

PATENT SPECIFICATION

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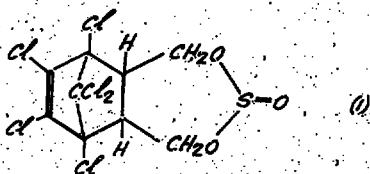


(54) PESTICIDAL MIXTURE AND COMPOSITION

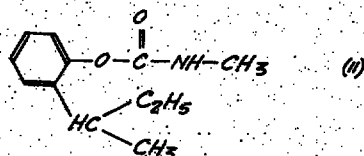
(71) We, HOECHST AKTIENGESSELLSCHAFT, formerly known as Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Brüning, a body corporate recognised under German Law, of 6230 Frankfurt Main 80, Hoechst, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a pesticidal mixture and to a pesticidal composition containing such a mixture.

The present invention provides a pesticidal mixture comprising 1,2,3,4,7,7-hexachlorobicyclo[2,2,1]-heptene - (2) - bis(hydroxymethylene) - (5,6) - sulfite (endosulfan) of the formula



and 2-sec.butyl-phenyl-N-methylcarbamate of the formula



Endosulfan is known, for example, from German Patent No. 1,015,797 and US Patent No. 2,799,685. It is used as a pesticide, mainly in fruit and vegetable growing and crop farming, against biting and sucking insects and in forests against beetles, caterpillars and tree aphids.

[Price 33p]

It has been found, however, that the activity of endosulfan is sometimes insufficient to ensure complete destruction of the pests.

Compound II, which is known, for example, from German Patent No. 1,159,929, is mainly used to combat cicadas in rice fields.

It has now been found that endosulfan and compound (II) complement each other in the sense of a true synergism as can be seen in the following Examples. Especially good results are obtained with mixtures consisting of 1 to 4 parts by weight of compound (I) with 1 part by weight of compound (II). The mixtures according to the present invention can be used in combination with one or more formulation additives, for example, solid or liquid carrier materials, adhesives, wetting and dispersion agents, and grinding auxiliaries in the form of wettable powders, emulsions, suspension, dusts, or granules. They can be mixed with other insecticides, fungicides, nematocides, and herbicides. Plant pests can be combated by applying effective amounts of such compositions to the plants or their locus. The total content of compound (I) and compound (II) in the pesticidal compositions according to the present invention is, in general, in the range of from 1 to 99% by weight.

The following Examples illustrate the invention, all parts, percentages and ratios being by weight.

EXAMPLE A.

A wettable powder readily dispersible in water is obtained by mixing

- 25 parts by weight of a mixture of compound (I) and compound (II) in the ratio 1:1,
 64 parts by weight of kaolin-containing quartz as inert material,
 10 parts by weight of potassium lignin-sulfonate and
 1 part by weight of sodium oleyl-methyl-aurine as dispersion agent

and grinding the mixture in a disk attrition mill.

EXAMPLE B.

5 A dusting agent suitable for use as an insecticide is obtained by mixing

10 parts by weight of a mixture of compound (I) and compound (II) in the ratio 4:1 and

10 90 parts by weight of talcum as inert material

and grinding the mixture in an impact pulveriser.

EXAMPLE C.

15 An emulsifier concentrate is obtained by mixing

15 parts by weight of a mixture of compound (I) and compound (II) in the ratio 3:1,

75 parts by weight of cyclohexanone as solvent and
10 parts by weight of nonyl(ethoxy)₁₀ phenol as emulsifier.

EXAMPLE 1.

Compound (I) and compound (II) were mixed in ratios of 1:1 and 3:1, respectively, and the mixtures dissolved in acetone. 1 cc of each of the solution containing the two compounds was uniformly distributed on the bottoms and insides of Petri dishes. After evaporation of the acetone, 20 common house flies (*Musca domestica*) were placed in each dish and the insecticidal effect was checked at regular time intervals. The dishes were kept in the laboratory at 20° C.

The following Table I shows that the mixtures of the two active compounds had a distinct synergistic effect.

TABLE I

active compound	concentration % in acetone	mortality in % after			
		1 hr	2 hrs	3 hrs	4 hrs
I + II	0.0001% (1 : 1)	20	45	60	80
I	0.0001%	0	0	0	0
II	0.0001%	0	0	0	0
I + II	0.0003% (3 : 1)	10	30	75	100
I	0.0003%	0	10	20	20
II	0.0001%	0	0	0	0

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EXAMPLE 2.

In the manner described in Example 1, the bottoms and insides of a number of Petri dishes were each uniformly sprayed with 1 cc of an acetonic solution containing the compounds (I) and (II) mixed in a ratio of 2:1. After evaporation of the acetone, 20

American cockroaches (*Periplaneta americana*) were placed in each dish and the insecticidal effect was checked daily. The dishes were kept in the laboratory at 20° C.

It can be seen from Table II that the mixture of the two compounds had a distinct synergistic effect.

TABLE II

active compound	concentration in % in acetone	mortality in % after		
		1	2	3 days
I + II	0.0005% (2 : 1)	30	60	99
I	0.0005%	0	0	0
II	0.00025%	0	0	0

EXAMPLE 3.

Petri dishes lined with filter paper were sprayed, in a dosing spraying apparatus, with equal amounts of aqueous dilutions of emulsifiable concentrates containing compounds (I) and (II) mixed in ratios of 1:1 and 4:1, respectively, or alone in the respective proportions.

After spraying, imagines of rice cicadas (*Nilaparvata lugens*) were placed in the dishes and the insecticidal effect was checked at the indicated time intervals.

It can be seen from Table III that the mixtures of the two compounds exhibit distinct synergism.

TABLE III

active compound	concentration in % in aqueous dilution	mortality in % after		
		18 hrs	24 hrs	48 hrs
I + II	0.00006% (1 : 1)	70	90	100
I	0.00006%	0	20	20
II	0.00006%	30	50	50
I + II	0.00012% (4 : 1)	30	70	90
I	0.00012%	20	30	30
II	0.00003%	0	20	20

WHAT WE CLAIM IS:—

1. A mixture comprising endosulfan and 2-sec.butyl-phenyl-N-methyl carbamate.

2. A pesticidal composition containing as active ingredients endosulfan and 2-sec.butyl-phenyl-N-methyl-carbamate together with one or more formulation additives.

3. A pesticidal composition as claimed in claim 2, containing from 1 to 4 parts by weight of endosulfan and 1 part by weight of 1-sec.butyl-phenyl-N-methyl-carbamate.

4. A pesticidal composition as claimed in claim 2 substantially as described in Example A, B or C herein.

5. A method for combating pests in plants which comprises applying to the plants or their locus an effective amount of a composition as claimed in any one of claims 2 to 4.

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I + II	0.00012% (4 : 1)	30	70	90
I	0.00012%	20	30	30
II	0.00003%	0	20	20

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