

FORM 1

612521

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

Degussa Aktiengesellschaft, incorporated in the Federal Republic of Germany,
of Weissfrauenstrasse 9, 6000 Frankfurt/Main, FEDERAL REPUBLIC OF GERMANY,
hereby apply for the grant of a standard patent for an invention entitled:

Hydrophobic Silica,

Prepared By Pyrogenic Methods For Use As An Insecticide".

which is described in the accompanying complete specification.

Details of basic application(s):-

Basic Applic. No: Country: Application Date:

P 38 35 592.2 DE 19 October 1988

The address for service is:-

Spruson & Ferguson
Patent Attorneys
Level 33 St Martins Tower
31 Market Street
Sydney New South Wales Australia

DATED this TWELFTH day of OCTOBER 1989

Degussa Aktiengesellschaft

By:



Registered Patent Attorney

TO: THE COMMISSIONER OF PATENTS
OUR REF: 108778
S&F CODE: 53300

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SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952

DECLARATION IN SUPPORT OF A CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application made for a patent for an invention
entitled:

Insecticides

I/~~We~~, ... Dr. Wolfgang Merk
[full name of declarant(s)]

of Bergstrasse 44, D-6477 Limeshain 3,
[full address of declarant(s) - not post office box]
Federal Republic of Germany

do solemnly and sincerely declare as follows:-

1. I am/~~We are~~ authorised by Degussa Aktiengesellschaft, the applicant for the patent to make this declaration on its behalf.
2. The basic application as defined by Section 141 of the Act was made in Federal Republic of Germany on 19 October 1988 by Degussa Aktiengesellschaft
3. Cenek H. Vrba, of 213 Cardiff Dr. N.W., Calgary, Alta, Canada T2K 1S1, is the actual inventor of the invention and the facts upon which the applicant is entitled to make the application are as follows:

The said applicant is the assignee of the actual inventor.
4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at Frankfurt/Main this 9th day of November 19 89



Dr. Wolfgang Merk
Signature of Declarant

TO: THE COMMISSIONER OF PATENTS
AUSTRALIA

cjd:2041D

(12) PATENT ABRIDGMENT (11) Document No. AU-B-42923/89
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 612521

- (54) Title
HYDROPHOBIC SILICA PREPARED BY A PYROGENIC PROCESS AS INSECTICIDE
- International Patent Classification(s)
(51)⁴ A01N 059/00
- (21) Application No. : 42923/89 (22) Application Date : 16.10.89
- (30) Priority Data
- (31) Number (32) Date (33) Country
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- (43) Publication Date : 26.04.90
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- (71) Applicant(s)
DEGUSSA AKTIENGESELLSCHAFT
- (72) Inventor(s)
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- (74) Attorney or Agent
SPRUSON & FERGUSON, GPO Box 3898, SYDNEY NSW 2001
- (57) Claim

1. Method for controlling insects, characterised in that the insects are treated with a silica which has been prepared by a pyrogenic method and rendered hydrophobic.
2. Method according to Claim 1, characterised in that the insects are sprayed with an aqueous dispersion of the silica which has been prepared by a pyrogenic process and rendered hydrophobic.
3. Method according to Claim 1, characterised in that the insects are dusted with the pulverulent silica which has been prepared by a pyrogenic process and rendered hydrophobic.

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FORM 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

612521

(ORIGINAL)

FOR OFFICE USE:

Class Int Class

Complete Specification Lodged:
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Priority:

Related Art:

Name and Address
of Applicant:

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Complete Specification for the invention entitled:

Hydrophobic Silica,
Prepared By Pyrogenic Methods For Use As An Insecticide".

The following statement is a full description of this invention, including the best method of performing it known to me/us



Abstract

Insects are controlled by treating the insects with a silica which has been prepared by a pyrogenic process and rendered hydrophobic.

On the one hand, the insects can be sprayed with an aqueous dispersion of the silica which has been prepared by a pyrogenic process and rendered hydrophobic.

On the other hand, the insects can be dusted with the pulverulent silica which has been prepared by a pyrogenic process and rendered hydrophobic.

Hydrophobic Silica, Prepared by Pyrogenic Methods For Use As An Insecticide

Description

The invention relates to a method for controlling insects.

It is known that harmful insects on plants can be controlled by means of organic substances which are sprayed. These substances have the disadvantage that, as a rule, they are generally highly toxic for other forms of life too.

It is thus the object to provide an insecticide which is non-toxic.

According to a broad form of this invention there is provided a method for controlling insects, which is characterised in that the insects are treated with a silica which has been prepared by a pyrogenic process and rendered hydrophobic.

In a preferred embodiment of the invention, the insects can be sprayed with an aqueous dispersion of the silica which has been prepared by a pyrogenic process and rendered hydrophobic.



In another preferred embodiment of the invention, the insects can be dusted with the pulverulent silica which has been prepared by a pyrogenic process and rendered hydrophobic.

- 5 The aqueous dispersion may contain 0.2 to 20% by weight, preferably 3 to 16% by weight, of silica which has been prepared by a pyrogenic process and rendered hydrophobic.

- 10 The following silica characterised by physiochemical parameters can be used as the silica prepared by a pyrogenic process and rendered hydrophobic:

Test method	DIM	AEROSIL R 202	AEROSIL R 805	AEROSIL R 812	AEROSIL R 972	AEROSIL R 974
Behaviour towards water					hydrophobic	
Appearance						
Surface area according to BET ¹⁾	m ² /g	90±20	150±25	260±30	110±20	170±20
Mean size of the primary particles	Nanometer	14	12	7	16	12
Tamped density ²⁾						
Normal product	g/l	about 50	about 50	about 50	about 50	about 50
Compacted product (addition of "V")	g/l	about 90	about 90	about 90	about 90	about 90
Loss on drying ³⁾ (2 h at 105°C) on leaving the supplier	%	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Loss on ignition ^{4) 7)} (2 h at 1000°C)	%	4.5-7.5 ¹³⁾	6-9 ¹⁴⁾	1.0-2.5 ¹⁵⁾	<2 ¹²⁾	<2 ¹²⁾
pH ⁵⁾ (in 4% aqueous dispersion)		4-6 ¹⁰⁾	3.5-5.5 ¹⁰⁾	5.5-7.5 ¹⁰⁾	3.6-4.3 ¹⁰⁾	3.4-4.2 ¹⁰⁾
SiO ₂ ⁸⁾	%	>99.8	>99.8	>99.8	>99.8	>99.8
Al ₂ O ₃ ⁸⁾	%	<0.05	<0.05	<0.05	<0.05	<0.05
Fe ₂ O ₃ ⁸⁾	%	<0.01	<0.01	<0.01	<0.01	<0.01
TiO ₂ ⁸⁾	%	<0.03	<0.03	<0.03	<0.03	<0.03
HCl ^{8) 11)}	%	<0.025	<0.025	<0.025	<0.05	<0.1
Sieve residue ⁶⁾ (according to Mocker, 45 µm)	%	-	-	-	-	-

- 1) According to DIN 66 131
- 2) According to DIN ISO 787/XI, JIS K 5101/18
- 3) According to DIN ISO 787/II, ASTM D 280, JIS K 5101 21
- 5 4) According to DIN 55 921, ASTM D 1208, JIS K 5101/23
- 5) According to DIN ISO 787/IX, ASTM D 1208, JIS K 5101/24
- 6) According to DIN ISO 787/XVII, JIS K 5101/20
- 7) Based on the substance dried for 2 hours at 105°C
- 10 8) Based on the substance ignited for 2 hours at 1000°C
- 9) Special packaging which protects against humidity
- 10) In water: acetone or methanol = 1 : 1
- 11) HCl content is part of the loss on ignition
- 15 12) Contains about 1% of chemically bonded carbon
- 13) Contains about 5% of chemically bonded carbon
- 14) Contains about 7% of chemically bonded carbon
- 15) Contains about 3.5% of chemically bonded carbon

20 These silicas can be prepared by known processes, for example according to German Patent 1,163,784.

The process according to the invention has the following advantages:

25 The employed dispersions of silica prepared by a pyrogenic process and rendered hydrophobic, or these silicas themselves, are non-toxic and are not dangerous to the environment, with the exception of the insects. They do not leave behind any undesirable residues on plants, in foods, etc. There are no storage problems and no problems with, for example, overdosage. The pulverulent layer on the leaves or plants can easily be
30 removed by washing with water.

Another advantage is the destructive effect on Gram negative and Gram positive bacteria.

5 The method according to the invention can advantageously be used in horticulture, in agriculture, in medicine and in veterinary medicine.

The pesticidal action of the silica dispersions used according to the invention or of dry water is based on direct contact of these substances with the insects.

10 This contact should persist for a relatively long time, preferably several hours. The dispersions or these silicas themselves are applied in a sufficient quantity to the plants, until a thin layer is visible.

15 Where unfavourable wind conditions make it disadvantageous to apply the silica to the leaves, the dispersion can also be dug into the soil, advantageously at a depth of 2 to 4 cm.

This method of application has the advantage that the water absorption capacity of the soil can be improved by the silica.

20 In a particular embodiment, a piece of fabric, for example linen, can be impregnated with the silica dispersion and placed between rows of plants.

25 In another embodiment, the fabric impregnated with the silica dispersion can be cut into strips and applied directly to the plants, for example crowns of trees.

Examples

A stock of so-called "dry water" with an Aerosil

content of 20% by weight was prepared using Aerosil R 972 and water.

5 Low concentrations, for example 15% by weight of Aerosil R 972, suspended in water give a paste. After drying, this paste forms a thick, discontinuous layer with a thin film of pulverulent material underneath.

10 The 15% paste can be diluted with water to a concentration of 4% by weight. This suspension is sprayed onto the bottom of a Petri dish using a known spray apparatus, dried in the course of 24 hours and tested to determine the insecticidal action.

First a 15% suspension and, from this, a 4% suspension were prepared in the same manner using Aerosil R 974.

15 The results of the investigation into the insecticidal action are shown in Table 1.

Table 1

Continuous exposure of *Tribolium confusum* duv. to Aerosil R 972 and R 974

Example	Material tested	Dose Number of		<u>Cumulative mortality in days in %</u>						
		mg	insects	1	2	3	4	5	6	7
1	Aerosil R 972	100	10	50	80	100				
2	Aerosil R 972	100	30	0	53	100				
3	" "									
	4% susp.									
	dehydrated	15	30	0	70	97	97	97	97	100
4	As for No. 3	15	30	0	70	97	97	100		
5	As for No. 3	15	30	0	57	93	93	97	100	
6	Untreated control	-	30	0	0	0	0	0	0	0
7	Aerosil R 972									
	15% susp.									
	dehydrated	300	30	0	97	100				
8	As for No. 7	100	30	0	90	97	100			
9	Aerosil R 974	100	10	100						
10	Aerosil R 974	100	30	80	100					
11	" "									
	4% susp.									
	dehydrated	15	30	80	100					
12	As for No. 11	15	30	80	100					
13	As for No. 11	15	30	70	100					
14	Untreated control	-	30	0	0	0	0			

The claims defining the invention are as follows:

1. Method for controlling insects, characterised in that the insects are treated with a silica which has been prepared by a pyrogenic method and rendered hydrophobic.
2. Method according to Claim 1, characterised in that the insects are sprayed with an aqueous dispersion of the silica which has been prepared by a pyrogenic process and rendered hydrophobic.
3. Method according to Claim 1, characterised in that the insects are dusted with the pulverulent silica which has been prepared by a pyrogenic process and rendered hydrophobic.
4. Method for controlling insects substantially as hereinbefore described with reference to any one of the Examples.

DATED this ELEVENTH day of OCTOBER, 1989

Degussa Aktiengesellschaft

Patent Attorneys for the Applicant
SPRUSON & FERGUSON