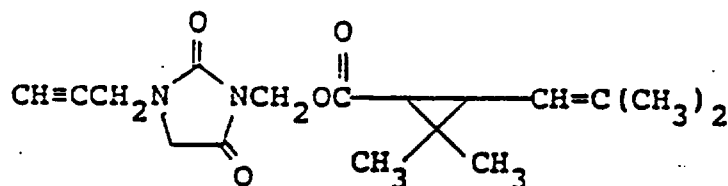


INSECTICIDAL COMPOSITION FOR AN AEROSOL

1 The present invention relates to an insecticidal composition for an aerosol. 2,4-Dioxo-1-(2-propynyl)-imidazolidin-3-ylmethyl chrysanthemate having the following formula (hereinafter referred to as Compound A),



5 is a compound disclosed in USP No. 4176189. This compound is known to be usable as an active ingredient for insecticidal aerosols. Since, however, the aerosols containing the same are not always satisfactory in the insecticidal activity, they have not yet been put to
10 practical use.

According to the present invention, there are provided an insecticidal composition which comprises

- (A) 2,4-dioxo-1-(2-propynyl)imidazolidin-3-ylmethyl chrysanthemate as an insecticidally active ingredient and
15 (B) an organic solvent containing at least one aromatic hydrocarbon having 12 to 20 carbon atoms and kerosene, the weight ratio of said aromatic hydrocarbon to said kerosene being 1:20 to 4:1,
and an insecticidal aerosol containing said
20 composition and a propellant.

Compound A used in an insecticidal composition of the present invention has

1 various optical isomers and geometrical isomers. There-
fore, any one of the isomers which has an insecticidal
activity and the mixtures containing it can be used
for the present invention. The content of Compound A in
5 the insecticidal composition of the present invention is
not critical, but it is preferably 0.0001 to 2.0% by
weight, more preferably 0.01 to 1.0% by weight based on
the total weight of the insecticidal composition.

The aromatic hydrocarbon used as a solvent is
10 the aromatic hydrocarbon having 12 to 20 carbon atoms.
Specific examples thereof are octylbenzene, dodecylbenzene
and phenylxylylethane

The term "kerosene" refers to a mixture of
hydrocarbons having a boiling point of 100° to 350°C,
15 which mixture is a fraction between gasoline and the fuel
oil obtained by the distillation of petroleum.

Usually the boiling point of kerosene used as
a solvent of the aerosols is 180°C to 280°C.

In the insecticidal composition of the present
20 invention, the weight ratio of aromatic hydrocarbon to
kerosene is 1:20 to 4:1, preferably 1:12 to 4:1.

The insecticidal composition of the present
invention may further be blended, for example, with
insecticides other than Compound A, synergists, perfumes
25 and fungicides. Specific examples of the insecticides
are 3-allyl-2-methyl-4-oxocyclopent-2-enyl
chrysanthemate (allerthrin), 3,4,5,6-
tetrahydrophthalimidemethyl chrysanthemate
(tetramethrin), 2-methyl-4-oxo-3-(2-propynyl)cyclopent-

- 1 2-enyl chrysanthemate (prallethrin), 3-phenoxybenzyl
chrysanthemate (phenothrin), 5-benzyl-3-furylmethyl
chrysanthemate (resmethrin), α -cyano-3-phenoxybenzyl
chrysanthemate (cyphenothrin), 3-phenoxybenzyl 3-(2,2-
5 dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate
(permethrin), α -cyano-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-
2,2-dimethylcyclopropanecarboxylate (cypermethrin), α -
cyano-4-fluoro-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-
dimethylcyclopropanecarboxylate (cyfluthrin), propoxur,
10 dichlorvos and fenitrothion.

The insecticidal composition of the present invention is prepared by mixing Compound A, at least one aromatic hydrocarbon having 12 to 20 carbon atoms, kerosene and optionally insecticides other than
15 Compound A, synergists, perfumes and fungicides at room temperature or under heating.

The insecticidal composition of the present invention is suitably used as an insecticidal composition for aerosols by putting it in an aerosol can, mounting
20 a valve portion on the can and charging a propellant under pressure into the can through the valve portion.

Specific examples of the propellant are liquefied petroleum gas (LPG), dimethyl ether (DME), carbon dioxide gas and nitrogen gas. Of these, liquefied
25 petroleum gas (LPG) and dimethyl ether (DME) are preferred.

The content of the propellant in the insecticidal composition of the present invention is not critical, but it is preferably 20 to 60% by weight based

1 on the total weight of the composition.

The insecticidal composition of the present invention can be used not only in trigger sprayers, but also in novel spray systems such as EXXEL[®], a system
5 comprising forcing out an insecticidal solution by the elastic power of rubbers developed by Container Industries in USA, and PROZON[®], a system comprising spraying an insecticidal solution by air fed by an electric pump developed by Oeco-tech in West Germany.

10 The present invention will be illustrated in more detail with reference to the following examples and comparative examples.

In the following Examples, parts are by weight.

15 Example 1

0.3 Part of Compound A containing a d-trans acid moiety, 5.0 parts of dodecylbenzene and 54.7 parts of kerosene were mixed with heating to prepare an insecticidal composition. The composition thus obtained
20 was put in an aerosol can, a valve portion was mounted on the can and 40.0 parts of LPG was charged into the can under pressure through the valve portion to obtain an aerosol.

Table 1 shows the contents of the insecticidal
25 compositions for aerosols obtained in the same manner as above.

Table 1

		Content (part by weight)				
		Active ingredient	Solvent			Propellant
		Compound A (containing a d-trans acid moiety)	Dodecylbenzene	Phenylxylyl-ethane	Kerosene	LPG
Example	1	0.3	5.0	-	54.7	40.0
	2	0.3	20.0	-	39.7	40.0
	3	0.3	30.0	-	29.7	40.0
	4	0.3	45.0	-	14.7	40.0
	5	0.3	-	5.0	54.7	40.0
	6	0.3	-	20.0	39.7	40.0
	7	0.3	-	30.0	29.7	40.0
	8	0.3	-	45.0	14.7	40.0
Comparative Example	1	0.3	1.0	-	58.7	40.0
	2	0.3	59.7	-	-	40.0
	3	0.3	-	1.0	58.7	40.0
	4	0.3	-	59.7	-	40.0
	5	0.3	-	-	59.7	40.0

- 1 With the aerosols obtained in Examples 1 to 8 and Comparative Examples 1 to 5, the knock-down efficacy (50% knock-down time) on flies and mosquitoes was examined by the Official Method of Chemical
- 5 Specialities Manufacturers Association (CSMA) for Evaluating Aerosol and Pressurized Space Spray Insecticides Against Flying Pests (Peet Grady's chamber method); see the 1971 "Blue Book" pages 161-163. The results are shown in Table 2.

Table 2

		KT ₅₀ on fly (min)	KT ₅₀ on mosquito (min)
Example	1	2.3	3.5
	2	1.8	2.7
	3	2.0	2.2
	4	1.8	3.6
	5	2.1	4.4
	6	1.8	3.3
	7	1.9	3.0
	8	2.0	3.5
Compara- tive Example	1	9.0	27.3
	2	4.6	6.2
	3	9.5	68.3
	4	4.0	10.3
	5	13.4	58.1

1 Example 9

0.3 Part of Compound A containing a d-trans acid moiety, 0.1 part of phenothrin, 20.0 parts of dodecylbenzene and 39.6 parts of kerosene were mixed with heating to prepare an insecticidal composition. The composition thus obtained was put in an aerosol can, a valve portion was mounted on the can and 40.0 parts of LPG and charged into the can under pressure through the valve portion to obtain an aerosol.

- 1 Table 3 shows the contents of the insecticides compositions for aerosols obtained in the same manner as above.

Table 3

Content (part by weight)											
	Active ingredient					Solvent				Propellant	
	Compound A (containing a d-trans acid moiety)	Alle- thrin	Pheno- thrin	Feni- tro- thion	Dode- cyl- benze- ne	Octyl- benze- ne	Phenyl- xylyl- ethane	Kero- sene	LPG	DME	
Example	9 0.3	-	0.1	-	20.0	-	-	39.6	40.0	-	
	10 0.3	0.1	-	-	20.0	-	-	39.6	40.0	-	
	11 0.3	-	-	0.3	30.0	-	-	19.4	50.0	-	
	12 0.3	-	0.1	-	-	20.0	-	39.6	40.0	-	
	13 0.3	0.1	0.1	-	20.0	-	-	29.5	25.0	25.0	
	14 0.3	-	0.1	-	10.0	-	10.0	29.6	25.0	25.0	

- 1 Aerosols obtained in Examples 9 to 14 were examined for the knock-down efficacy on flies and mosquitoes by the CSMA aerosol test method. The results are shown in Table 4.

Table 4

		KT ₅₀ on fly (min)	KT ₅₀ on mosquito (min)
Example	9	1.7	2.3
	10	1.3	1.2
	11	1.6	1.9
	12	1.5	2.6
	13	1.3	1.1
	14	1.5	2.1

- 5 Table 5 shows the contents of the insecticidal compositions for aerosols obtained in the same manner as in Example 1.

Table 5

Content (part by weight)									
		Active ingredient	Solvent					Propel-lant	
		Compound A (containing a d-trans acid moiety)	Xylene	Toluene	Tri-methyl-benzene	Butyl-ben-zene	Octyl-benzene	Kero-sene	LPG
Example	15	0.3	-	-	-	-	20.0	39.7	40.0
Compara-tive Example	6	0.3	20.0	-	-	-	-	39.7	40.0
	7	0.3	-	20.0	-	-	-	39.7	40.0
	8	0.3	-	-	20.0	-	-	39.7	40.0
	9	0.3	-	-	-	20.0	-	39.7	40.0

- 1 Aerosols obtained in Example 15 and Comparative Examples 6 to 9 were examined for the knock-down efficacy on flies and mosquitoes by the CSMA aerosol test method. The results are shown in Table 6.

Table 6

		KT ₅₀ on fly (min)	KT ₅₀ on mosquito (min)
Example	15	1.7	2.6
Comparative Example	6	7.2	9.7
	7	6.5	8.3
	8	8.0	10.3
	9	6.0	8.2



CLAIMS

1. An insecticidal composition which comprises
 - (A) 2,4-dioxo-1-(2-propynyl)imidazolidin-3-ylmethyl chrysanthemate as an insecticidally active compound and
 - (B) an organic solvent containing at least one aromatic hydrocarbon having 12 to 20 carbon atoms and kerosene, the weight ratio of said aromatic hydrocarbon to said kerosene being 1:20 to 4:1.
2. A composition according to Claim 1, wherein the composition further contains at least one insecticide selected from 3-allyl-2-methyl-4-oxocyclopent-2-enyl chrysanthemate (allethrin), 3,4,5,6-tetrahydrophthalimidemethyl chrysanthemate (tetramethrin), 2-methyl-4-oxo-3-(2-propynyl)cyclopent-2-enyl chrysanthemate (prallethrin), 3-phenoxybenzyl chrysanthemate (phenothrin), 5-benzyl-3-furylmethyl chrysanthemate (resmethrin), α -cyano-3-phenoxybenzyl chrysanthemate (cyphenothrin), 3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (permethrin), α -cyano-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (cypermethrin), α -cyano-4-fluoro-3-phenoxybenzyl 3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (cyfluthrin), propoxur, dichlorvos and fenitrothion.



3. An insecticial composition according to claim 1 or claim 2, wherein the said compound (A) is present in an amount of 0.0001 to 2.0% by weight based on the total weight of the composition.

4. An insecticial composition according to claim 3, wherein the said compound (A) is present in an amount of 0.01 to 1.0% by weight based on the total weight of the composition.

5. An insecticidal composition according to any preceding claim, wherein the said aromatic hydrocarbon is selected from octylbenzene, dodecylbenzene and phenyl-xylylethane.

6. An insecticidal aerosol consisting essentially of an insecticidal composition according to any preceding claim and a propellant.
