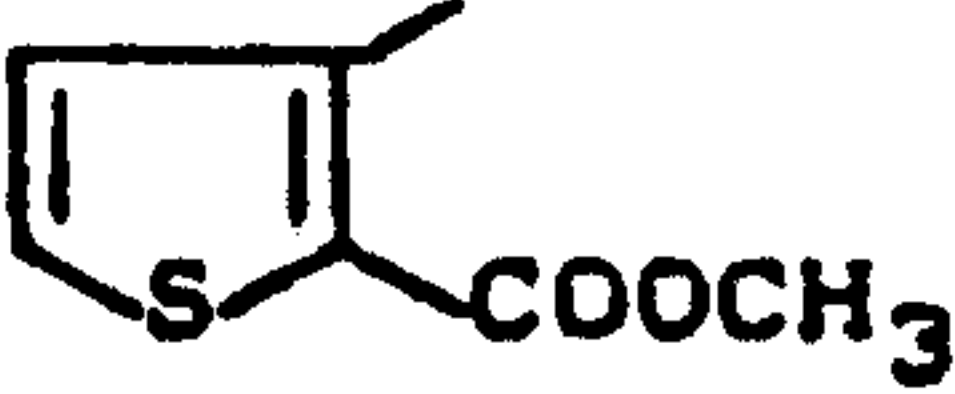
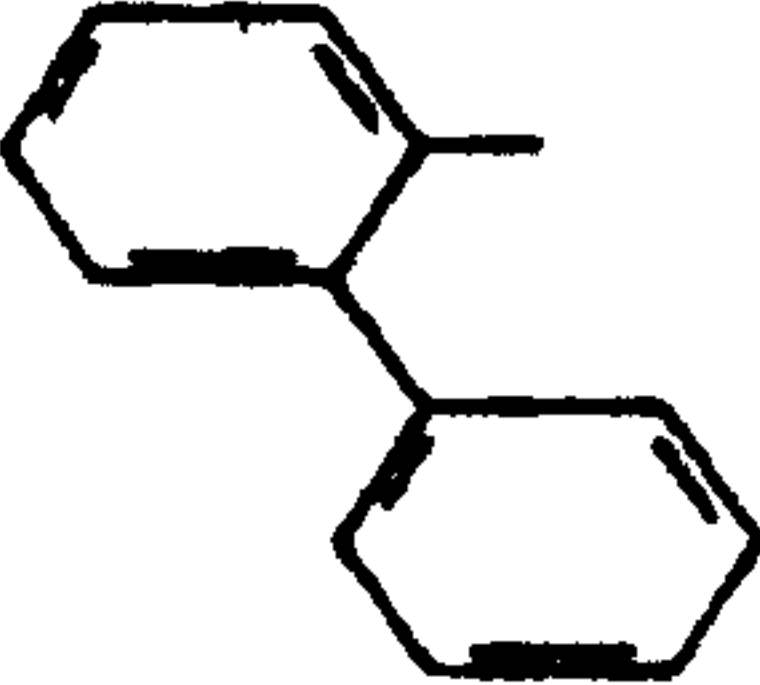
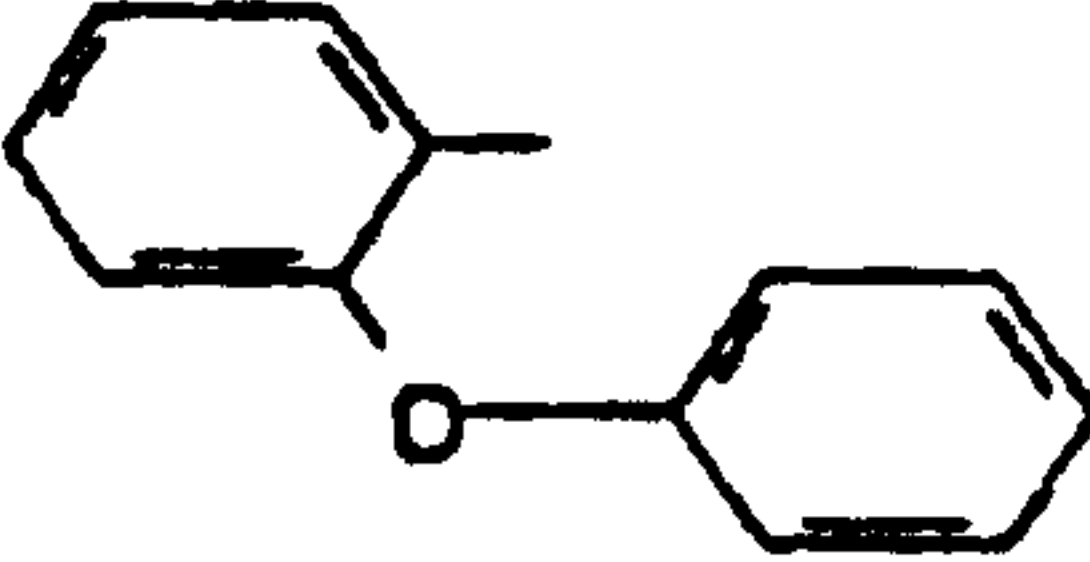
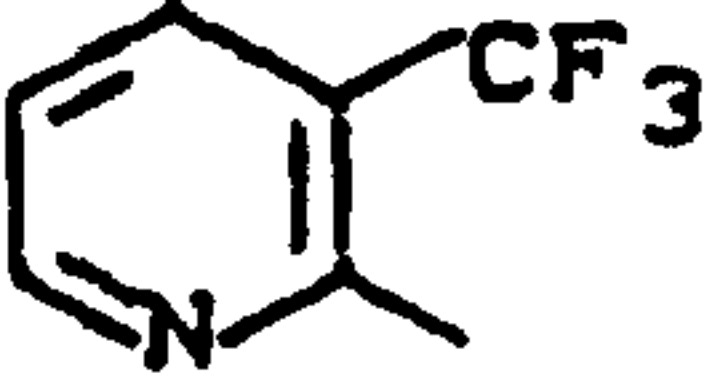
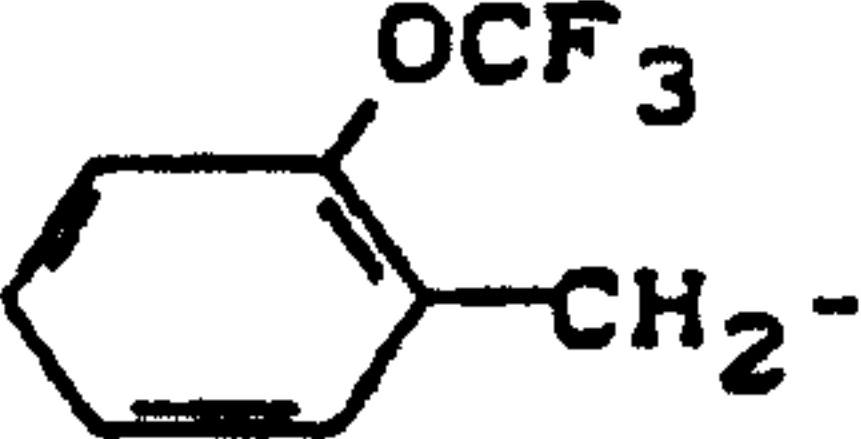
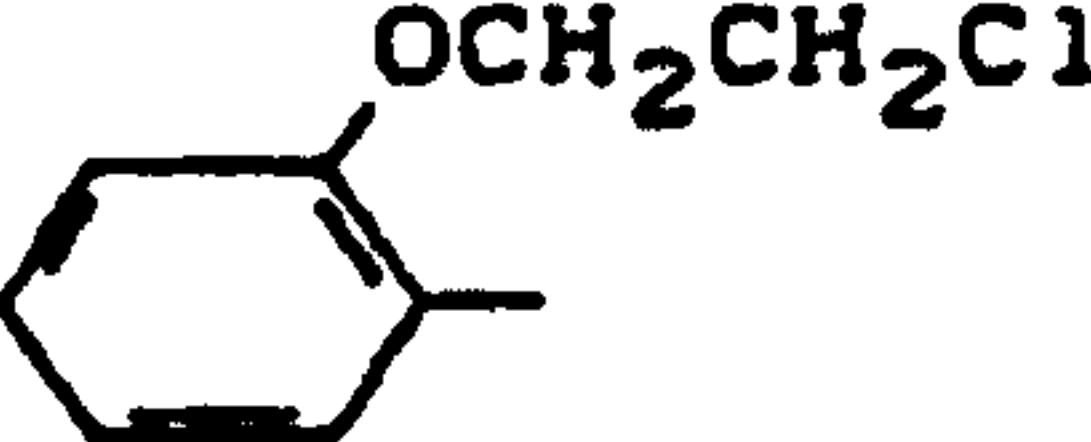
R^1	R^2	R^3
CH_3	C_2H_5	
CH_3	C_2H_5	
C_2H_5	C_2H_5	
C_2H_5	C_3H_7	
	CH_3	
	C_2H_5	
	$CH(CH_3)_2$	

Table 1: (Continuation)

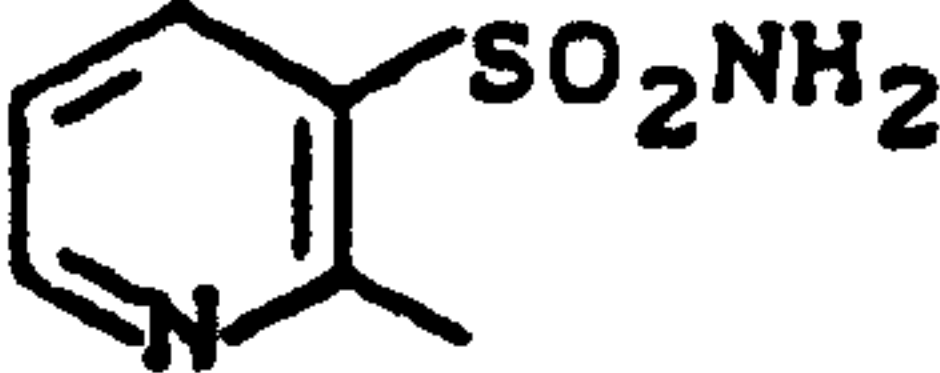
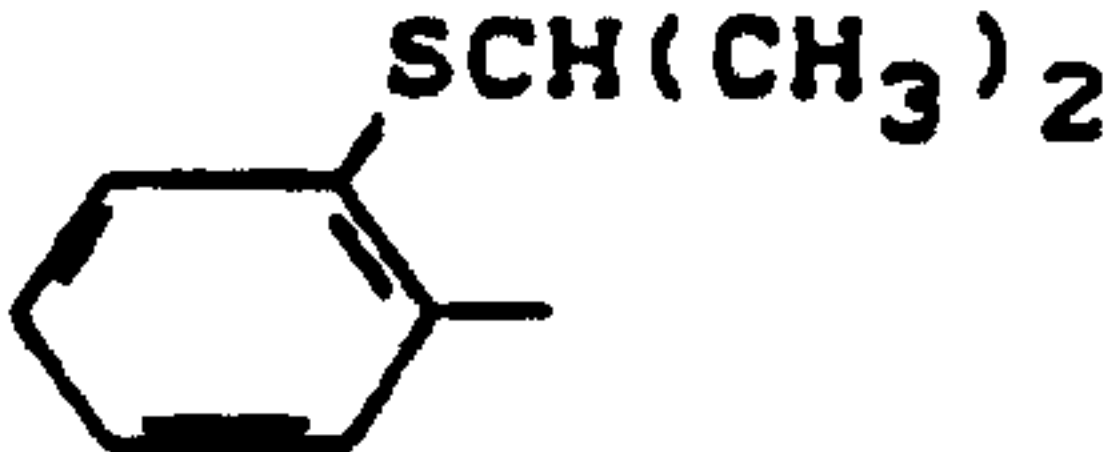
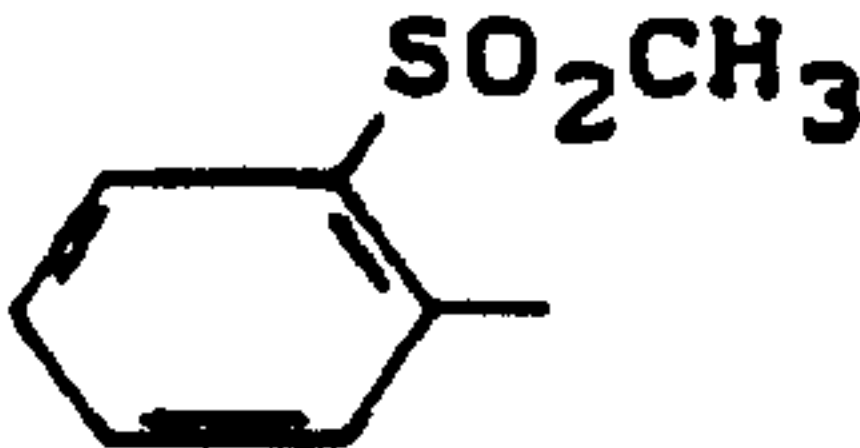
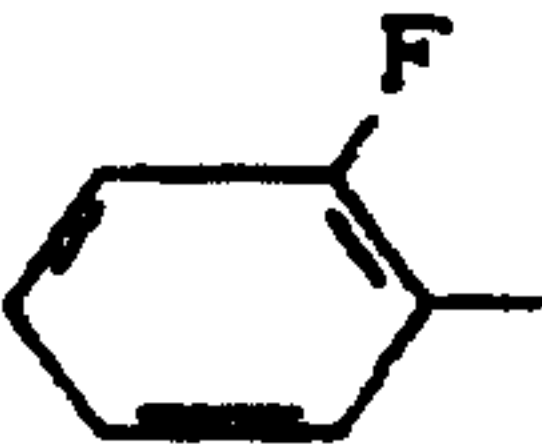
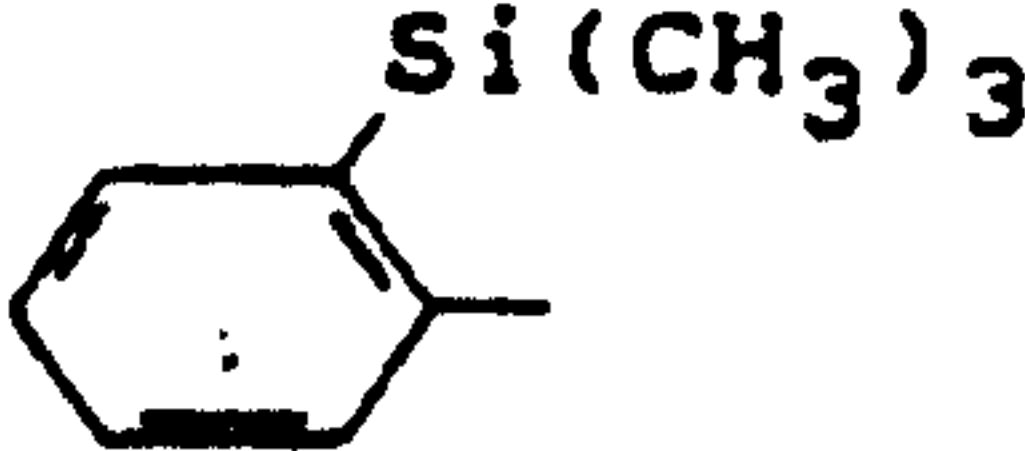
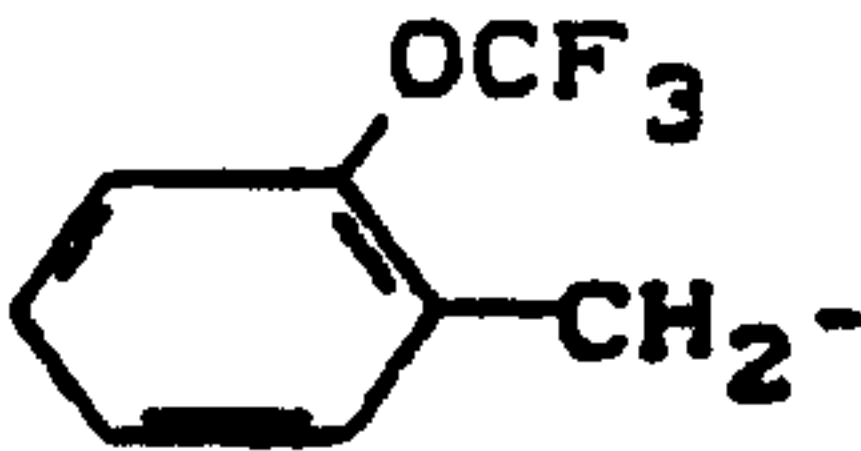
R^1	R^2	R^3
CH_3	$CH(CH_3)_2$	
CH_3	$CH_2-CH=CH_2$	
C_2H_5	CH_3	
C_2H_5	C_2H_5	
CH_3	C_2H_5	
C_2H_5	C_3H_7	
CH_3	C_2H_5	

Table 1: (Continuation)

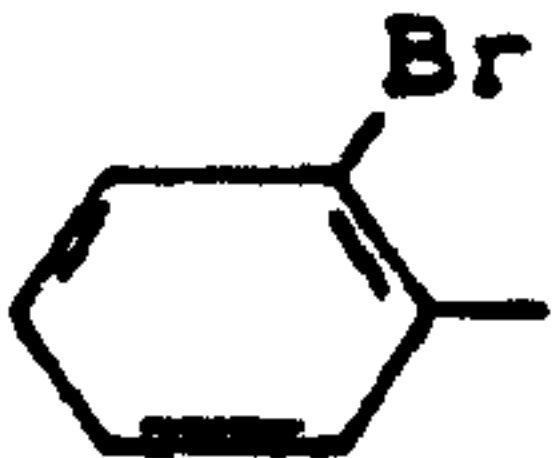
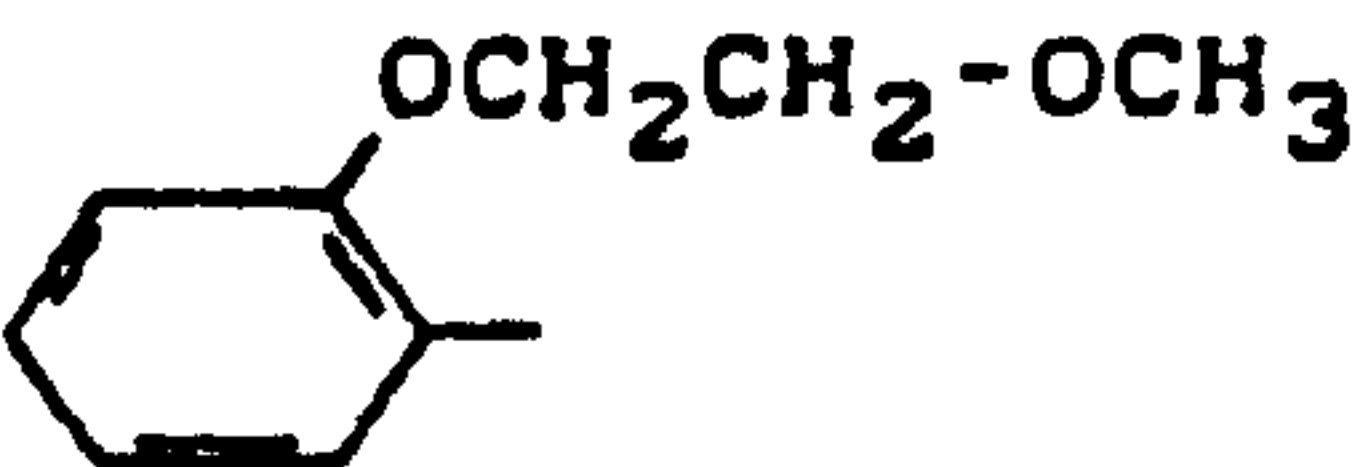
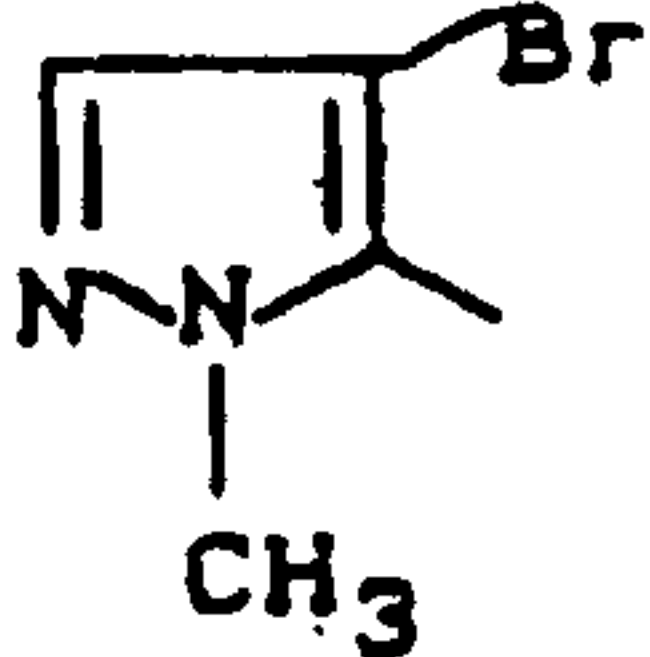
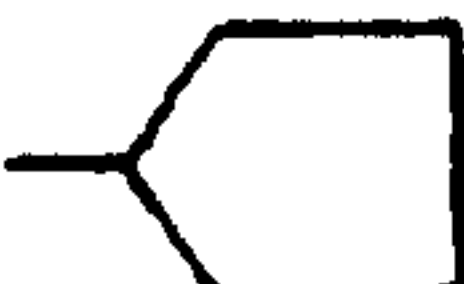
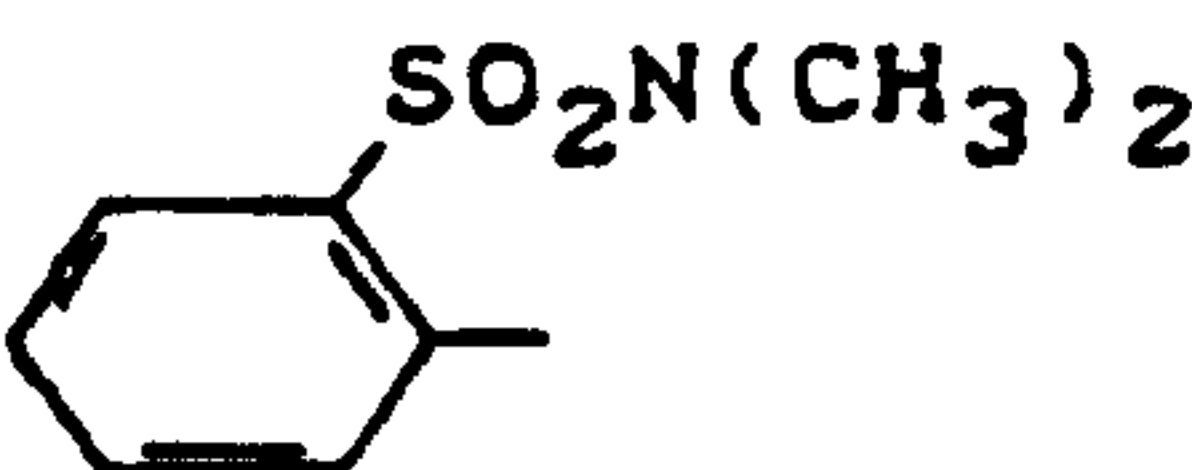
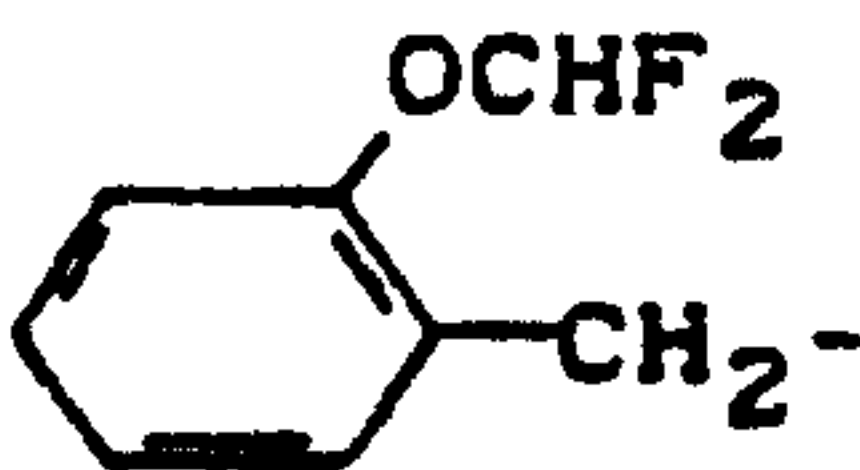
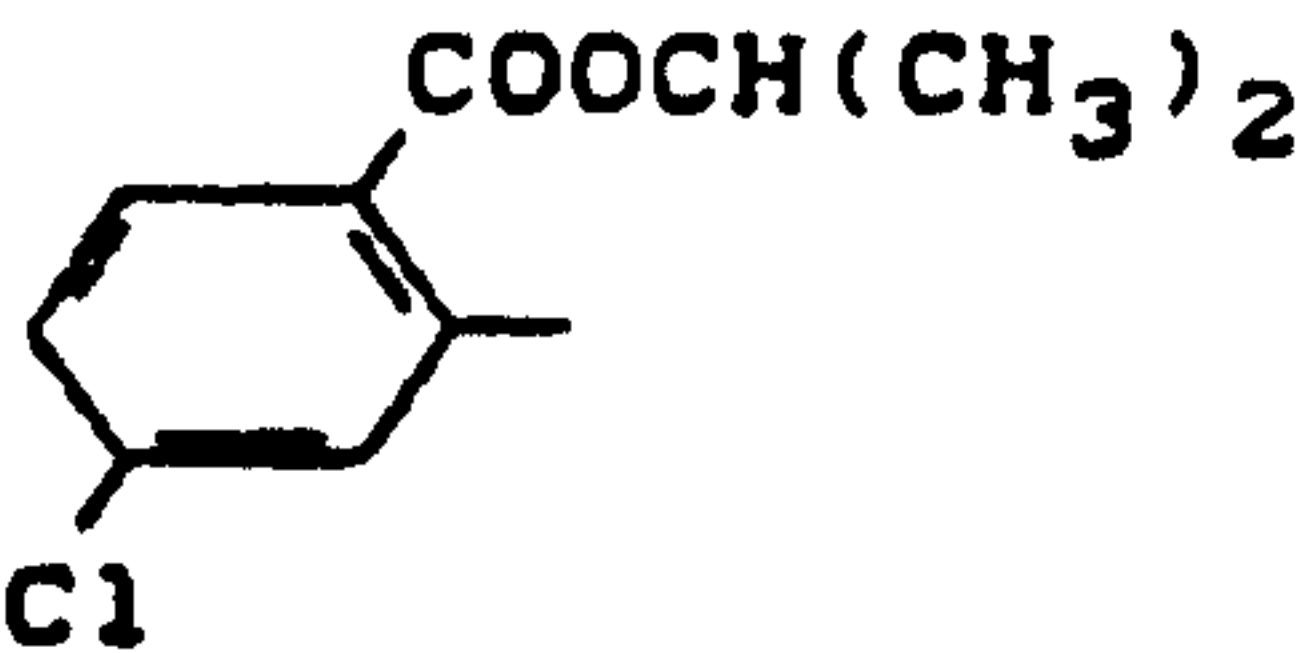
R^1	R^2	R^3
	CH_3	
	C_2H_5	
	CH_3	
	C_2H_5	
	C_3H_7-n	
CH_3	C_2H_5	

Table 1: (Continuation)

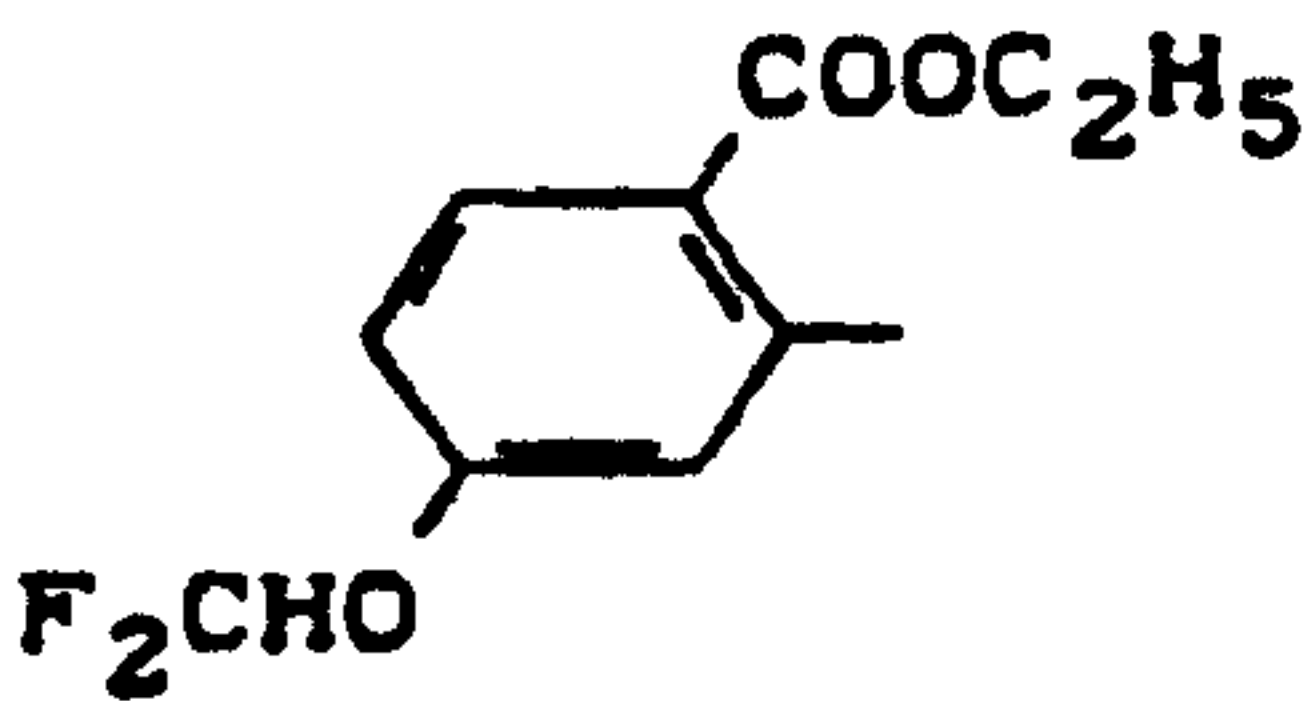
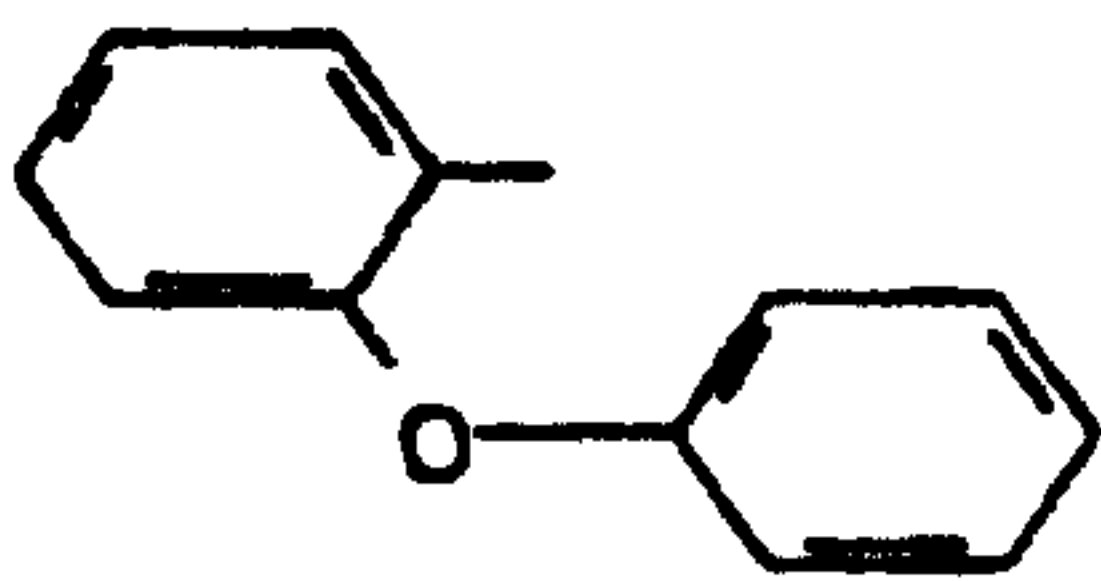
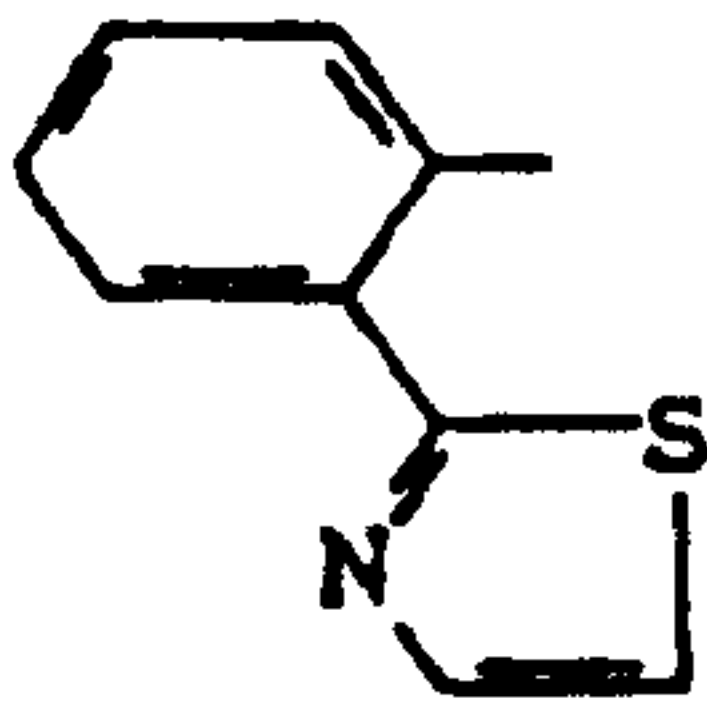
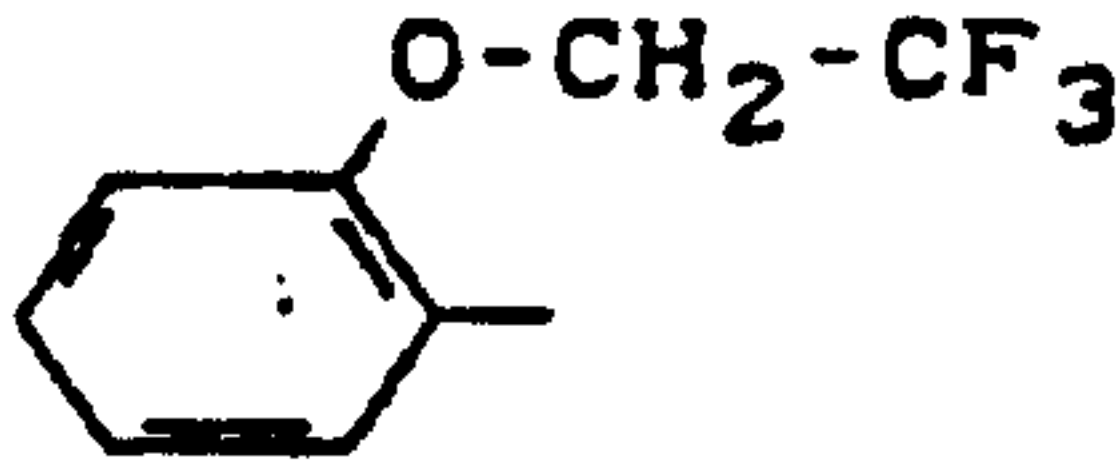
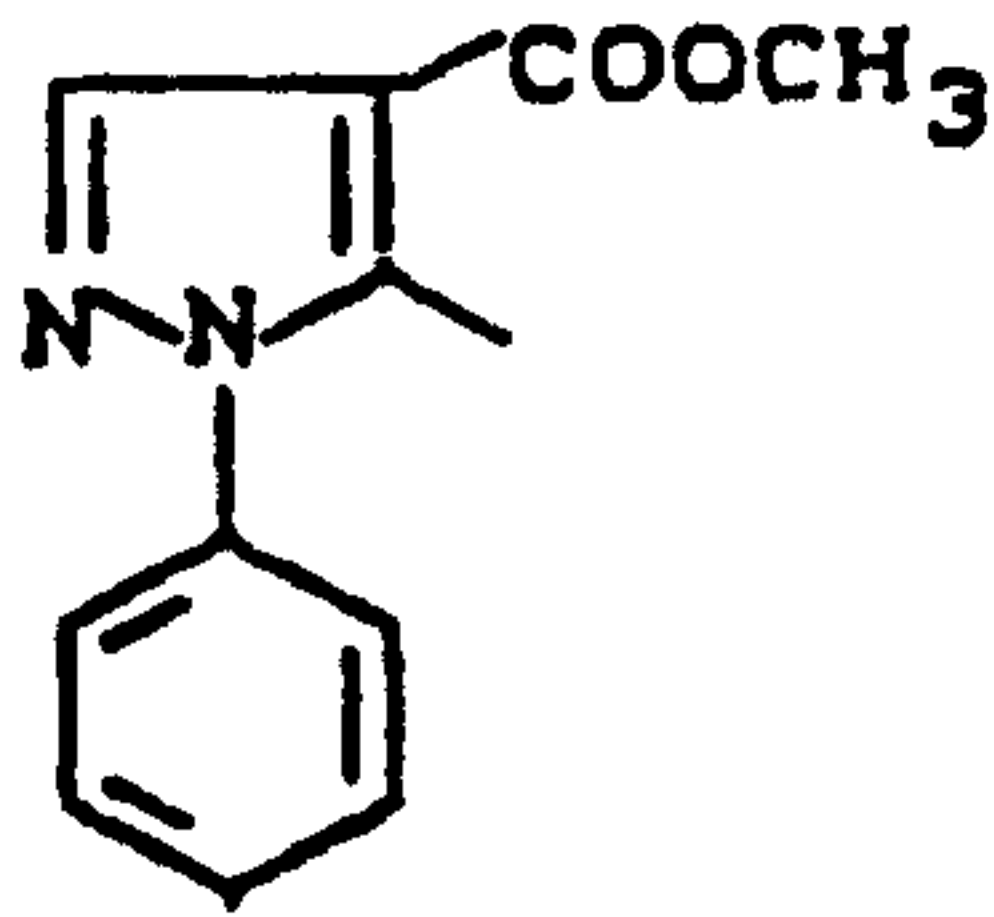
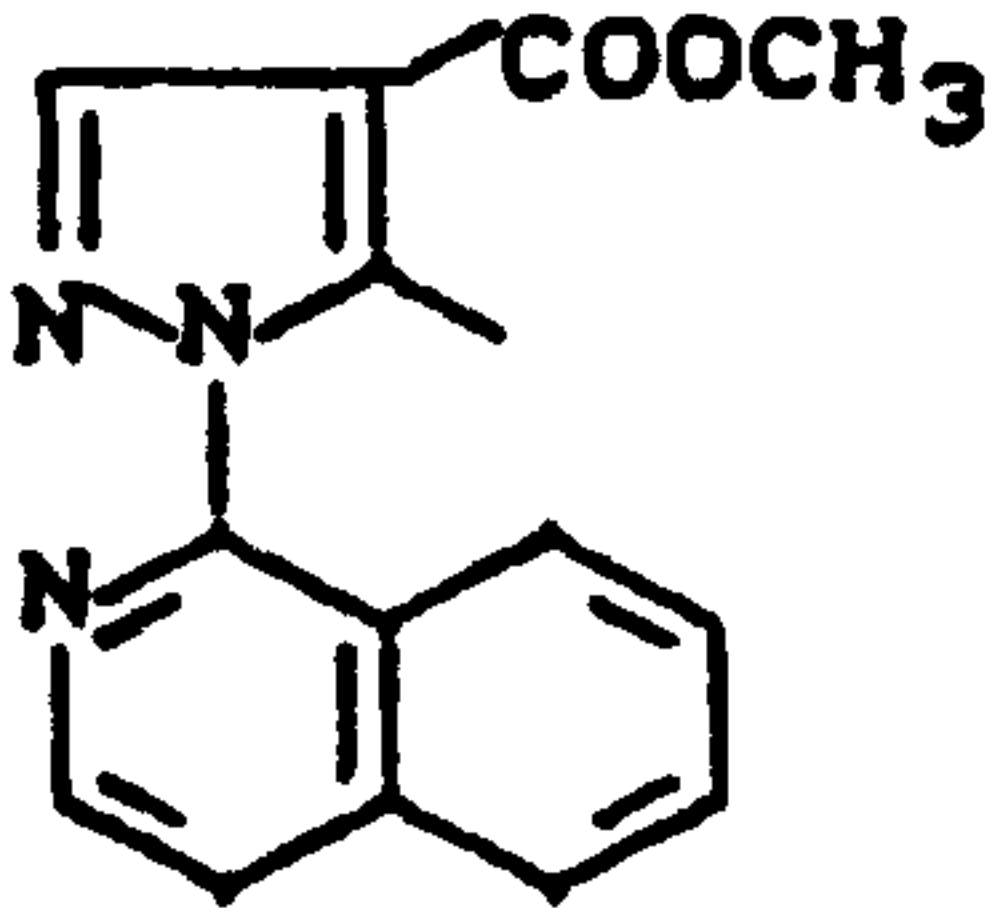
R^1	R^2	R^3
CH_3	CH_3	
CH_3	C_2H_5	
CH_3	$S-CH_2-C\equiv CH$	
CH_3	C_2H_5	
	C_2H_5	
	CH_3	

Table 1: (Continuation)

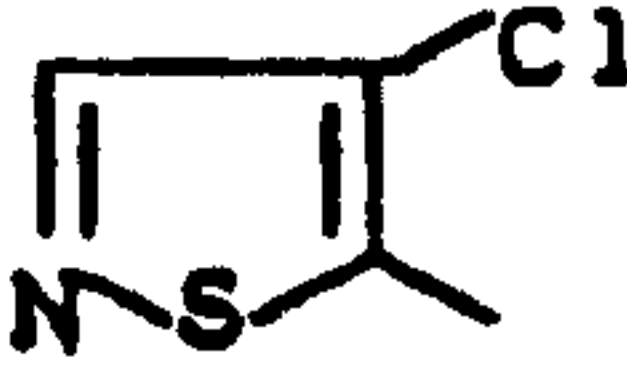
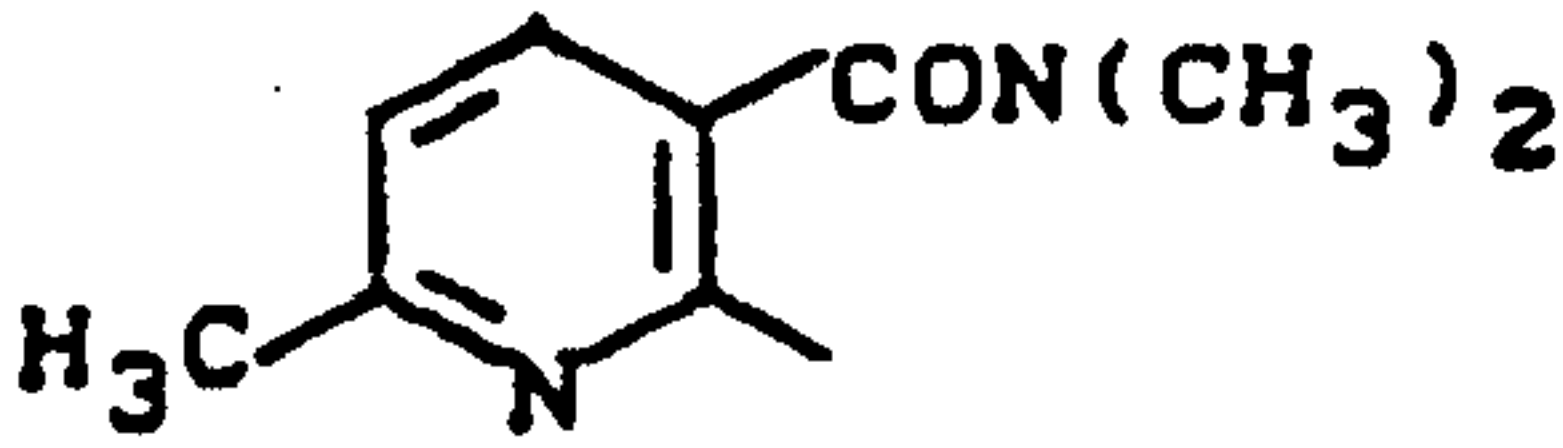
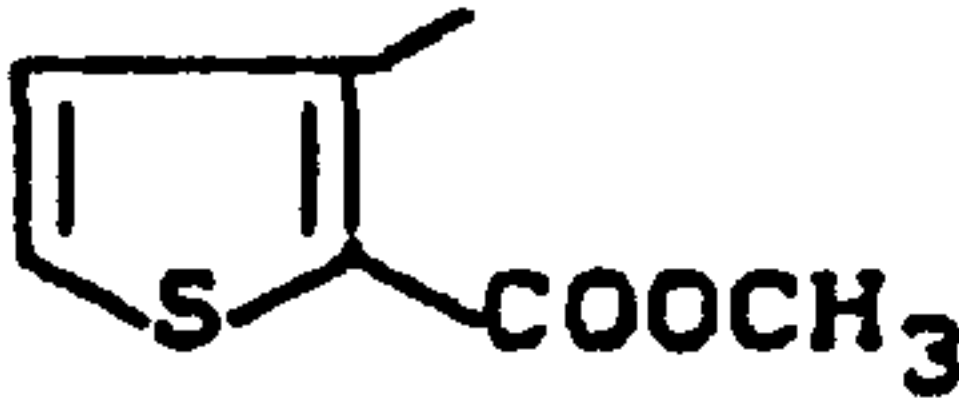
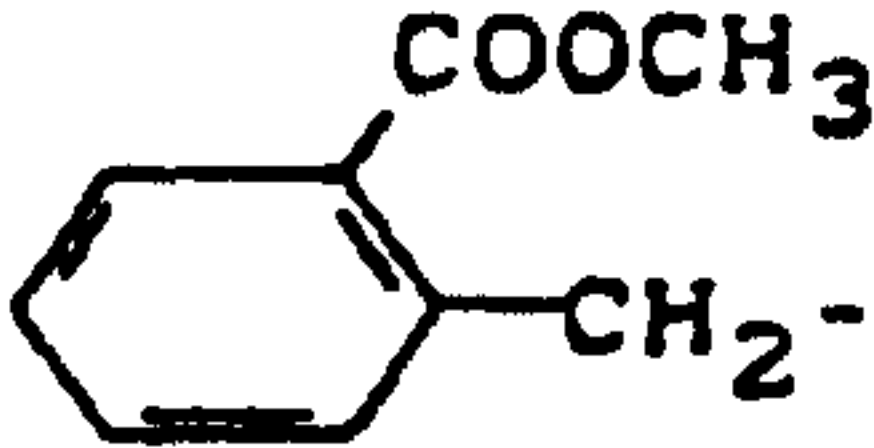
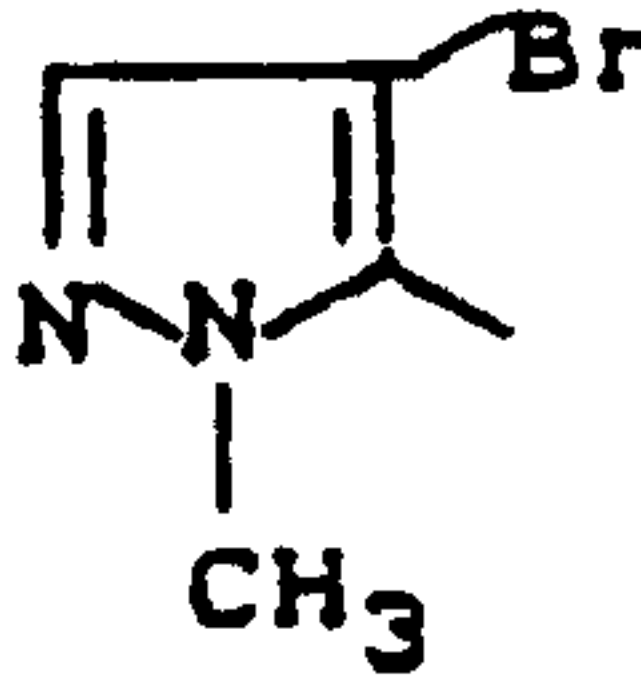
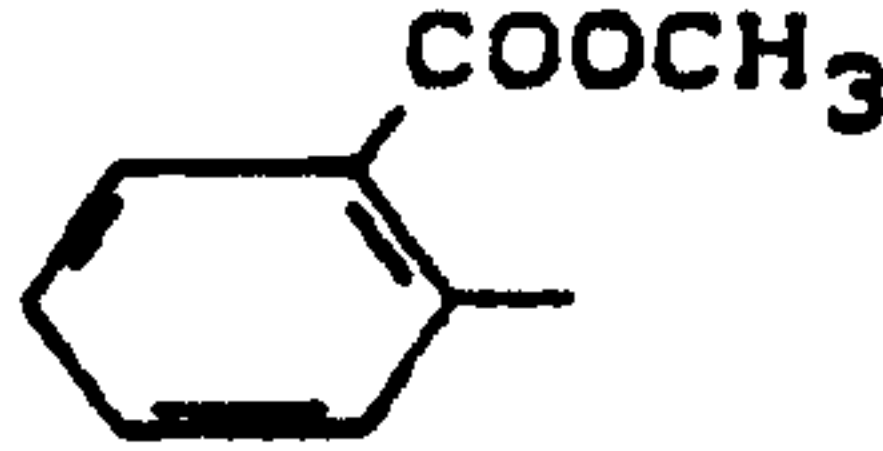
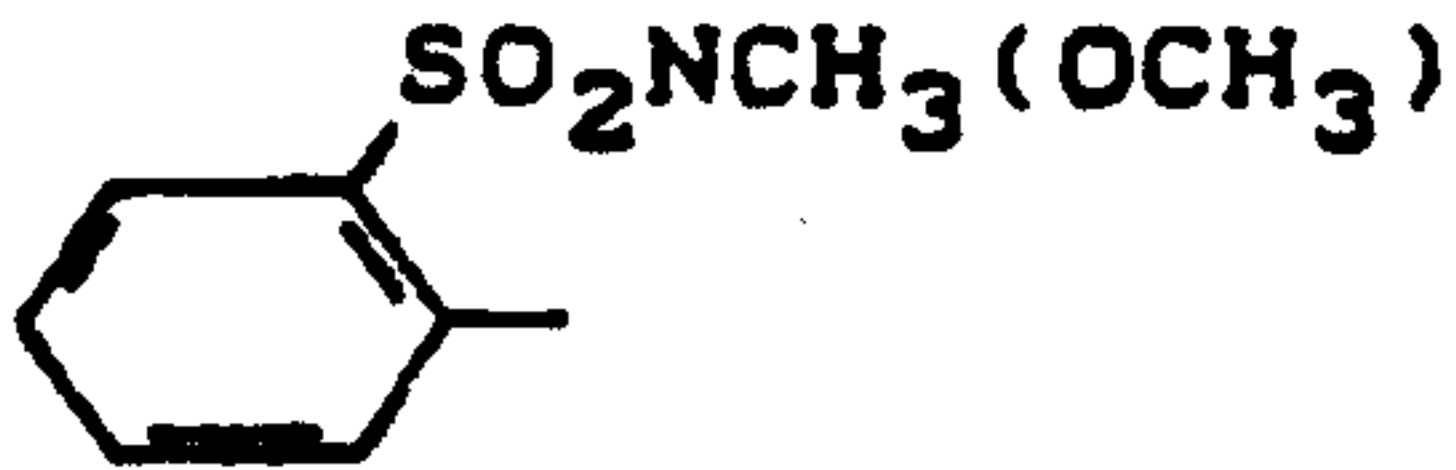
R^1	R^2	R^3
CH_3	CH_3	
CH_3	C_3H_7	
C_2H_5	C_2H_5	
$CH_2-CH=CH_2$	C_2H_5	
$CH_2-CH=CH_2$	CH_3	
C_2H_5	CH_3	
C_2H_5	C_2H_5	

Table 1: (Continuation)

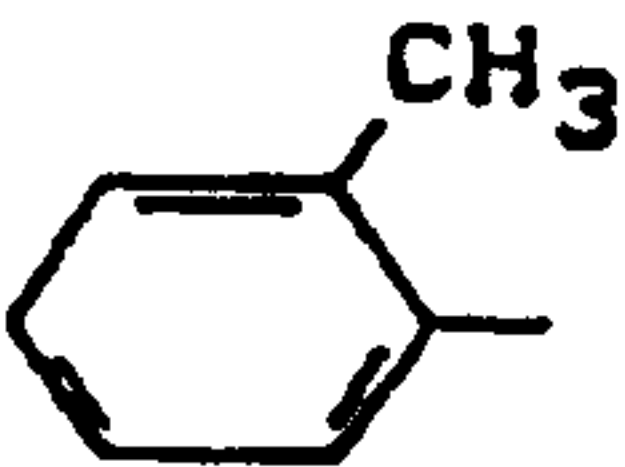
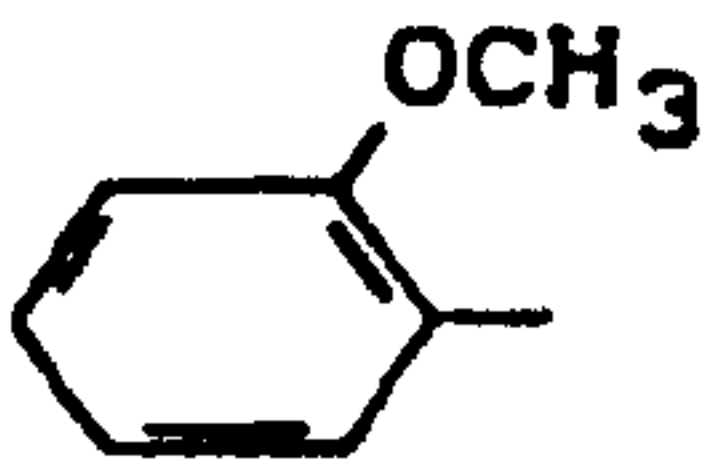
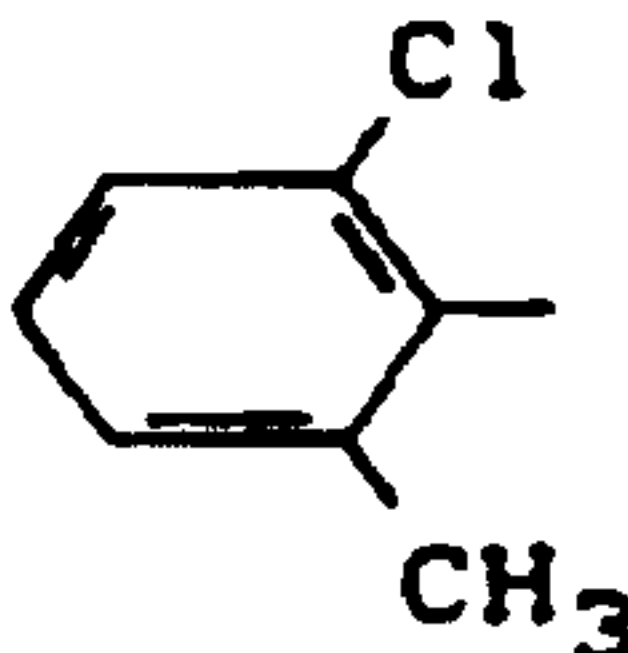
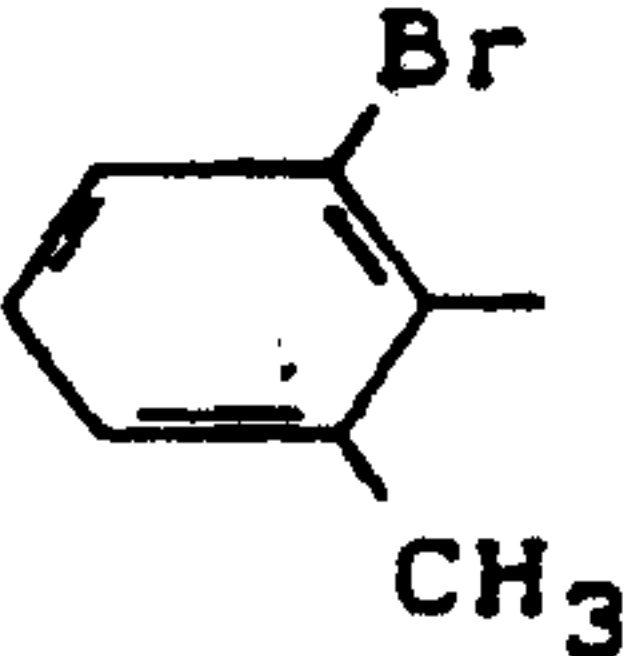
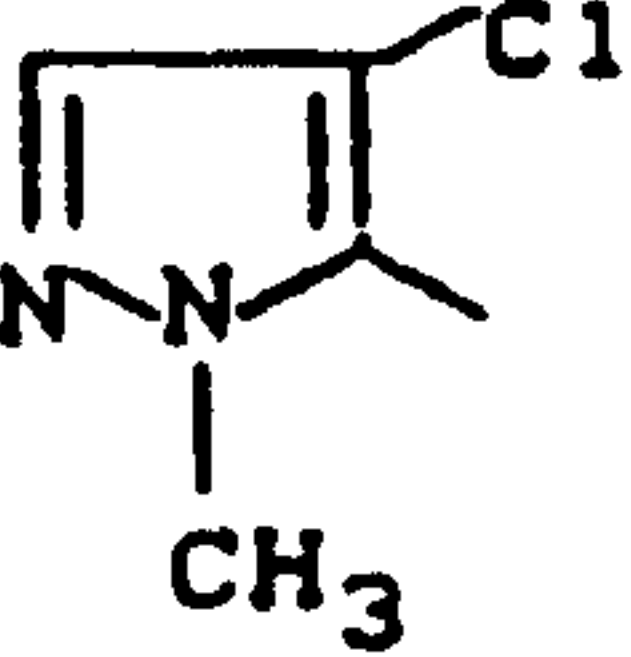
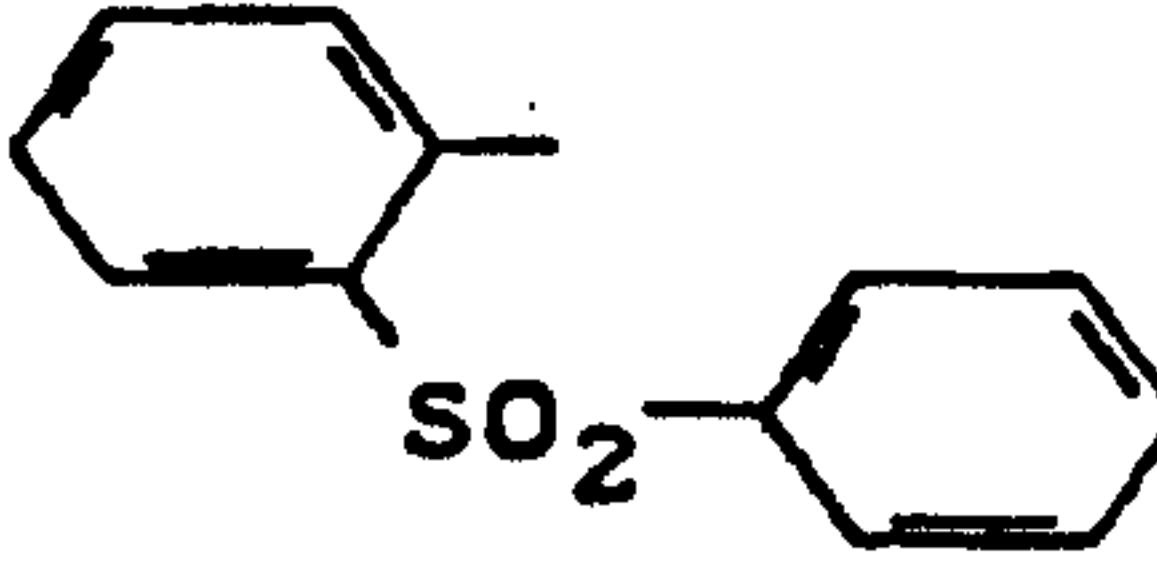
R^1	R^2	R^3
C_3H_7	$CH_2-CH=CH_2$	
CH_3	CH_3	
	C_2H_5	
	C_2H_5	
C_2H_5	C_2H_5	
CH_3	C_2H_5	

Table 1: (Continuation)

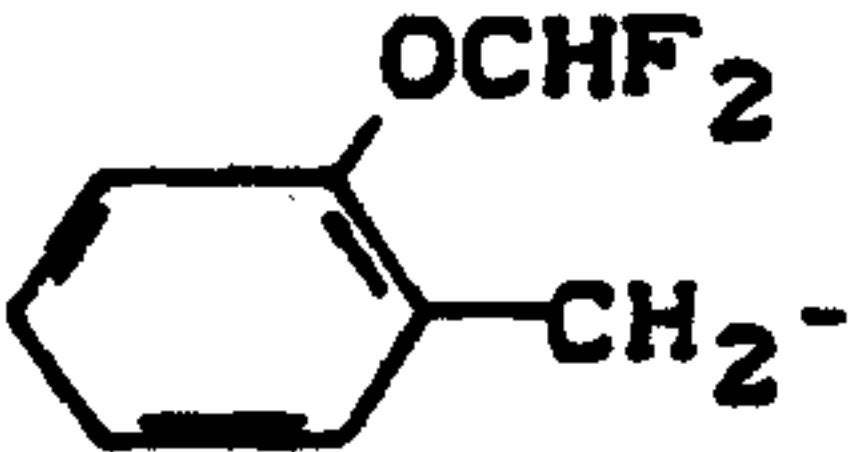
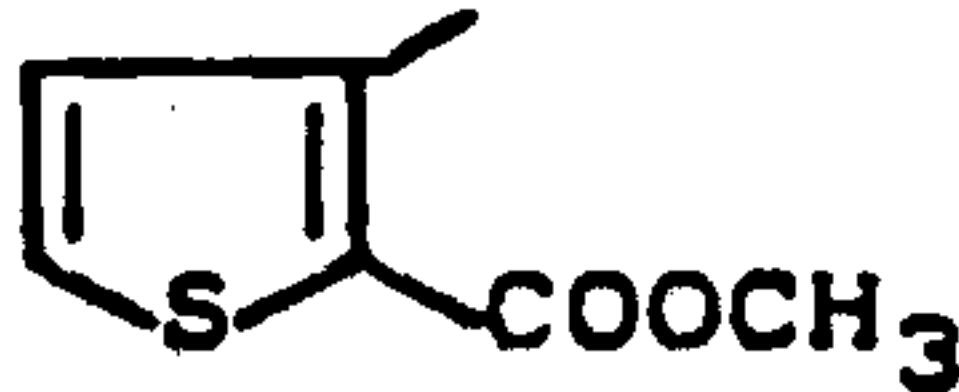
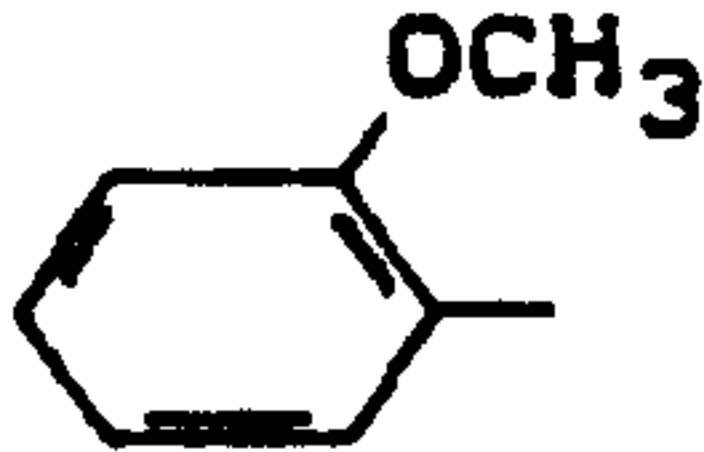
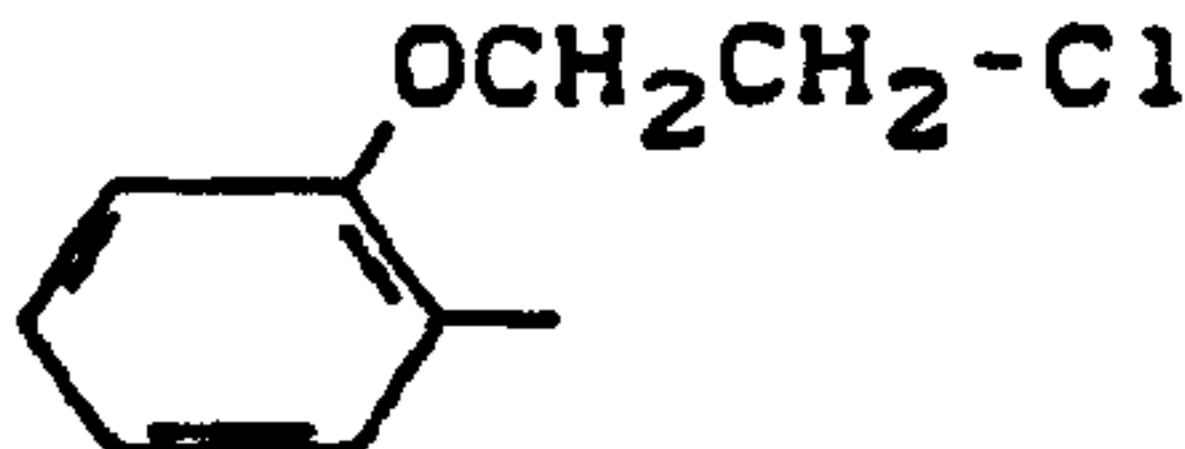
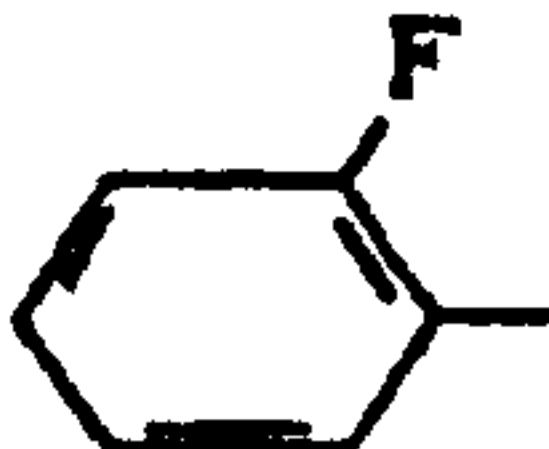
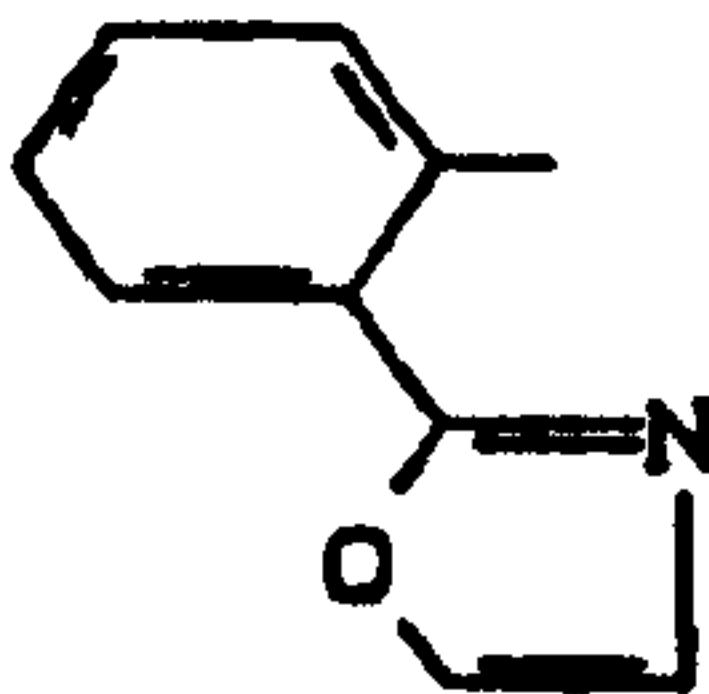
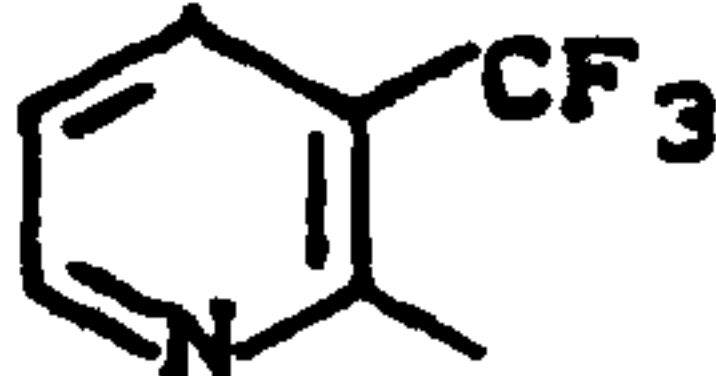
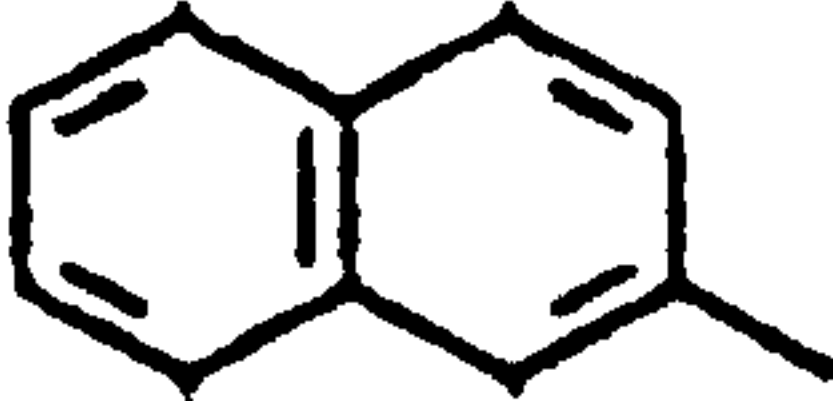
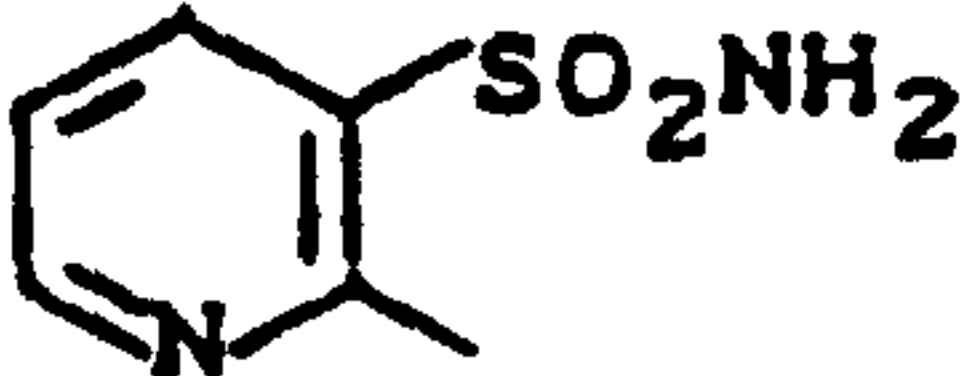
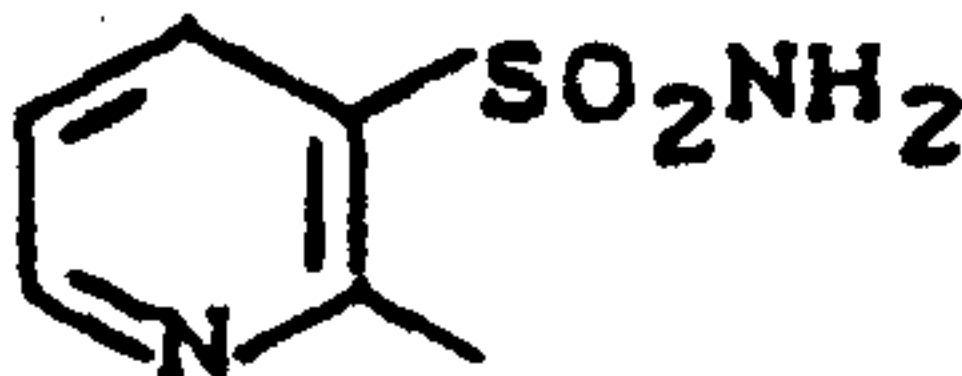
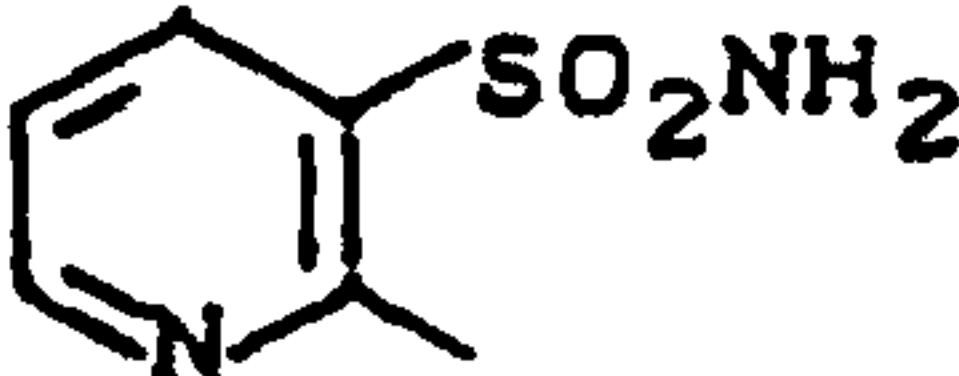
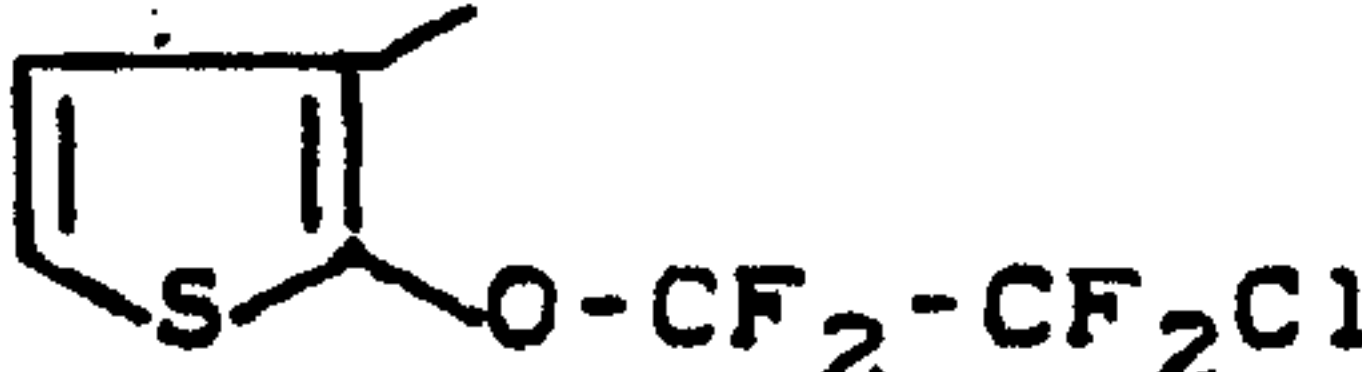
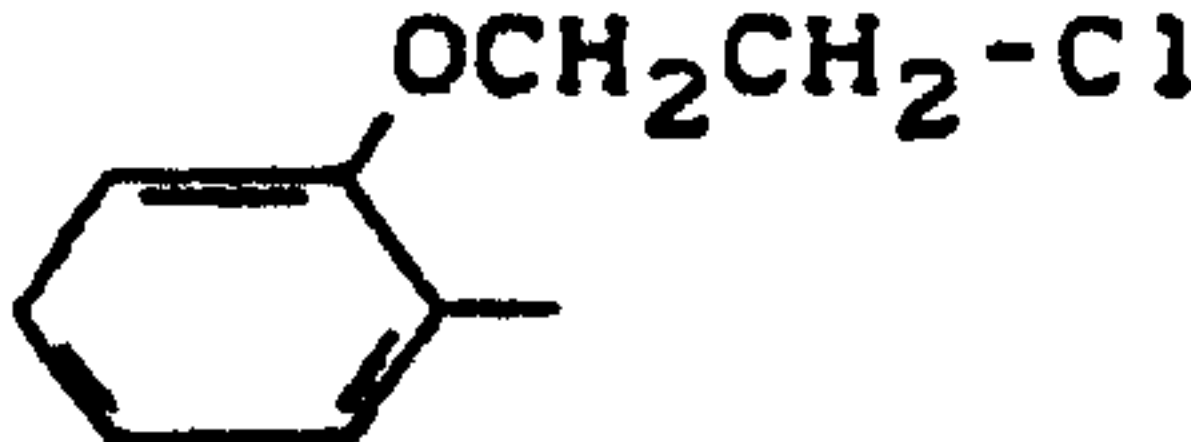
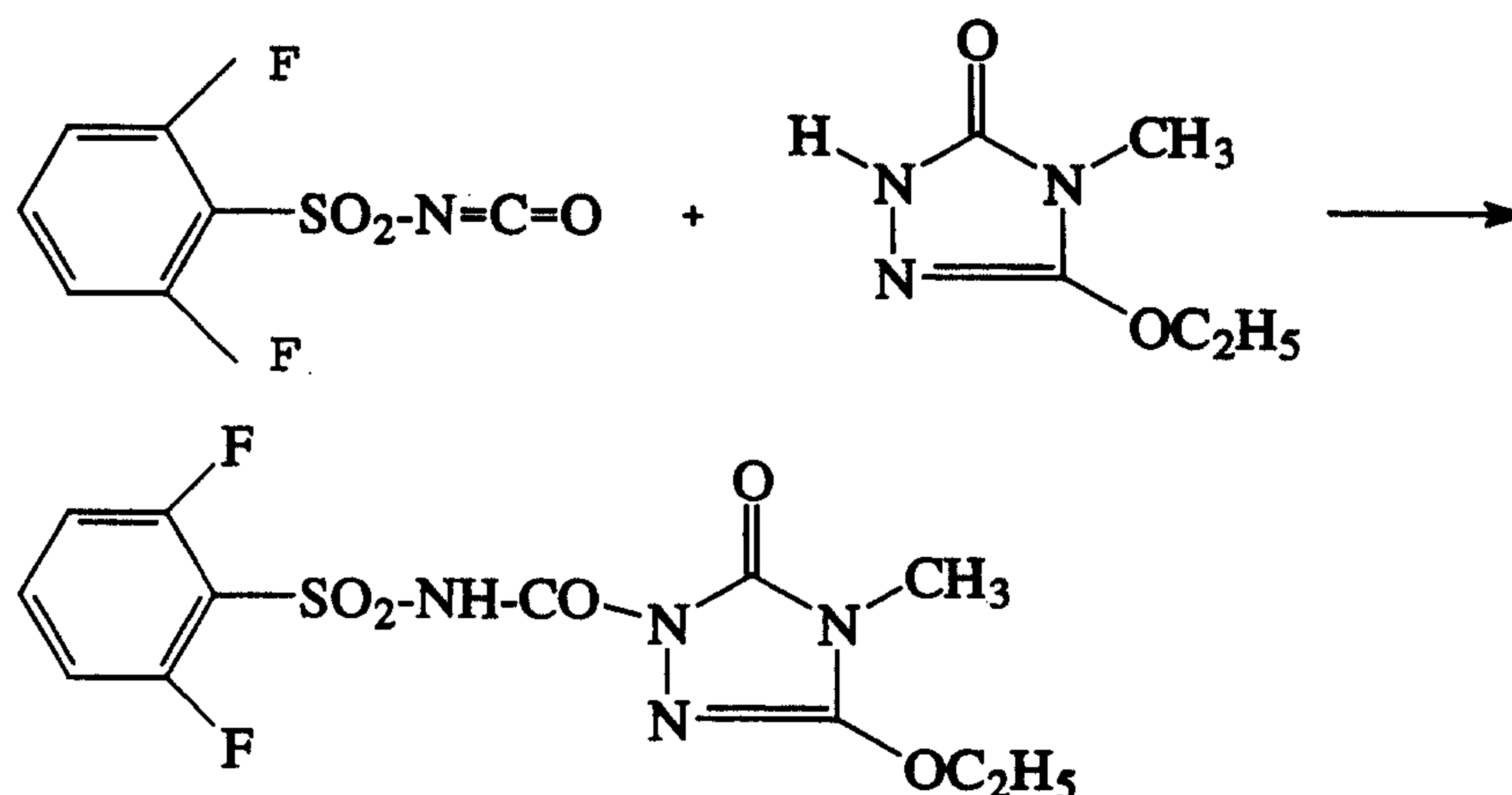
R^1	R^2	R^3
CH_3	C_3H_7	
C_3H_7	CH_3	
C_3H_7	CH_3	
C_3H_7	C_2H_5	
C_3H_7	C_2H_5	
CH_3	C_2H_5	
CH_3	CH_3	

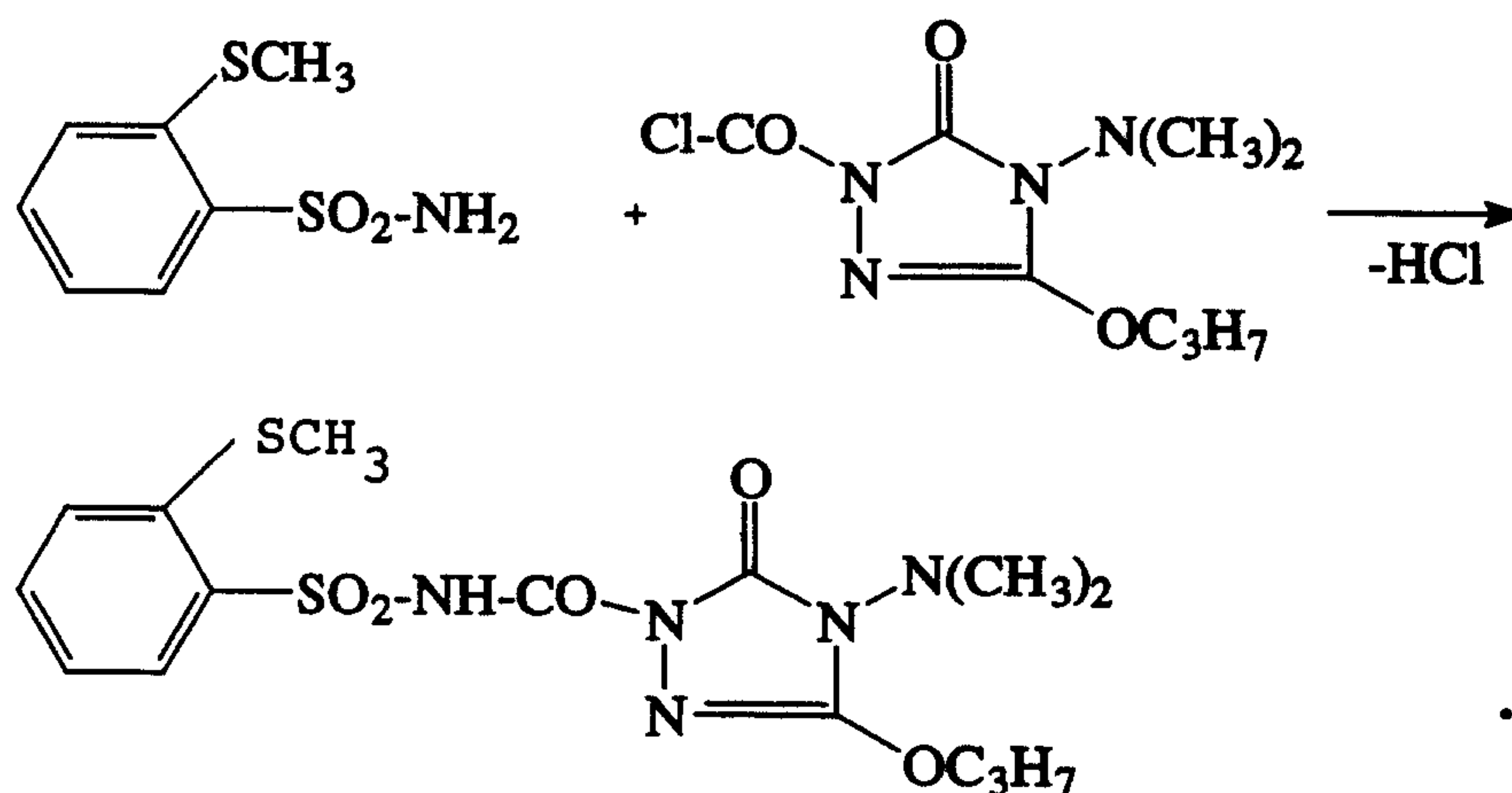
Table 1: (Continuation)

R^1	R^2	R^3
$N(CH_3)_2$	CH_3	
CH_3	C_2H_5	
C_2H_5	C_2H_5	
	CH_3	
CH_3	C_2H_5	
$N(CH_3)_2$	CH_3	

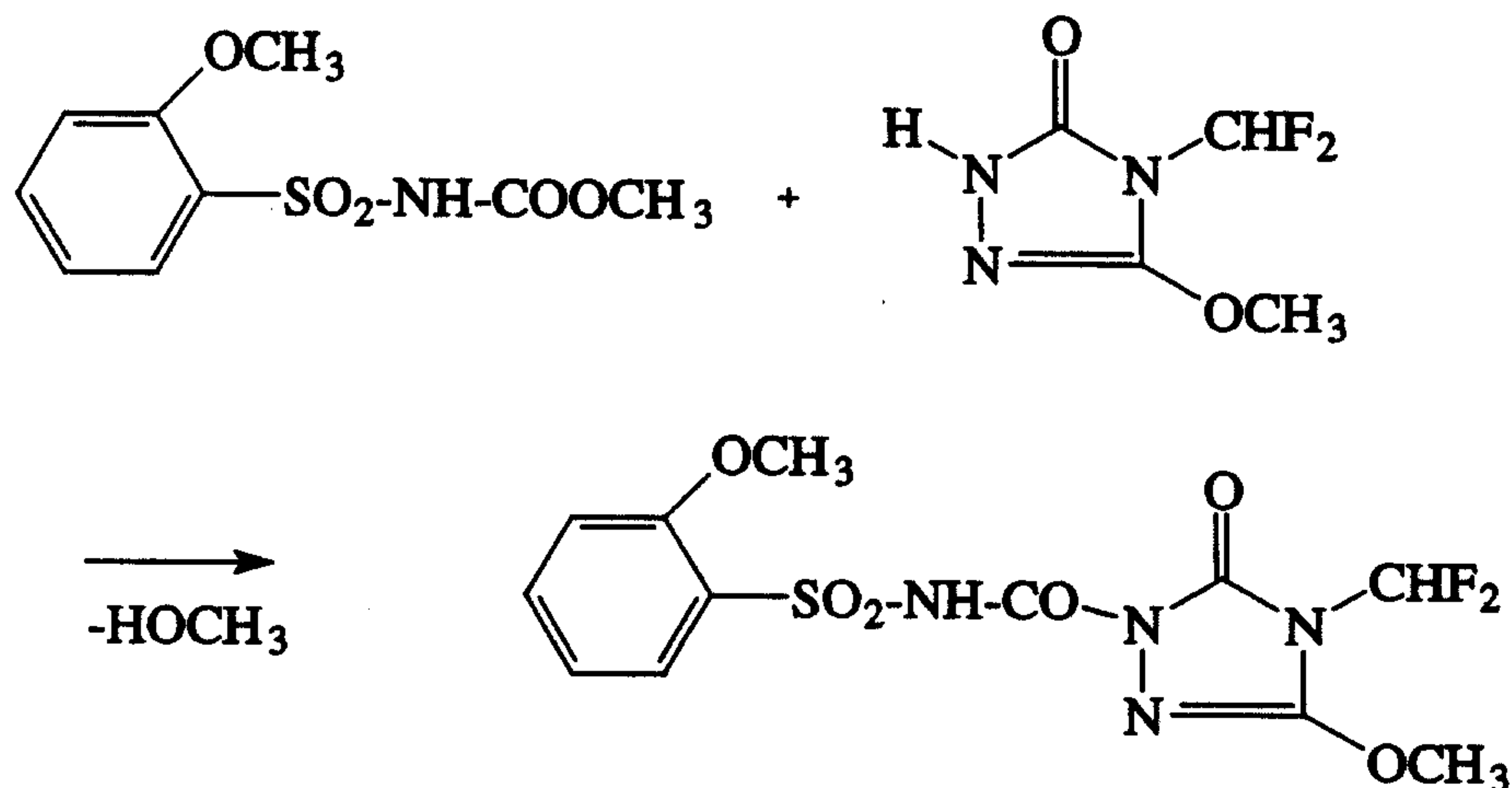
If, for example, 2,6-difluoro-phenylsulphonyl isocyanate and 5-ethoxy-4-methyl-2,4-dihydro-3H-1,2,4-triazol-3-one are used as starting substances, the course of the reaction in process (a) can be outlined by the following equation:



If, for example, 2-methylthio-benzenesulphonamide and 2-chlorocarbonyl-4-dimethylamino-5-propyloxy-2,4-dihydro-3H-1,2,4-triazol-3-one are used as starting substances, the course of the reaction in process (b) can be outlined by the following equation:



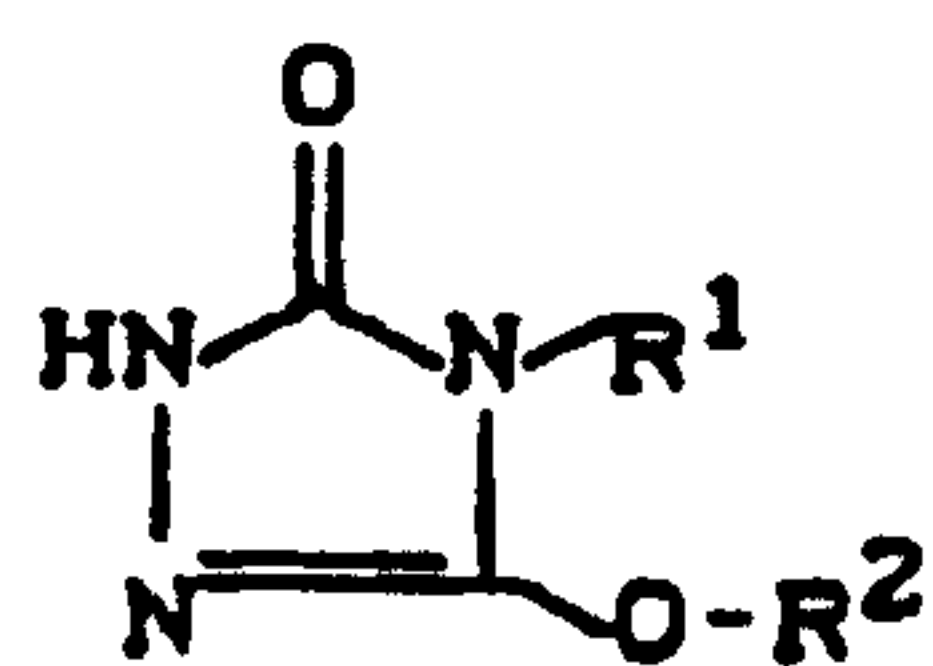
If, for example, N-methoxycarbonyl-2-methoxybenzenesulphonamide and 5-methoxy-4-difluoromethyl-2,4-dihydro-3H-1,2,4-triazol-3-one are used as starting substances, the course of the reaction in process (c) can be outlined by the following equation:



Formula (II) provides a general definition of the triazolinones to be used as starting substances in processes (a) and (c) for the preparation of compounds of the formula (I).

In formula (II), R^1 and R^2 preferably, or in particular, have those meanings which have already been mentioned above in connection with the description of the compounds of the formula (I) as being preferred, or particularly preferred, for R^1 and R^2 .

Examples of the starting substances of the formula (II) are listed in Table 2 below.



(II)

Table 2: Examples of the starting substances of the formula (II)

R^1	R^2
H	CH ₃
CH ₃	CH ₃
C ₂ H ₅	CH ₃
C ₃ H ₇	CH ₃
CH(CH ₃) ₂	CH ₃
C ₄ H ₉	CH ₃
	CH ₃
CH ₃	C ₂ H ₅
CH ₃	C ₃ H ₇
CH ₃	CH(CH ₃) ₂
CH ₃	CH ₂ -CH=CH ₂
CH ₃	CH ₂ - 

Table 2: (Continuation)

R^1	R^2
CH_3	$CH_2-C\equiv CH$
C_2H_5	C_2H_5
C_3H_7	C_2H_5
	C_2H_5
$CH_2-CH=CH_2$	C_2H_5
$CH_2-CHBr-CH_2Br$	C_2H_5
	C_3H_7
	$CH_2-CH=CH_2$
	$CH(CH_3)_2$
C_2H_5	$CH(CH_3)_2$
C_3H_7	$CH(CH_3)_2$
$CH_2-CH=CH_2$	C_3H_7
C_2H_5	C_3H_7
C_2H_5	$-CH_2-C\equiv CH$
C_3H_7	C_3H_7

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Some of the starting substances of the formula (II) are the subject of German application 4,030,063, published March 26, 1992.

5 The compounds of the general formula (II) in which R^1 has the abovementioned meaning and R^2 represents in each case optionally substituted cycloalkyl, cycloalkenyl, aralkyl or aryl, are new and a subject of the present divisional patent application.

10 The compounds of the formula (II) are obtained when hydrazinoformic esters of the general formula (VII)



in which

15 R^{27} represents methyl, ethyl or phenyl are reacted with alkyliminocarbonic diesters of the general formula (VIII)



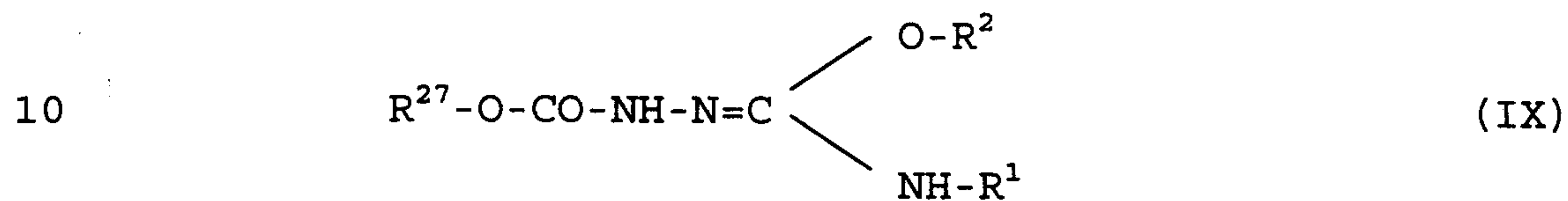
20 in which

R^1 represents hydrogen, amino, C_1 - C_4 -alkyl which is optionally substituted by fluorine, cyano, methoxy or ethoxy, or represents allyl, C_3 - C_6 -cycloalkyl, benzyl, phenyl, C_1 - C_3 -alkylamino, C_3 - C_6 -cycloalkylamino or di- $(C_1$ - C_3 -
25 alkyl)-amino;

R^2 represents hydrogen, C_1 - C_4 -alkyl which is optionally substituted by fluorine and/or chlorine, methoxy

or ethoxy, or represents C₃-C₄-alkenyl which is optionally substituted by fluorine and/or chlorine, or represents C₃-C₆-cycloalkyl, or represents phenyl or benzyl which is optionally substituted by fluorine, chlorine and/or methyl;

5 in the presence of a diluent such as, for example, methanol, at temperatures between 0°C and 50°C, and the compounds formed in this process, of the general formula (IX)



in which

R^1 , R^2 and R^{27} have the abovementioned meaning, are, if appropriate, isolated by customary methods and heated to temperatures between 50°C and 150°C, if appropriate in the presence of a diluent such as, for example, toluene, xylene or o-dichlorobenzene (cf. Preparation Examples).

The starting substances of the formulae (VII) and (VIII) are known chemicals.

The intermediates of the formula (IX) are new compounds.

Formula (III) provides a general definition of the sulphonyl isocyanates furthermore to be used as starting substances in process (a) for the preparation of compounds of the formula (I).

In formula (III), R^3 preferably, or in particular, has that meaning which has already been mentioned above in connection with the description of the compounds of the formula (I) as being preferred, or particularly preferred, for R^3 .

Examples of the starting substances of the formula (III) which may be mentioned are:

2-fluoro-, 2-chloro-, 2-bromo-, 2-methyl-, 2-methoxy-,
2-trifluoromethyl-, 2-difluoro-methoxy-, 2-trifluoromethoxy-,
2-methylthio-, 2-ethylthio-, 2-propylthio-,
2-methylsulphonyl-, 2-methylsulphonyl-,
2-dimethylaminosulphonyl-, 2-diethylaminosulphonyl-,
2-(N-methoxy-N-methyl)-aminosulphonyl-, 2-phenyl-, 2-phenoxy-,

2-methoxycarbonyl-, 2-ethoxycarbonyl-, 2-propoxycarbonyl and 2-isopropoxycarbonyl-phenylsulphonyl isocyanate, 2-fluoro-, -chloro-, 2-difluoromethoxy-, 2-trifluoromethoxy-, 2-methoxycarbonyl- and 2-ethoxycarbonyl-benzylsulphonyl isocyanate, 2-methoxycarbonyl-3-thienyl-sulphonyl isocyanate, 4-methoxycarbonyl- and 4-ethoxycarbonyl-1-methyl-pyrazol-5-yl-sulphonyl isocyanate.

The sulphonyl isocyanates of the formula (III) are known and/or can be prepared by processes known per se (cf. US Patent 4,127,405, 4,169,719, 4,371,391; EP-A 7,687, 13,480, 21,641, 23,141, 23,422, 30,139, 35,893, 44,808, 44,809, 48,143, 51,466, 64,322, 70,041, 173,312).

Process (a) for the preparation of the new compounds of the formula (I) is preferably carried out using diluents. Diluents which are suitable for this purpose are virtually all inert organic solvents. These preferably include aliphatic and aromatic, optionally halogenated hydrocarbons such as pentane, hexane, heptane, cyclohexane, petroleum ether, benzine, ligroine, benzene, toluene, xylene, methylene chloride, ethylene chloride, chloroform, carbon tetrachloride, chlorobenzene and o-dichlorobenzene, ethers such as diethyl ether and dibutyl ether, glycol dimethyl ether and diglycol dimethyl ether, tetrahydrofuran and dioxane, ketones such as acetone, methyl ethyl ketone, methyl isopropyl ketone and methyl isobutyl ketone, esters such as methyl acetate and ethyl acetate, nitriles such as, for example, acetonitrile and propionitrile, amides such as, for example, dimethylformamide, dimethylacetamide and N-methylpyrrolidone, and also dimethyl

sulphoxide, tetramethylene sulphone and hexamethylphosphoric triamide.

When carrying out process (a) the reaction temperatures can be varied within a substantial range. In general, the process is carried out at temperatures between 0°C and 150°C, preferably at temperatures between 10°C and 80°C.

In general, process (a) is carried out under atmospheric pressure.

For carrying out process (a) between 1 and 3 moles, preferably between 1 and 2 moles, of sulphonyl isocyanate of the formula (III) are generally employed per mole of triazolinone of the formula (II).

The reactants can be combined in any desired sequence. The reaction mixture is stirred until the reaction is complete and the product is isolated by filtration with suction. In another processing variant, the mixture is concentrated, and the crude product which remains in the residue is brought to crystallisation with a suitable solvent such as, for example, diethyl ether. The product of the formula (I) which is obtained in this way in crystalline form is isolated by filtration with suction.

Formula (IV) provides a general definition of the triazolinone derivatives to be used as starting substances in process (b) for the preparation of compounds of the formula (I).

In formula (IV), R^1 and R^2 preferably, or in particular, have those meanings which have already been mentioned above in connection with description of the compounds of the formula (I) as being preferred, or particularly preferred, for R^1 and R^2 and Z preferably represents chlorine, C_1 - C_4 -alkoxy, benzyloxy or phenoxy, in particular methoxy or phenoxy.

Examples of the starting substances of the formula (IV) which are possible are the compounds of the formula (IV) which are to be prepared from the compounds of the

formula (II) listed in Table 2 and phosgene, methyl chloroformate, benzyl chloroformate, phenyl chloroformate or diphenyl carbonate.

5 The starting substances of the formula (IV) were hitherto unknown.

The new triazolinone derivatives of the formula (IV) are obtained when triazolinones of the general formula (II)



in which

10 R¹ and R² have the abovementioned meanings

are reacted with carbonic acid derivatives of the general formula (X)



in which

15 Z has the abovementioned meaning and

Z¹ represents a leaving group such as chlorine,

methoxy, benzyloxy or phenoxy,
if appropriate in the presence of a diluent such as, for example, tetrahydrofuran, and, if appropriate, in the presence of an acid acceptor such as, for example, sodium hydride or potassium tert-butyrate, at temperatures between -20°C and $+100^{\circ}\text{C}$.

Formula (V) provides a general definition of the sulphonamides furthermore to be used as starting substances in process (b) for the preparation of compounds of the formula (I).

In formula (V), R^3 preferably, or in particular, has that meaning which has already been mentioned above in connection with the description of the compounds of the formula (I) as being preferred, or particularly preferred, for R^3 .

The following may be mentioned as examples of the starting substances of the formula (V):

2-fluoro-, 2-chloro-, 2-bromo-, 2-methyl-, 2-methoxy-,
2-trifluoromethyl-, 2-difluoro-methoxy-, 2-trifluoromethoxy-,
2-methylthio-, 2-ethylthio-, 2-propylthio-,
2-methylsulphinyl-, 2-methylsulphonyl-,
2-dimethylaminosulphonyl-, 2-diethylaminosulphonyl-,
2-(N-methoxy-N-methyl)-aminosulphonyl-, 2-phenyl-, 2-phenoxy-,
2-methoxycarbonyl-, 2-ethoxycarbonyl-, 2-propoxycarbonyl and
2-isopropoxycarbonyl-benzenesulphonamide, 2-fluoro-,
2-chloro-, 2-difluoromethoxy-, 2-trifluoromethoxy-,
2-methoxycarbonyl- and 2-ethoxycarbonyl-phenylmethane-

sulphonamide, 2-methoxycarbonyl-3-thiophenesulphonamide, 4-methoxycarbonyl- and 4-ethoxycarbonyl-1-methyl-pyrazole-5-sulphonamide.

The sulphonamides of the formula (V) are known and/or can be prepared by processes known per se (cf. US Patent 4,127,405, 4,169,719, 4,371,391; EP-A 7,687, 13,480, 21,641, 23,141, 23,422, 30,139, 35,893, 44,808, 44,809, 48,143, 51,466, 64,322, 70,041, 173,312).

Process (b) for the preparation of the new compounds of the formula (I) is preferably carried out using diluents. Diluents which are suitable for this purpose are virtually all inert organic solvents as have been indicated, for example, above in the case of process (a).

Acid acceptors which can be employed in process (b) are all acid-binding agents which can customarily be employed for reactions of this type. The following are preferably suitable: alkali metal hydroxides such as, for example, sodium hydroxide and potassium hydroxide, alkaline earth metal hydroxides such as, for example, calcium hydroxide, alkali metal carbonates and alkali metal alcoholates such as sodium carbonate, potassium carbonate, sodium tert-butyrate and potassium tert-butyrate, furthermore aliphatic, aromatic or heterocyclic amines, for example triethylamine, trimethylamine, dimethylaniline, dimethylbenzylamine, pyridine, 1,5-diazabicyclo-[4.3.0]-non-5-ene (DBN), 1,8-diazabicyclo-[5.4.0]-undec-7-ene (DBU) and 1,4-diazabicyclo[2.2.2]-octane (DABCO).

When carrying out process (b), the reaction temperatures can be varied within a substantial range. In general, the process is carried out at temperatures between 0°C and 100°C, preferably at temperatures between 10°C and 60°C.

Process (b) is generally carried out under atmospheric pressure. However, it can also be carried out under increased or reduced pressure.

For carrying out process (b) the starting substances required in each case are generally employed in approximately equimolar amounts. However, it is also possible to use one of the two components employed in each case in a larger excess. In general, the reactions are carried out in a suitable diluent in the presence of an acid acceptor, and the reaction mixture is stirred for several hours at the particular temperature required. Working-up in process (b) is carried out in each case by customary methods.

The triazolinones of the formula (II) to be used as starting substances in process (c) for the preparation of compounds of the formula (I) have already been described as starting substances for process (a).

Formula (VI) provides a general definition of the sulphonamide derivatives furthermore to be used as starting substances in process (c) for the preparation of compounds of the formula (I).

In formula (VI), R^3 and Z preferably, or in particular, have those meanings which have already been

mentioned above in connection with the description of the compounds of the formula (I) or (IV) as being preferred, or particularly preferred, for R^3 and Z.

Process (c) is preferably carried out using diluents. Solvents which are suitable for this purpose are the same organic solvents as have been mentioned above in connection with the description of process (a).

If appropriate, process (c) is carried out in the presence of an acid acceptor. Acid-binding agents which are suitable for this purpose are the same as have been mentioned above in connection with the description of process (b).

When carrying out process (c), the reaction temperatures can vary within a substantial range. In general, the process is carried out at temperatures between 0°C and 100°C, preferably at temperatures between 10°C and 60°C.

In general, process (c) is carried out under atmospheric pressure. However, the process can also be carried out under increased or reduced pressure.

For carrying out process (c), the starting substances required in each case are generally employed in approximately equimolar amounts. However, it is also possible to use one of the two components employed in each case in a larger excess. The reactions are generally carried out in a suitable diluent in the presence of an acid acceptor, and the reaction mixture is stirred for several hours at the particular temperature required. Working-up is carried out in process (c) in each case by customary methods.

To convert the compounds of the formula (I) into salts, they are stirred with suitable salt formers such as, for example, sodium hydroxide, sodium methyllate, sodium ethyllate, potassium hydroxide, potassium methyllate or potassium ethyllate, ammonia, isopropylamine, dibutylamine or triethylamine, in suitable diluents such as, for example, water, methanol or ethanol. The salts can be isolated in the form of crystalline products, if appropriate after concentration.

The active compounds can be used as defoliants, desiccants, agents for destroying broad-leaved plants and, especially, as weed-killers. By weeds, in the broadest sense, there are to be understood all plants which grow in locations where they are undesired. Whether the substances act as total or selective herbicides depends essentially on the amount used.

The active compounds can be used, for example, in connection with the following plants:

Dicotyledon weeds of the genera: Sinapis, Lepidium, Galium, Stellaria, Natricaria, Anthemis, Galinsoga, Chenopodium, Urtica, Senecio, Amaranthus, Portulaca, Xanthium, Convolvulus, Ipomoea, Polygonum, Sesbania, Ambrosia, Cirsium, Carduus, Sonchus, Solanum, Rorippa, Rotala, Lindernia, Lamium, Veronica, Abutilon, Emex, Datura, Viola, Galeopsis, Papaver, Centaurea, Trifolium, Ranunculus and Taraxacum.

Dicotyledon cultures of the genera: Gossypium, Glycine, Beta, Daucus, Phaseolus, Pisum, Solanum, Linum, Ipomoea, Vicia, Nicotiana, Lycopersicon, Arachis, Brassica, Lactuca, Cucumis and Cucurbita.

Monocotyledon weeds of the genera: Echinochloa, Setaria, Panicum, Digitaria, Phleum, Poa, Festuca, Eleusine,

Agropyron, Cynodon, Monochoria, Fimbristylis, Sagittaria, Eleocharis, Scirpus, Paspalum, Ischaemum, Sphenoclea, Dactyloctenium, Agrostis, Alopecurus and Apera.

Monocotyledon cultures of the genera: Oryza, Zea, Triticum, Hordeum, Avena, Secale, Sorghum, Panicum, Saccharum, Ananas, Asparagus and Allium.

However, the use of the active compounds is in no way restricted to these genera, but also extends in the same manner to other plants.

The compounds are suitable, depending on the concentration, for the total combating of weeds, for example on industrial terrain and rail tracks, and on paths and squares with or without tree plantings. Equally, the compounds can be employed for combating weeds in perennial cultures, for example afforestations, decorative tree plantings, orchards, vineyards, citrus groves, nut orchards, banana plantations, coffee plantations, tea plantations, rubber plantations, oil palm plantations, cocoa plantations, soft fruit plantings and hopfields, on lawns, turf and pasture-land, and for the selective combating of weeds in annual cultures.

Some of the compounds of the formula (I) are suitable for total or semi-total weed control, some for the selective control of monocotyledon and dicotyledon weeds in monocotyledon and dicotyledon cultures, both pre-emergence and post-emergence.

The active compounds can be converted into the customary formulations, such as solutions, emulsions, wettable powders, suspensions, powders, dusting agents, pastes,

soluble powders, granules, suspension-emulsion concentrates, natural and synthetic materials impregnated with active compound, and very fine capsules in polymeric substances.

5 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 surface-active agents, that is emulsifying agents and/or dispersing agents and/or foam-forming agents.

10

In the case of the use of water as an extender, organic solvents can, for example, also be used as auxiliary solvents. As liquid solvents, there are suitable in the main: aromatics, such as xylene, toluene or alkyl-naphthalenes, chlorinated aromatics and chlorinated

15 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

20 butanol or glycol as well as 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, as well as water.

25 As solid carriers there are suitable: for example ammonium salts and ground natural minerals, such as kaolins, clays, talc, chalk, quartz, attapulgite, mont-

morillonite or diatomaceous earth, and ground synthetic minerals, such as highly disperse silica, alumina and silicates, as solid carriers for granules there are suitable: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite and dolomite, as well as synthetic granules of inorganic and organic meals, and granules of organic material such as sawdust, coconut shells, maize cobs and tobacco stalks; as emulsifying and/or foam-forming agents there are suitable: for example non-ionic and anionic emulsifiers, such as polyoxyethylene fatty acid esters, polyoxyethylene fatty alcohol ethers, for example alkylaryl polyglycol ethers, alkylsulphonates, alkyl sulphates, arylsulphonates as well as albumen hydrolysis products; as dispersing agents there are suitable: for example lignin-sulphite waste liquors and methylcellulose.

Adhesives such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latexes, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, as well as natural phospholipids, such as cephalins and lecithins, and synthetic phospholipids, can be used in the formulations. Further additives can be 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, cobalt, molybdenum and zinc.

The formulations in general contain between 0.1 and 95 per cent by weight of active compound, preferably between 0.5 and 90%.

For combating weeds, the active compounds, as such or in the form of their formulations, can also be used as mixtures with known herbicides, finished formulations or tank mixes being possible.

Suitable herbicides for the mixtures are known herbicides, such as, for example, 1-amino-6-ethylthio-3-(2,2-dimethylpropyl)-1,3,5-triazine-2,4(1H,3H)-dione (AMETHYDIONE) or N-(2-benzothiazolyl)-N,N'-dimethyl-urea (METABENZTHIAZURON) for combating weeds in cereals; 4-amino-3-methyl-6-phenyl-1,2,4-triazin-5(4H)-one (METAMITRON) for combating weeds in sugar beet and 4-amino-6-(1,1-dimethylethyl)-3-methylthio-1,2,4-triazin-5(4H)-one (METRIBUZIN) for combating weeds in soya beans; furthermore also 2,4-dichlorophenoxyacetic acid (2,4-D); 4-(2,4-dichlorophenoxy)-butyric acid (2,4-DB); 2,4-dichlorophenoxypropionic acid (2,4-DP); 5-(2-chloro-4-trifluoromethyl-phenoxy)-2-nitro-benzoic acid (ACIFLUORFEN); N-(methoxy-methyl)-2,6-diethyl-chloroacetanilide (ALACHLOR); methyl-6,6-dimethyl-2,4-dioxo-3[1-(2-propenyloxyamino)-butylidene]-cyclohexanecarboxylic acid (ALLOXYDIM); 4-amino-benzenesulphonyl-methyl carbamate (ASULAM); 2-chloro-4-ethylamino-6-isopropylamino

1,3,5-triazine (ATRAZINE); methyl 2-[[[[(4,6-dimethoxy-pyrimidin-2-yl)-amino]-carbonyl]-amino]-sulphonyl]-methyl]-benzoate (BENSULFURON); 3-isopropyl-2,1,3-benzothiadiazin-4-one 2,2-dioxide (BENTAZONE); methyl 5-(2,4-dichlorophenoxy)-2-nitrobenzoate (BIFENOX); 3,5-dibromo-4-hydroxy-benzonitrile; (BROMOXYNIL); N-(butoxymethyl)-2-chloro-N-(2,6-diethylphenyl)-acetamide (BUTACHLOR); 5-amino-4-chloro-2-phenyl-2,3-dihydro-3-oxy-pyridazine (CHLORIDAZON); ethyl 2-[(4-chloro-6-methoxy-2-pyrimidinyl)-aminocarbonyl]-aminosulphonyl]-benzoate (CHLORIMURON); N-(3-chlorophenyl)-isopropyl carbamate (CHLOROPROPHAM); 2-chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]-carbonyl]-benzenesulphonamide (CHLORSULFURON); N,N-dimethyl-N'-(3-chloro-4-methylphenyl)-urea (CHLORTOLURON); exo-1-methyl-4-(1-methylethyl)-2-(2-methylphenyl-methoxy)-7-oxabicyclo-(2,2,1)-heptane (CINMETHYLIN); 3,6-dichloro-2-pyridinecarboxylic acid (CLOPYRALID); 2-chloro-4-ethylamino-6-(3-cyanopropylamino)-1,3,5-triazine (CYANAZINE); N,S-diethyl N-cyclohexyl-thiocarbamate (CYCLOATE); 2-[1-(ethoximino)-butyl]-3-hydroxy-5-[tetrahydro-(2H)-thiopyran-3-yl]-2-cyclohexen-1-one (CYCLOXYDIM); 2-[4-(2,4-dichlorophenoxy)-phenoxy]-propionic acid, its methyl ester or its ethyl ester (DICLOFOP); 2-[(2-chlorophenyl)-methyl]-4,4-dimethylisoxazolidin-3-one (DIMETHAZONE); S-ethyl N,N-di-n-propyl-thiocarbamate (EPTAME); 4-amino-6-t-butyl-3-ethylthio-1,2,4-triazin-5(4H)-one (ETHIOZIN); 2-[4-[(6-chloro-2-benzoxazolyl)-oxy]-phenoxy]-propanoic acid, its methyl ester or its ethyl ester (FENOXAPROP); 2-[4-(5-trifluoromethyl-2-pyridyloxy)-phenoxy]-propanoic acid or

its butyl ester (FLUAZIFOP); N,N-dimethyl-N'-(3-tri-
 fluoromethylphenyl)-urea (FLUOMETURON); 1-methyl-
 3-phenyl-5-(3-trifluoromethylphenyl)-4-pyridone
 (FLURIDONE); [(4-amino-3,5-dichloro-6-fluoro-2-pyri-
 5 danyl)-oxy]-acetic acid or its 1-methylheptyl ester
 (FLUROXYPYR); 5-(2-chloro-4-trifluoromethyl-phenoxy)-N-
 methylsulphonyl-2-nitrobenzamide (FOMESAFEN); N-phos-
 phonomethyl-glycine (GLYPHOSATE); 2-{4-[(3-chloro-5-
 (trifluoromethyl)-2-pyridinyl)-oxy]-phenoxy}-propanoic
 10 acid or its ethyl ester (HALOXYFOP); 3-cyclohexyl-
 6-dimethylamino-1-methyl-1,3,5-triazine-2,4-dione
 (HEXAZINONE); methyl 2-[4,5-dihydro-4-methyl-4-(1-methyl-
 ethyl)-5-oxo-1H-imidazol-2-yl]-4(5)-methylbenzoate
 (IMAZAMETHABENZ); 2-(4,5-dihydro-4-methyl-4-isopropyl-
 15 5-oxo-1H-imidazol-2-yl)-pyridine-3-carboxylic acid
 (IMAZAPYR); 2-[5-methyl-5-(1-methylethyl)-4-oxo-2-imida-
 zolin-2-yl]-3-quinolinecarboxylic acid (IMAZAQUIN); 2-
 [4,5-dihydro-4-methyl-4-isopropyl-5-oxo-(1H)-imidazol-2-
 yl]-5-ethylpyridin-3-carboxylic acid (IMAZETHAPYR); 3,5-
 20 diiodo-4-hydroxybenzonitrile (IOXYNIL); N,N-dimethyl-N'-
 (4-isopropylphenyl)-urea (ISOPROTURON); 2-ethoxy-1-
 methyl-2-oxo-ethyl 5-[2-chloro-4-(trifluoromethyl)-
 phenoxy]-2-nitrobenzoate (LACTOFEN); (2-methyl-4-chloro-
 phenoxy)-acetic acid (MCPA); (4-chloro-2-methylphenoxy)-
 25 propionic acid (MCPPE); N-methyl-2-(1,3-benzothiazol-2-
 yloxy)-acetanilide (MEFENACET); 2-chloro-N-(2,6-dimethyl-
 phenyl)-N-[(1H)-pyrazol-1-yl-methyl]-acetamide
 (METAZACHLOR); 2-ethyl-6-methyl-N-(1-methyl-2-methoxy-
 ethyl)-chloroacetanilide (METOLACHLOR); 2-[[[(4-methoxy-
 30 6-methyl-1,3,5-triazin-2-yl)-amino]-carbonyl]-amino]-

sulphonyl}-benzoic acid or its methyl ester
 (METSULFURON); S-ethyl N,N-hexamethylene-thiocarbamate
 (MOLINATE); 1-(3-trifluoromethyl-phenyl)-4-methylamino-
 5-chloro-6-pyridazone (NORFLURAZON); 4-(di-n-propyl-
 5 amino)-3,5-dinitrobenzenesulphonamide (ORYZALIN); 2-
 chloro-4-trifluoromethylphenyl 3-ethoxy-4-nitro-phenyl
 ether (OXYFLUORFEN); N-(1-ethylpropyl)-3,4-dimethyl-2,6-
 dinitroaniline (PENDIMETHALIN); 3-(ethoxycarbonylamino-
 phenyl) N-(3'-methylphenyl)-carbamate (PHENMEDIPHAM);
 10 4-amino-3,5,6-trichloropyridine-2-carboxylic acid
 (PICLORAM); α -chloro-2',6'-diethyl-N-(2-propoxyethyl)-
 acetanilide (PRETILACHLOR); 2-chloro-N-isopropyl-
 acetanilide (PROPACHLOR); isopropyl-N-phenyl-carbamate
 (PROPHAM); O-(6-chloro-3-phenyl-pyridazin-4-yl) S-octyl
 15 thiocarbonate (PYRIDATE); ethyl 2-[4-(6-chloro-quinoxa-
 lin-2-yl-oxy)-phenoxy]-propionate (QUIZALOFOP-ETHYL); 2-
 [1-(ethoxamino)-butylidene]-5-(2-ethylthiopropyl)-1,3-
 cyclohexadione (SETHOXYDIM); 2-chloro-4,6-bis-(ethyl-
 amino)-1,3,5-triazine (SIMAZINE); 2,4-bis-[N-ethylamino]-
 20 6-methylthio-1,3,5-triazine (SIMETRYNE); methyl
 2-[[[(4,6-dimethyl-2-pyrimidinyl)-aminocarbonyl]-amino-
 sulphonyl}-benzoate (SULFOMETURON); 4-ethylamino-2-t-
 butylamino-6-methylthio-s-triazine (TERBUTRYNE); methyl
 3-[[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino]-
 25 carbonyl]-amino]-sulphonyl]-thiophene-2-carboxylate
 (THIAMETURON); S-[(4-chlorophenyl)-methyl] N,N-diethyl-
 thiocarbamate (THIOBENCARB); S-(2,3,3-trichloroallyl)
 N,N-diisopropylthiocarbamate (TRIALATE); 2,6-dinitro-4-
 trifluoromethyl-N,N-dipropylaniline (TRIFLURALIN).

Surprisingly, some mixtures also show a synergistic action.

Mixtures with other known active compounds, such as fungicides, insecticides, acaricides, nematocides, bird repellents, plant nutrients and agents which improve soil structure, are also possible.

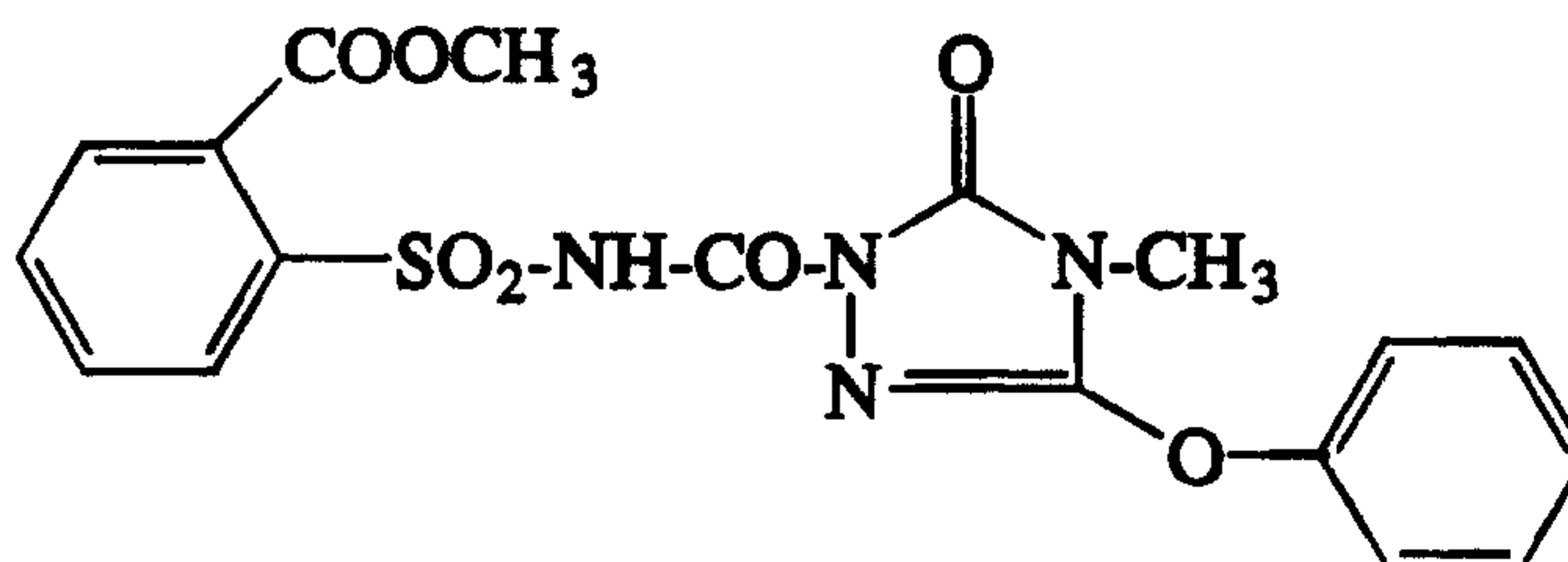
The active compounds can be used as such, in the form of their formulations or in the use forms prepared therefrom by further dilution, such as ready-to-use solutions, suspensions, emulsions, powders, pastes and granules. They are used in the customary manner, for example by watering, spraying, atomising or scattering.

The active compounds can be applied either before or after emergence of the plants.

They can also be incorporated into the soil before sowing.

The amount of active compound used can vary within a substantial range. It depends essentially on the nature of the desired effect. In general, the amounts used are between 1 g and 10 kg of active compound per hectare of soil surface, preferably between 5 g and 5 kg per ha.

The preparation and use of the active compounds can be seen from the following examples.

Preparation ExamplesExample 1(Process (a))

A mixture of 2.0 g (10.5 mmol) of 4-methyl-5-phenoxy-2,4-dihydro-3H-1,2,4-triazol-3-one, 3.5 g (14.5 mmol) of 2-methoxycarbonyl-phenylsulphonyl isocyanate and 60 ml of acetonitrile is stirred for 6 hours at 20°C and subsequently concentrated under a water pump vacuum. The residue is stirred with diethyl ether and the product which has precipitated in crystalline form is isolated by filtration with suction.

4.1 g (90% of theory) of 2-(2-methoxycarbonyl-phenylsulphonylaminocarbonyl)-4-methyl-5-phenoxy-2,4-dihydro-3H-1,2,4-triazol-3-one of melting point 161°C are obtained.

Other examples of compounds of the formula (I) which can be prepared analogously to Example 1 and following the general description of the preparation processes are those listed in Table 3 below.

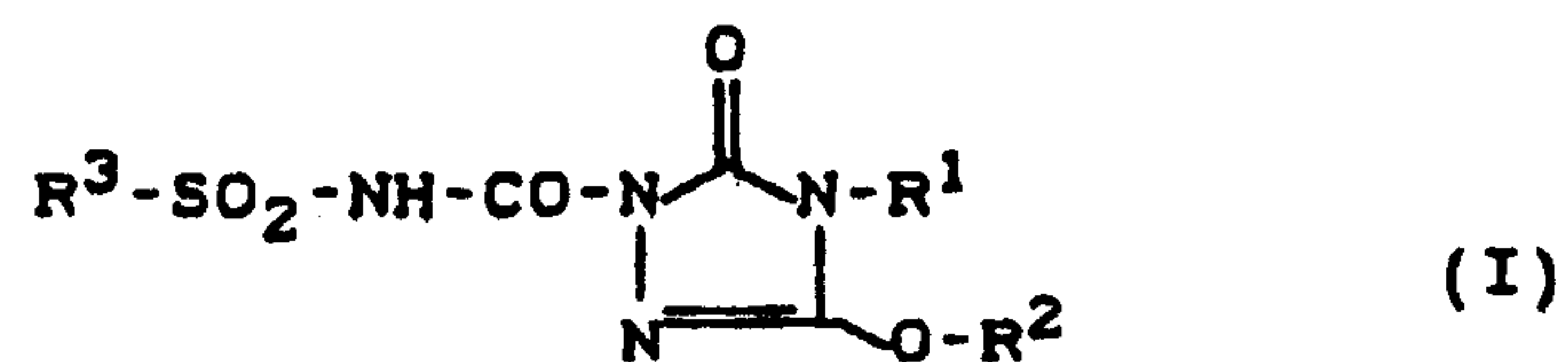


Table 3: Preparation Examples of the compounds of the formula (I)

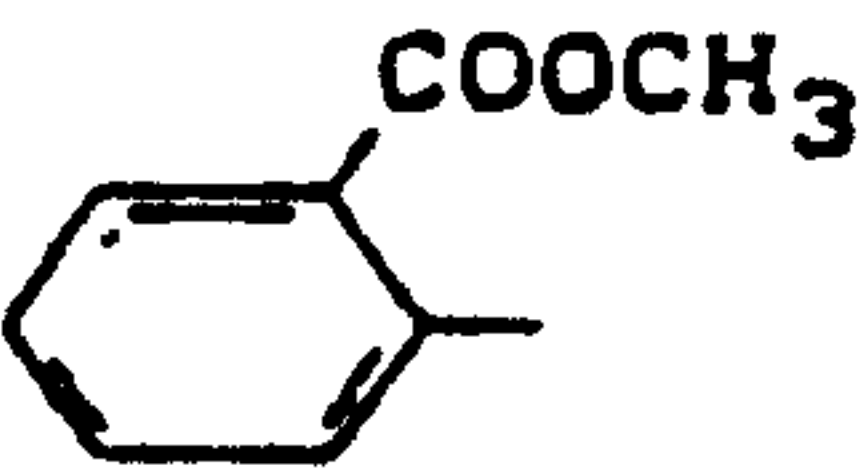
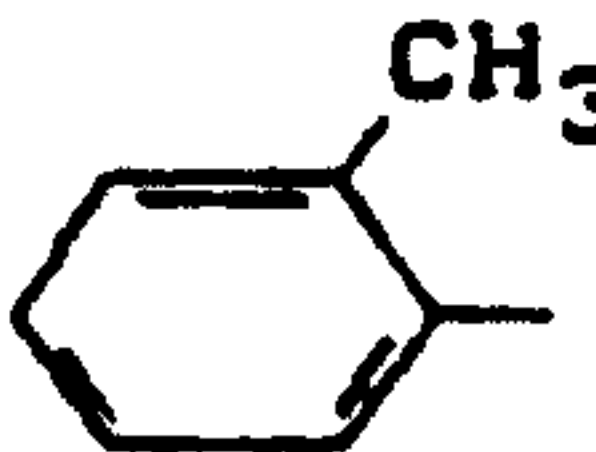
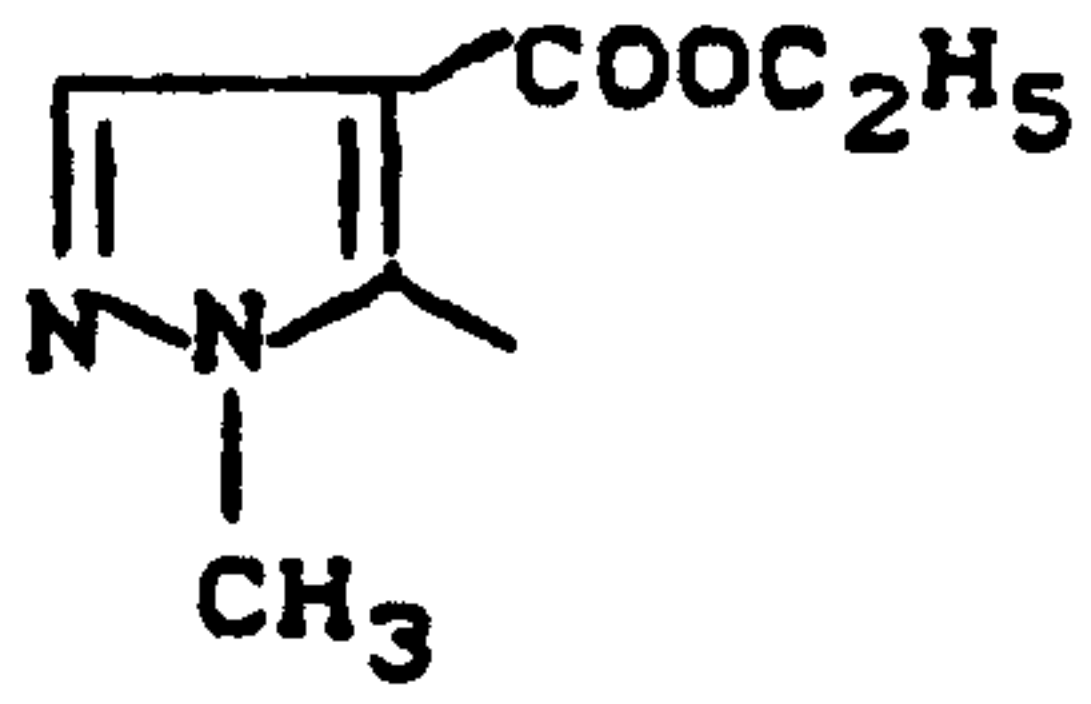
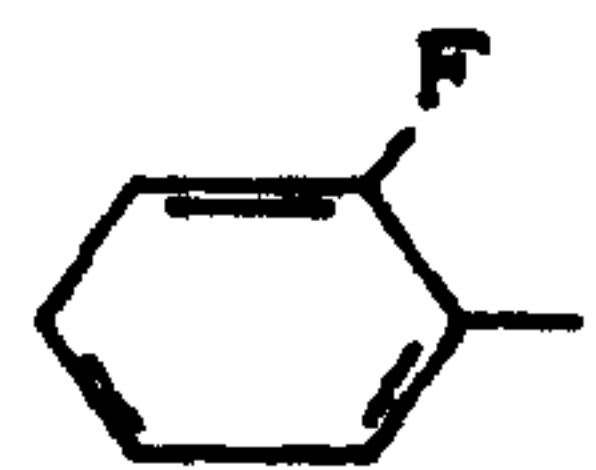
Example No.	R ¹	R ²	R ³	Melting point (°C)
2		C ₂ H ₅		183
3	CH ₃			190
4	CH ₃	C ₃ H ₇		120
5	CH ₃	C ₃ H ₇		134

Table 3 - Continuation

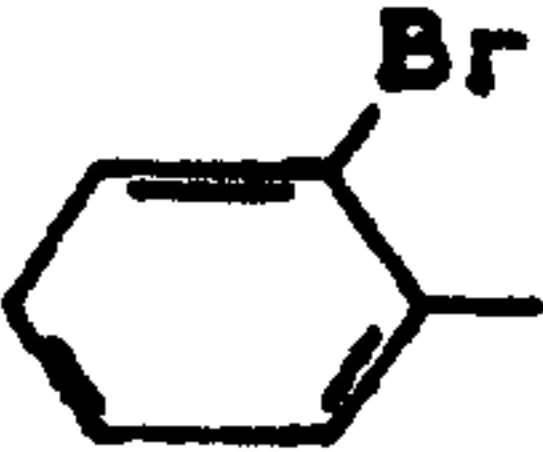
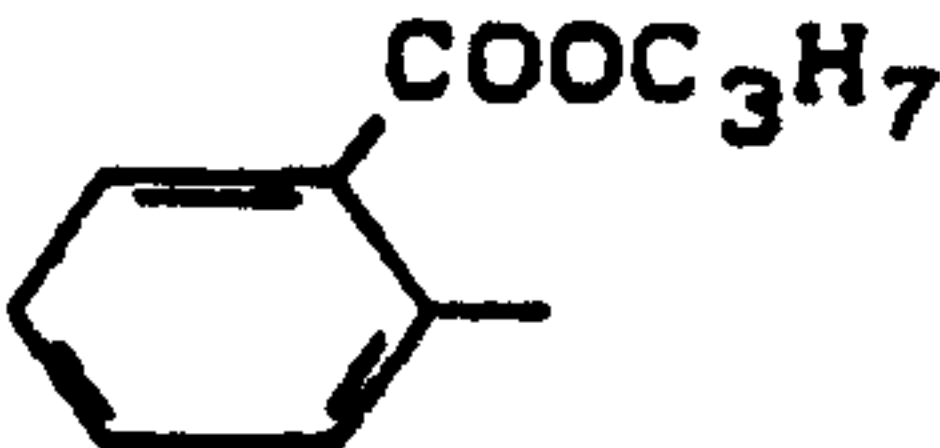
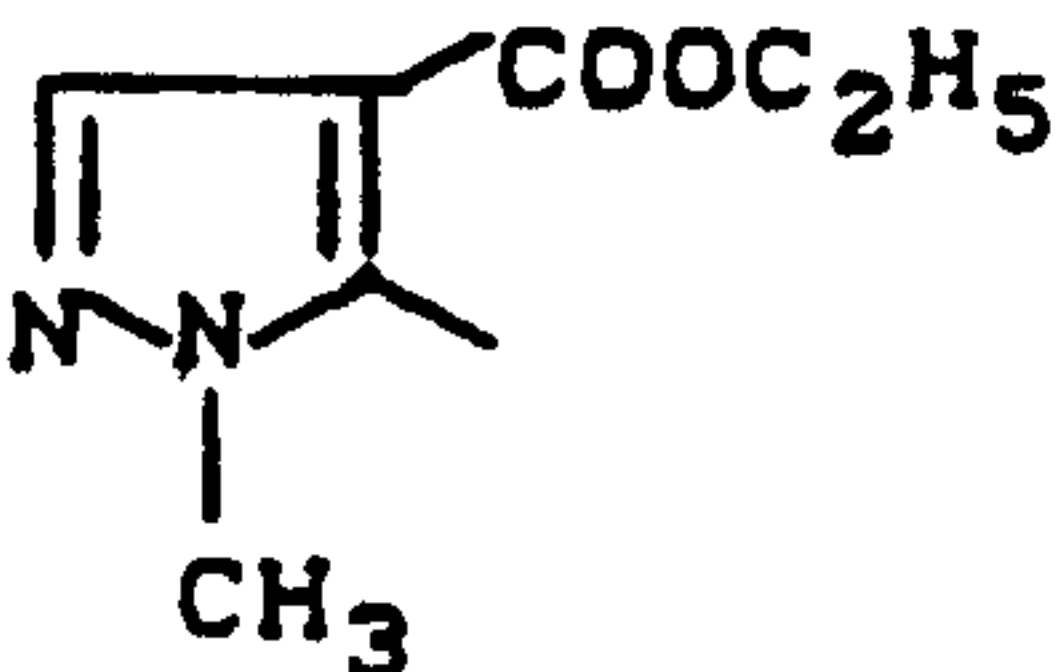
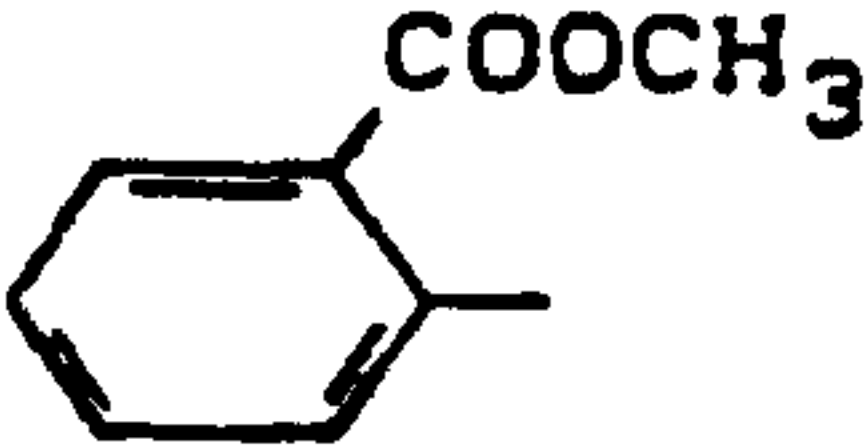
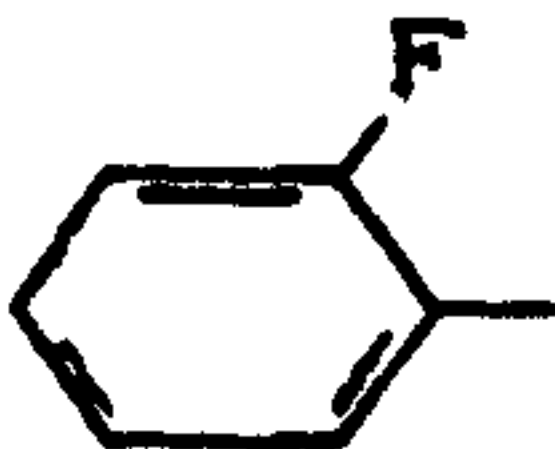
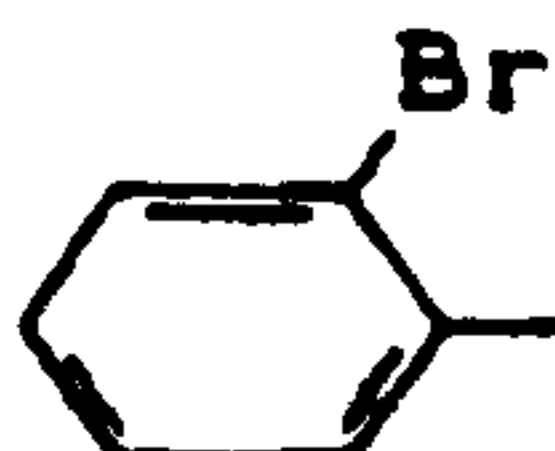
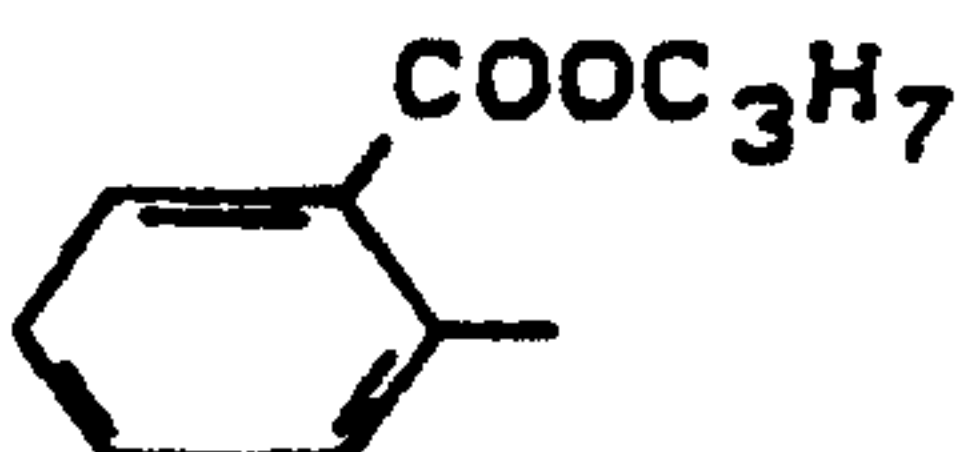
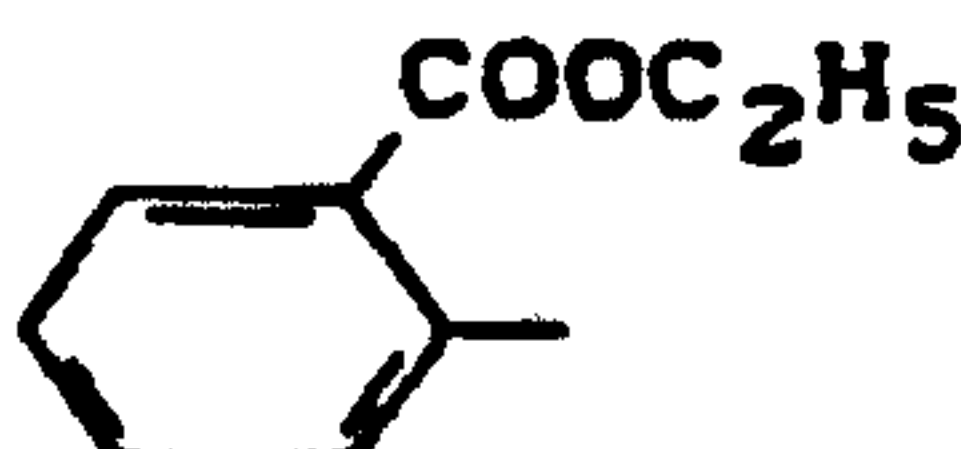
Example No.	R ¹	R ²	R ³	Melting point (°C)
6	CH ₃	C ₃ H ₇		122
7	CH ₃	C ₃ H ₇		125
8	CH ₃	C ₂ H ₅		166-167
9	CH ₃	C ₂ H ₅		131-132
10	CH ₃	C ₂ H ₅		147-148
11	CH ₃	C ₂ H ₅		186-187
12	CH ₃	C ₂ H ₅		125-126
13	CH ₃	C ₂ H ₅		123-124

Table 3 - Continuation

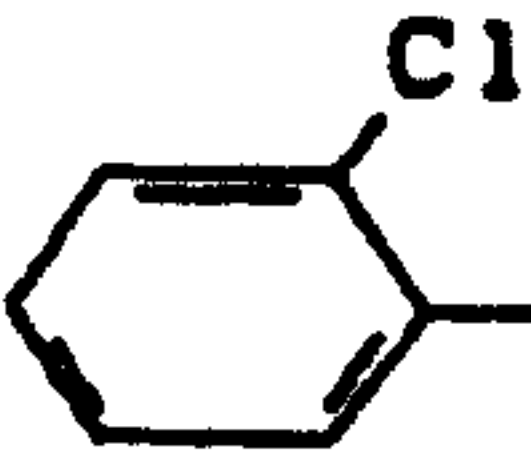
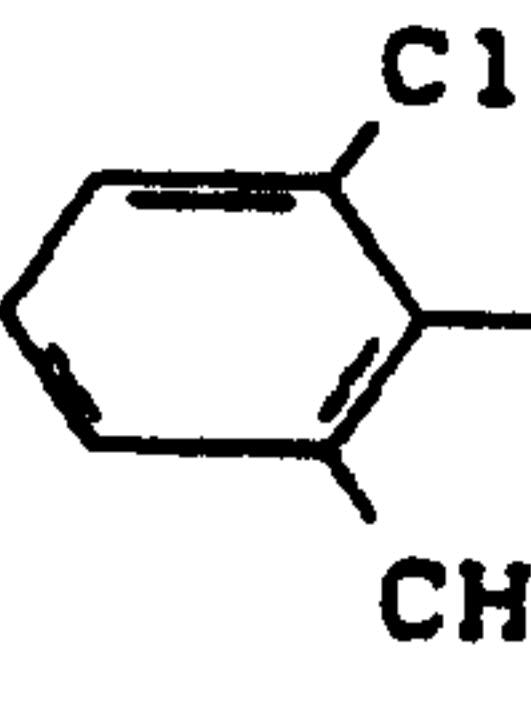
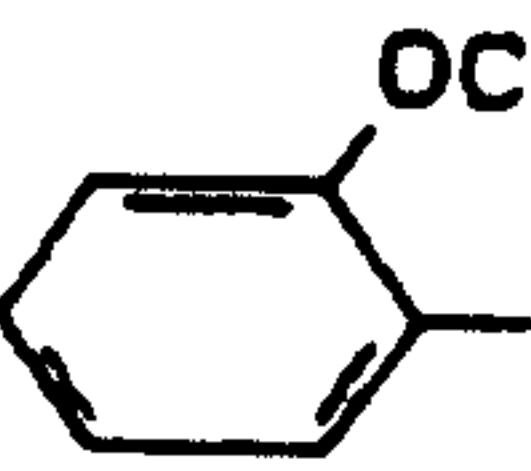
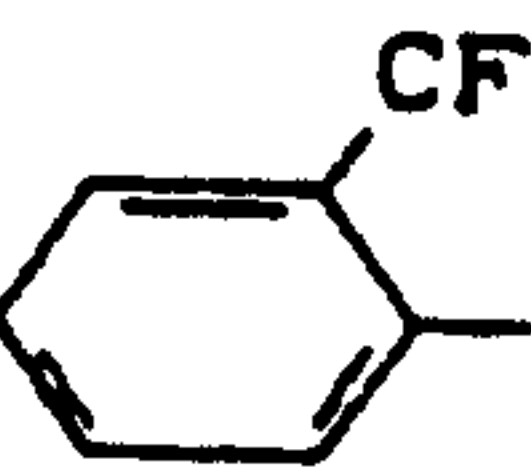
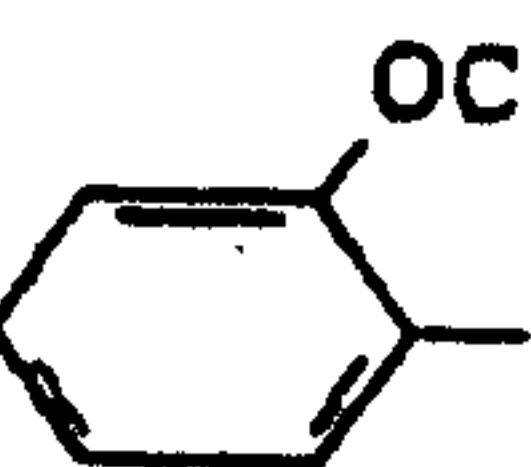
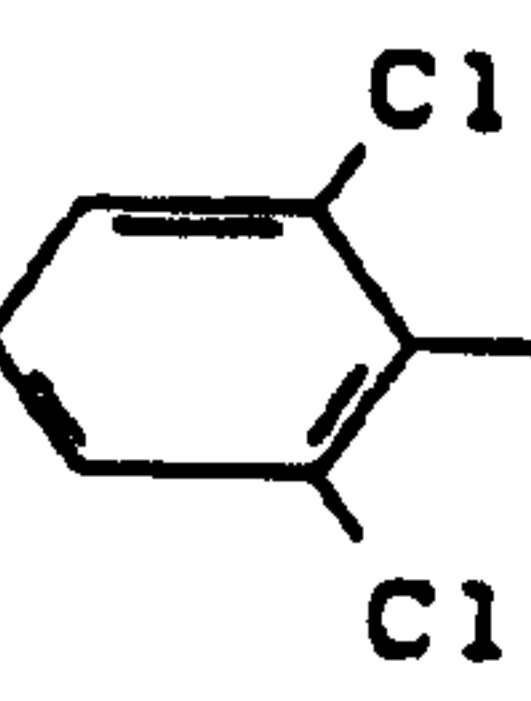
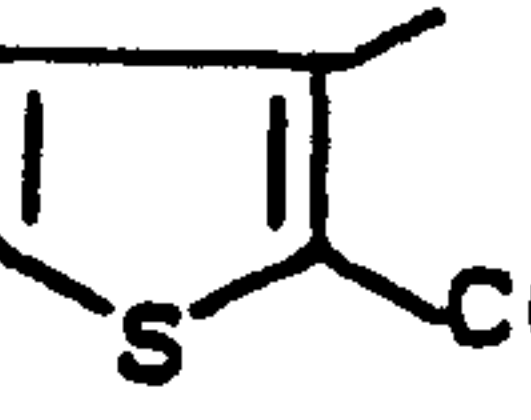
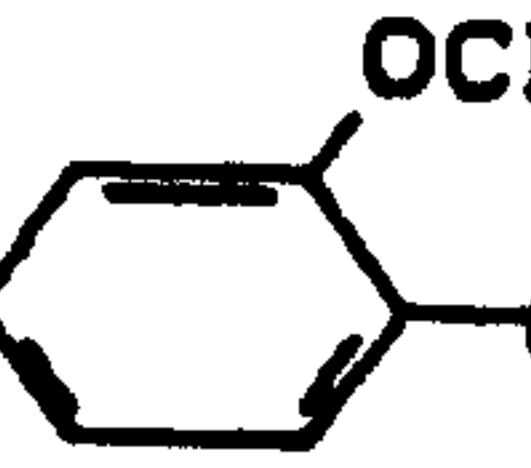
Example No.	R ¹	R ²	R ³	Melting point (°C)
14	CH ₃	C ₂ H ₅		188-189
15	CH ₃	C ₂ H ₅		175-176
16	CH ₃	C ₂ H ₅		152-153
17	CH ₃	C ₂ H ₅		172-173
18	CH ₃	C ₂ H ₅		147-148
19	CH ₃	C ₂ H ₅		183-184
20	CH ₃	C ₂ H ₅		178-183
21	CH ₃	C ₂ H ₅		155-156

Table 3 - Continuation

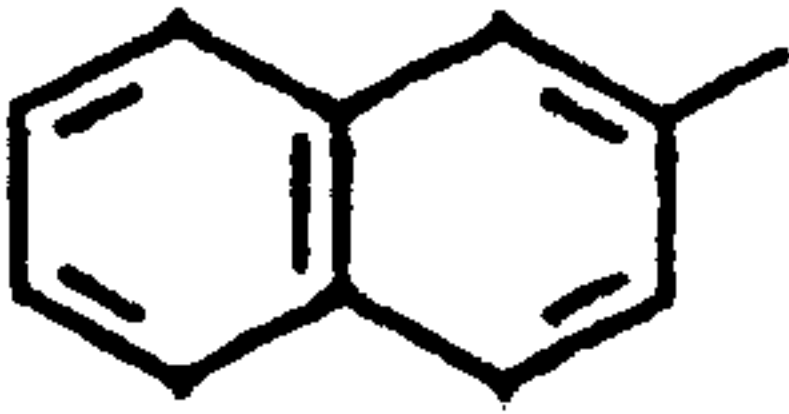
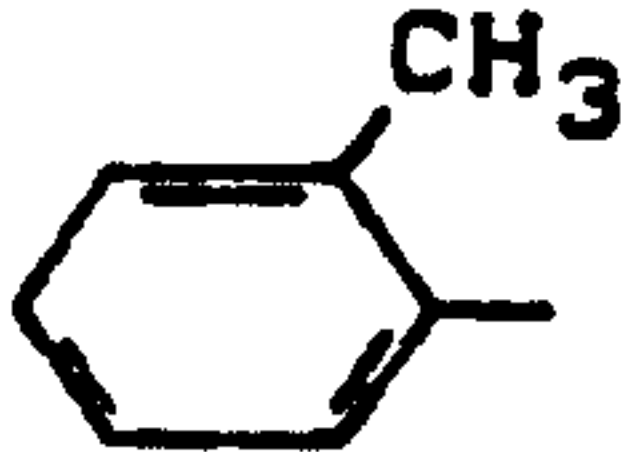
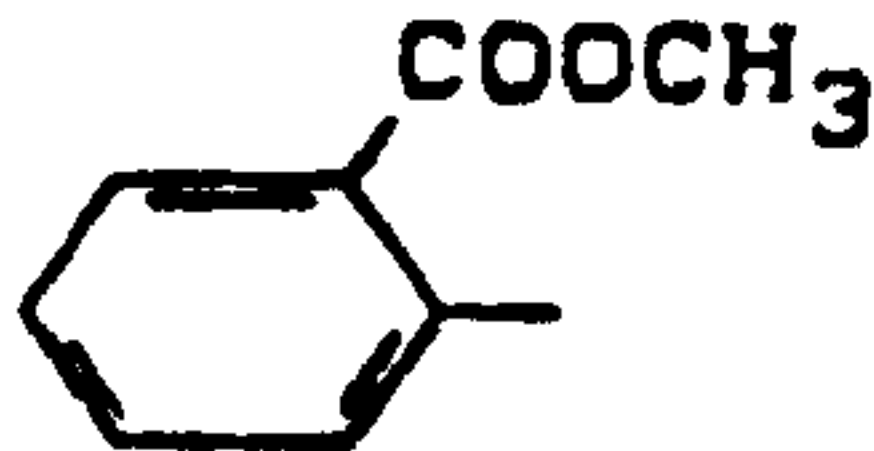
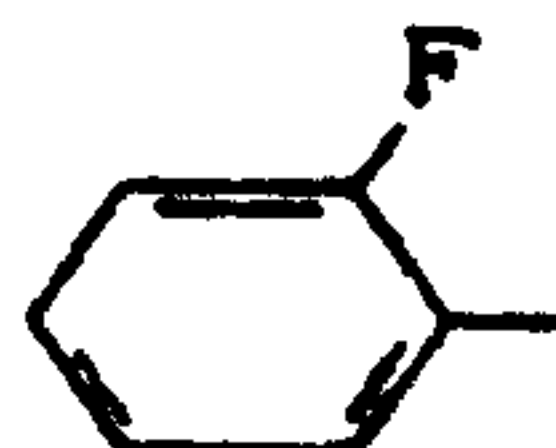
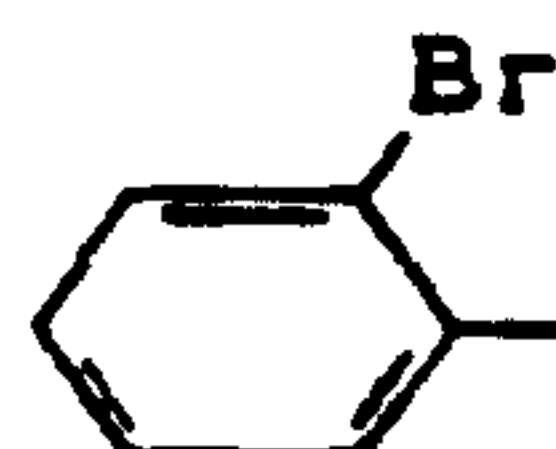
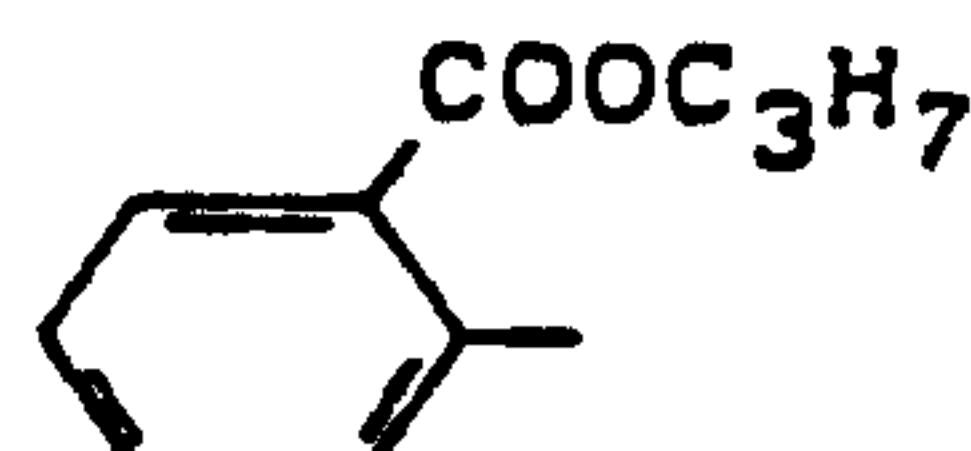
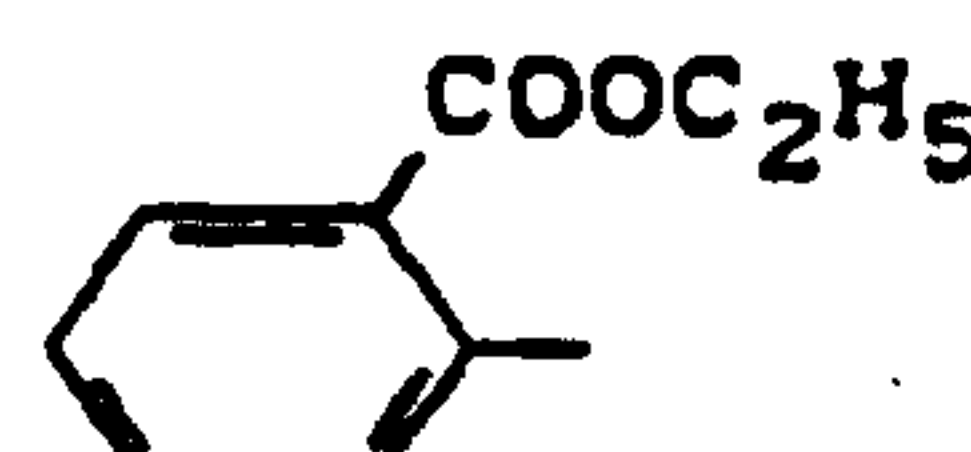
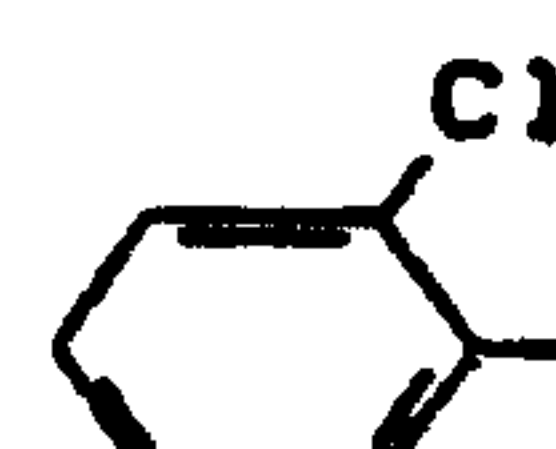
Example No.	R ¹	R ²	R ³	Melting point (°C)
22	CH ₃	C ₂ H ₅		162-163
23	CH ₃	C ₂ H ₅		146-147
24	C ₃ H ₇	CH ₃		129-130
25	C ₃ H ₇	CH ₃		150-151
26	C ₃ H ₇	CH ₃		130-131
27	C ₃ H ₇	CH ₃		135-136
28	C ₃ H ₇	CH ₃		126-127
29	C ₃ H ₇	CH ₃		116-117

Table 3 - Continuation

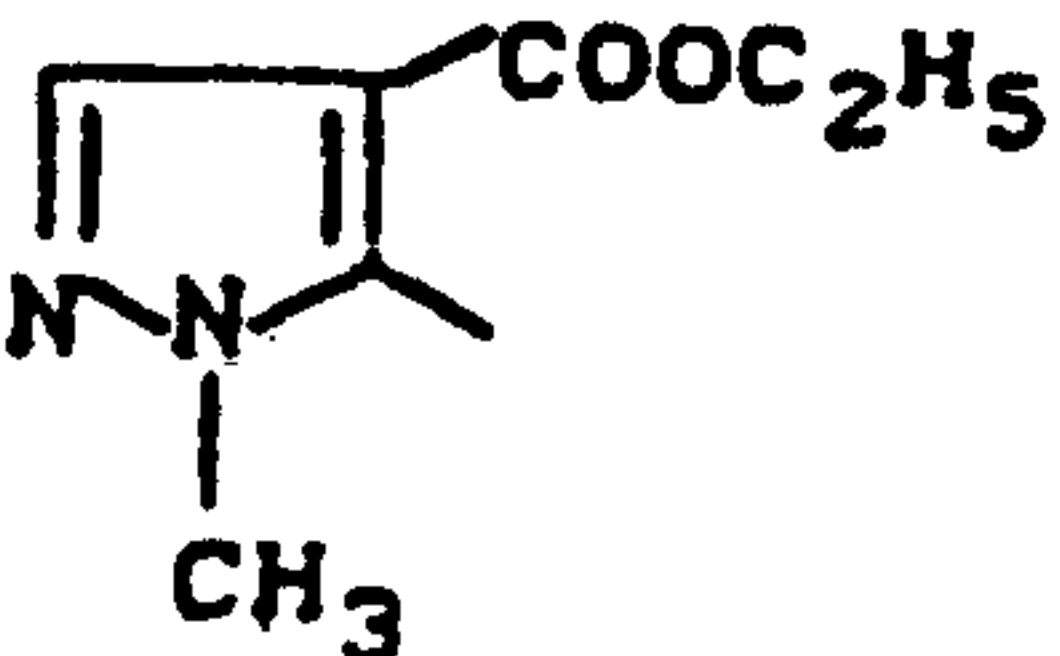
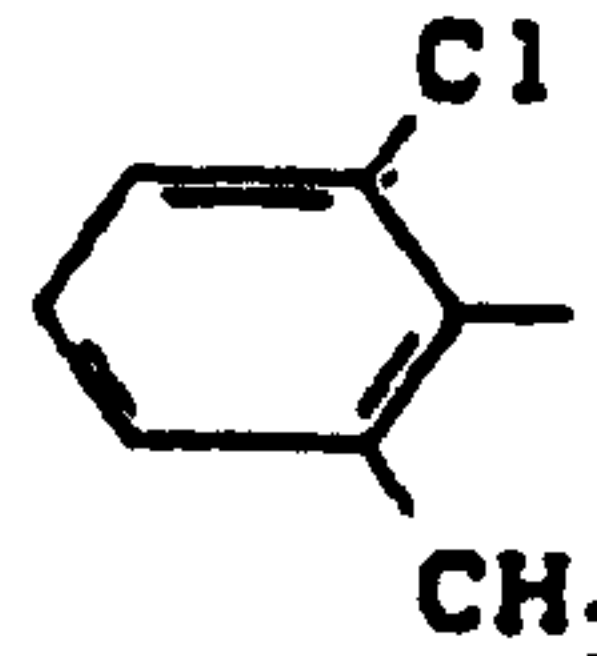
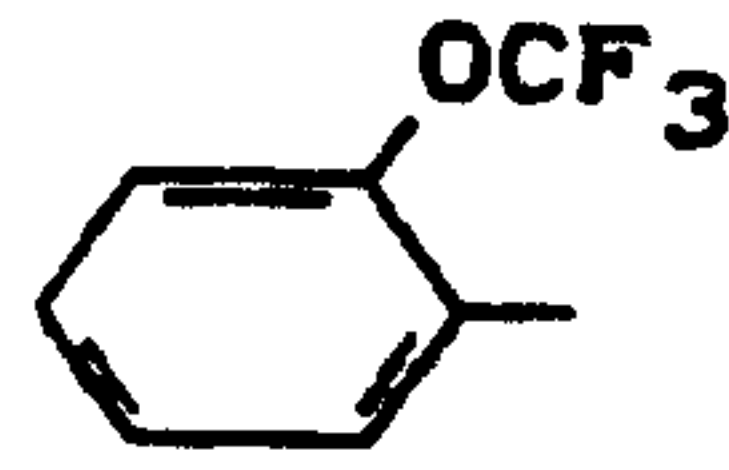
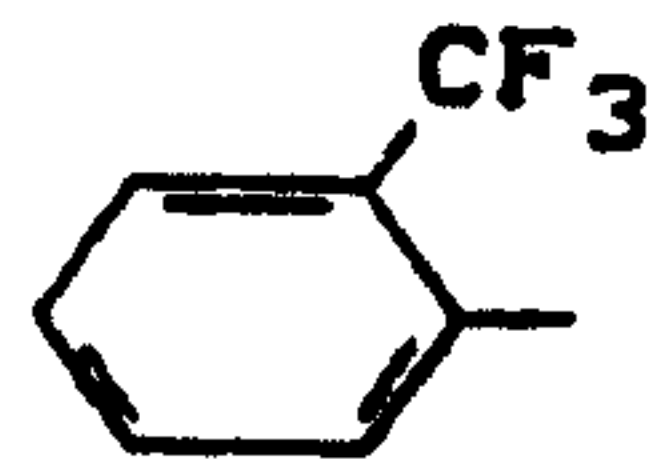
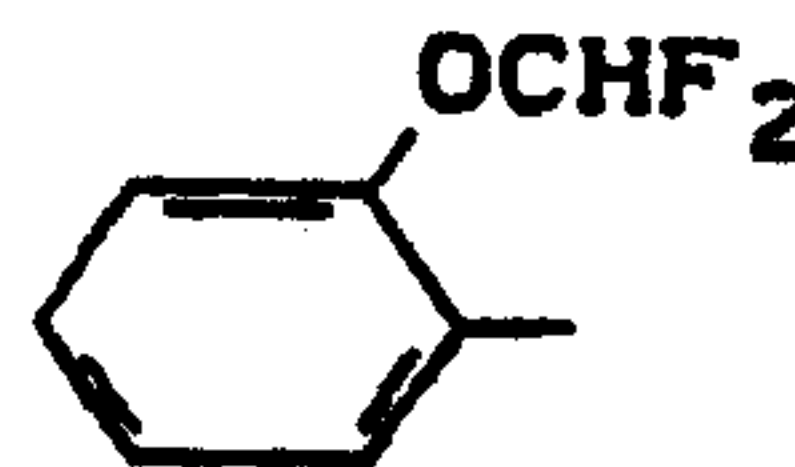
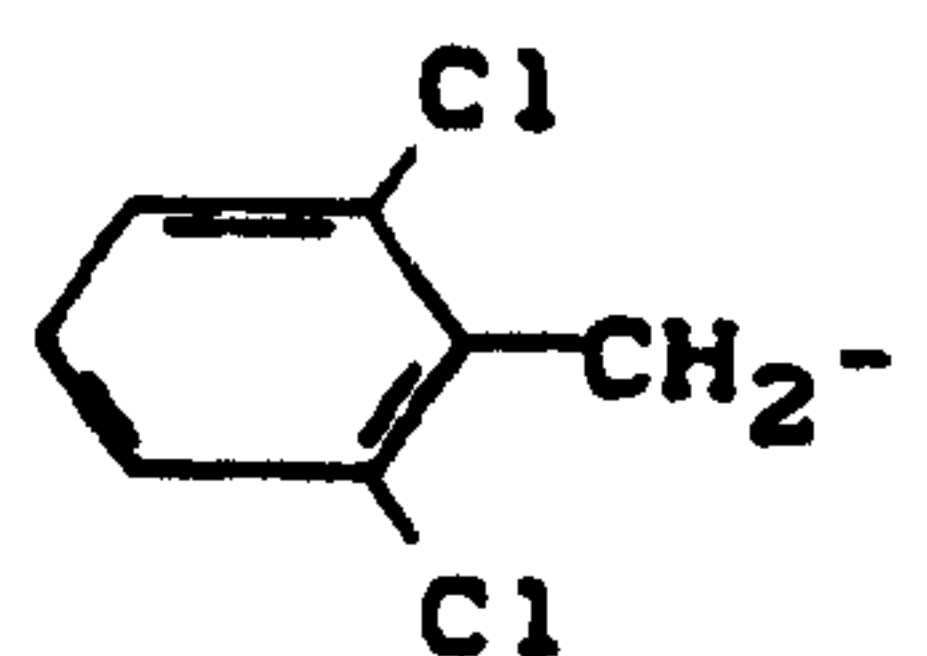
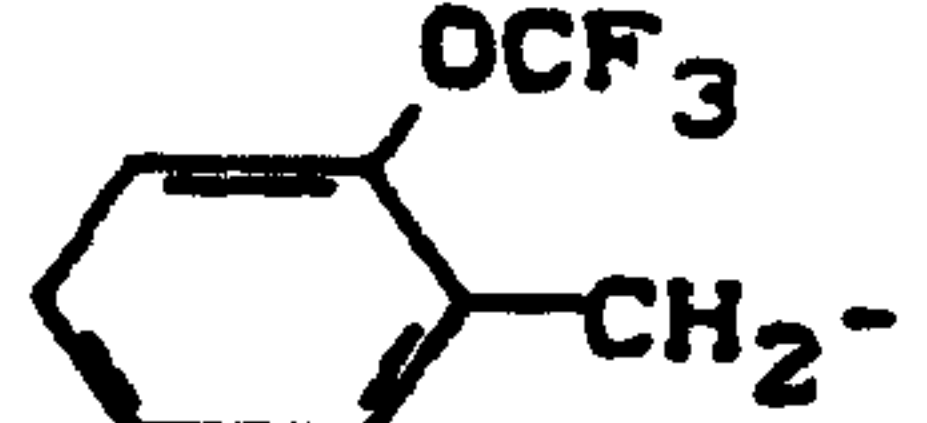
Example No.	R ¹	R ²	R ³	Melting point (°C)
30	C ₃ H ₇	CH ₃		129-130
31	C ₃ H ₇	CH ₃		156-157
32	C ₃ H ₇	CH ₃		117-118
33	C ₃ H ₇	CH ₃		139-140
34	C ₃ H ₇	CH ₃		115-116
35	C ₃ H ₇	CH ₃		183-184
36	C ₃ H ₇	CH ₃		130-131
37	C ₃ H ₇	CH ₃		108-109

Table 3 - Continuation

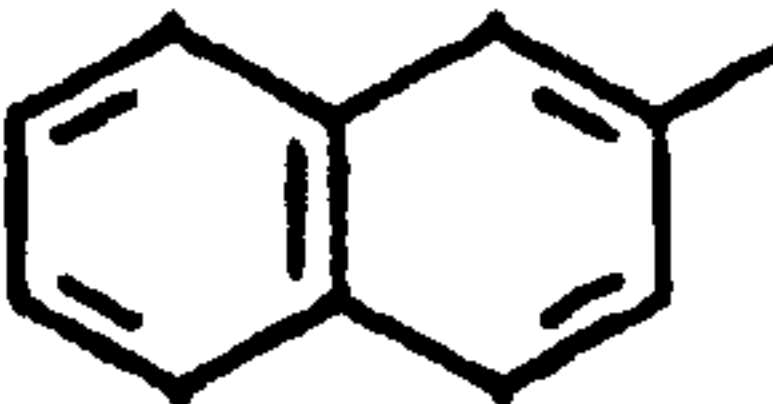
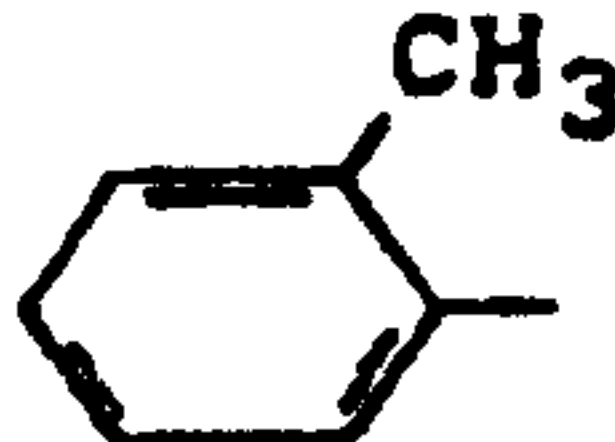
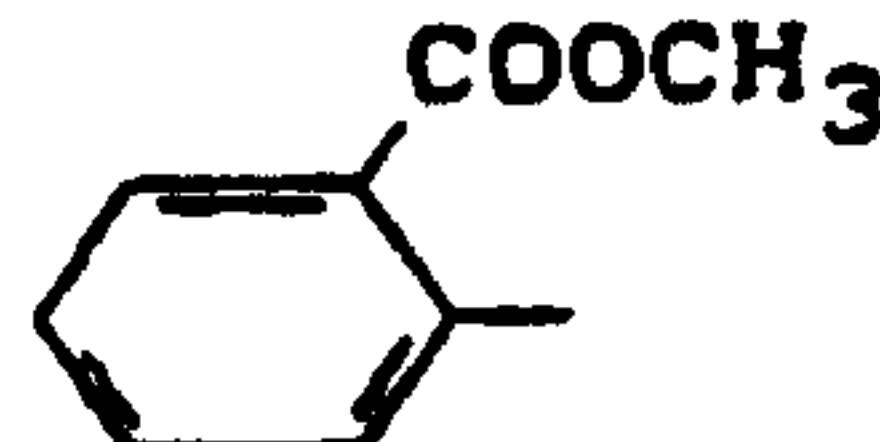
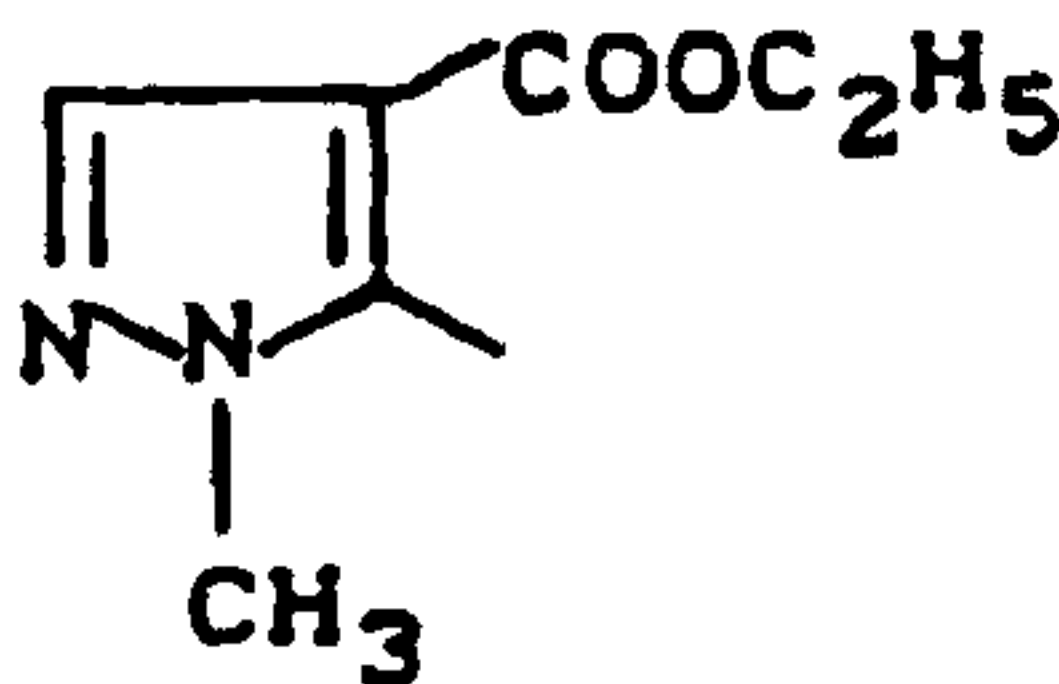
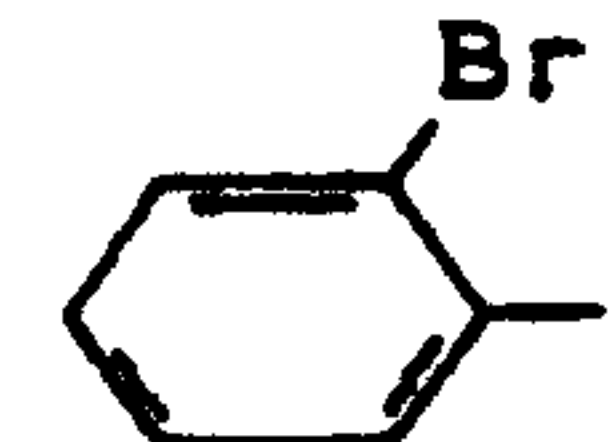
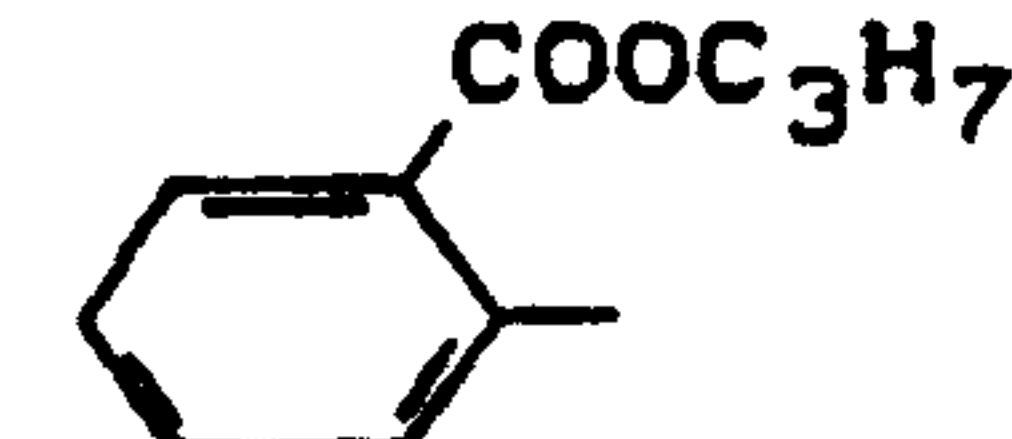
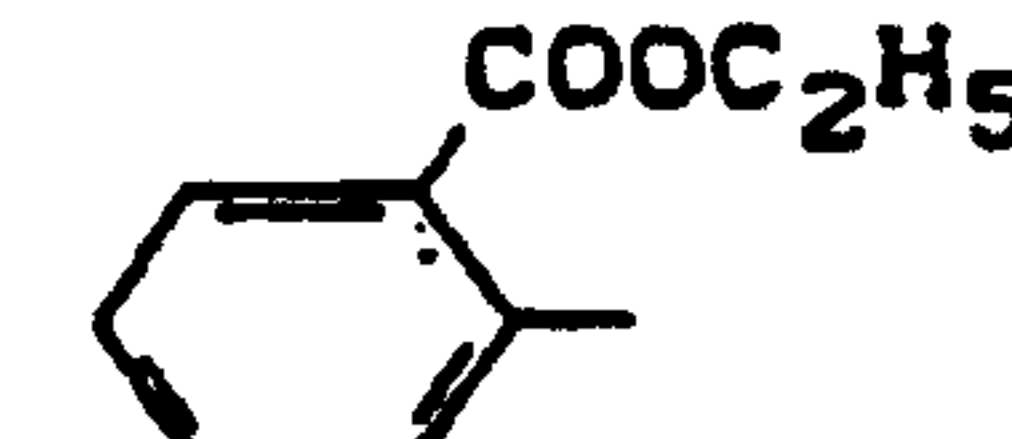
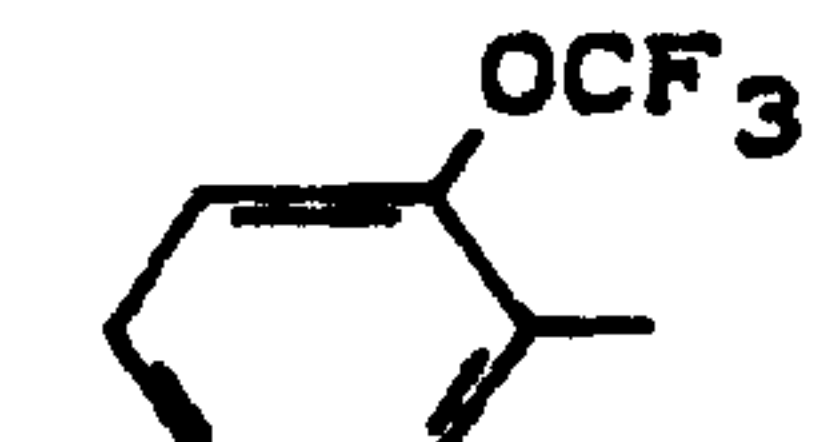
Example No.	R¹	R²	R³	Melting point (°C)
38	C ₃ H ₇	CH ₃		122-123
39	C ₃ H ₇	CH ₃		128-129
40	CH ₃	C ₄ H ₉		76
41	CH ₃	C ₄ H ₉		197
42	CH ₃	C ₄ H ₉		153
43	CH ₃	C ₄ H ₉		105
44	CH ₃	C ₄ H ₉		81
45	CH ₃	C ₄ H ₉		137

Table 3 - Continuation

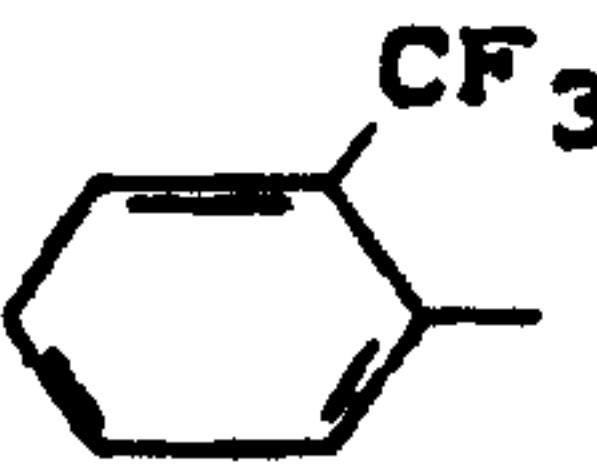
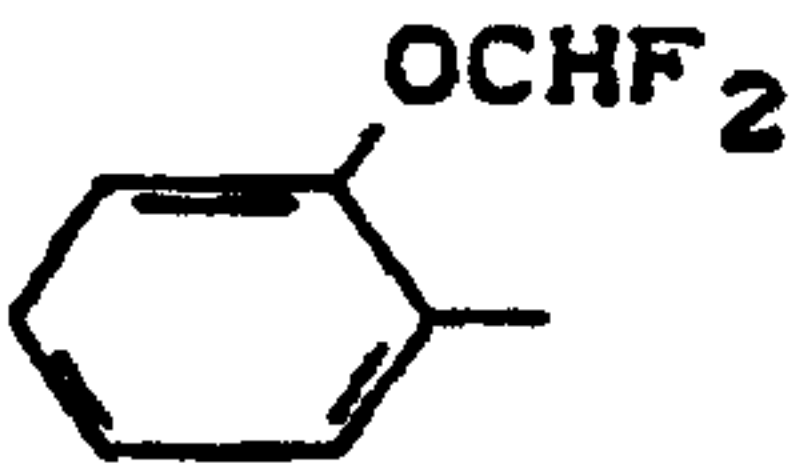
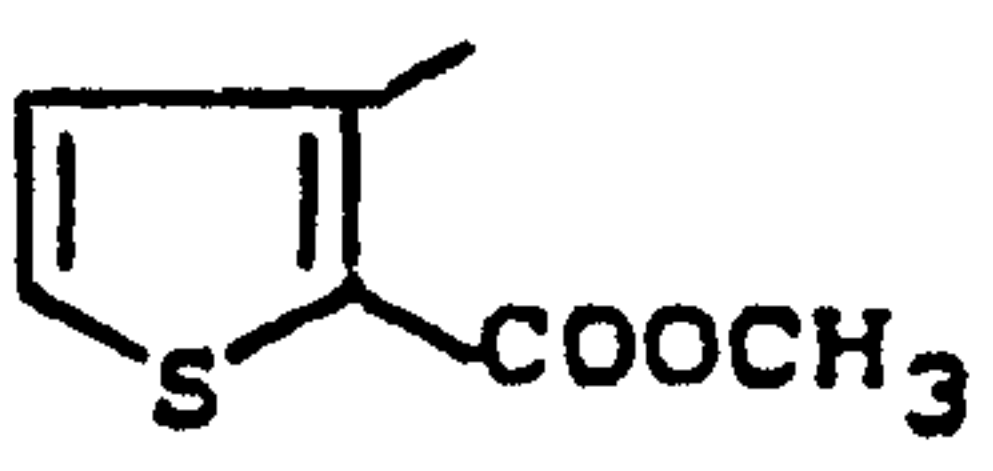
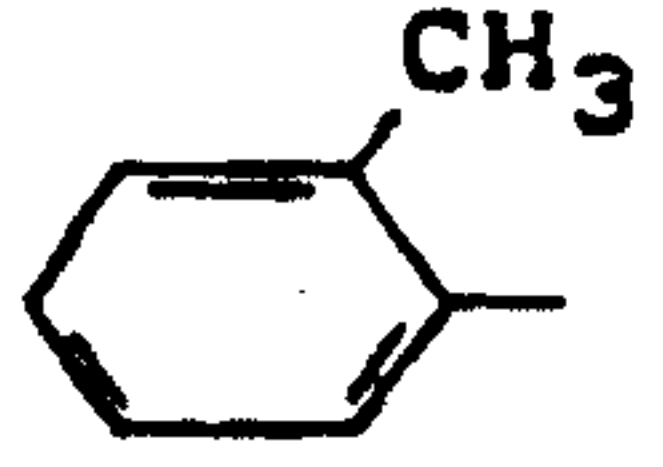
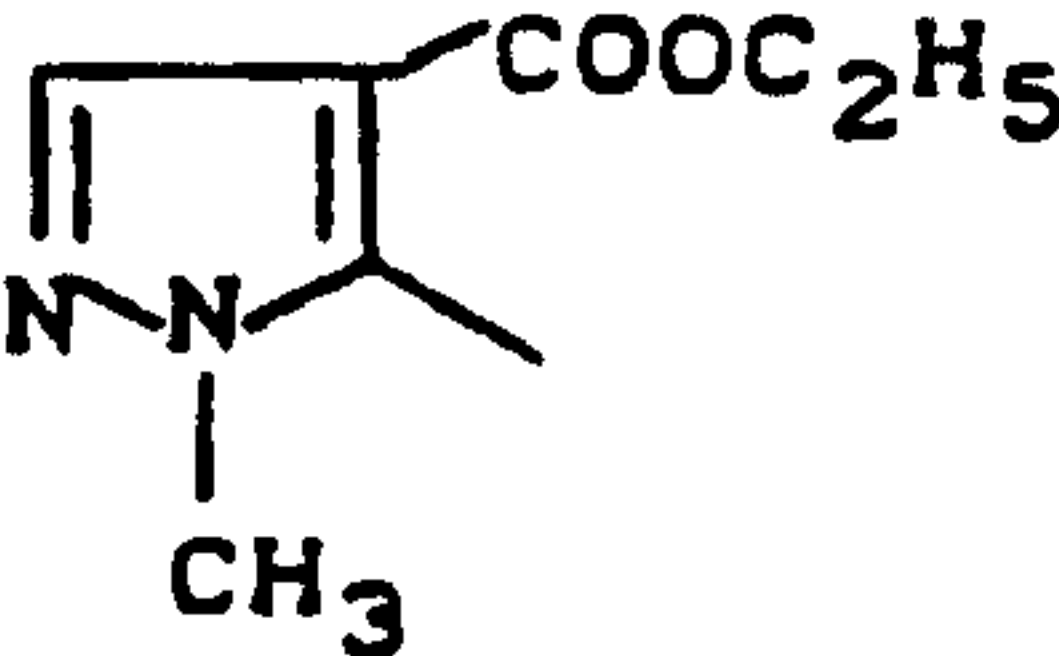
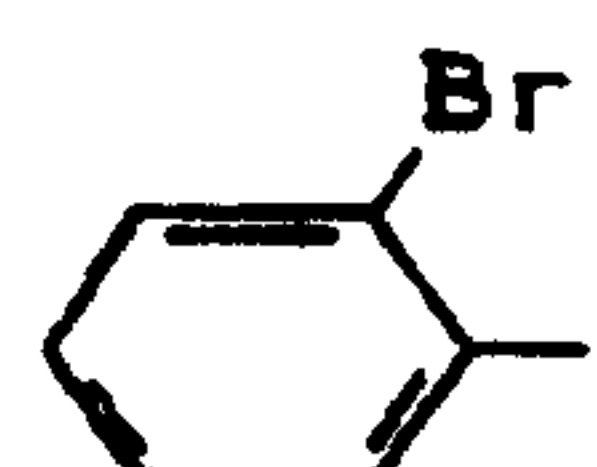
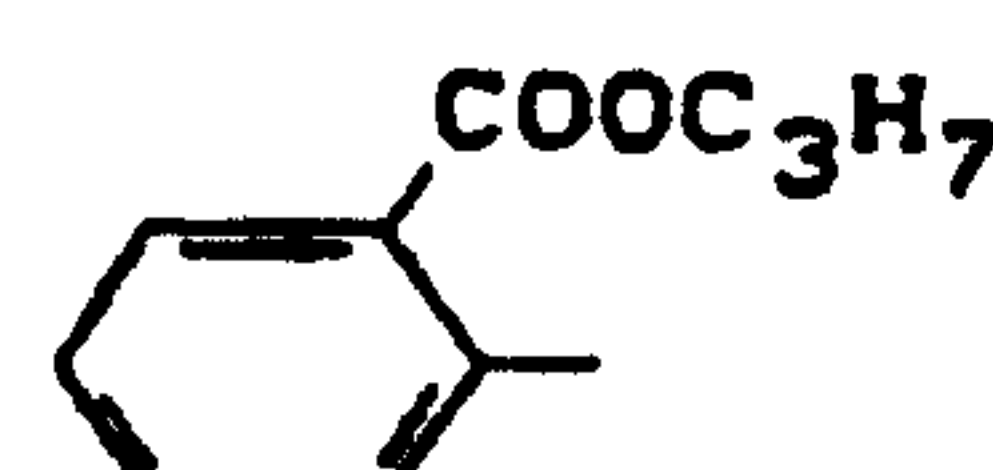
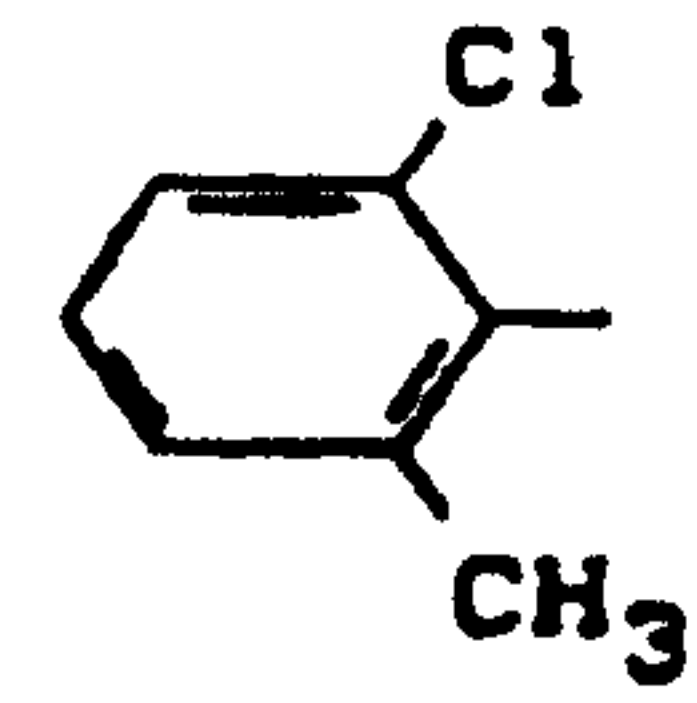
Example No.	R ¹	R ²	R ³	Melting point (°C)
46	CH ₃	C ₄ H ₉		148
47	CH ₃	C ₄ H ₉		114
48	CH ₃	C ₄ H ₉		147
49	CH ₃	C ₄ H ₉		139
50		C ₂ H ₅		114
51		C ₂ H ₅		135
52		C ₂ H ₅		108
53	CH ₃			209

Table 3 - Continuation

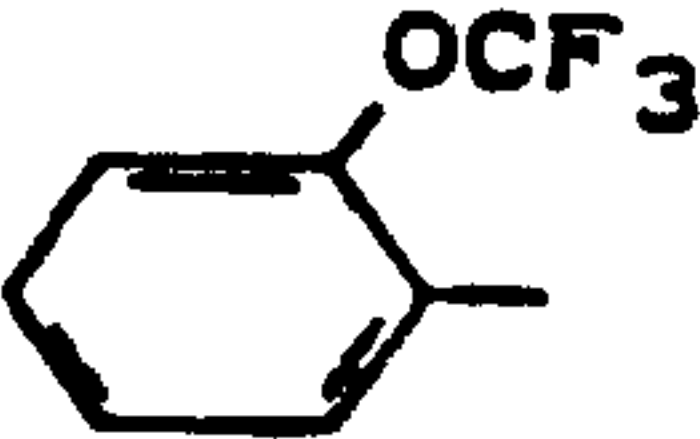
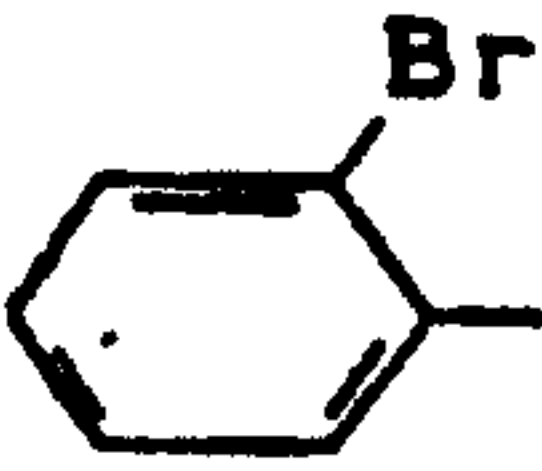
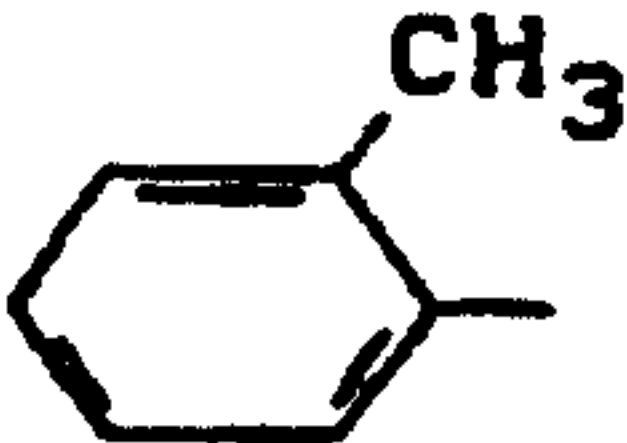
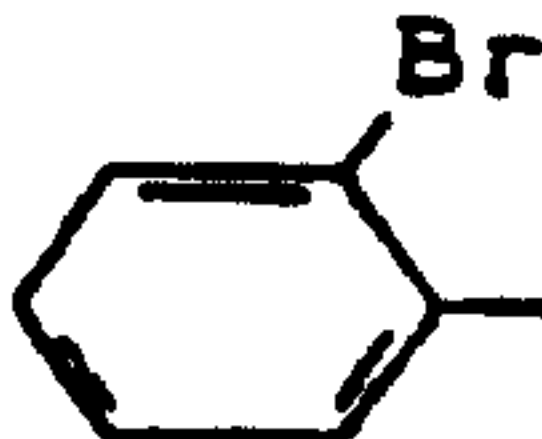
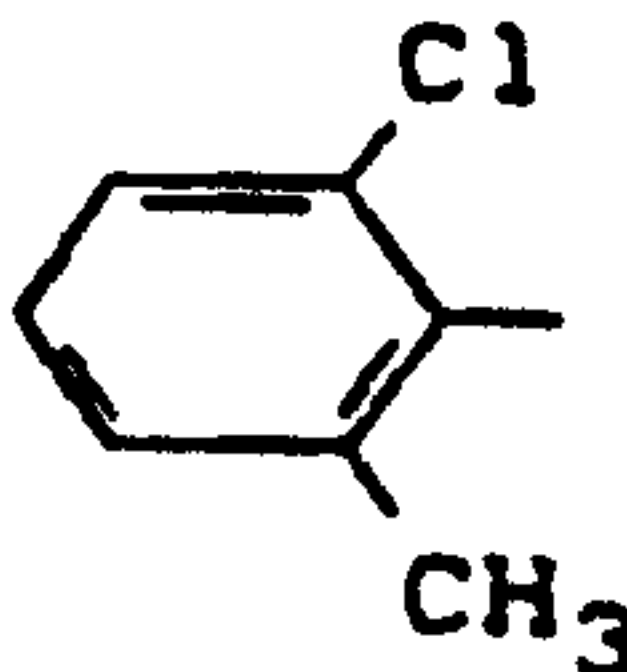
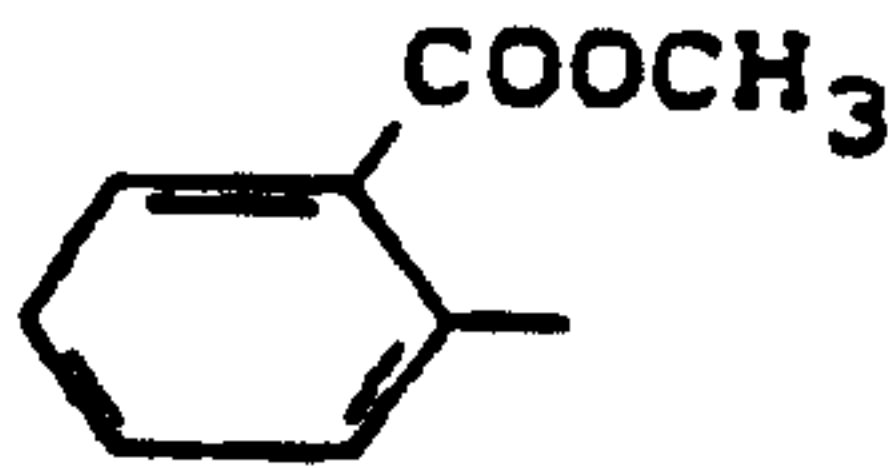
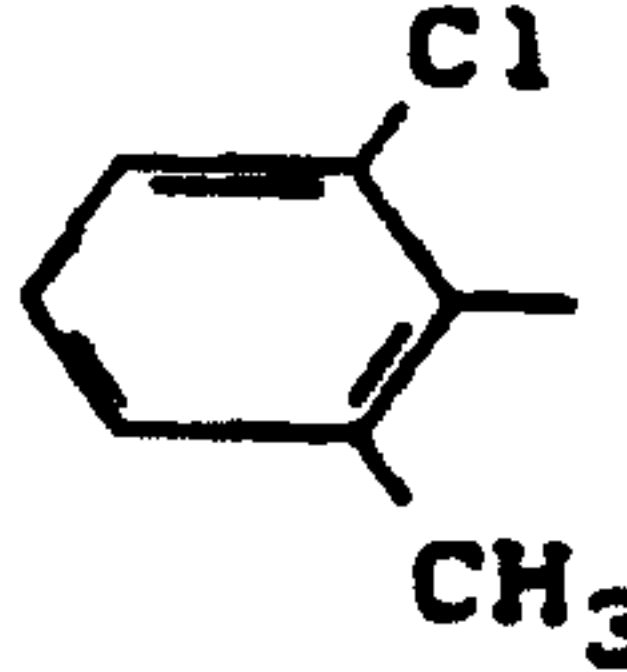
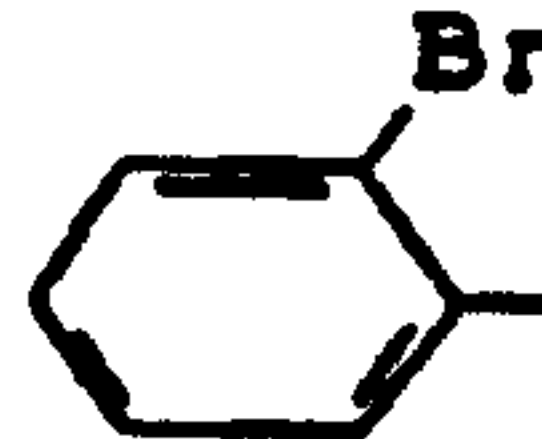
Example No.	R ¹	R ²	R ³	Melting point (°C)
54	CH ₃			191
55	CH ₃			207
56	CH ₃	CH ₃		154
57	CH ₃	CH ₃		187
58	CH ₃	CH ₃		179
59	-CH ₂ -CH=CH ₂	CH ₃		124
60	-CH ₂ -CH=CH ₂	CH ₃		153
61	-CH ₂ -CH=CH ₂	CH ₃		150

Table 3- Continuation

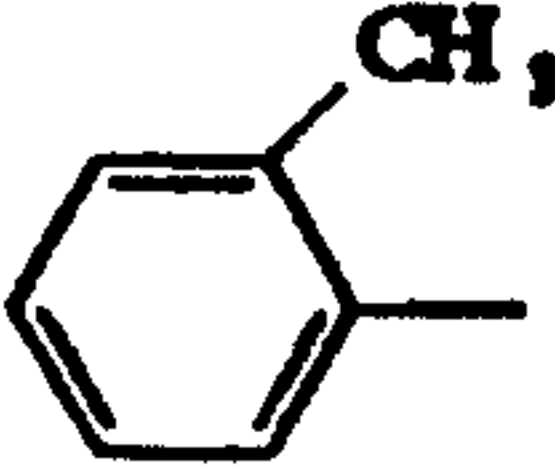
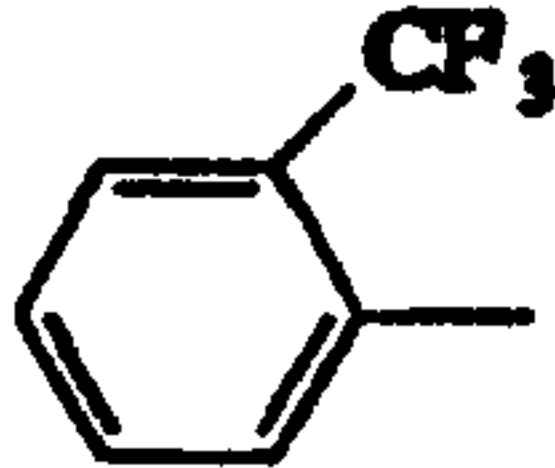
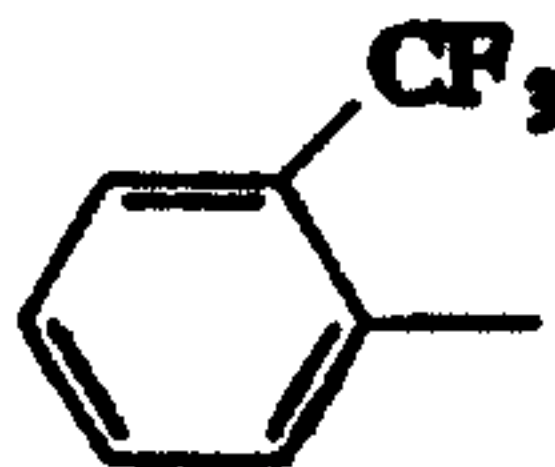
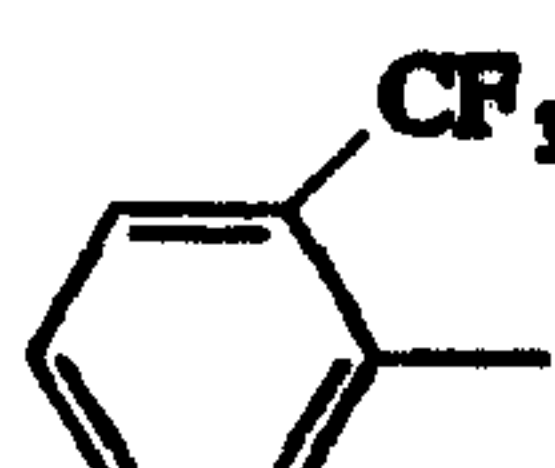
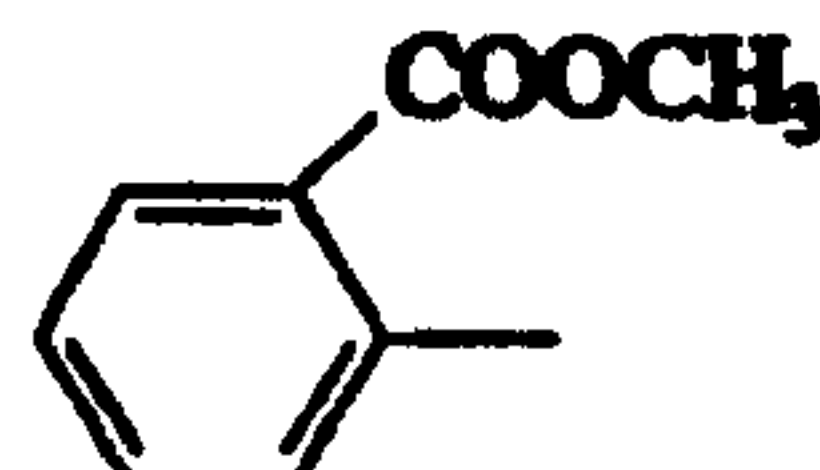
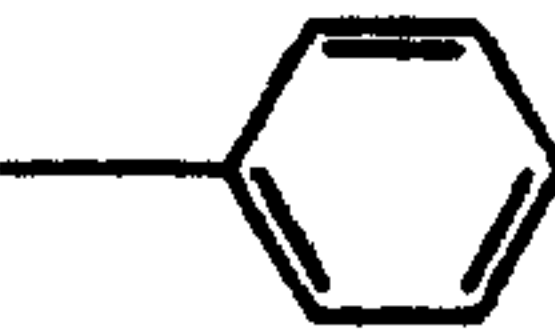
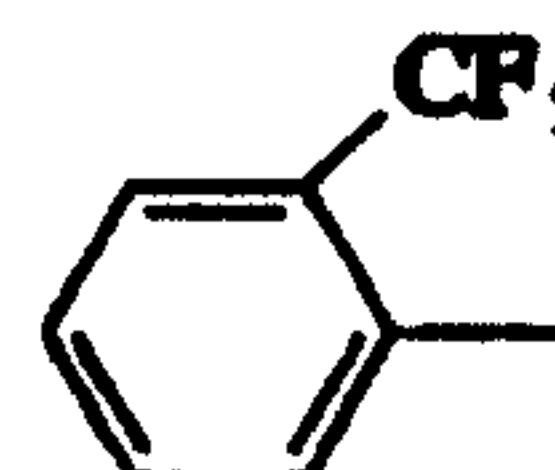
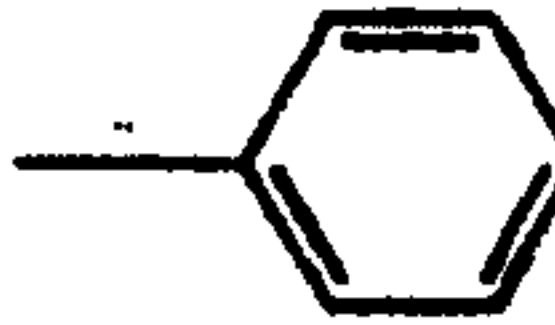
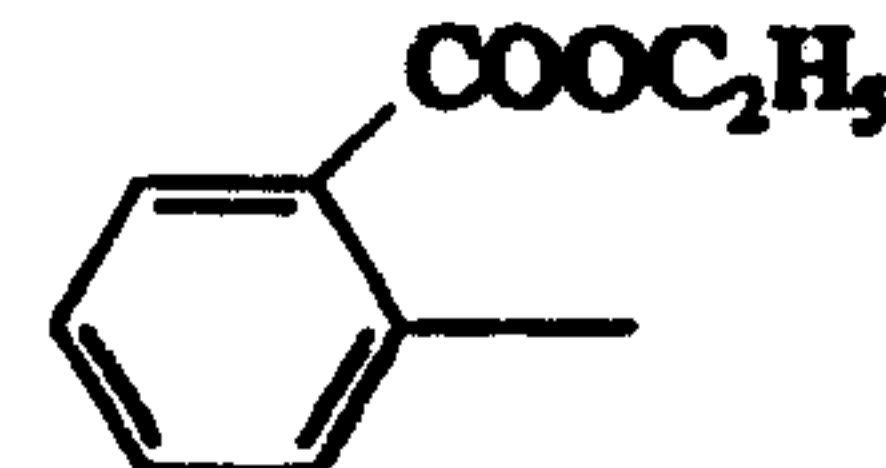
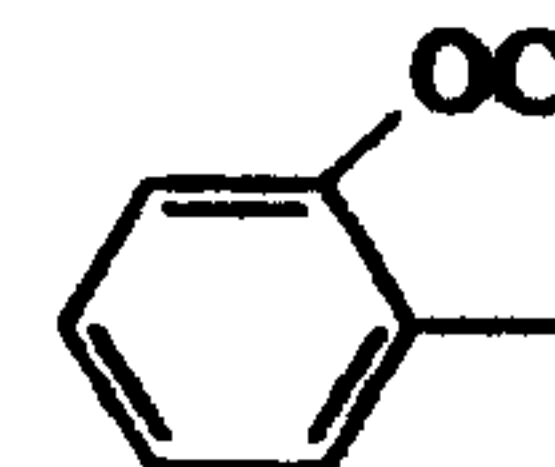
Example No.	R ¹	R ²	R ³	Melting Point (°C)
62	-CH ₂ -CH=CH ₂	CH ₃		103
63	-CH ₂ -CH=CH ₂	CH ₃		130
64	CH ₃	CH ₃		196
65	CH ₃	CH ₃		161-163 (Na-Salt)
66	-CH ₂ -CH=CH ₂	CH ₃		130
67	CH ₃			211
68	CH ₃			179
69	CH ₃	CH ₃		171

Table 3 - Continuation

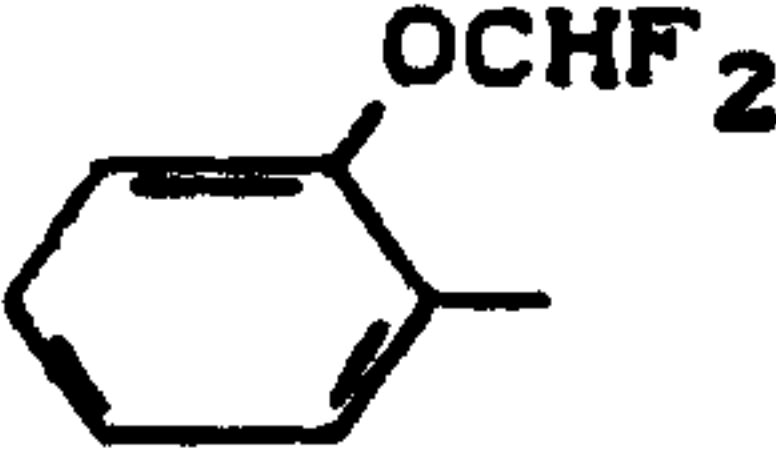
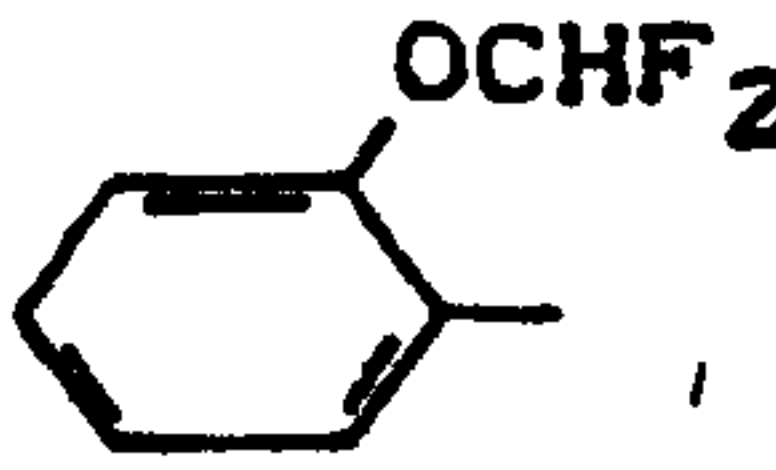
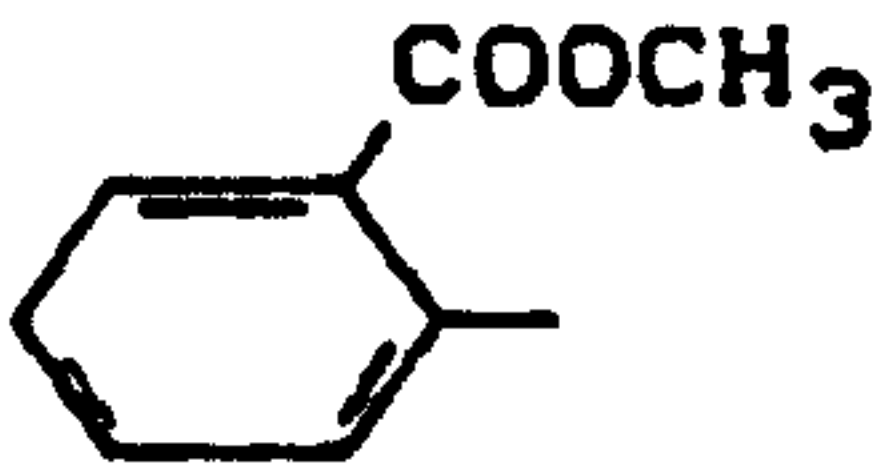
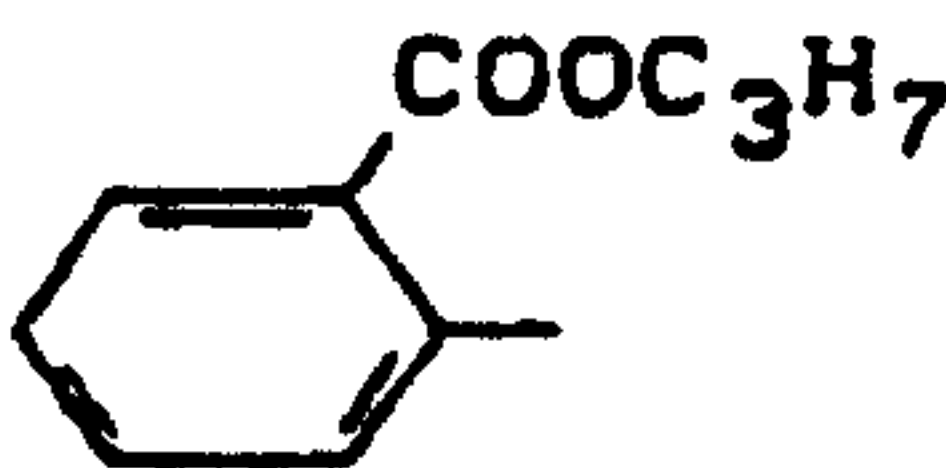
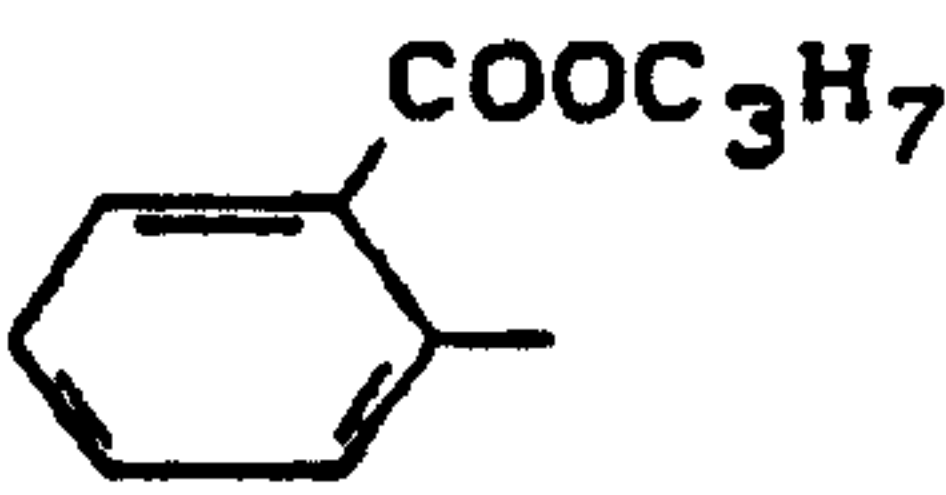
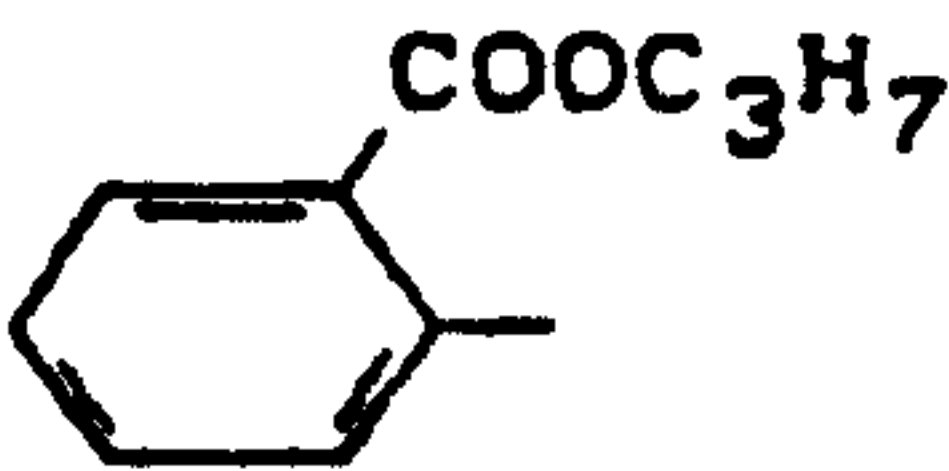
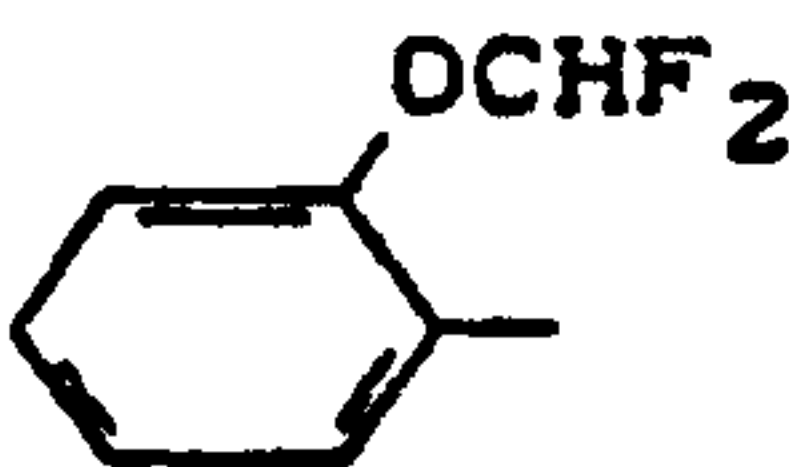
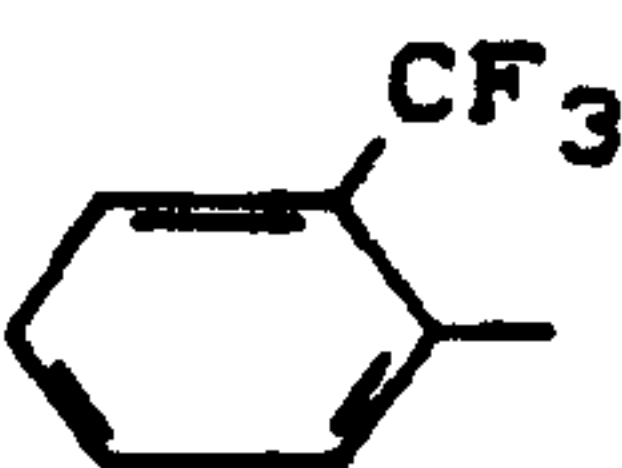
Example No.	R ¹	R ²	R ³	Melting point (°C)
70	-CH ₂ -CH=CH ₂	CH ₃		115
71	CH ₃			162
72	CH ₃	C ₃ H ₇		141
73	CH ₃	CH ₃		148
74	CH ₃			174
75	-CH ₂ -CH=CH ₂	CH ₃		138
76		CH ₃		148
77		CH ₃		150

Table 3 - Continuation

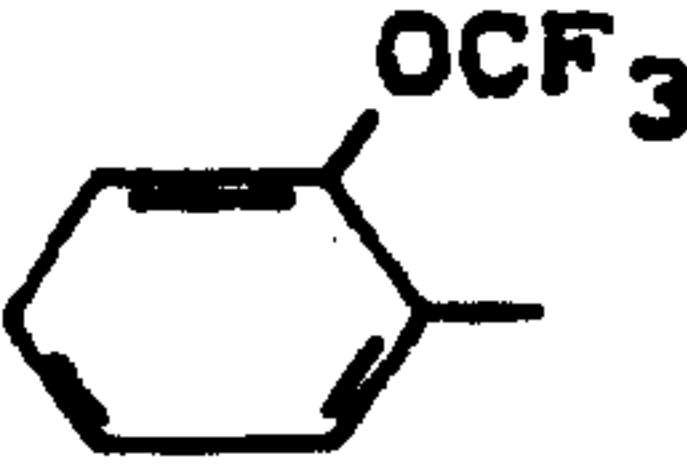
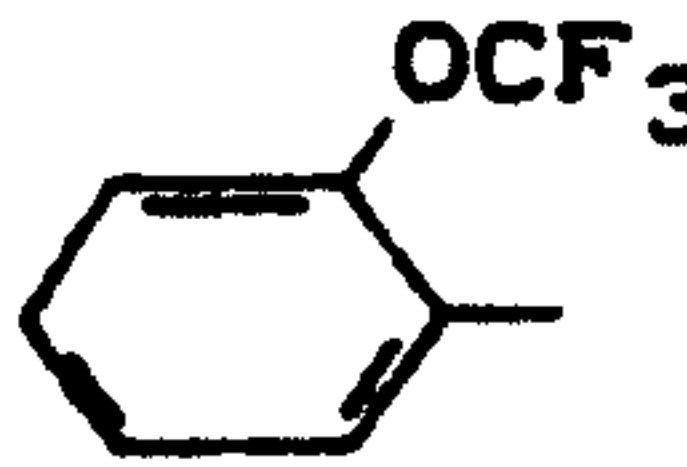
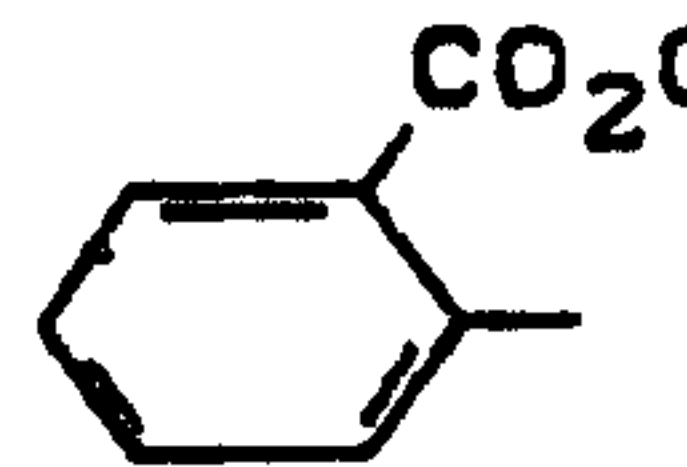
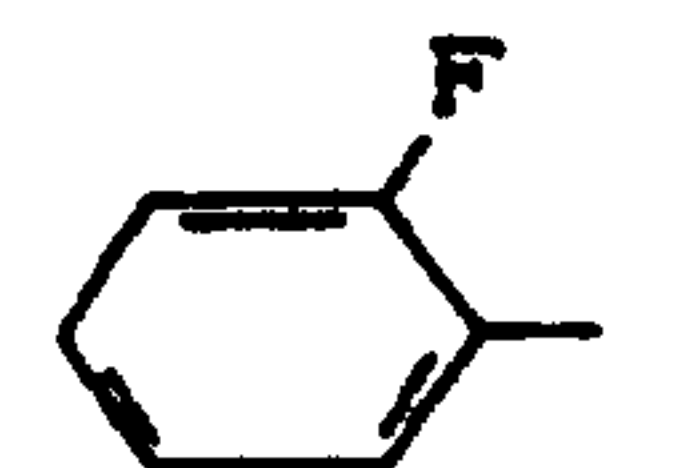
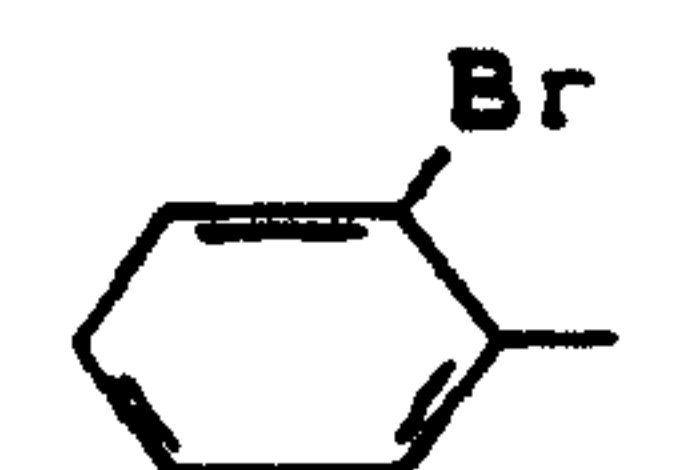
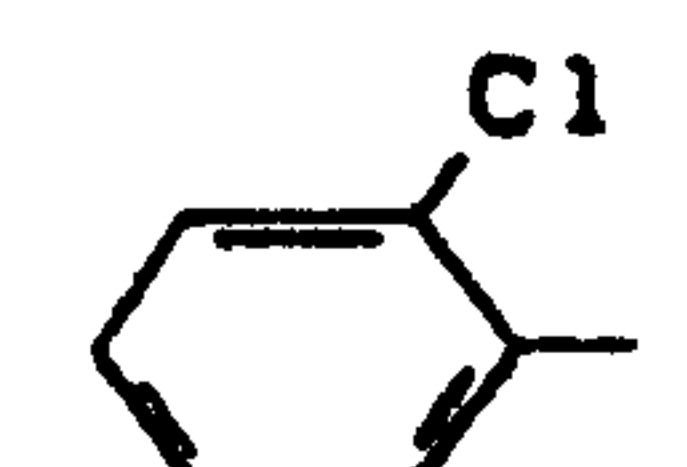
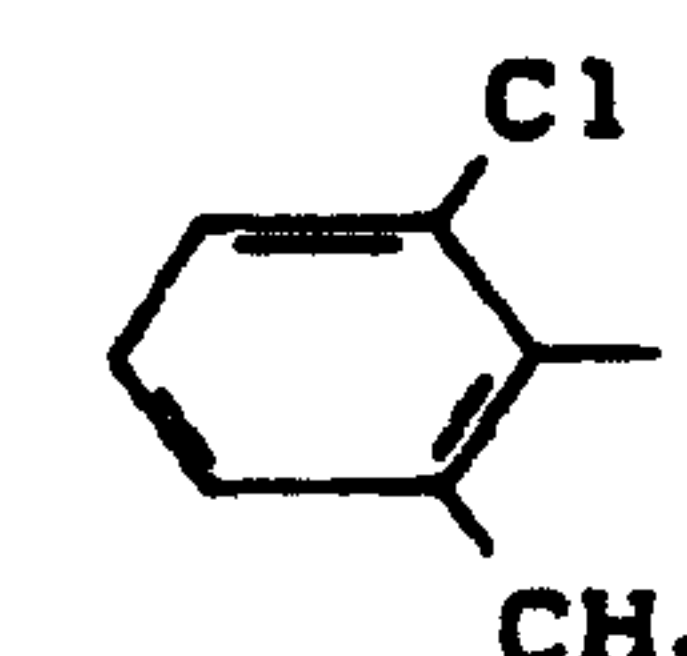
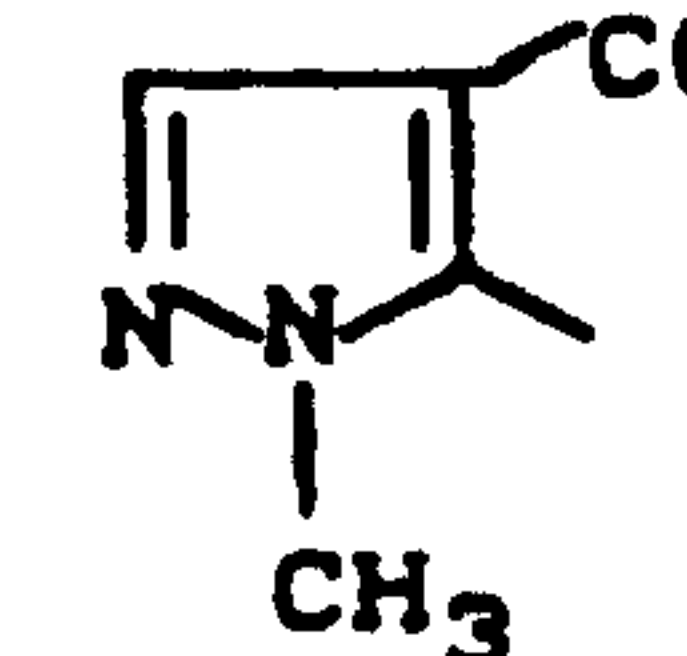
Example No.	R ¹	R ²	R ³	Melting point (°C)
78	-CH ₂ -CH=CH ₂	CH ₃		125
79	CH ₃	CH ₃		145
80	C ₂ H ₅	CH ₃		153-154
81	C ₂ H ₅	CH ₃		151-152
82	C ₂ H ₅	CH ₃		167-168
83	C ₂ H ₅	CH ₃		155-156
84	C ₂ H ₅	CH ₃		174-175
85	C ₂ H ₅	CH ₃		140-141

Table 3 - Continuation

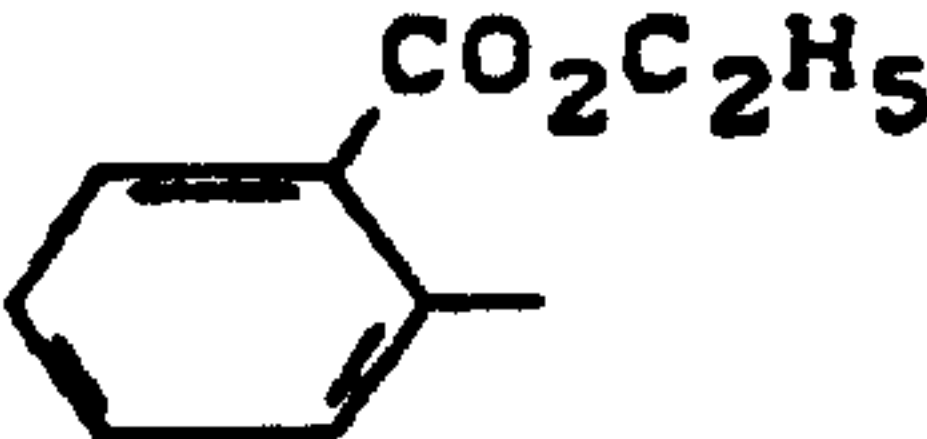
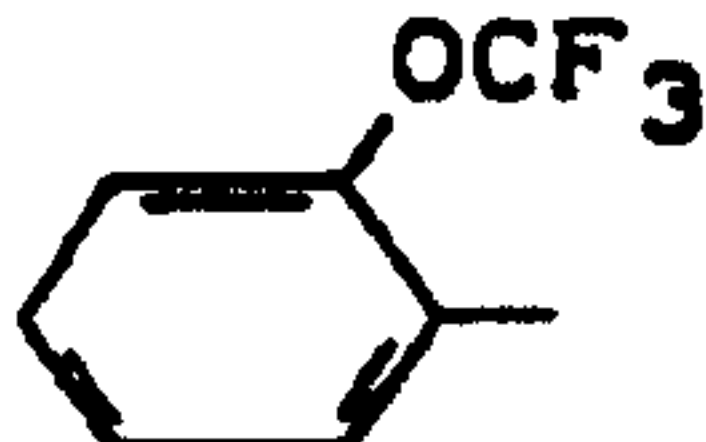
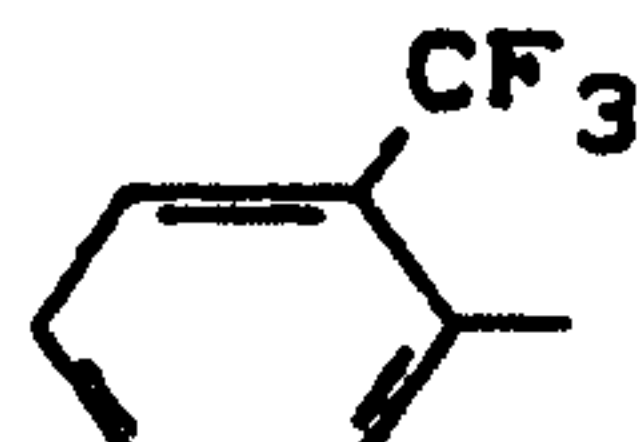
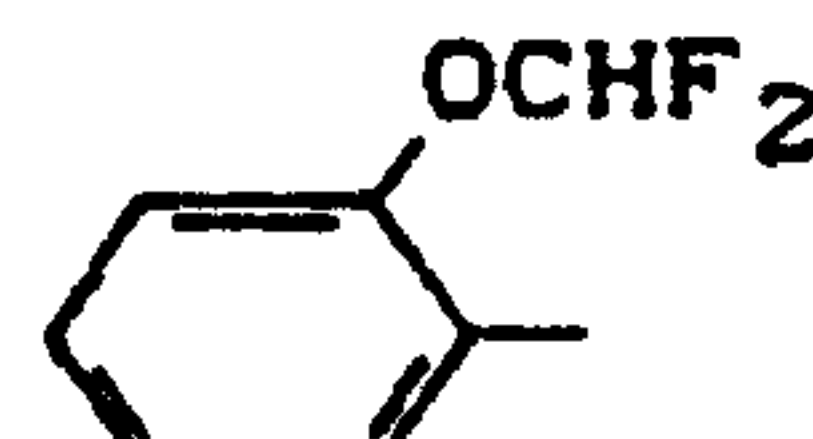
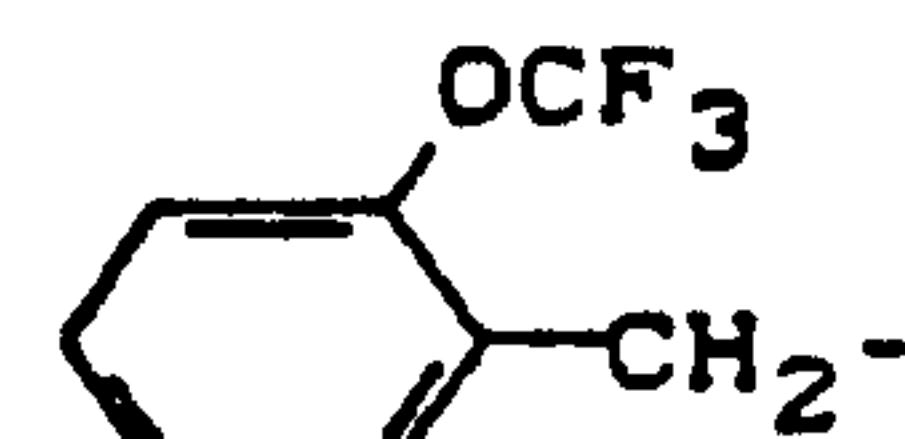
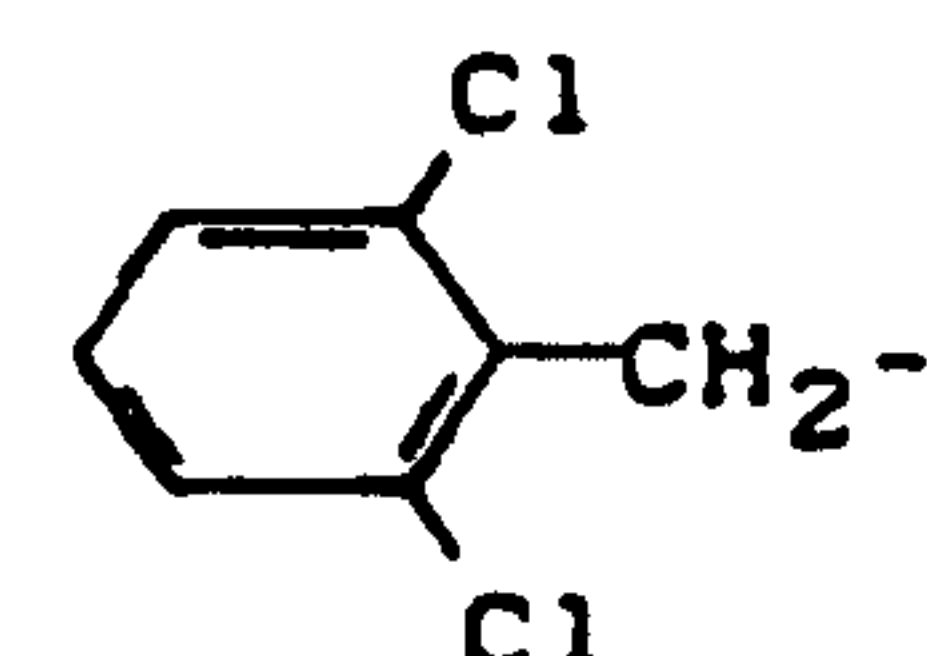
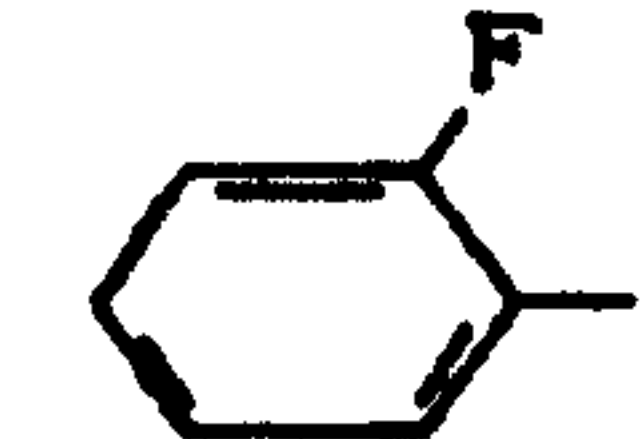
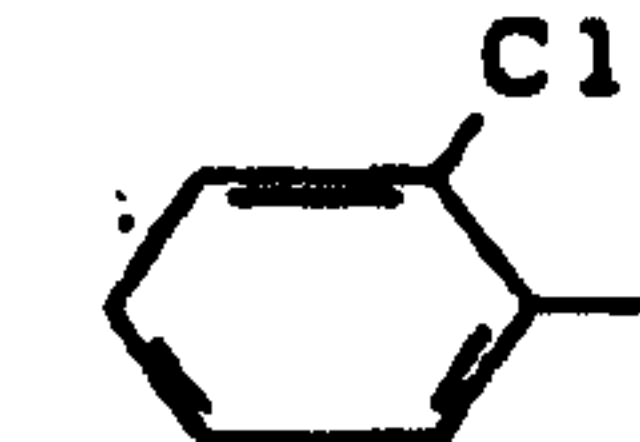
Example No.	R¹	R²	R³	Melting point (°C)
86	C ₂ H ₅	CH ₃		160
87	C ₂ H ₅	CH ₃		146-147
88	C ₂ H ₅	CH ₃		156-157
89	C ₂ H ₅	CH ₃		125-126
90	C ₂ H ₅	CH ₃		137-138
91	C ₂ H ₅	CH ₃		203-204
92	CH ₃	C ₄ H ₉		118-119
93	CH ₃	C ₄ H ₉		146-147

Table 3 - Continuation

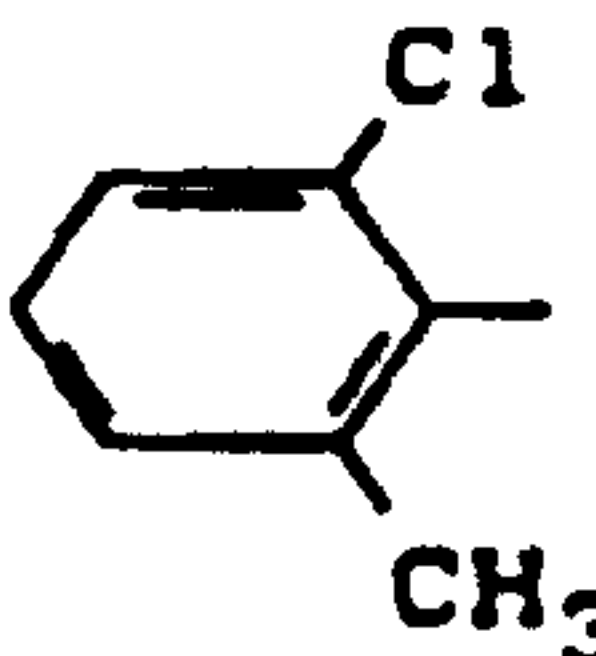
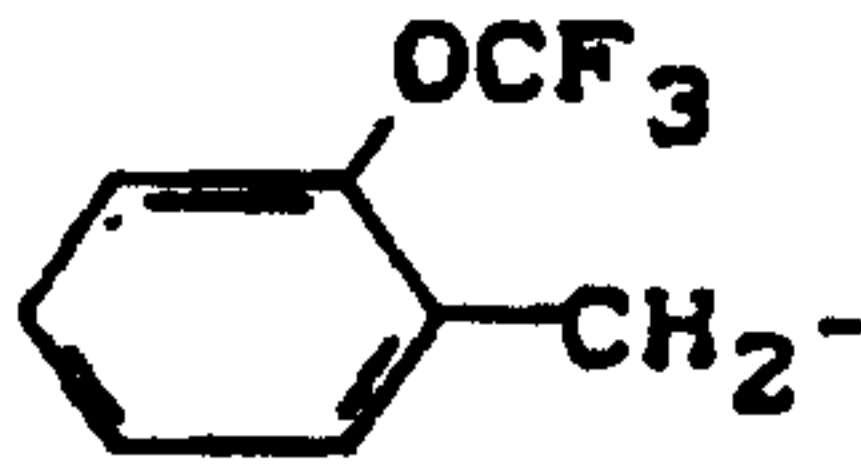
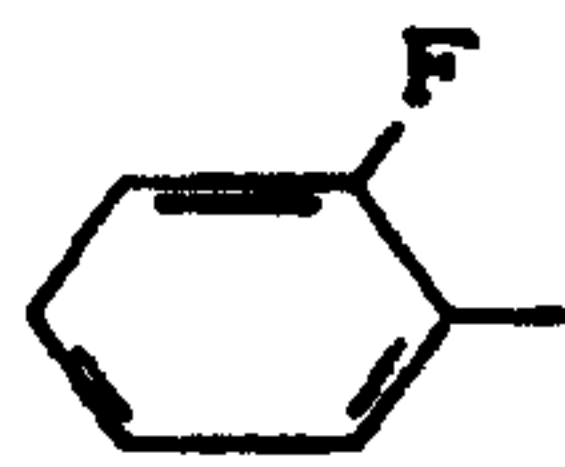
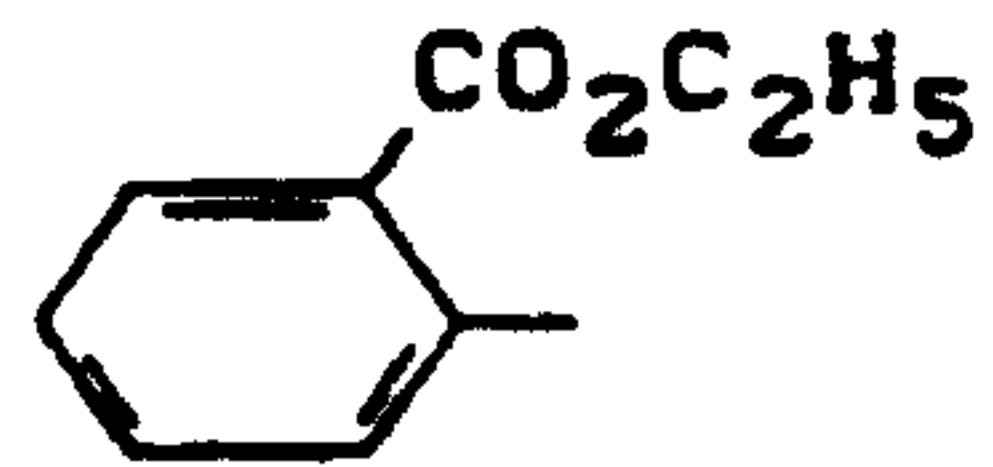
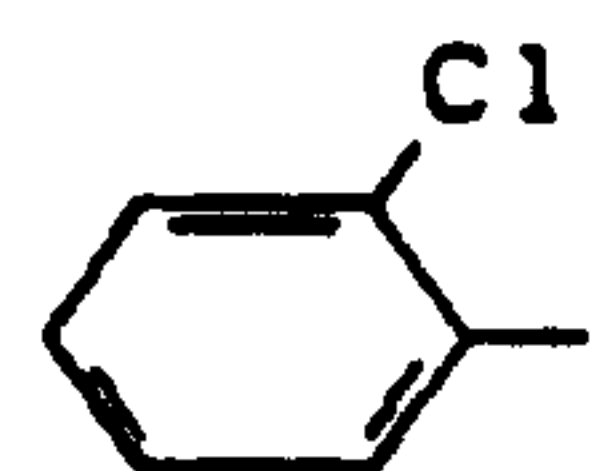
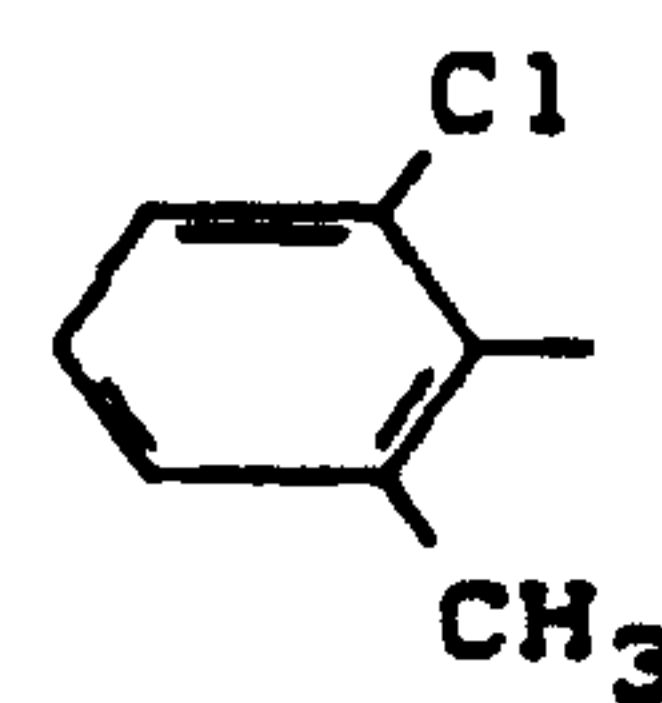
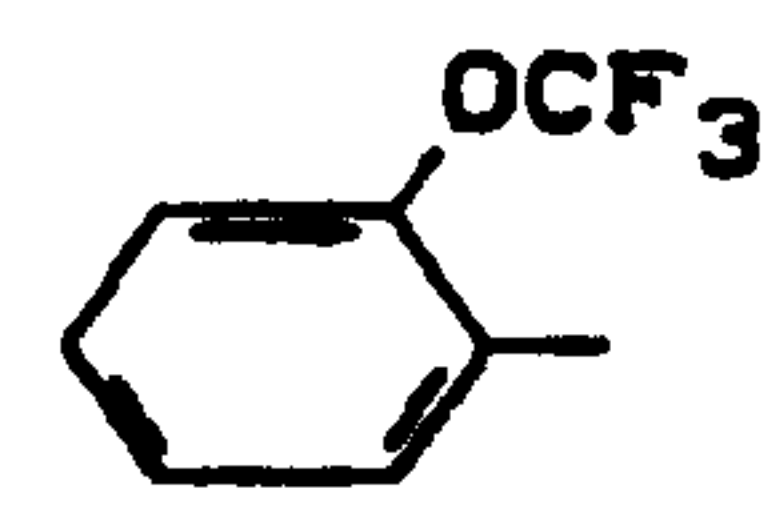
Example No.	R ¹	R ²	R ³	Melting point (°C)
94	CH ₃	C ₄ H ₉		110-111
95	CH ₃	C ₄ H ₉		123-124
96		C ₂ H ₅		152-153
97		C ₂ H ₅		116-117
98		C ₂ H ₅		145-146
99		C ₂ H ₅		132-133
100		C ₂ H ₅		88-89

Table 3 - Continuation

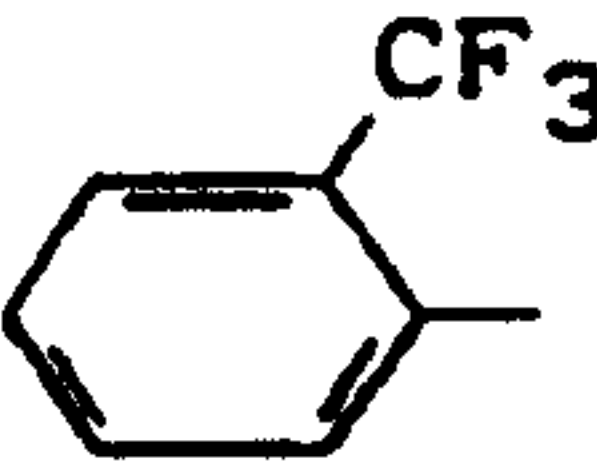
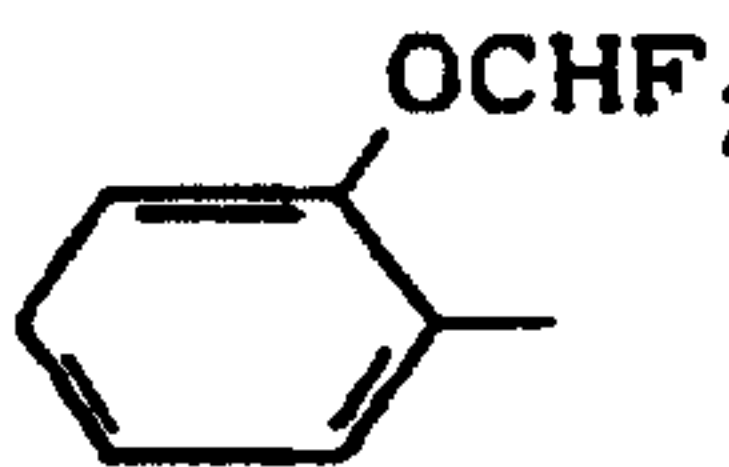
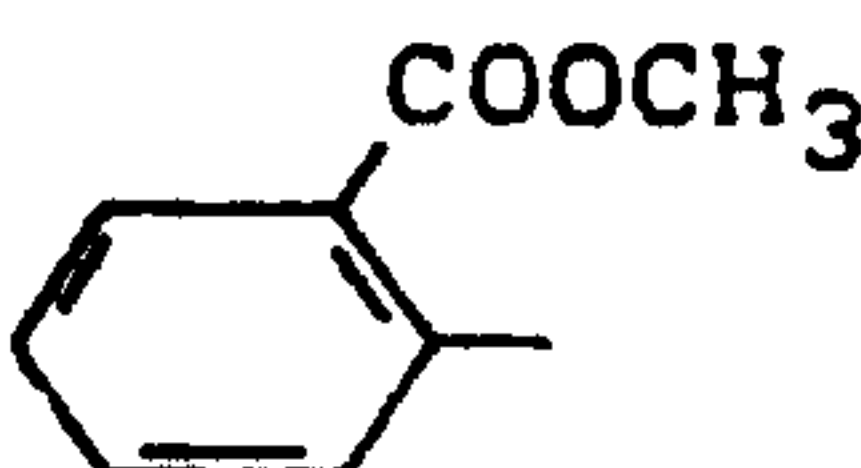
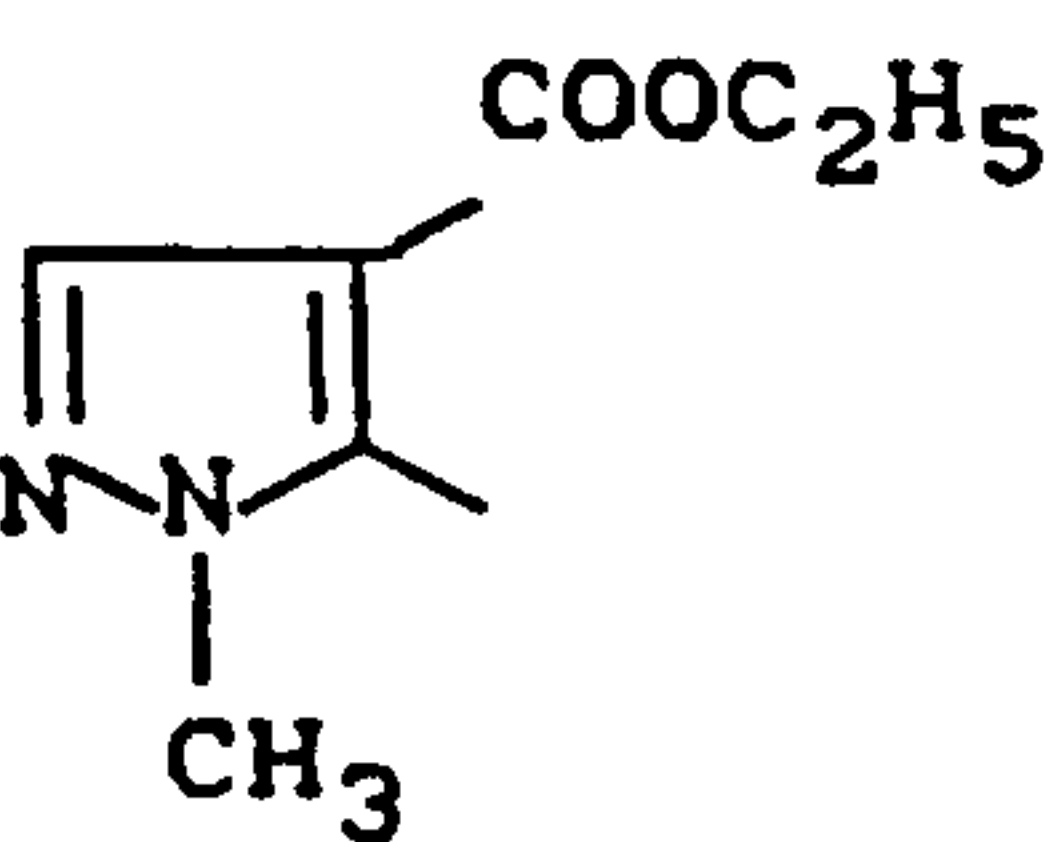
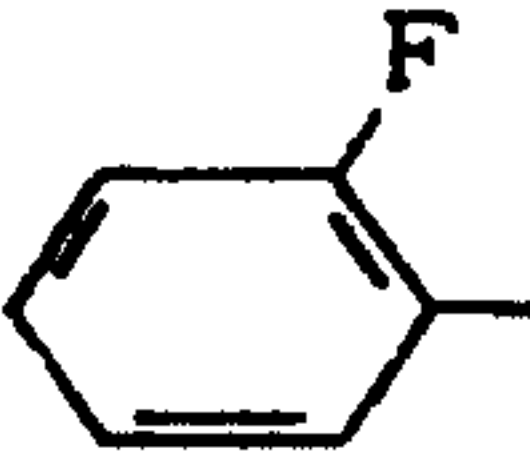
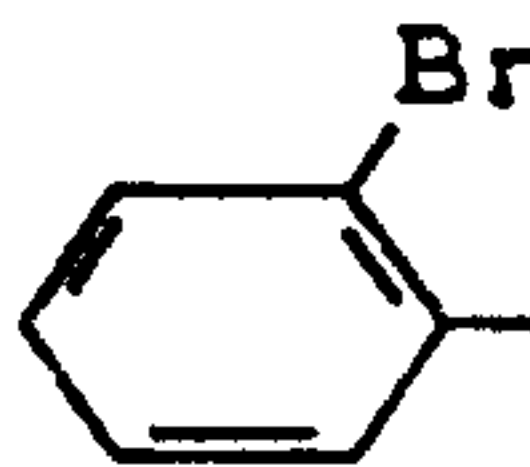
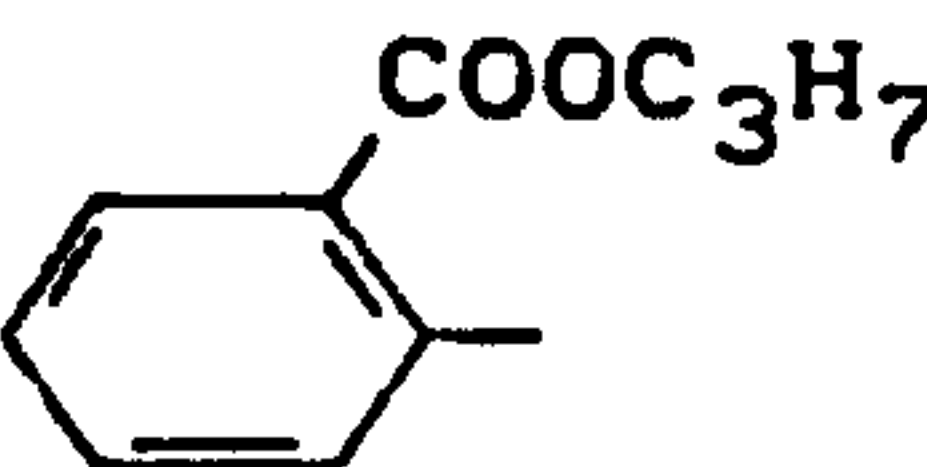
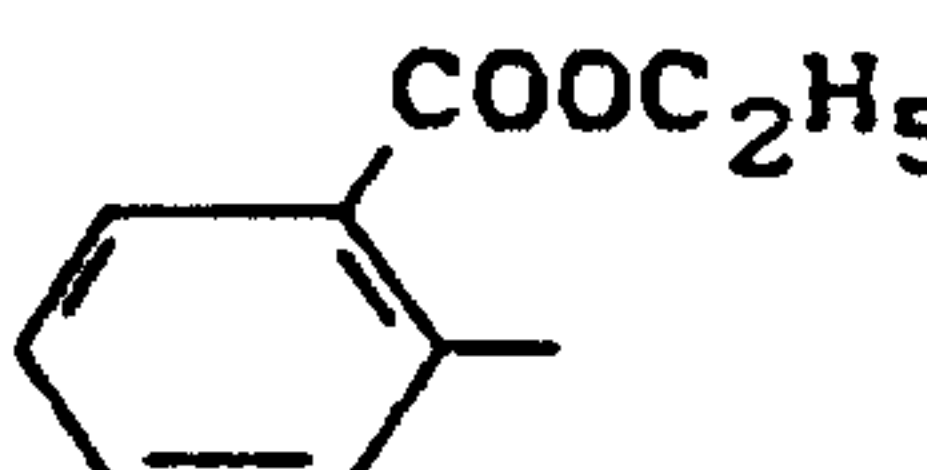
Example No.	R ¹	R ²	R ³	Melting point (°C)
101		C ₂ H ₅		128-129
102		C ₂ H ₅		79-77
103	-CH ₂ -CH=CH ₂	C ₂ H ₅		114-115
104	-CH ₂ -CH=CH ₂	C ₂ H ₅		104-106
105	-CH ₂ -CH=CH ₂	C ₂ H ₅		85-86
106	-CH ₂ -CH=CH ₂	C ₂ H ₅		121-122
107	-CH ₂ -CH=CH ₂	C ₂ H ₅		107-108
108	-CH ₂ -CH=CH ₂	C ₂ H ₅		123-124

Table 3 - Continuation

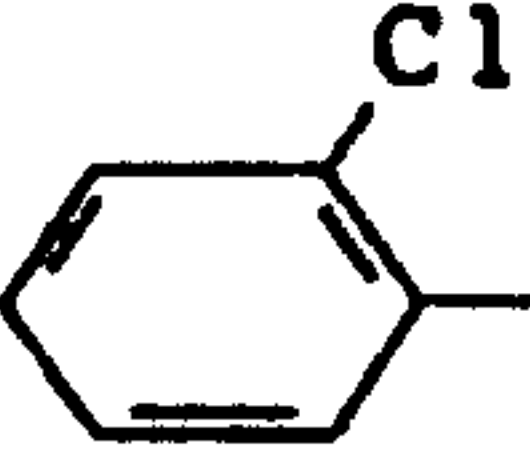
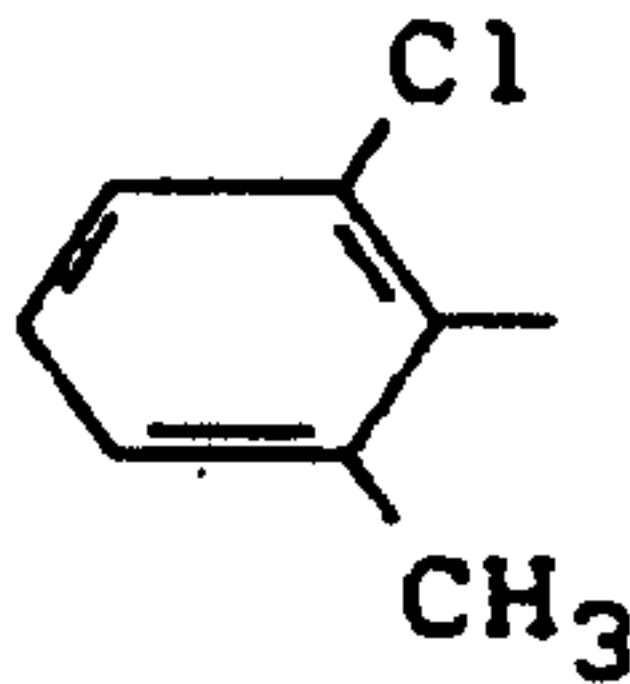
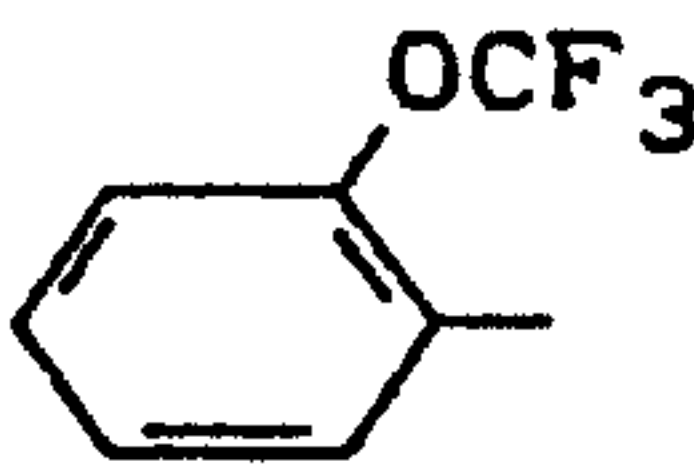
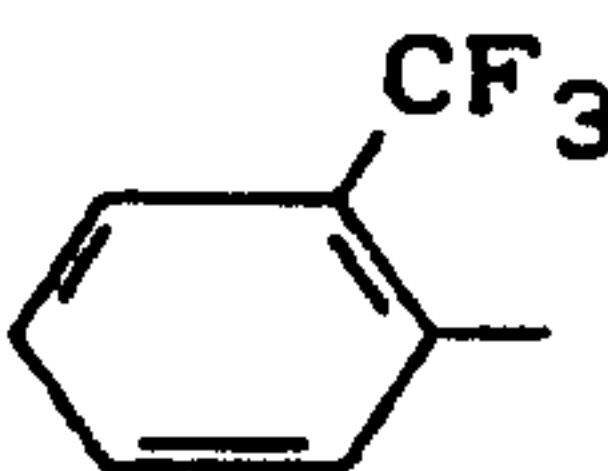
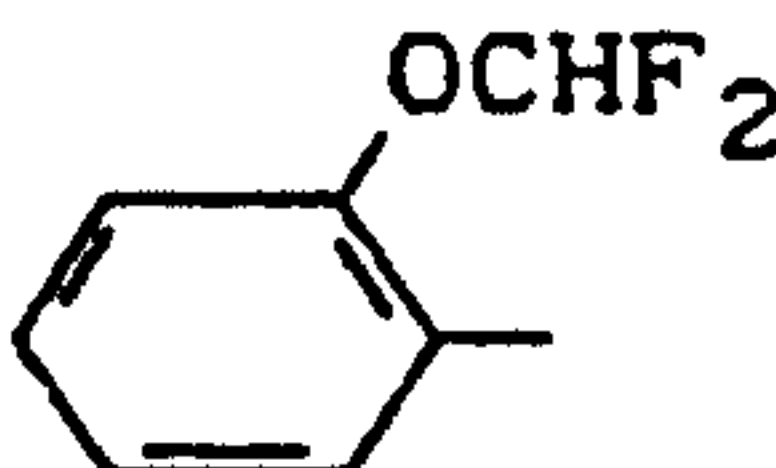
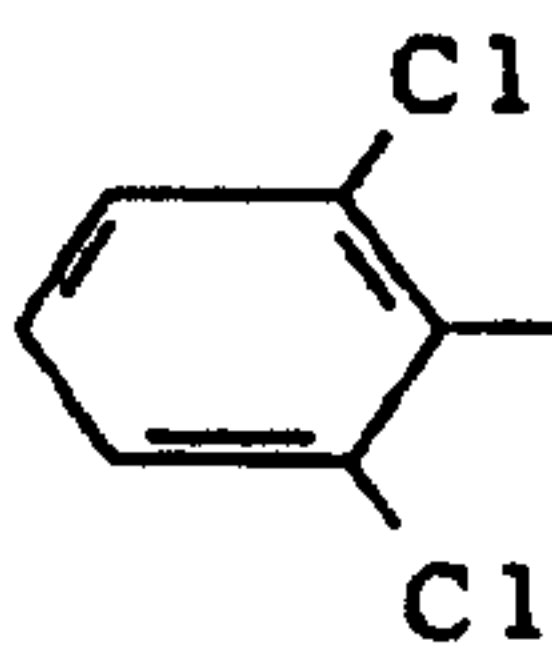
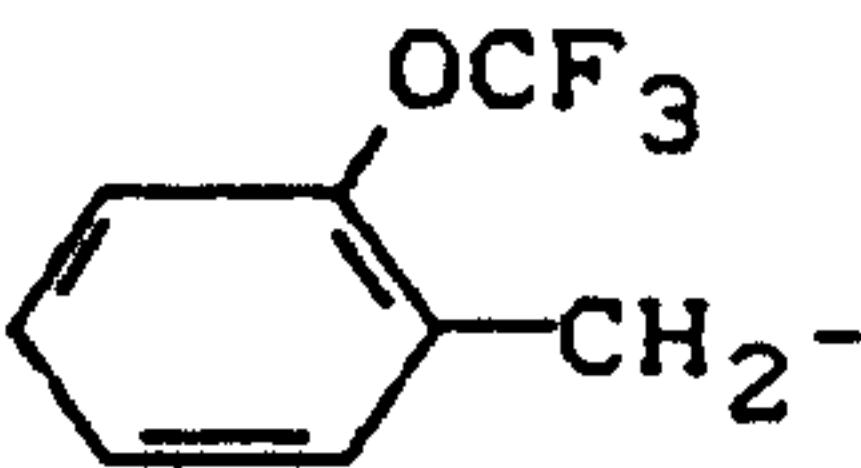
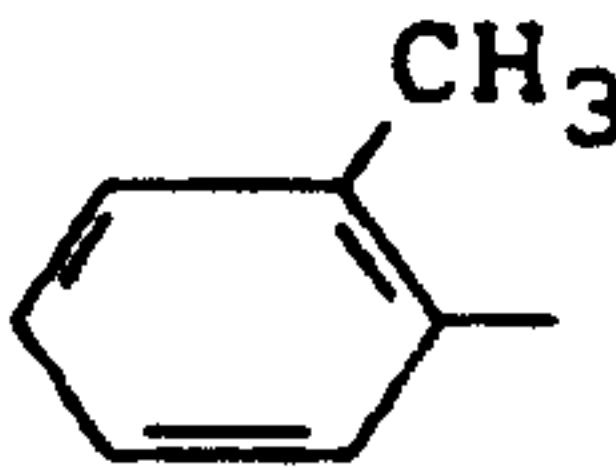
Example No.	R ¹	R ²	R ³	Melting point (°C)
109	-CH ₂ -CH=CH ₂	C ₂ H ₅		131-132
110	-CH ₂ -CH=CH ₂	C ₂ H ₅		118-119
111	-CH ₂ -CH=CH ₂	C ₂ H ₅		110-111
112	-CH ₂ -CH=CH ₂	C ₂ H ₅		123-124
113	-CH ₂ -CH=CH ₂	C ₂ H ₅		103-104
114	-CH ₂ -CH=CH ₂	C ₂ H ₅		>250
115	-CH ₂ -CH=CH ₂	C ₂ H ₅		114-115
116	-CH ₂ -CH=CH ₂	C ₂ H ₅		122-123

Table 3 - Continuation

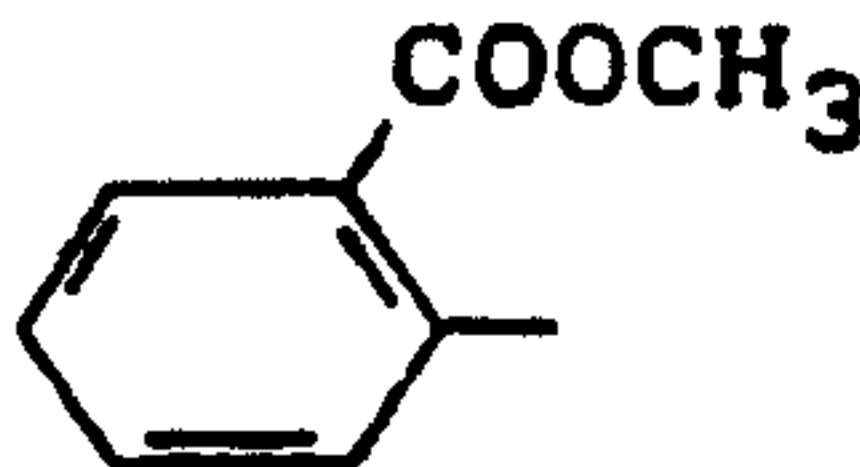
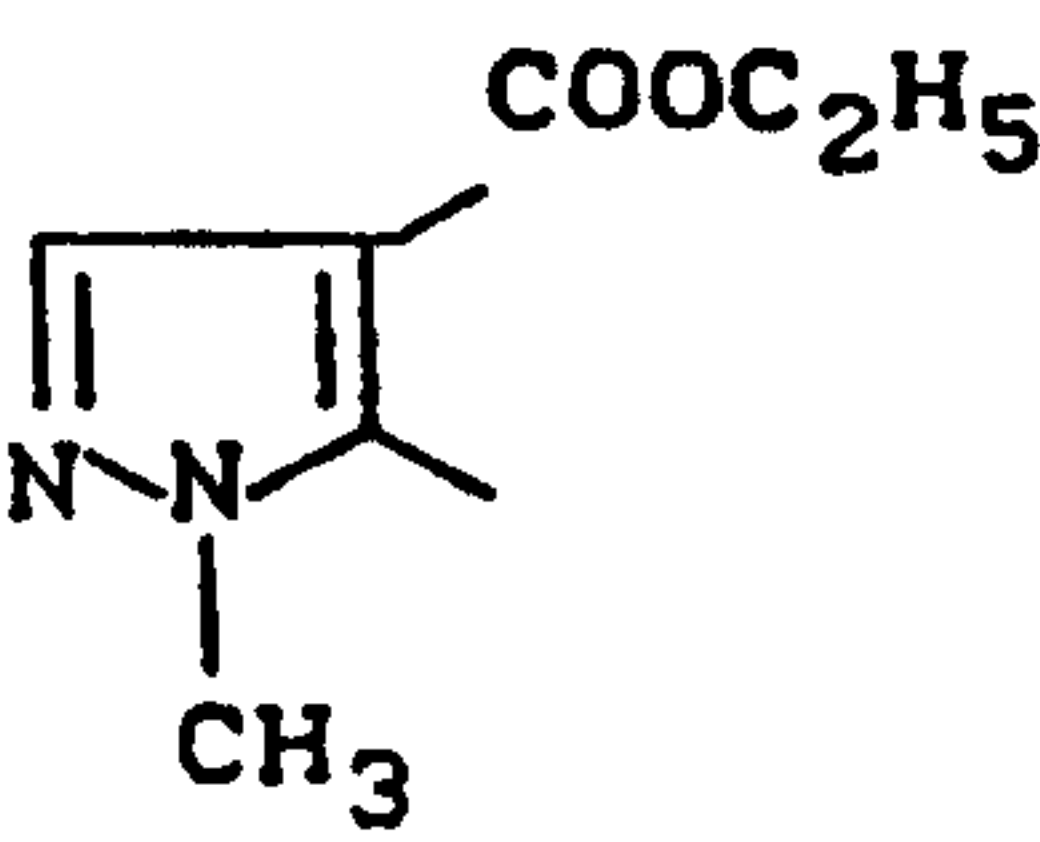
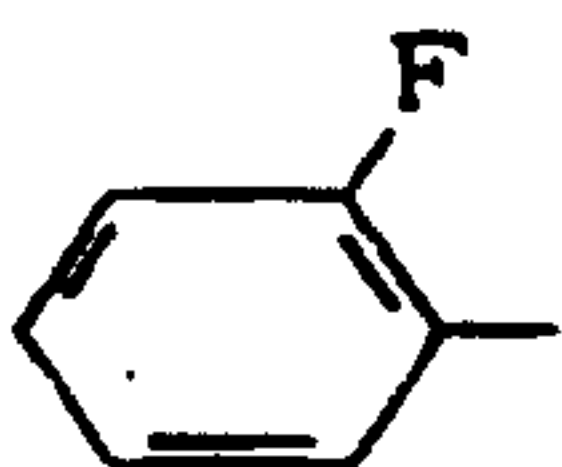
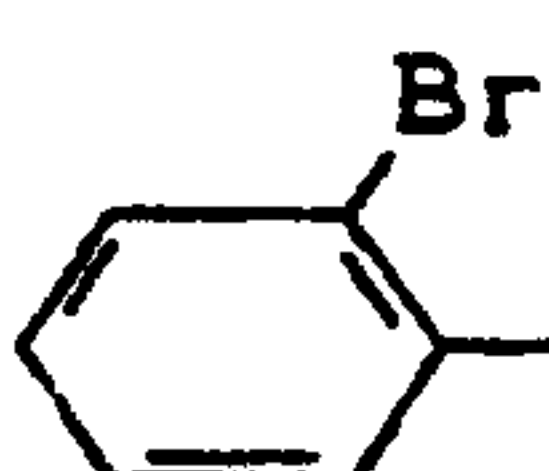
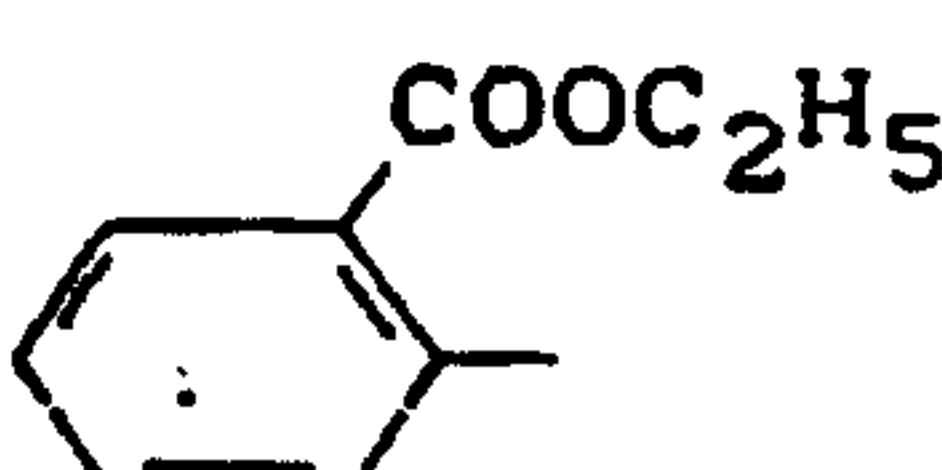
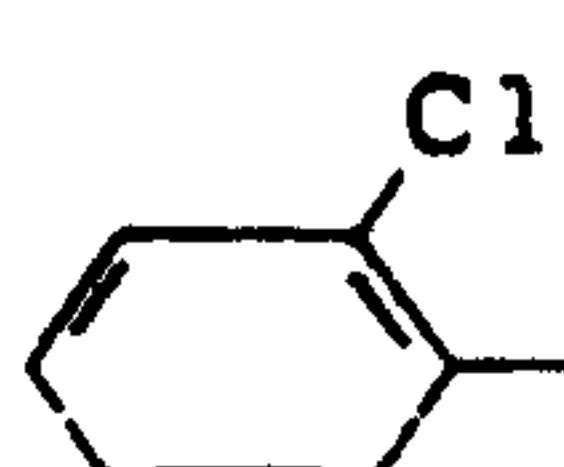
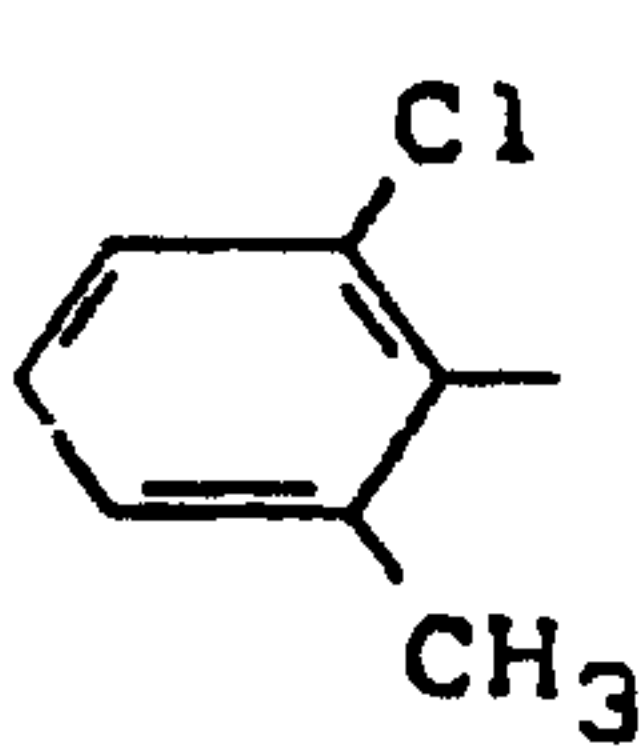
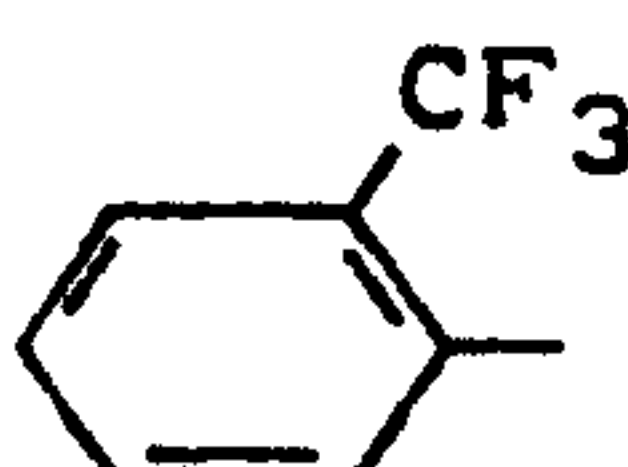
Example No.	R ¹	R ²	R ³	Melting point (°C)
117	CH(CH ₃) ₂	C ₂ H ₅		188-190
118	CH(CH ₃) ₂	C ₂ H ₅		230-231
119	CH(CH ₃) ₂	C ₂ H ₅		129-130
120	CH(CH ₃) ₂	C ₂ H ₅		207 (Zers.)
121	CH(CH ₃) ₂	C ₂ H ₅		113-114
122	CH(CH ₃) ₂	C ₂ H ₅		195-200
123	CH(CH ₃) ₂	C ₂ H ₅		133-134
124	CH(CH ₃) ₂	C ₂ H ₅		139-140

Table 3 - Continuation

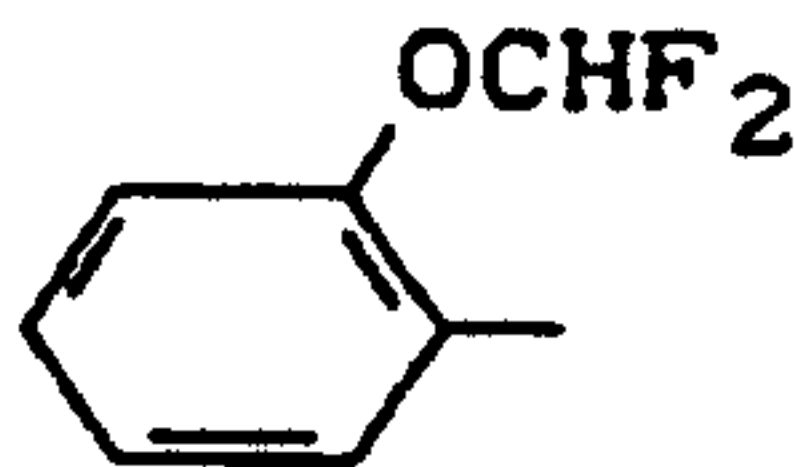
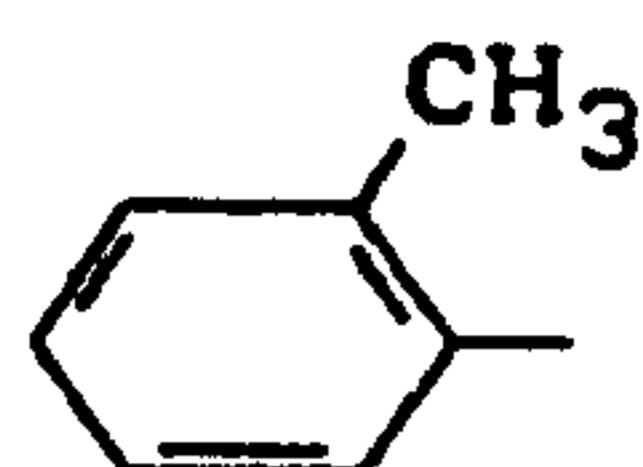
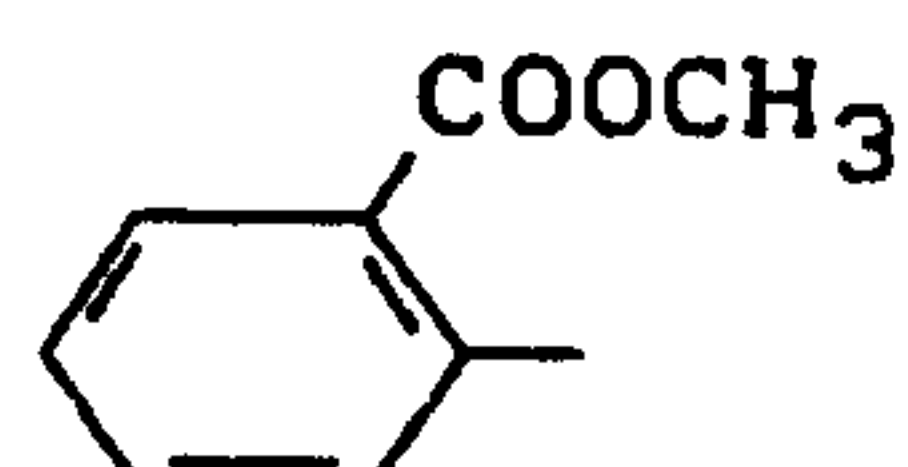
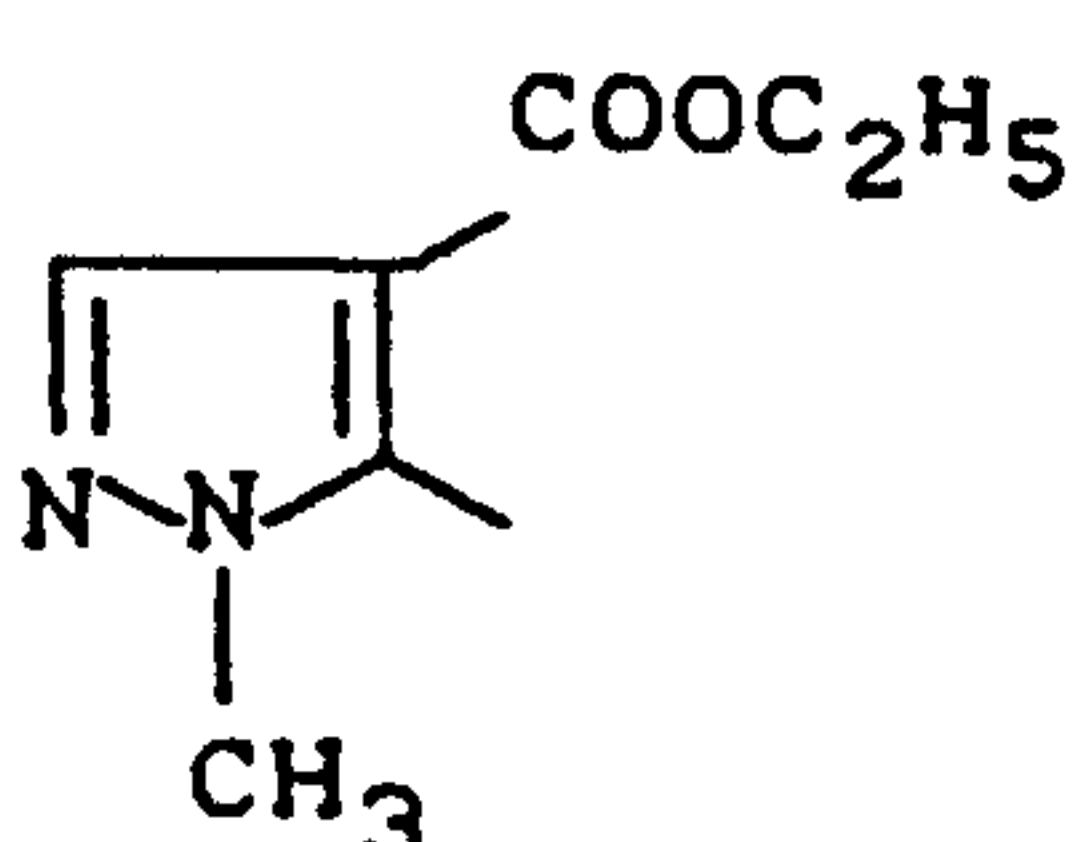
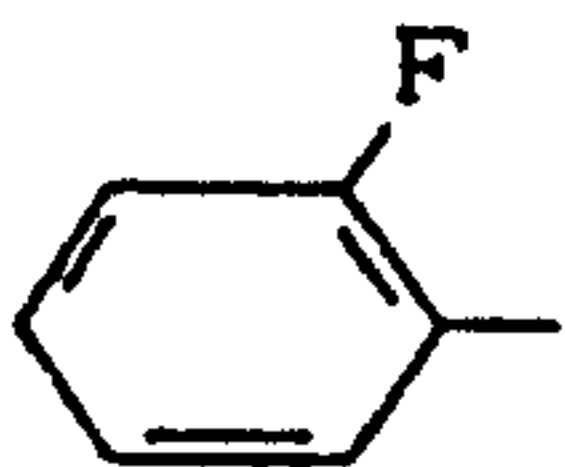
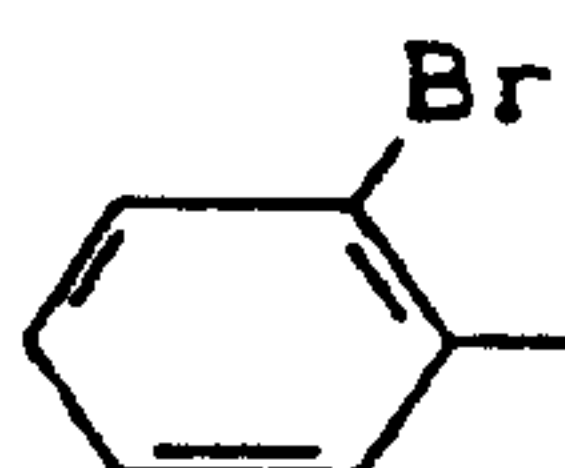
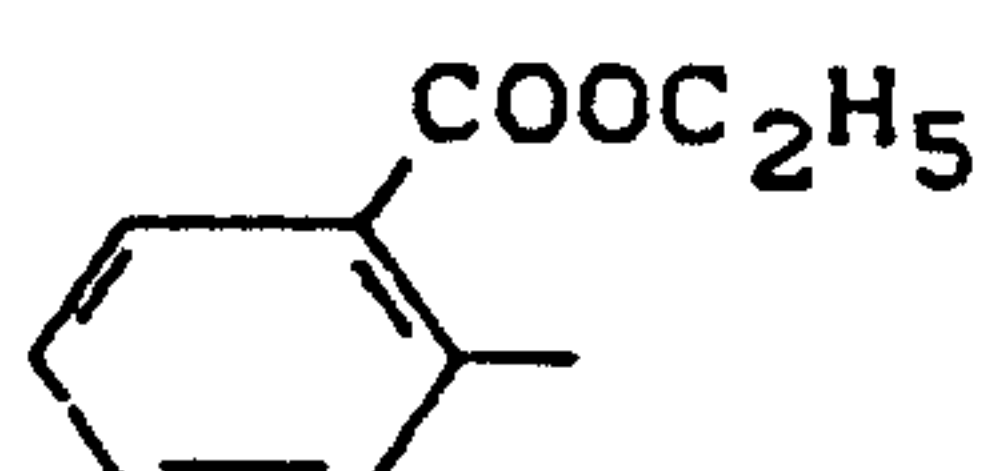
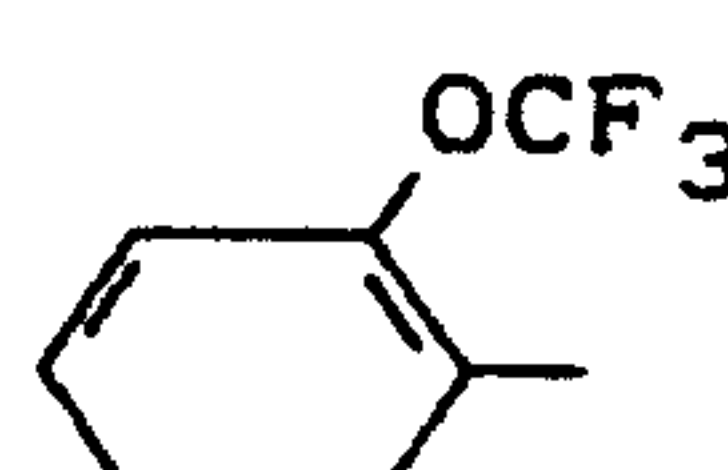
Example No.	R ¹	R ²	R ³	Melting point (°C)
125	CH(CH ₃) ₂	C ₂ H ₅		105-106
126	CH(CH ₃) ₂	C ₂ H ₅		123-124
127	-(CH ₂) ₃ -OCH ₃	CH ₃		112-114
128	-(CH ₂) ₃ -OCH ₃	CH ₃		92-95
129	-(CH ₂) ₃ -OCH ₃	CH ₃		126-127
130	-(CH ₂) ₃ -OCH ₃	CH ₃		115-116
131	-(CH ₂) ₃ -OCH ₃	CH ₃		112-113
132	-(CH ₂) ₃ -OCH ₃	CH ₃		81-82

Table 3 - Continuation

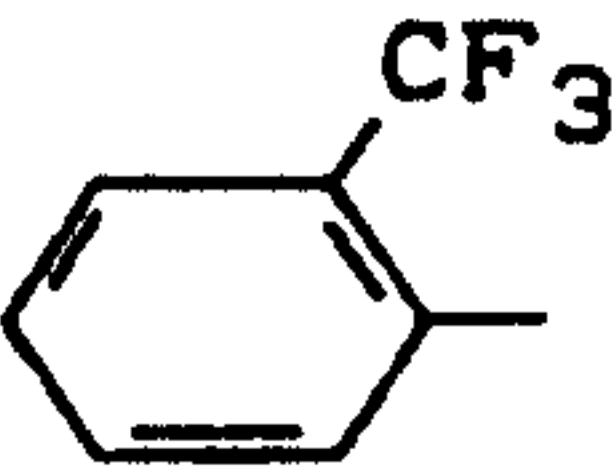
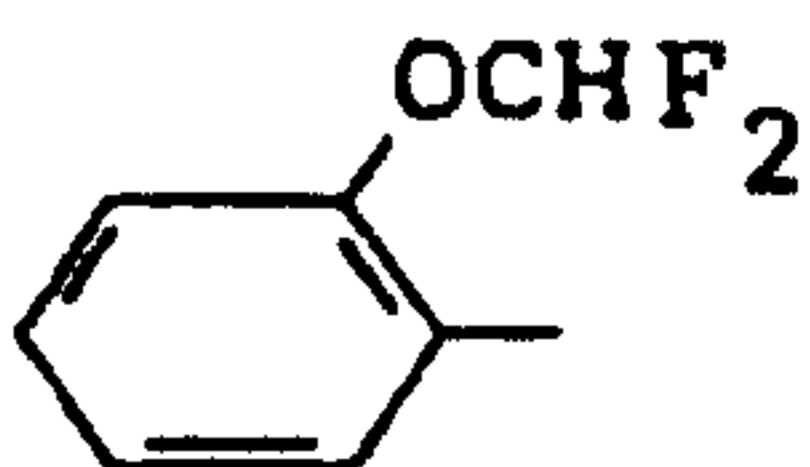
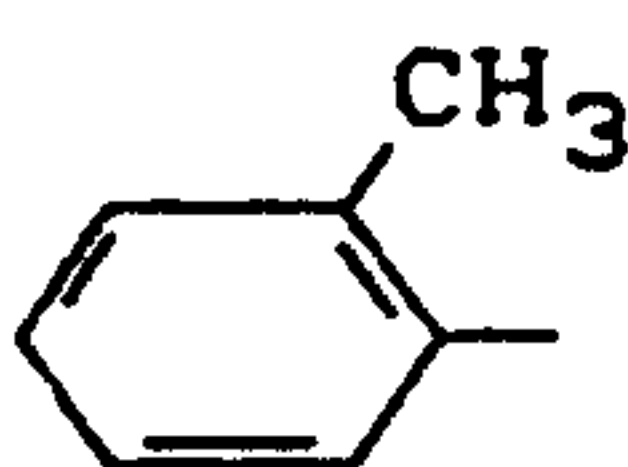
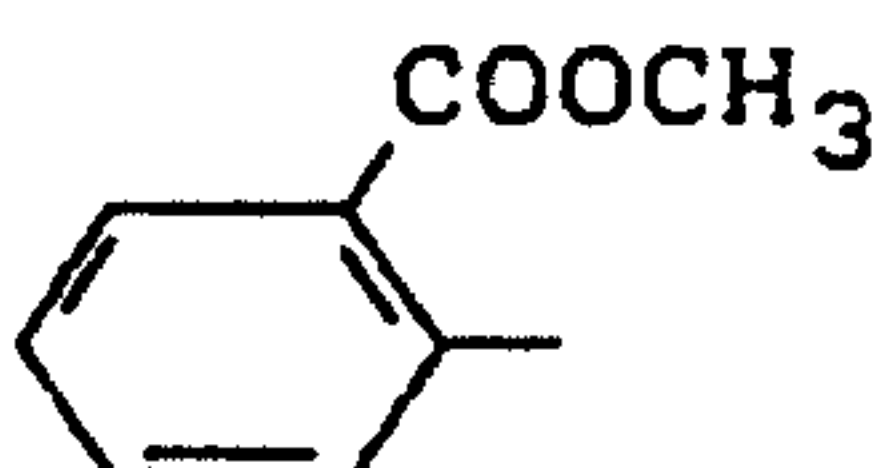
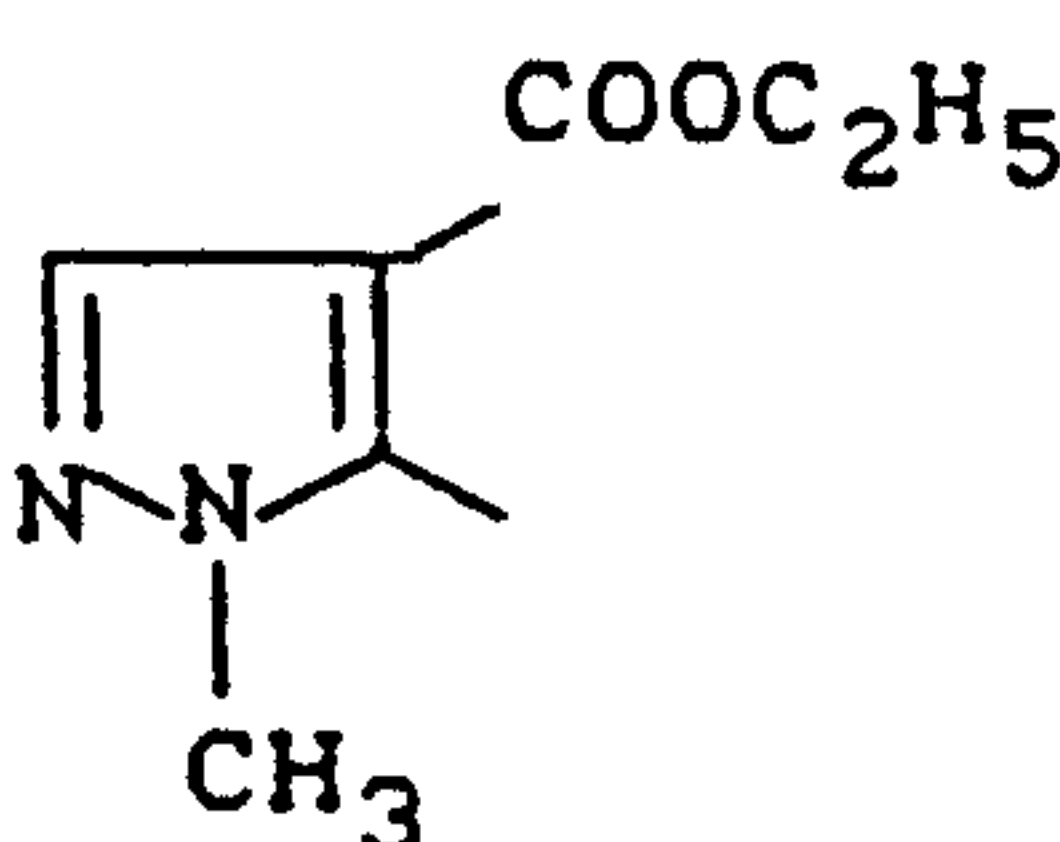
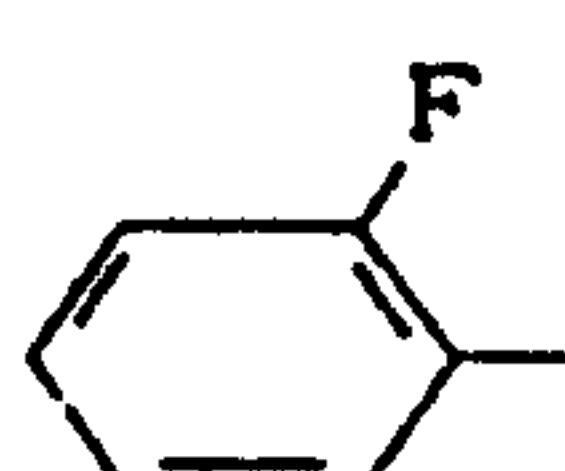
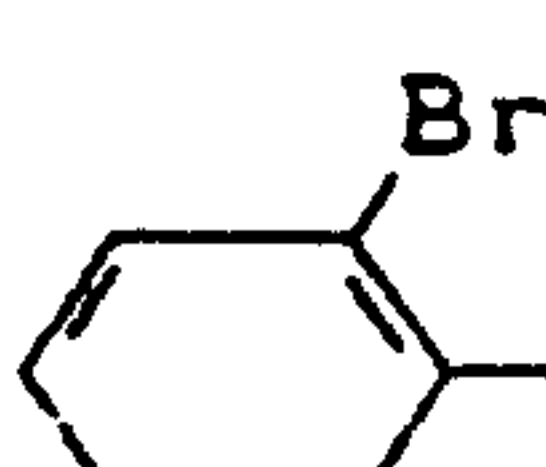
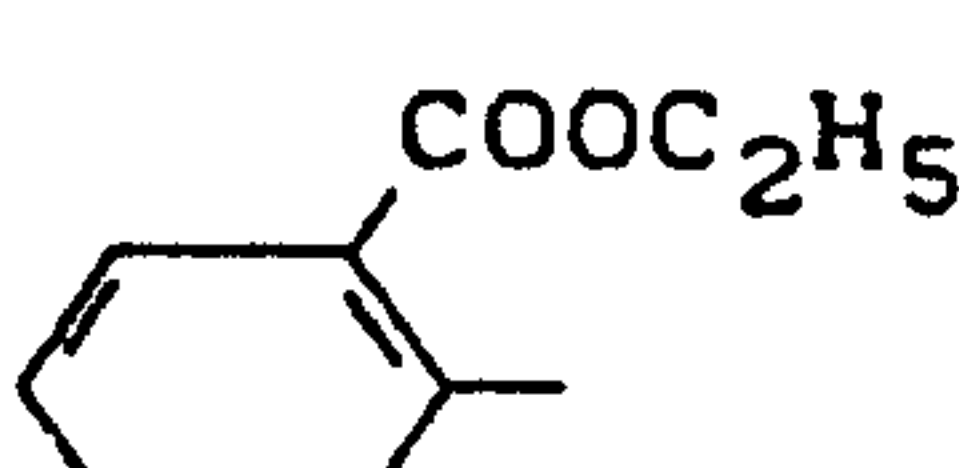
Example No.	R ¹	R ²	R ³	Melting point (°C)
133	-(CH ₂) ₃ -OCH ₃	CH ₃		104-105
134	-(CH ₂) ₃ -OCH ₃	CH ₃		113-114
135	-(CH ₂) ₃ -OCH ₃	CH ₃		91-92
136	n-C ₃ H ₇	C ₂ H ₅		108 (Zers.)
137	n-C ₃ H ₇	C ₂ H ₅		212-213
138	n-C ₃ H ₇	C ₂ H ₅		106-107
139	n-C ₃ H ₇	C ₂ H ₅		127-128
140	n-C ₃ H ₇	C ₂ H ₅		95 (Zers.)

Table 3 - Continuation

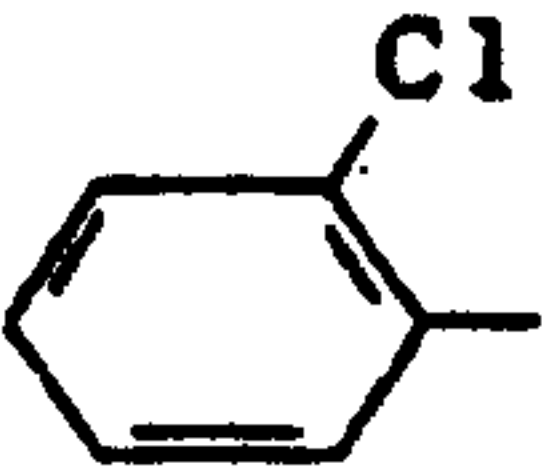
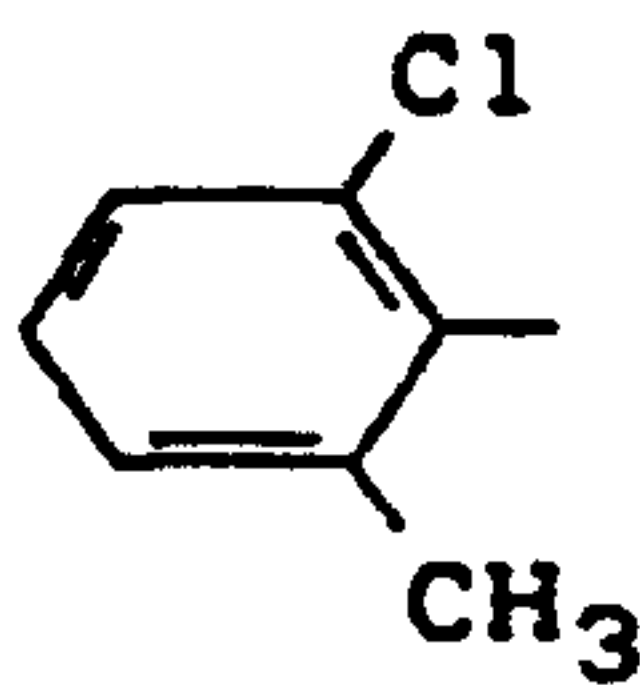
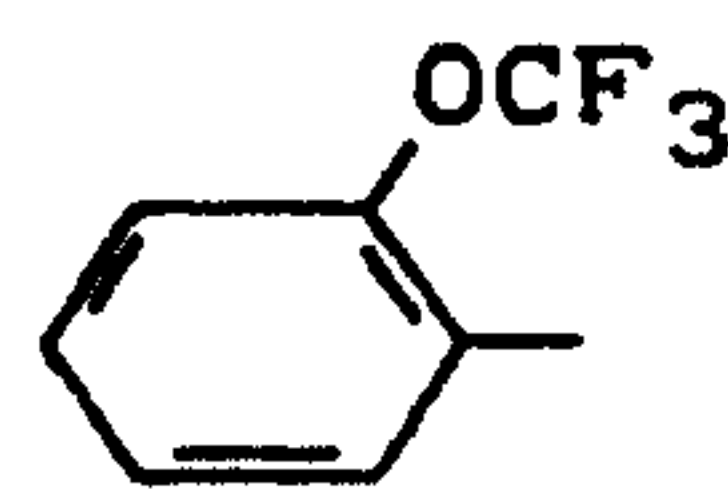
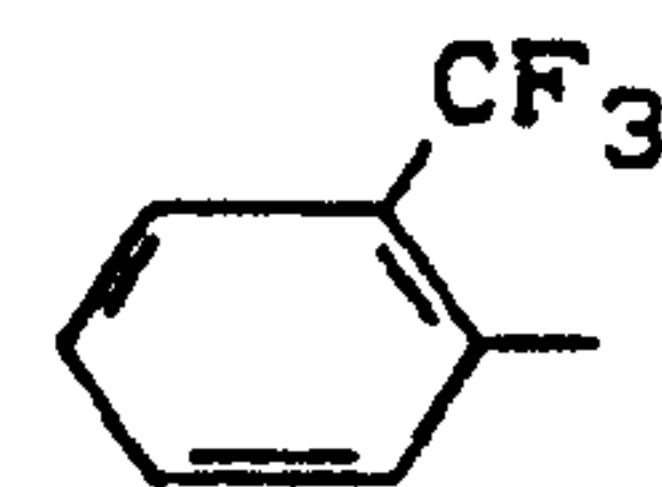
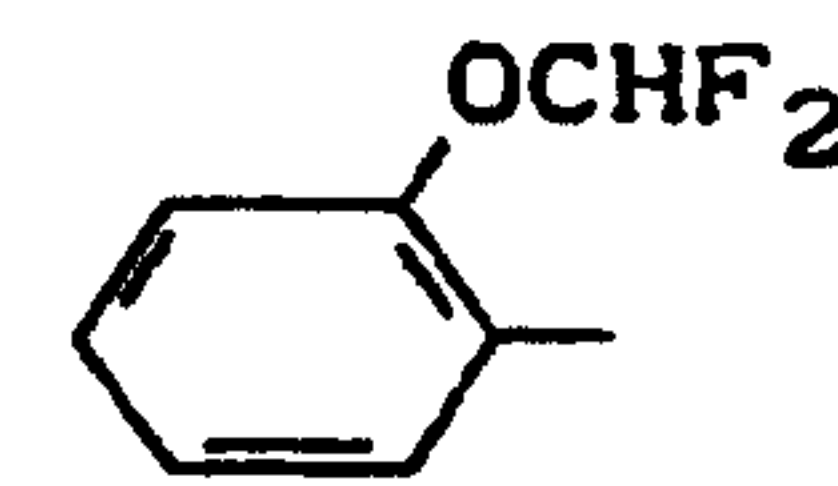
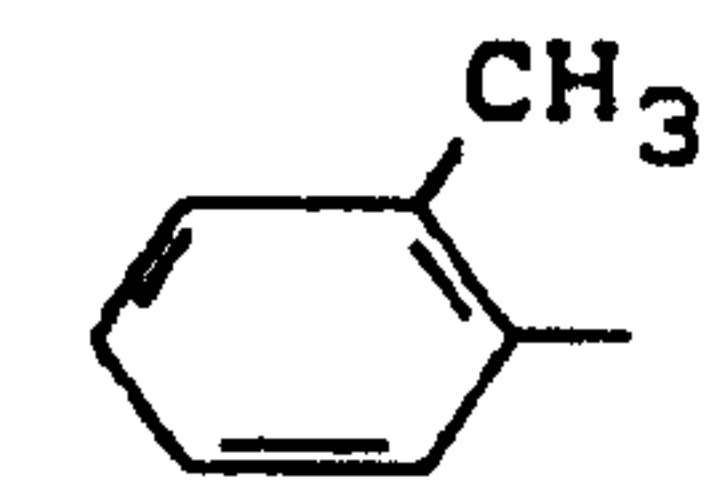
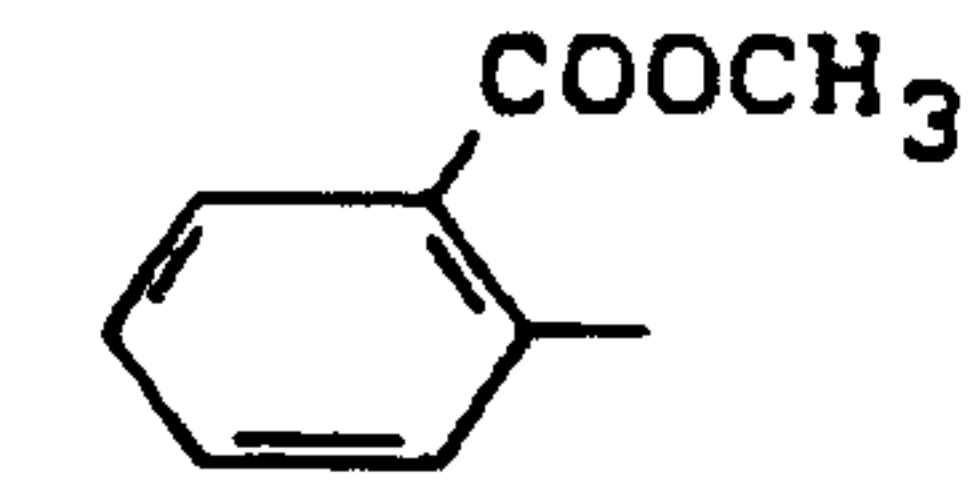
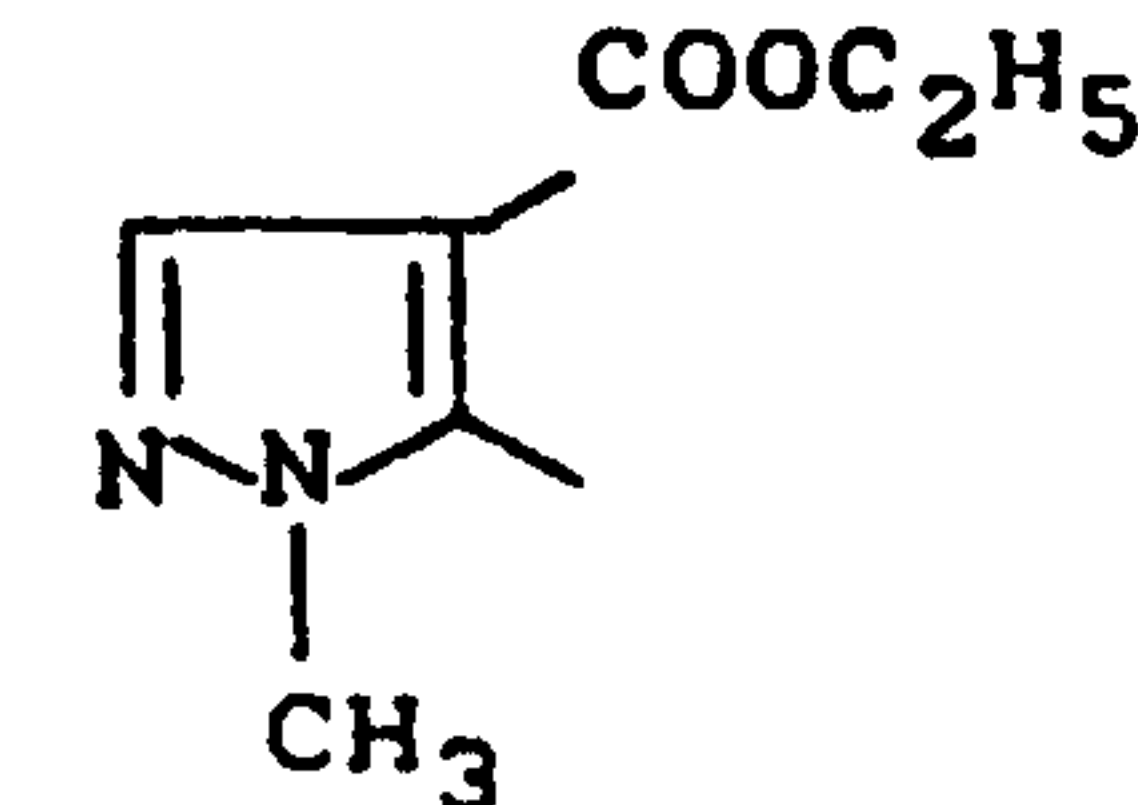
Example No.	R ¹	R ²	R ³	Melting point (°C)
141	n-C ₃ H ₇	C ₂ H ₅		132-135
142	n-C ₃ H ₇	C ₂ H ₅		138-140
143	n-C ₃ H ₇	C ₂ H ₅		87-88
144	n-C ₃ H ₇	C ₂ H ₅		108-109
145	n-C ₃ H ₇	C ₂ H ₅		154-157
146	n-C ₃ H ₇	C ₂ H ₅		130-133
147	CH(CH ₃) ₂	CH ₃		150-151
148	CH(CH ₃) ₂	CH ₃		160-161

Table 3 - Continuation

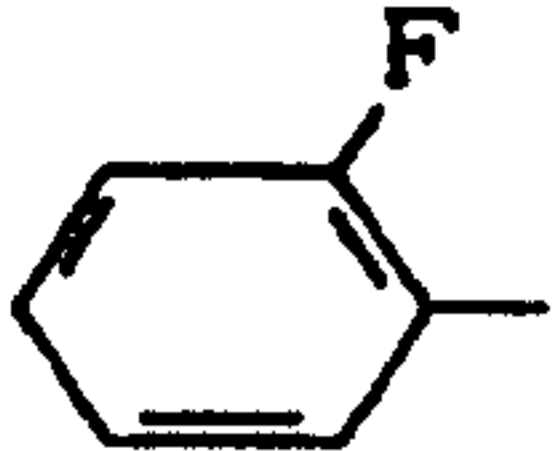
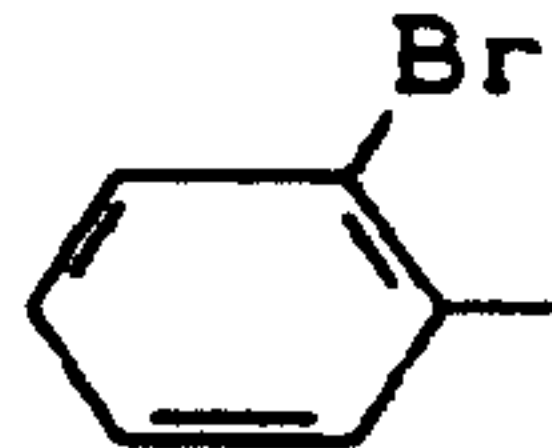
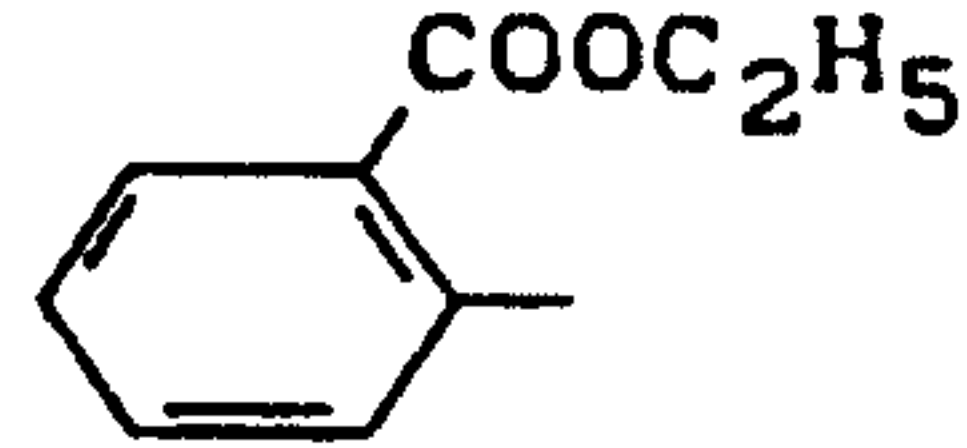
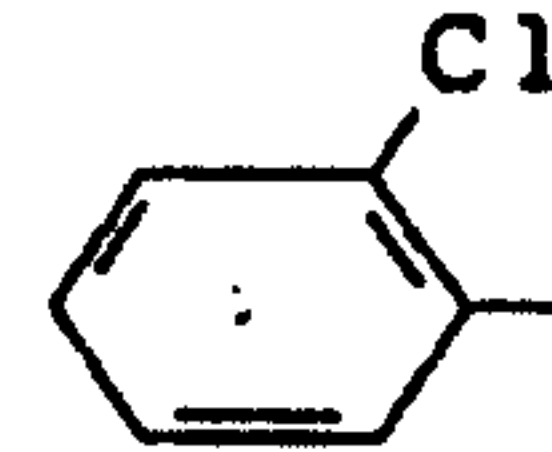
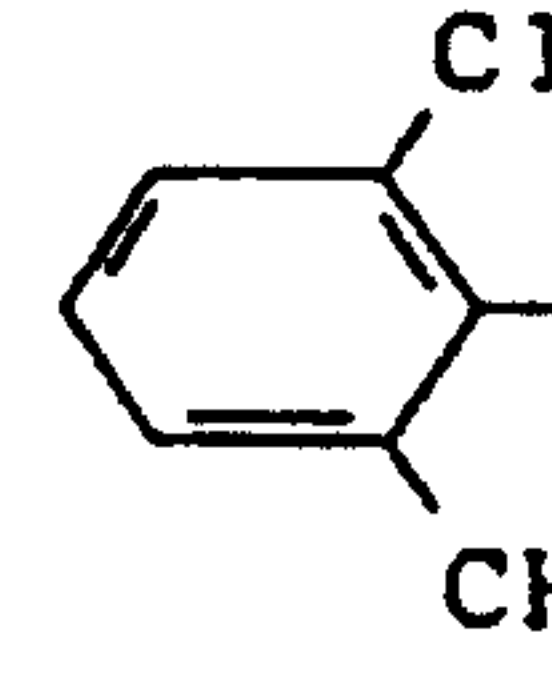
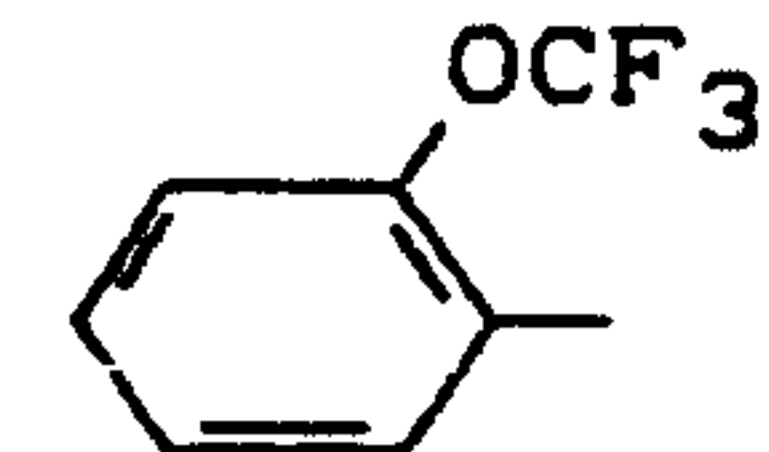
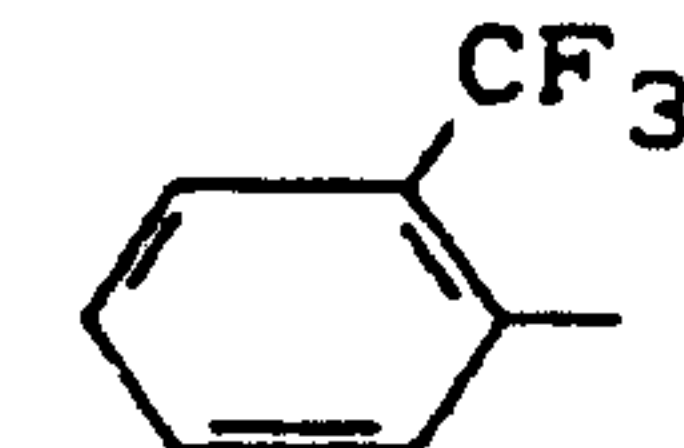
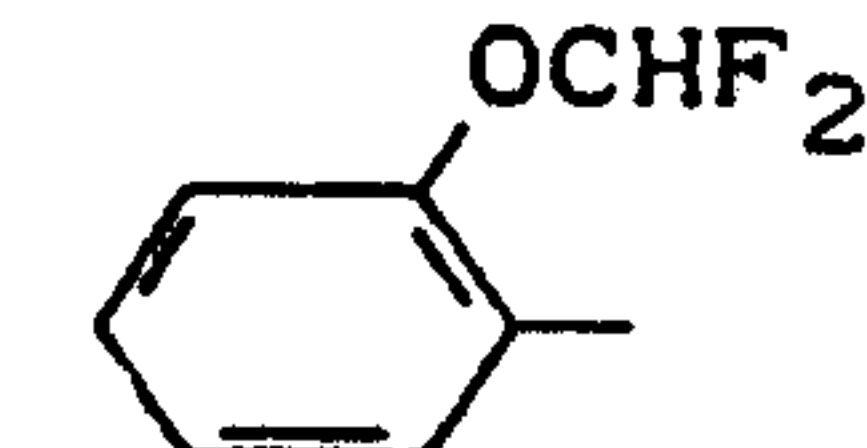
Example No.	R ¹	R ²	R ³	Melting point (°C)
149	CH(CH ₃) ₂	CH ₃		147-148
150	CH(CH ₃) ₂	CH ₃		148-150
151	CH(CH ₃) ₂	CH ₃		143-144
152	CH(CH ₃) ₂	CH ₃		134-135
153	CH(CH ₃) ₂	CH ₃		147-150
154	CH(CH ₃) ₂	CH ₃		148-150
155	CH(CH ₃) ₂	CH ₃		143-145
156	CH(CH ₃) ₂	CH ₃		114-116

Table 3 - Continuation

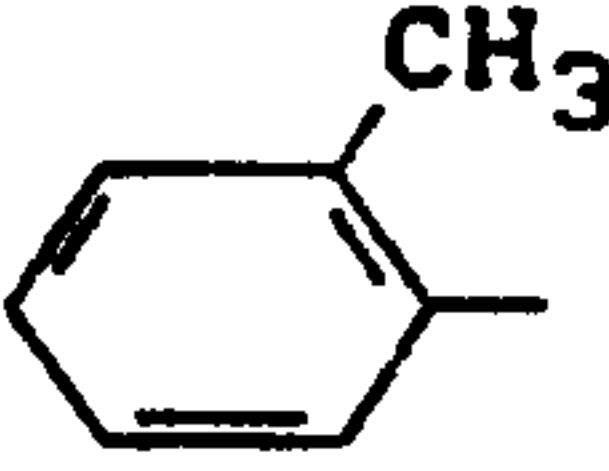
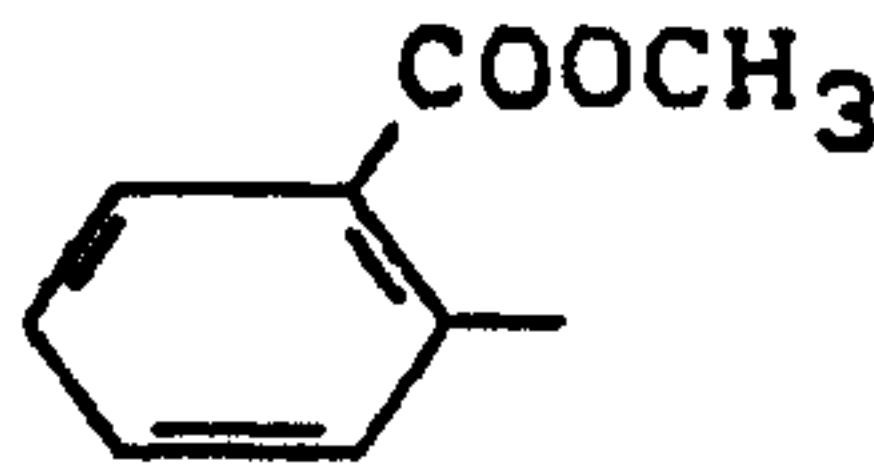
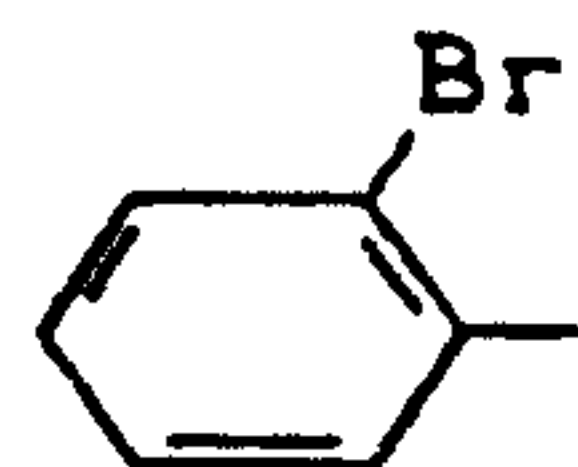
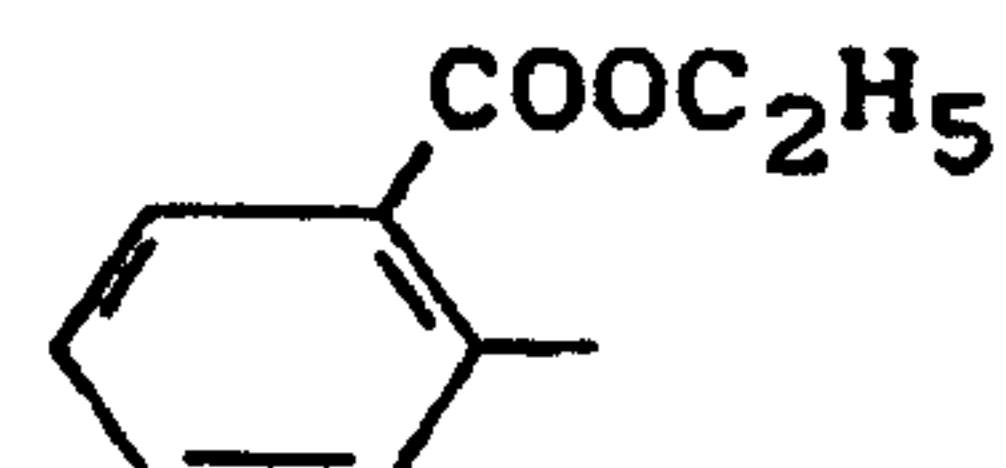
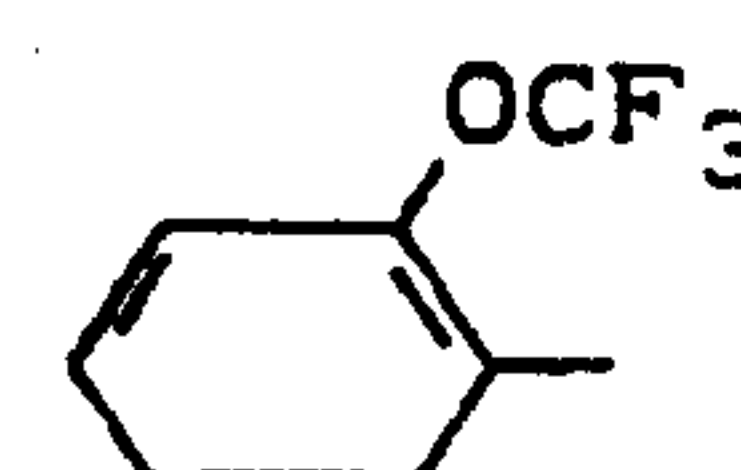
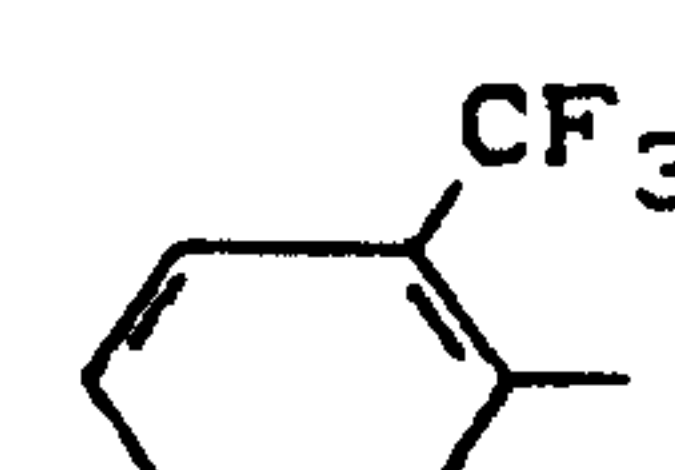
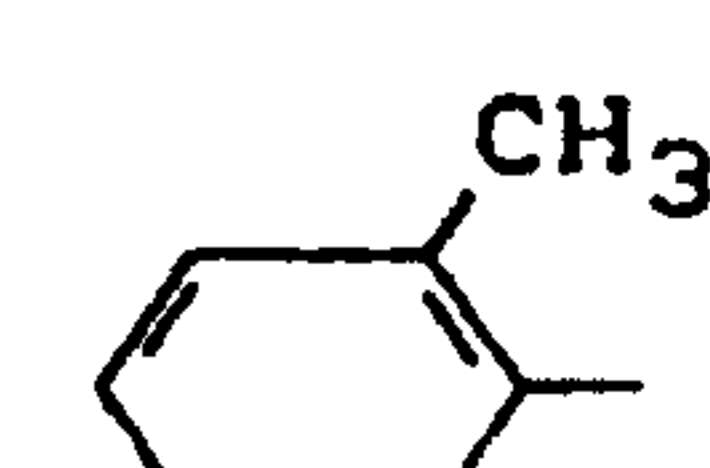
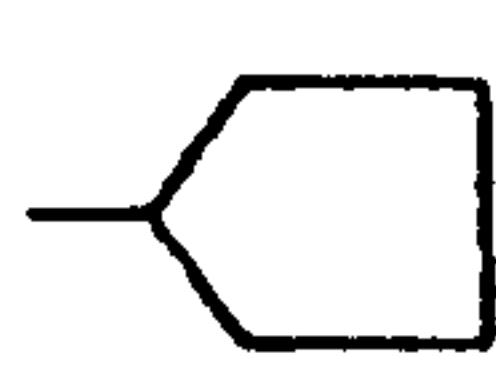
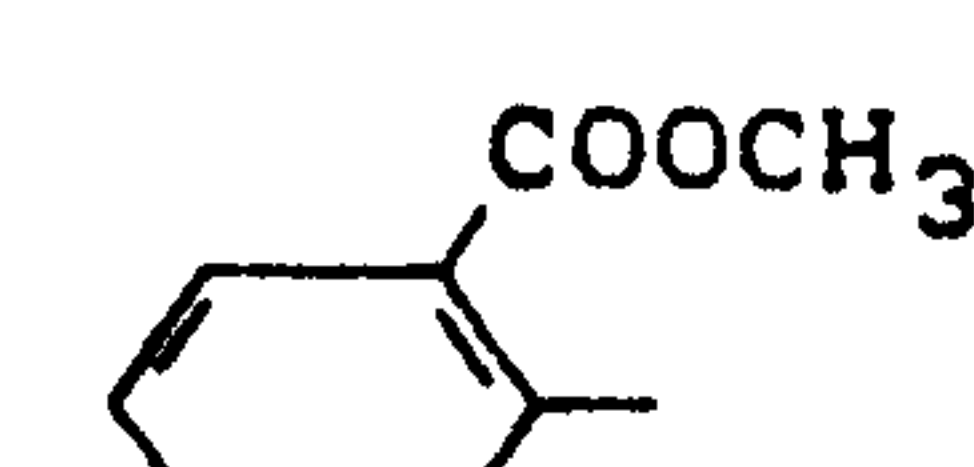
Example No.	R ¹	R ²	R ³	Melting point (°C)
157	CH(CH ₃) ₂	CH ₃		125-128
158	CH ₃	CH(CH ₃) ₂		95-97
159	CH ₃	CH(CH ₃) ₂		158-160
160	CH ₃	CH(CH ₃) ₂		152-153
161	CH ₃	CH(CH ₃) ₂		150-152
162	CH ₃	CH(CH ₃) ₂		128-130
163	CH ₃	CH(CH ₃) ₂		150-152
164	CH ₃			117-118

Table 3 - Continuation

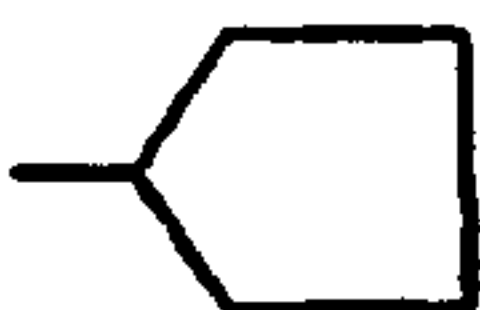
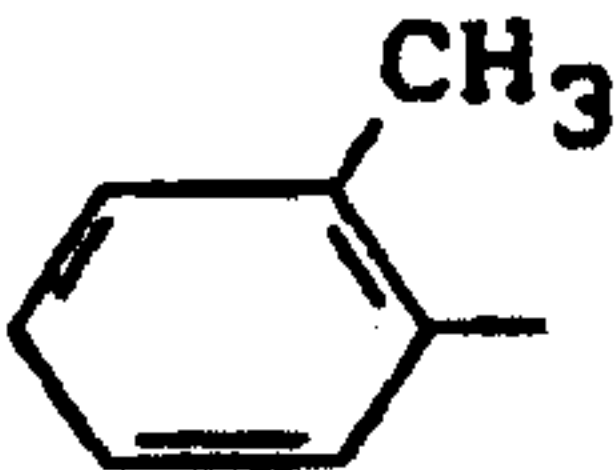
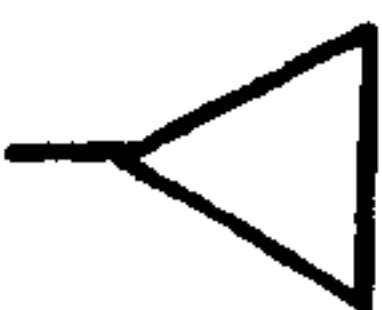
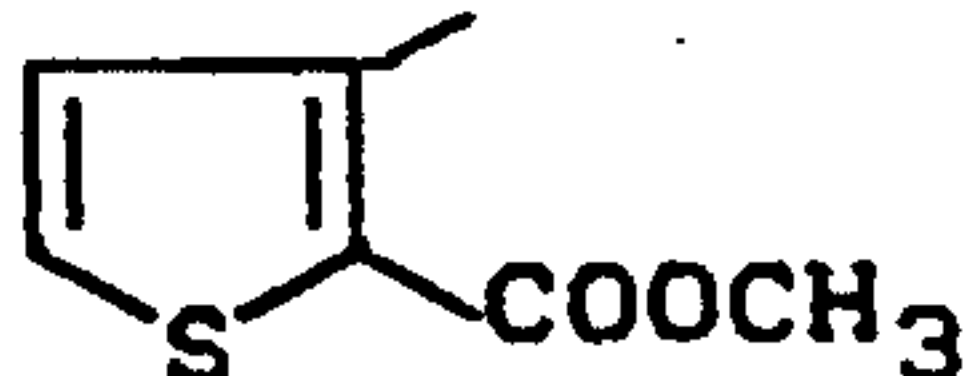
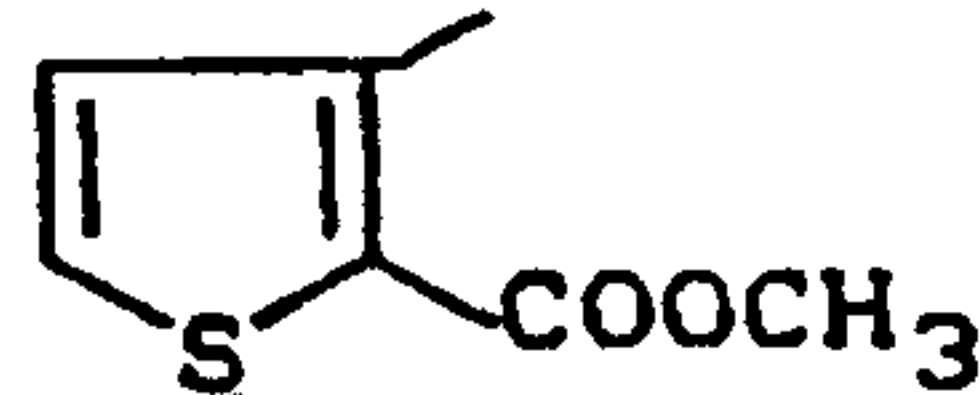
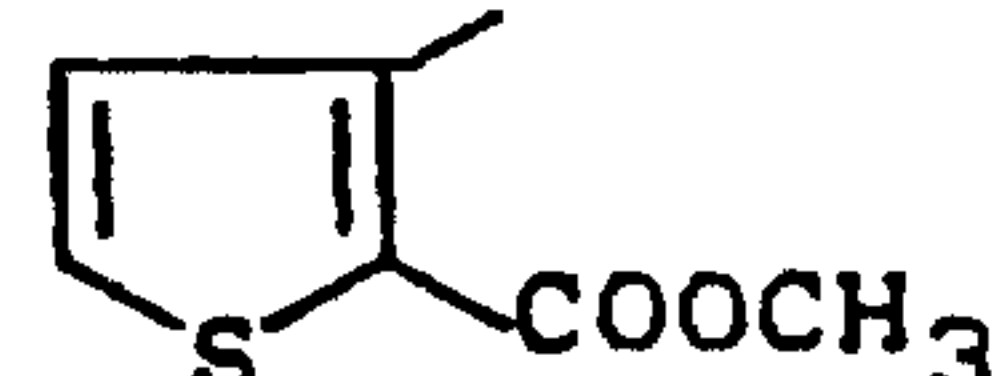
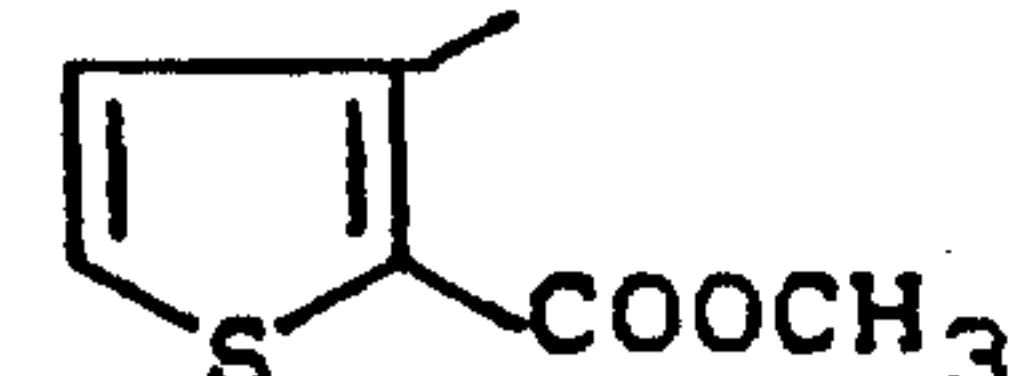
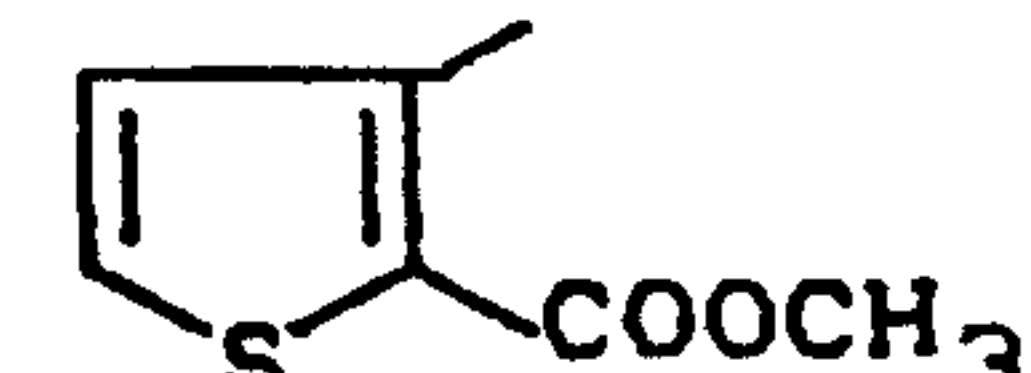
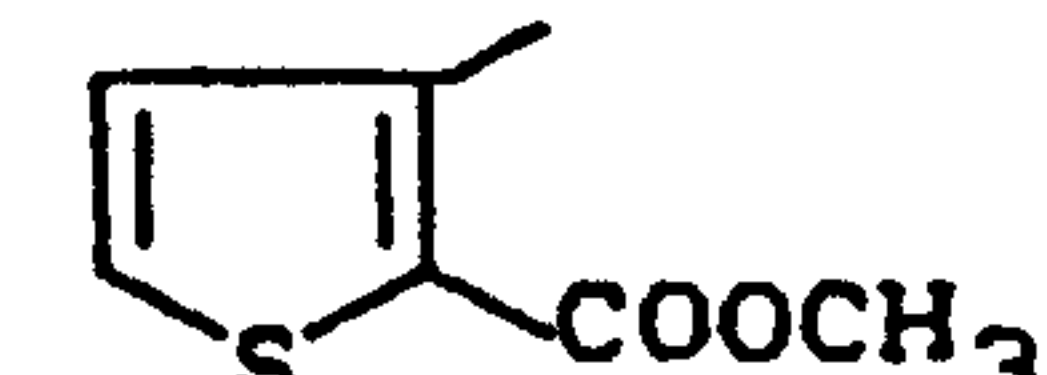
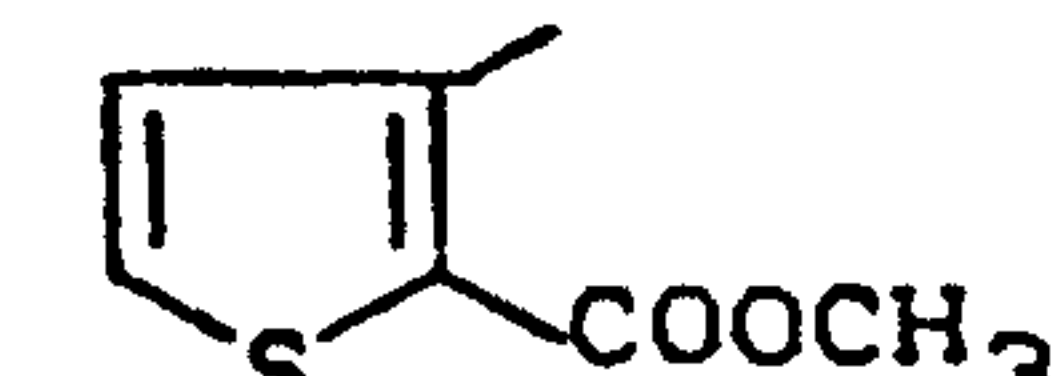
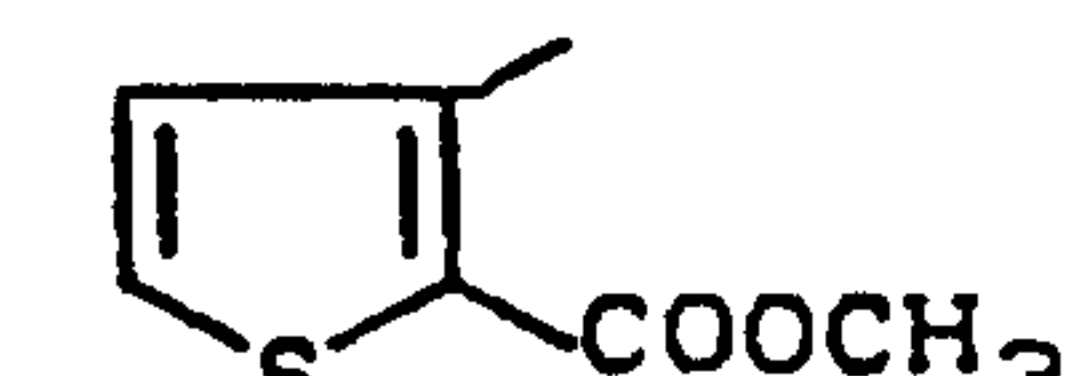
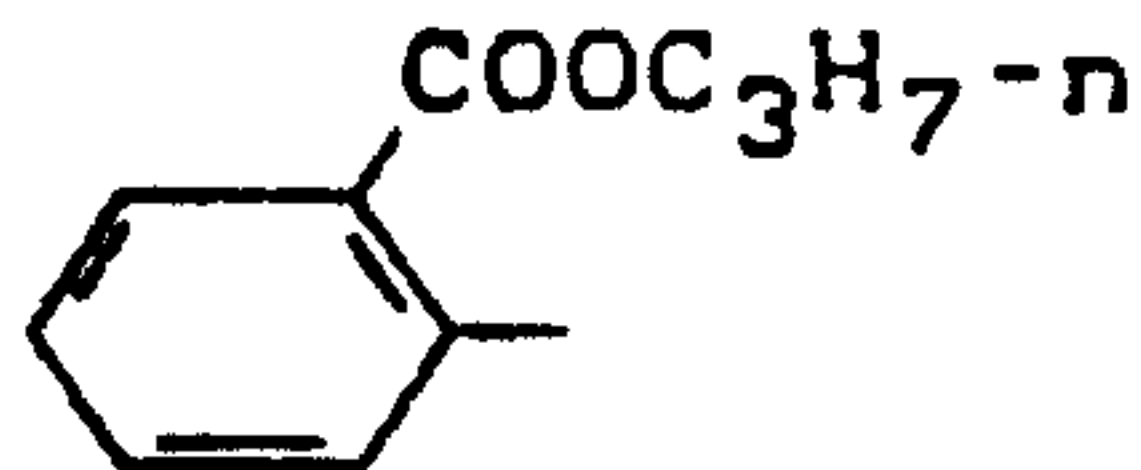
Example No.	R ¹	R ²	R ³	Melting point (°C)
165	CH ₃			130-132
166		C ₂ H ₅		148-150
167	C ₂ H ₅	CH ₃		172-173
168	-CH ₂ -CH=CH ₂	C ₂ H ₅		130-132
169	CH(CH ₃) ₂	C ₂ H ₅		142-144
170	-(CH ₂) ₃ -OCH ₃	CH ₃		127-130
171	n-C ₃ H ₇	C ₂ H ₅		127-130
172	CH(CH ₃) ₂	CH ₃		156-157
173	CH ₃	CH(CH ₃) ₂		198-200
174	CH(CH ₃) ₂	C ₂ H ₅		122-124

Table 3 - Continuation

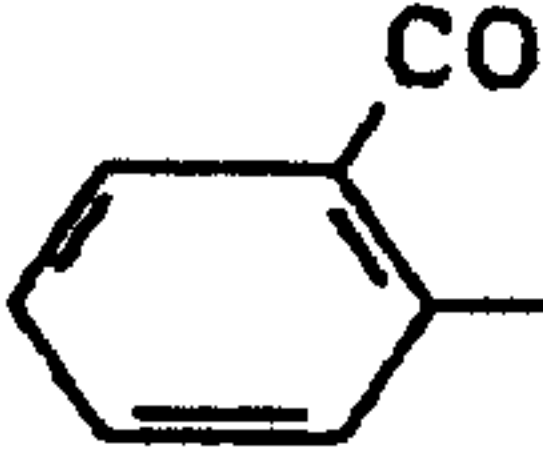
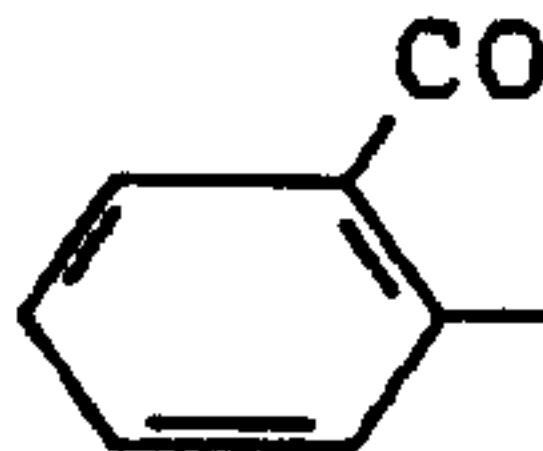
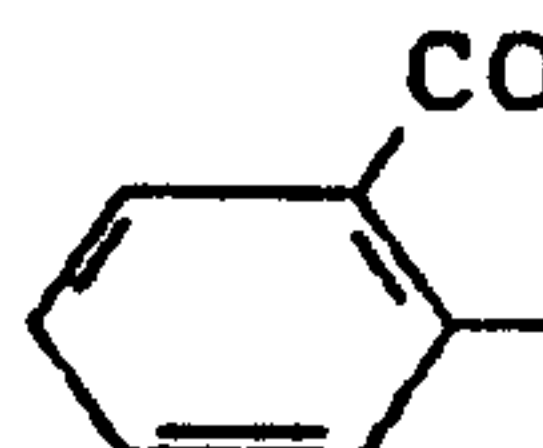
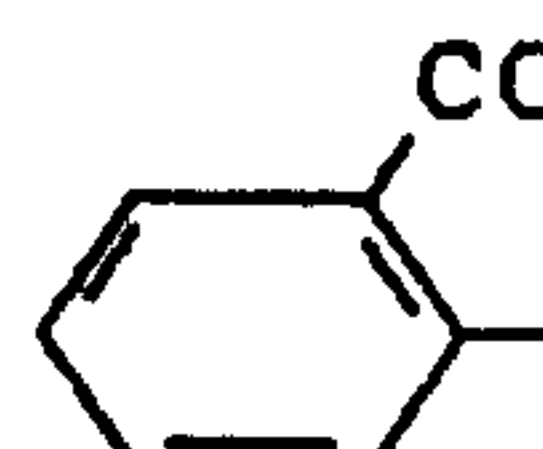
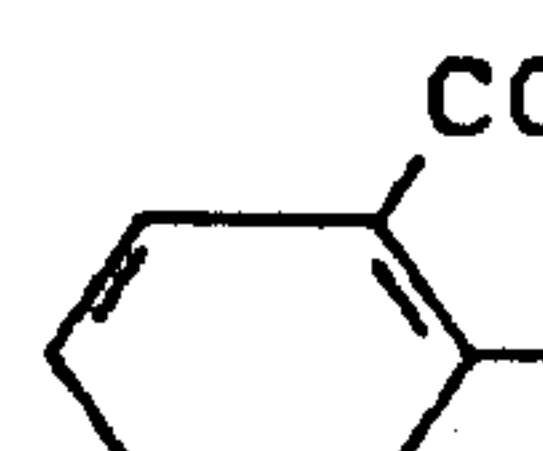
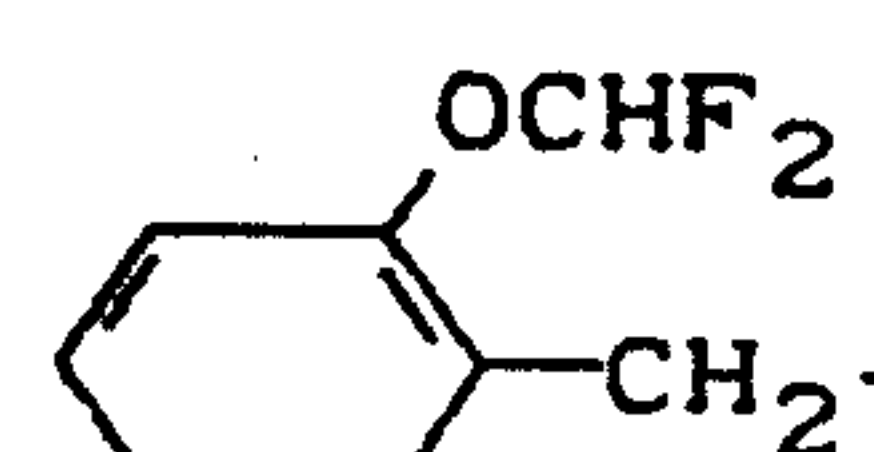
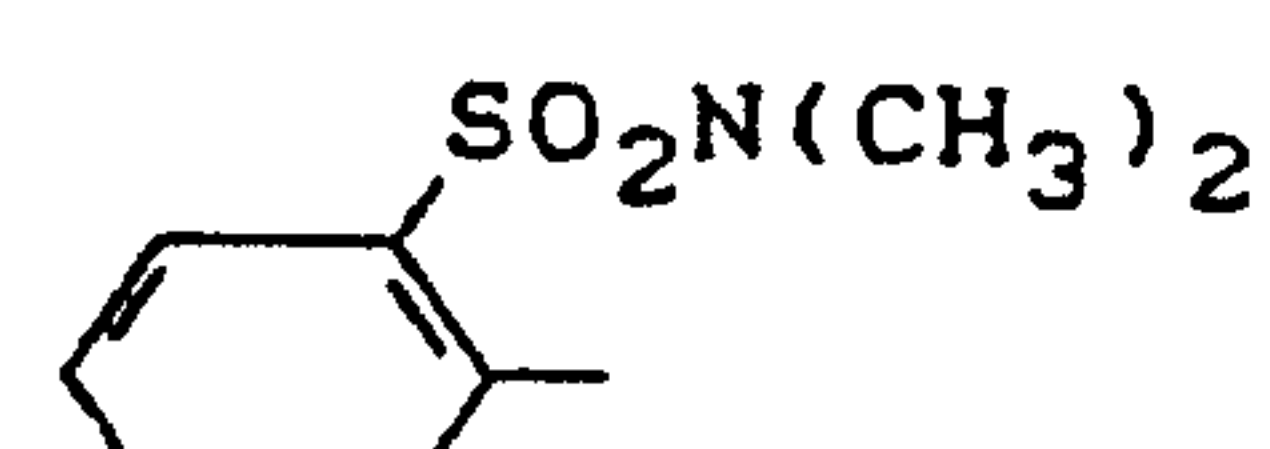
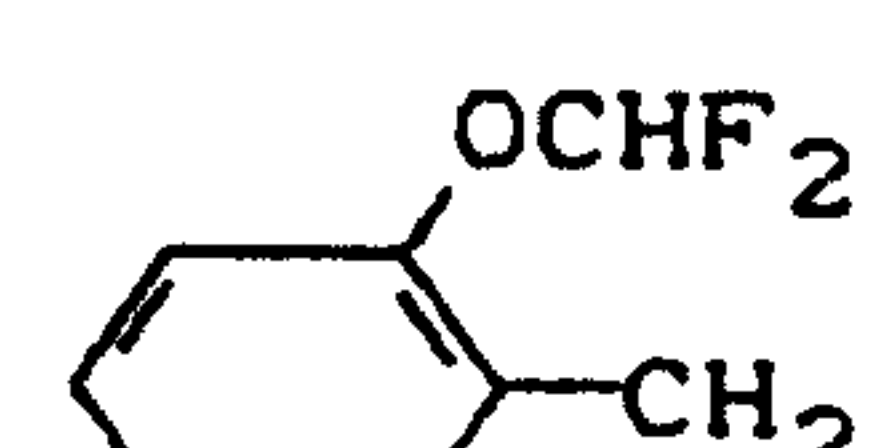
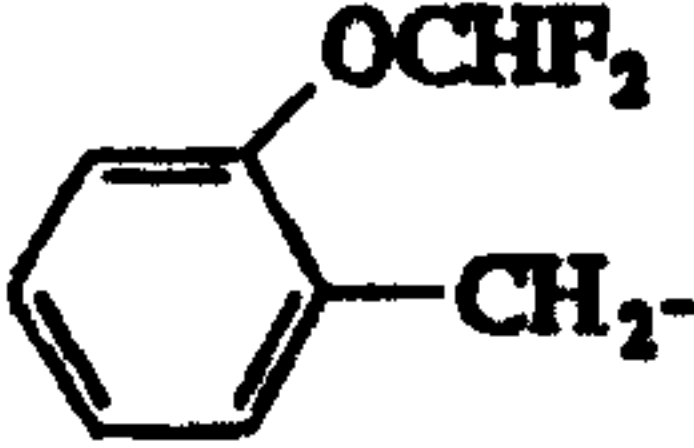
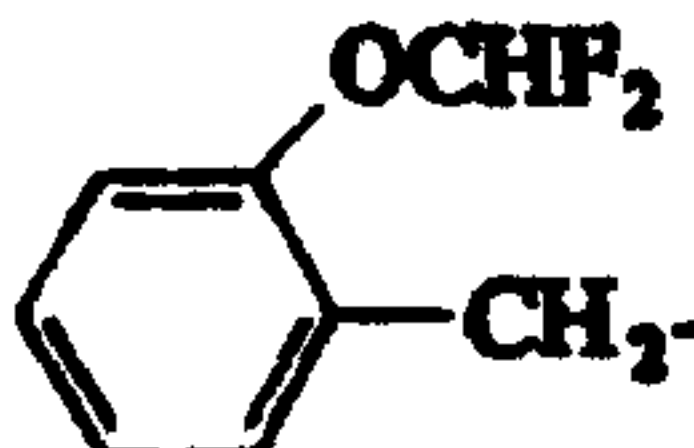
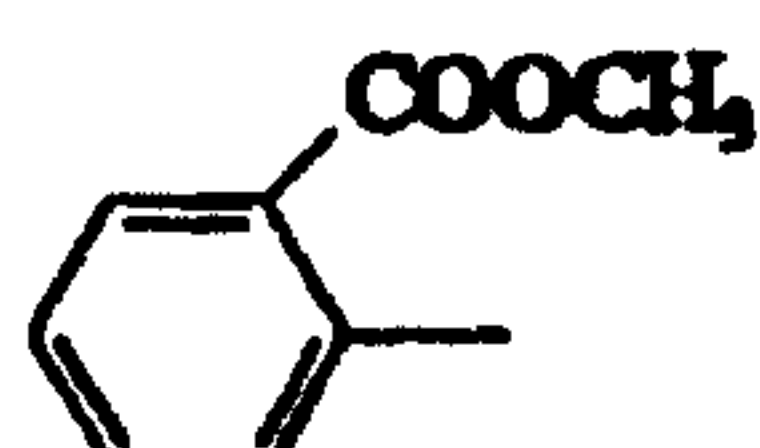
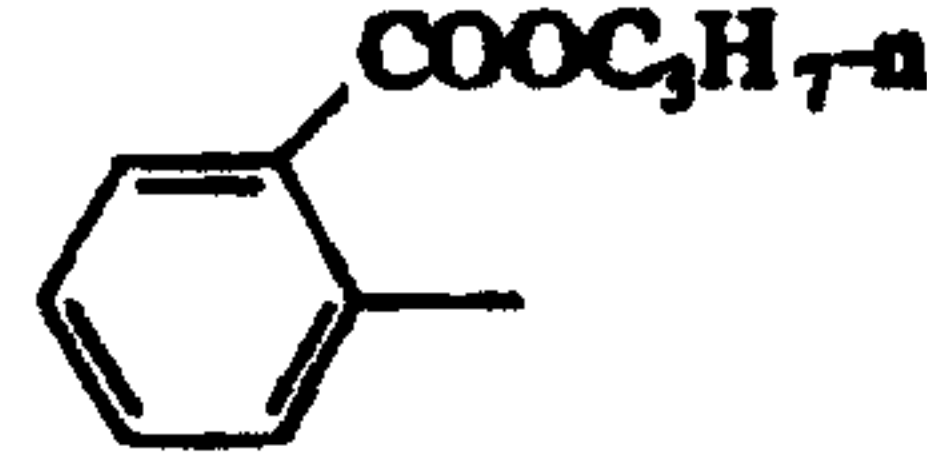
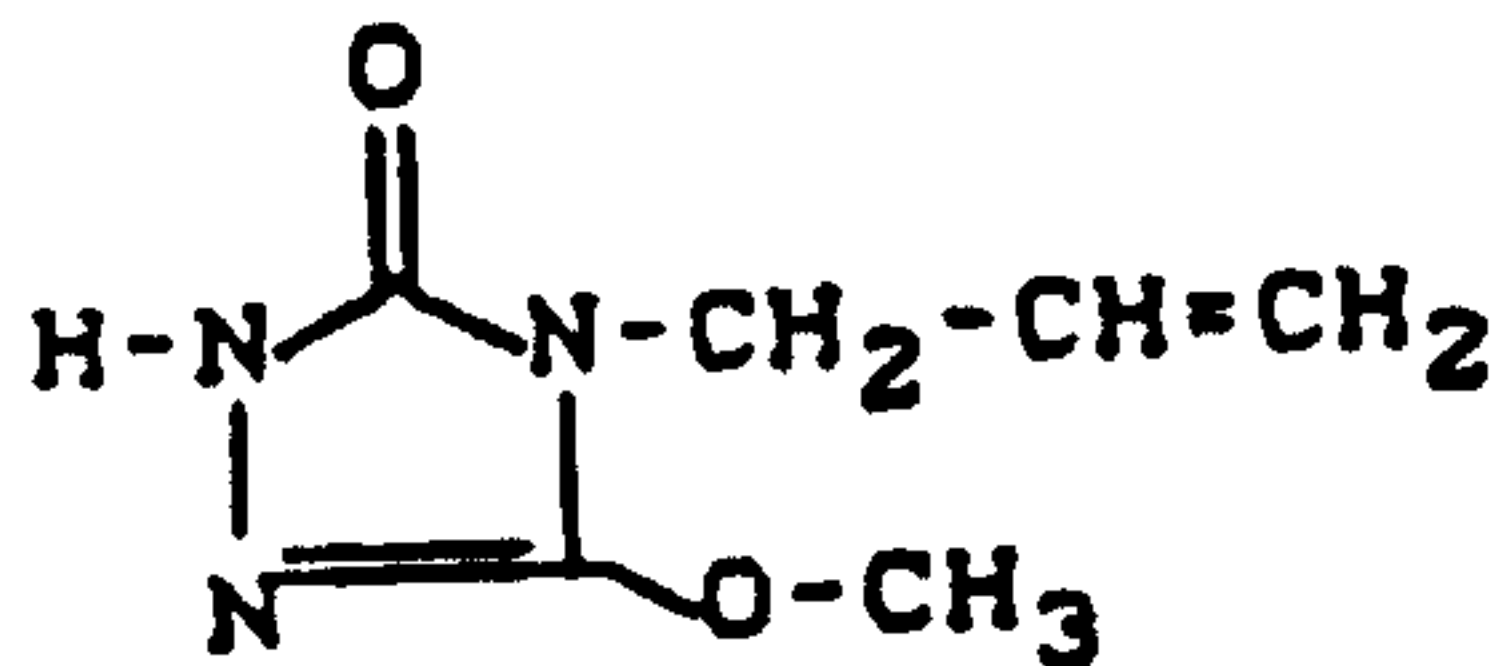
Example No.	R ¹	R ²	R ³	Melting point (°C)
175	-(CH ₂) ₃ -OCH ₃	CH ₃		97-98
176	n-C ₃ H ₇	C ₂ H ₅		128-130
177	CH(CH ₃) ₂	CH ₃		148-150
178	CH ₃	CH(CH ₃) ₂		154
179	C ₂ H ₅	CH ₃		145
180	CH ₃	C ₂ H ₅		134-136
181	CH ₃	C ₂ H ₅		178
182	CH ₃	n-C ₄ H ₉		142-143

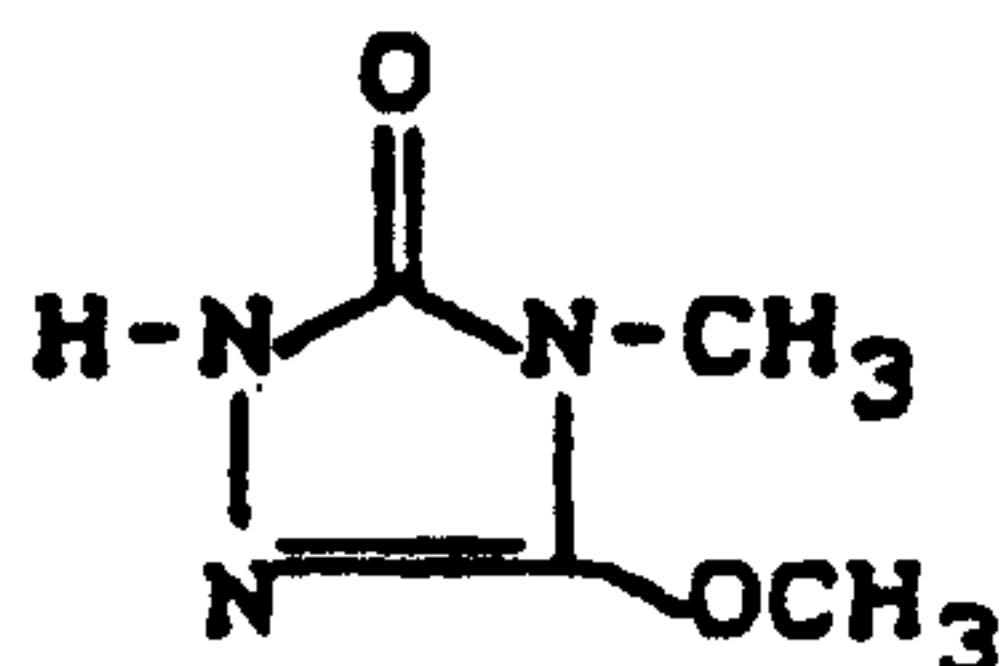
Table 3- Continuation

Example No.	R ¹	R ²	R ³	Melting Point (°C)
183	C ₂ H ₅	CH ₃		115-118
184	-CH ₂ -CH-CH ₂	C ₂ H ₅		98-99
185	CH ₃	C ₂ H ₅		114-115 (Na-Salt)
186	CH ₃	C ₂ H ₅		135-140 (Na-Salt)

Starting substances of the formula (II):5 Example (II-1)

10 A mixture of 5.0 g (0.02 mol) of 1-phenoxy-carbonyl-4-allyl-O-methyl-isosemicarbazide and 30 ml of toluene is refluxed for 15 minutes and subsequently concentrated under a water pump vacuum. The residue is triturated with diethyl ether/petroleum ether, and the product which has been obtained in crystalline form is isolated by filtration with suction.

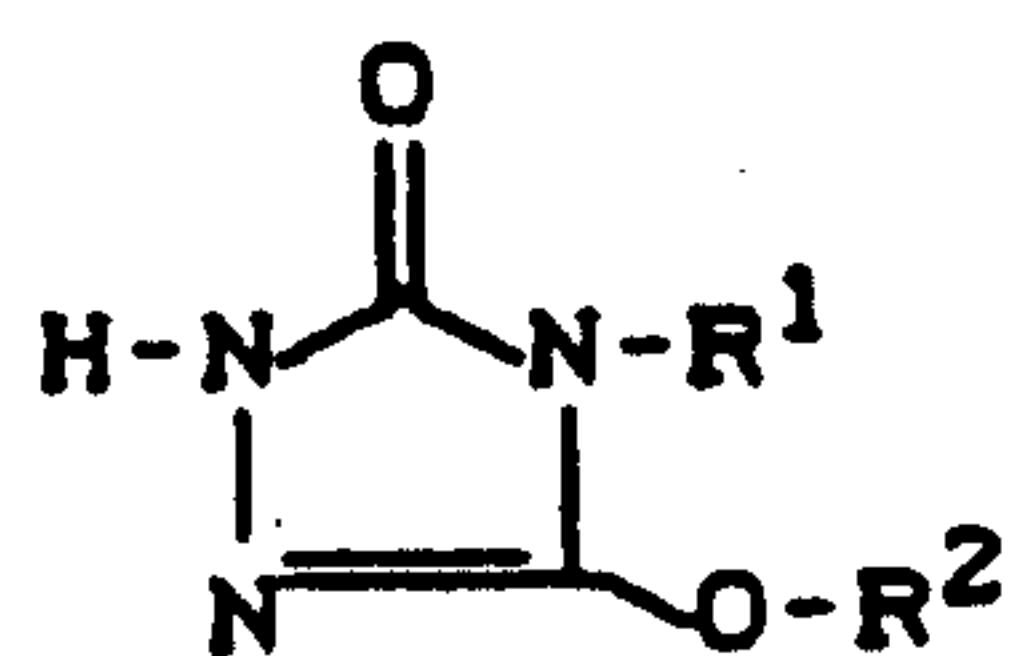
15 2.0 g (64% of theory) of 4-allyl-5-methoxy-2,4-dihydro-3H-1,2,4-triazol-3-one of melting point 111°C are obtained.

Example (II-2)

50.2 g (0.33 mol) of phenyl hydrazinoformate and 36.6 g (0.33 mol, 93% strength) of trimethyl iminocarbonate are heated to 60°C in 100 ml of absolute o-dichlorobenzene, and the mixture is stirred for 2 hours, during which process a clear solution is formed. In the course of two hours, it is heated to 120°C, during which process methanol distilled off. A vacuum is applied carefully, during which process more methanol and finally phenol distil off. Further distillation results in a fraction which solidifies in the receiving vessel in crystalline form.

After recrystallisation from toluene, 7.0 g (0.054 mol, 16% of theory) of 4-methyl-5-methoxy-2,4-dihydro-3H-1,2,4-triazol-3-one of melting point 142-144°C are obtained in the form of colourless crystals.

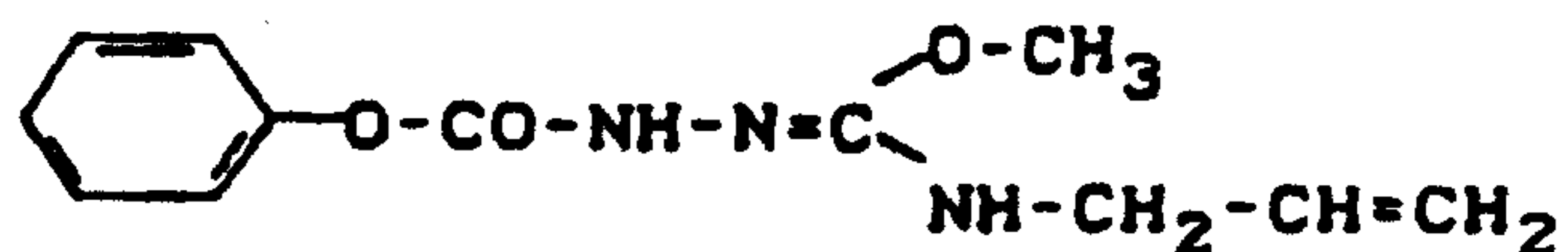
Other examples of compounds of the formula (II) which can be prepared analogously to Examples (II-1) and (II-2) are those listed in Table 4 below.



(II)

Table 4: Examples of the starting substances of the formula (II)

5 Example No.	R ¹	R ²	Melting point (°C)
II-3	CH ₃		163
II-4	CH ₃	C ₃ H ₇	72
II-5		CH ₃	149
II-6		C ₂ H ₅	130
II-7	CH(CH ₃) ₂	CH ₃	80-81
II-8	C ₂ H ₅	CH ₃	(b.p. : 120° C at 1,5 mbar)
II-9	C ₃ H ₇	CH ₃	(b.p. : 130-150° C at 1,5 mbar)
II-10	CH ₃	C ₄ H ₉	152-153
II-11	(CH ₂) ₃ OCH ₃	CH ₃	84-85
II-12	CH ₃	C ₂ H ₅	(b.p. : 140-150° C at 1,5 mbar)
II-13	CH(CH ₃) ₂	C ₂ H ₅	66-67
II-14	C ₃ H ₇	C ₂ H ₅	(b.p. : 140-150° C at 1,5 mbar)
II-15	CH ₂ =CH-CH ₂	C ₂ H ₅	(b.p. : 150° C at 1,5 mbar)

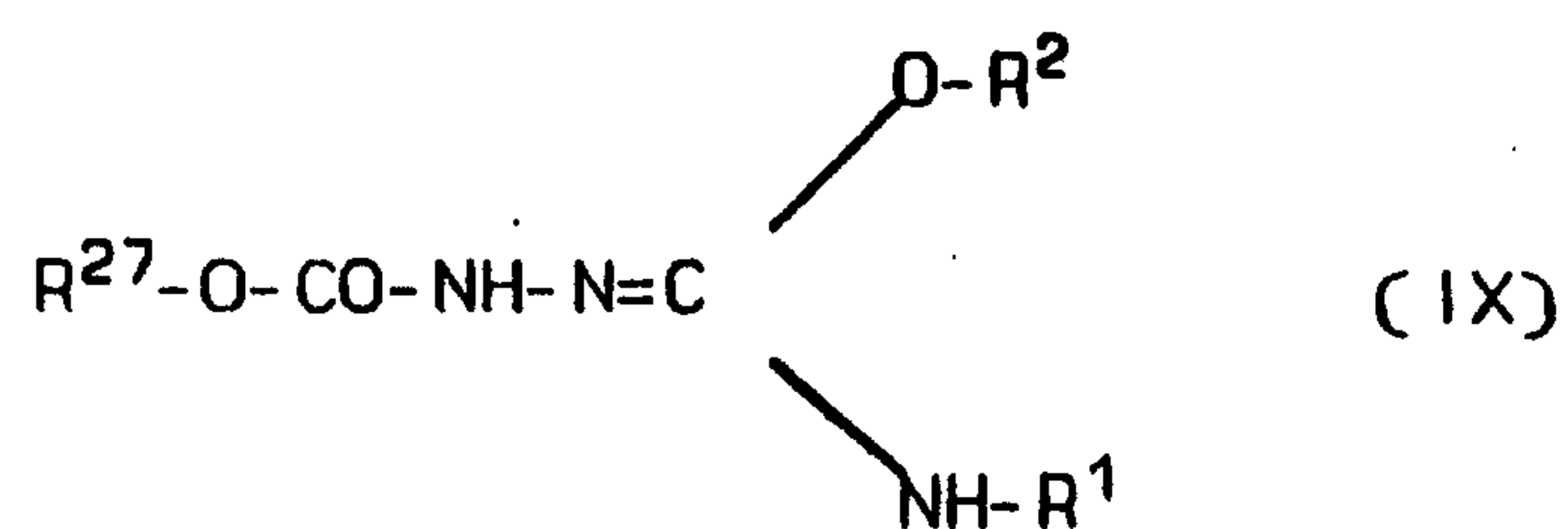
Intermediates of the formula (IX):Example (IX-1)

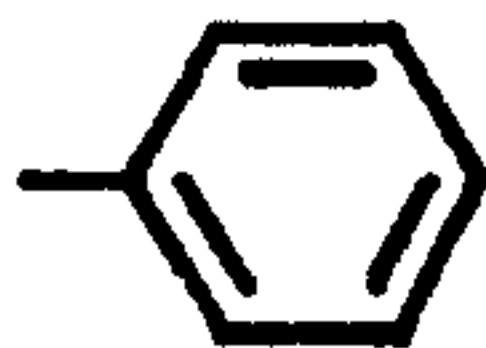
5 A mixture of 30.4 g (0.2 mol) of phenyl hydrazinoformate, 26.0 g (0.2 mol) of methyl N-allyl-iminocarbonate and 150 ml of methanol is stirred for 12 hours at 20°C and subsequently concentrated under a water pump vacuum. The residue is triturated with diethyl ether/ethanol (1/1 by vol.), and the crystalline product is isolated by filtration with suction.

10 11.0 g (22% of theory) of 1-phenoxycarbonyl-4-allyl-O-methyl-isosemicarbazide of melting point 114°C are obtained.

15 Other examples of compounds of the formula (IX) which can be prepared analogously to Example (IX-1) are those listed in Table 5 below.

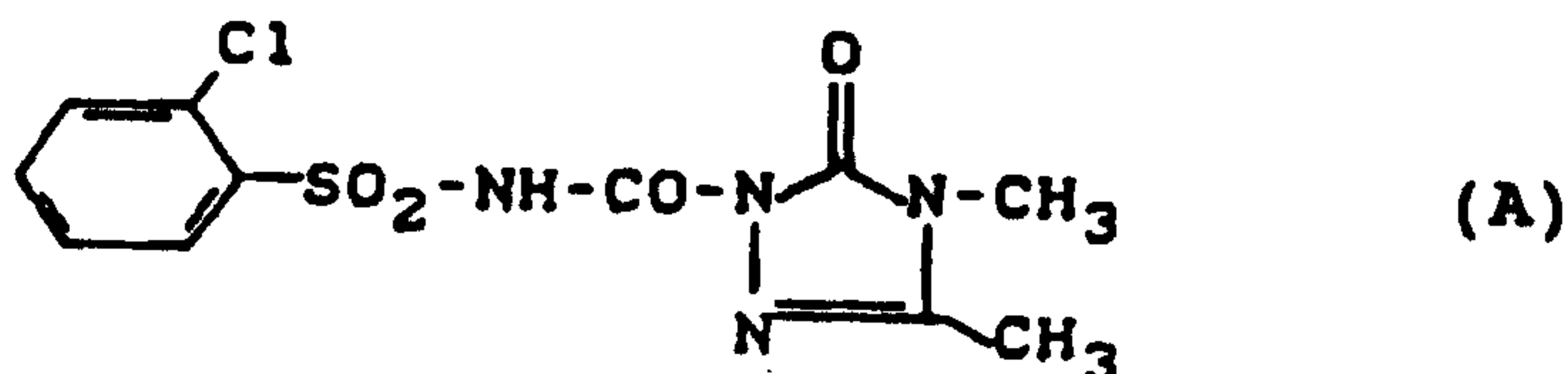
23189-7322

**Table 5:** Examples of the compounds of the formula (IX)

Example No.	R ¹	R ²	R ²⁷	Melting point (°C)
IX-2	CH ₃	CH ₃		123
IX-3	C ₂ H ₅	CH ₃	C ₂ H ₅	137
IX-4	CH ₃	CH ₃	CH ₃	134
IX-5	CH ₃	CH ₃	C ₂ H ₅	135
IX-6	C ₂ H ₅	CH ₃		133- 134

Use Examples:

In the Use Examples, the following compound (A) is used as comparison substance:



- 5 2-(2-chloro-phenylsulphonylaminocarbonyl)-4,5-dimethyl-2,4-dihydro-3H-1,2,4-triazol-3-one (disclosed in EP-A 341,489).

Example A

Post-emergence test

- 10 Solvent: 5 parts by weight of acetone
 Emulsifier: 1 part by weight of alkylaryl polyglycol ether

- 15 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.

- 20 Test plants which have a height of 5 - 15 cm are sprayed with the preparation of the active compound in such a way as to apply the particular amounts of active compound

desired per unit area. The concentration of the spray liquor is so chosen that the particular amounts of active compound desired are applied in 1,000 l of water/ha. After three weeks, the degree of damage to the plants is rated in % damage in comparison to the development of the untreated control. The figures denote:

0% = no action (like untreated control)

100% = total destruction

In this test, a considerably more powerful action against weeds than the known compound (A) is shown, for example, by the compounds of Preparation Examples 1, 2, 3, 53, 54, 55, 56, 57, 58, 64, 65 and 67, while having, in some cases, good crop plant compatibility.

Example B

Pre-emergence test

Solvent: 5 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, the stated amount of emulsifier is added and the concentrate is diluted with water to the desired concentration.

Seeds of the test plants are sown in normal soil and, after 24 hours, watered with the preparation of the

active compound. It is expedient to keep constant the amount of water per unit area. The concentration of the active compound in the preparation is of no importance, only the amount of active compound applied per unit area being decisive. After three weeks, the degree of damage to the plants is rated in % damage in comparison to the development of the untreated control. The figures denote:

0% = no action (like untreated control)

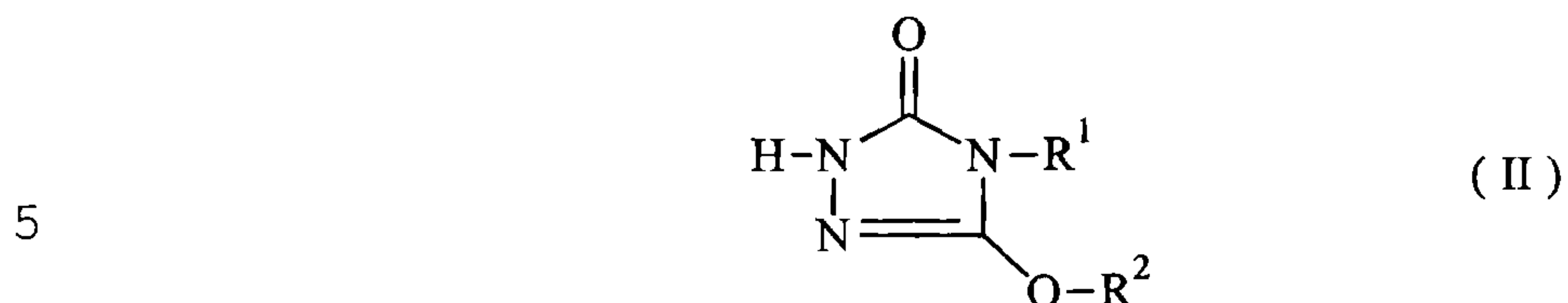
100% = total destruction

10 In this test, a considerably more powerful action against weeds than the known compound (A) is shown, for example, by the compounds of Preparation Examples 2, 54 and 69, while having, in some cases, good crop plant compatibility.

30517-86E

CLAIMS:

1. A process for preparing a triazolinone of the general formula (II):

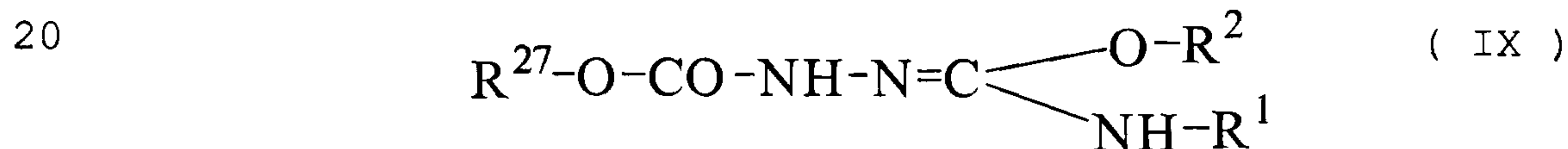


wherein:

R^1 represents: (i) H, amino, allyl, C_3 - C_6 -cycloalkyl, benzyl, phenyl, C_1 - C_3 -alkylamino, C_3 - C_6 -cycloalkylamino or di- $(\text{C}_1$ - C_3 -alkyl)-amino, or (ii) C_1 - C_4 -alkyl which is optionally substituted by F, cyano, methoxy or ethoxy; and

R^2 represents: (i) C_1 - C_4 -alkyl which is optionally substituted by F, Cl or a combination thereof, methoxy or ethoxy, (ii) C_3 - C_4 -alkenyl which is optionally substituted by F, Cl or a combination thereof, (iii) C_3 - C_6 -cycloalkyl, or (iv) phenyl or benzyl which is optionally substituted by F, Cl, methyl or a combination thereof,

which process comprises heating a compound of the general formula (IX):



wherein R^1 and R^2 are as defined above, and R^{27} represents methyl, ethyl or phenyl, at a temperature of from 50°C to 150°C .

