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<p>(21) International Application Number: PCT/GB98/03039 (22) International Filing Date: 9 October 1998 (09.10.98) (30) Priority Data: 9721466.2 9 October 1997 (09.10.97) GB (71) Applicant (for all designated States except US): BARRIER HYGIENE LIMITED [GB/GB]; 36 Haverscroft Industrial Estate, New Road, Attleborough, Norfolk NR17 1YE (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): RYAN, Robert, Eugene [GB/GB]; Honister, North End, Snetterton, Norfolk NR16 2LE (GB). MORRIS, Sandra [GB/GB]; Honister, North End, Snetterton, Norfolk NR16 2LE (GB). (74) Agent: BALDOCK, Sharon, Claire; Boulton Wade Tennant, 27 Furnival Street, London EC4A 1PQ (GB).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>
<p>(54) Title: A PESTICIDAL COMPOSITION</p> <p>(57) Abstract</p> <p>There is disclosed a pesticidal composition comprising by volume, approximately 40 to 60 % eucalyptus oil, 10 to 30 % cajaput oil, 10 to 30 % lemongrass oils and 4 to 20 % of surfactant. The composition is used in a method for controlling pesticidal activity at a locus which comprises applying an effective amount of the composition thereto.</p>		

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A PESTICIDAL COMPOSITION

The present invention is concerned with a
pesticidal composition, and in particular with a
5 pesticidal composition which may be used as an
insecticide and/or a larvicide against, for example,
ectoparasites, a major component of said composition
comprising natural or essential oils.

Insects and their larvae are common pests of
10 households, animals, crops, meat and poultry houses
and the like. Typically, to eradicate such insect
pests synthetically produced chemical pesticides are
used. These compounds are generally highly toxic to
mammals and plants and are often very slow to degrade
15 making them unsuitable for wide spread application.

Examples of compounds which have previously been
used for eradicating insects and their larvae include
organophosphates which, although generally not as
toxic as synthetic non-organophosphates, still exhibit
20 relatively high toxicity levels. They are, however,
of limited use against some pests. For example, the
larvae of the poultry house beetle are notoriously
difficult to kill and are relatively unaffected by
such organophosphates.

Essential oils have been used previously for use
25 as pesticides. US 4,587,123 discloses that eucalyptus
oil is applied as a pesticide in a composition which
includes a low molecular weight carbon content alcohol
miscible with water. GB 1467 419 also discloses the
30 use of eucalyptus oil as an insecticide in admixture
with an extract of pepper. The compositions disclosed
in these documents generally do not possess broad
spectrum insecticidal or larvicidal activity.

Accordingly, it is an object of the present
35 invention to provide a pesticidal composition which

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has broad spectrum activity and which is relatively non-toxic to mammals, particularly humans, or plants.

Therefore, there is provided by the present invention a pesticidal composition comprising by
5 volume approximately 40 to 60% eucalyptus oil, 10 to 30% cajeput oil, 10 to 30% lemongrass oils and 4 to 20% of a surfactant. Preferably, the composition is further diluted with water, in which case the composition preferably comprises approximately 20 to
10 30% eucalyptus oil, 5 to 15% cajeput oil, 5 to 15% lemongrass oils, 40 to 60% water, and from 2% to 10% of a surfactant.

The inventors have surprisingly found that the composition according to the invention has a broad
15 spectrum of activity and is particularly effective against insects having a cuticle or proteinaceous exoskeleton or the like. The presence of the surfactant is believed to confer the broad spectrum pesticidal activity on the composition. The
20 surfactant functions as a penetrating agent which facilitates or aids penetration of the natural oils through the exoskeleton thus permitting the oils to exert their insecticidal activity on the internal organs and/or central nervous system of the insect or
25 larva. Furthermore, the composition according to the present invention, comprises natural or essential oils as a major component and is therefore particularly advantageous in terms of its relative non-toxicity.

The composition is, advantageously, particularly
30 active against poultry house beetle and its larvae. Poultry house beetle is a pernicious pest that is not readily destroyed by insecticidal agents even synthetic pesticides.

Preferably the composition comprises
35 approximately, 25% eucalyptus oil, 10% cajeput oil,

10% lemongrass oils, 5% anionic surfactant and 50% water, which percentage values may deviate by plus or minus 10% for the respective ingredient.

As is known, oil of eucalyptus is obtained from various species of eucalyptus and the resulting oils do not possess a uniform analysis. It is believed, however, that the properties of the eucalyptus oil according to the invention are not dependent on a particular source of oil of eucalyptus and one may use oil derived from *Eucalyptus globulous* and *Eucalyptus dives*. Eucalyptus oil is rich in cineole and desirably eucalyptus oil according to the invention comprises cineole and preferably 1-8 cineole in an amount of from approximately 35 to 90% by volume.

Preferably, the surfactant may be an anionic surfactant and which may be selected from any one of the following; alkylarylsulfonates, alkanesulfonates, alcohol and alcohol ether sulfates, polyether carboxylates, olefinsulfonates, α -sulfomono-carboxylic esters and phosphorous - containing anionic surfactants such as phosphoric acid, phosphorous acid, phosphonic acid and phosphinic acid derivatives. Preferably, the surfactant comprises sodium-2-ethylhexyl sulfosuccinate, and preferably in an amount greater than approximately 50%, optionally together with ethanol in an amount from approximately 10 to 25% by volume.

The composition according to the invention, may advantageously, be provided in the form of an oil based solution which provides for better foaming and gripping onto surfaces. Alternatively, the composition according to the invention may be formulated for spray application or as an aerosol. Alternatively the composition may be provided as a powder suitable for sprinkling or as a gel. In

another embodiment of the invention, the composition may further include an appropriate attractant, such as a pheromone or the like, so as to attract the insect to the pesticidal composition.

5 If desired, the composition according to the invention may contain, or be applied in association with other insecticides or pesticides.

 In another aspect of the present invention there is provided a method for controlling pesticidal
10 activity at a locus, which method comprises applying thereto an effective amount of a composition according to the invention.

 The present invention may be more clearly understood with reference to the following exemplary
15 embodiment of the invention, which is given by way of example only.

 Eucalyptus oil, cajeput oil, lemongrass oils, surfactant and water were suitably mixed in the percentage values of 25%, 10%, 10%, 5% and 50% by
20 volume respectively, and subsequently diluted to 1 part per 50 parts water. The prepared solution was either sprayed directly onto the area of application or is provided in the form of a gel, or as a powder for sprinkling.

25 In the present example, the composition according to the invention was applied to mealworm, locusts (*locusta migratoria*), the West Indian cockroach and to poultry house litter beetle (*Alphitobius Diaperus*).

30 In all cases as can be seen from Table 1 application of the composition resulted in death of the insect within a time period of between 1 to 10 minutes following its application. The insects generally exhibited nervous twitching prior to death
35 indicating an effect on its central nervous system.

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Omission of the surfactant from the composition resulted in markedly reduced insecticidal effects. Other variations in the composition, such as omission of one of the oils also resulted in reduced
5 insecticidal activity. The composition was highly successful in exterminating poultry house beetle and its larvae which are notoriously difficult to destroy.

TABLE 1 **Barrier B Composition**

Barrier B = 25% Eucalyptol, 10% Cajaputol, 10%
Lemongrass oils, 5% Surfactant, 50% Water

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Organism	No. Destroyed	Time Elapsed
Mealworm	All	3 Minutes
Cockroach	All	4 Minutes
Locust	All	5 Minutes
Poultry House Beetle	All	1½ Minutes
Larvae of Poultry House Beetle	All	1½ Minutes

Claims

1. A pesticidal composition comprising by
volume approximately 40 to 60% eucalyptus oil, 10 to
5 30% cajeput oil, 10 to 30% lemongrass oils and from 4%
to 20% surfactant.
2. A pesticidal composition according to claim
1 comprising, by volume, approximately 20 to 30%
10 eucalyptus oil, 5 to 15% cajeput oil, 5 to 15%
lemongrass oils, 2 to 10% surfactant and 40 to 60%
water.
3. A composition according to claim 1 or 2
15 which composition comprises by volume approximately
25% eucalyptus oil, 10% cajeput oil, 10% lemongrass
oils, 5% surfactant and 50% water, or a deviation of
between + or - 10% in the quantity of each of the
respective ingredients.
- 20 4. A composition according to any of claims 1
to 3 wherein said composition is further diluted to 1
part composition per 50 parts water.
- 25 5. A composition according to any of claims 1
to 4 wherein said surfactant is an anionic surfactant.
- 30 6. A composition according to claim 5 wherein
said anionic surfactant is selected from the group
consisting of alkylarylsulphonates, alkanesulfonates,
alcohol and alcohol ether sulfates, polyether
carboxylates, olefinsulfonates, α -sulfomonocarboxylic
esters and phosphorous containing anionic surfactants.
- 35 7. A composition according to claim 6 wherein

said surfactant comprises sodium-2-ethylhexyl sulfosuccinate

8. A composition according to claim 1 which
5 composition is provided in the form of an oil based solution, a water based solution, a powder or a gel.

9. A composition according to any of claims 1
10 to 8 which further comprises a suitable insect attractant.

10. A composition according to claim 9 wherein said attractant is a pheromone.

15 11. A composition according to any of claims 1 to 10 for use against insects having a cuticle or proteinaceous exoskeleton or their larvae.

20 12. A composition according to any of claims 1 to 11 for use against poultry house beetle or its larvae.

25 13. A process for controlling pesticidal activity at a locus, which process comprises applying thereto, an effective amount of a composition according to any of claims 1 to 10.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/03039

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A01N65/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 629 345 A (NATURAL PLANT PROTECTION) 21 December 1994 see page 2, line 1 - page 3, line 23 see page 3, line 43 - line 48 ---	1-13
A	CHEMICAL ABSTRACTS, vol. 105, no. 15, 13 October 1986 Columbus, Ohio, US; abstract no. 129423, AHMED, S. M. ET AL: "Vapor toxicity and repellency of some essential oils to insect pests" XP002089702 see abstract & INDIAN PERFUM. (1986), 30(1), 273-8 CODEN: IPERAS;ISSN: 0019-607X, --- -/--	1-13

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Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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