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(56) Documents Cited:  
**GB 2302542 A** **GB 1480125 A**  
**US 20060083763 A1**

(58) Field of Search:  
INT CL **A01M, A01N, B65D, B65F**  
Other: **Online: WPI, EPODOC, CAPLUS, REGISTRY**

(54) Abstract Title: **Insect repellent for incorporation into a plastics matrix**

(57) An insect repellent master batch composition for incorporation into a plastics matrix, comprises a polymer base and up to 20% by weight of eucalyptus maculate citriodora, such as Citrepel (RTM), and at least five other fragrance oils selected from bergamot oil, eucalyptus oil, lavandin oil, geranium oil, tea tree oil, clover oil, niaouli oil, peppermint oil, basil oil, each of the other oils being present in the master batch at a proportion less than 1%, the balance being made up of the polymer base. Preferably, the polymer base is ethylene vinyl acetate copolymer. Isopropyl myristate may be added as a fixative to slow down the rate of dissipation of the fragrances. A plastics article made by the method may have a concentration of between 5% and 1% Citrepel (RTM) in the finished article, which may be a refuse sack.

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## Insect Repellent

This invention relates to an insect repellent composition, to be incorporated in a plastics matrix to give products made from the plastics matrix insect repellent properties.

In particular, the composition may be used in plastics intended to be made into refuse sacks, and the invention extends to refuse sacks incorporating such a composition.

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According to the invention, there is provided an insect repellent master batch composition for incorporation into a plastics matrix, the composition comprising a polymer base and up to 20% by weight of eucalyptus maculata citriodora (preferably in the form of an oil sold by Chemian Technology Limited of Darlington under the trade mark Citrepel 75) and at least five other fragrance oils selected from the following list: bergamot oil, eucalyptus oil, lavandin oil, geranium oil, tea tree oil, clove oil, niaouli oil, peppermint oil, basil oil, each of the other oils being present in the maser batch at a proportion less than 1%, the balance being made up of the polymer base.

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According to a second aspect of the invention, there is provided an insect repellent master batch composition for incorporation into a plastics matrix, the composition comprising a polymer base and up to 20% by weight of fragrant oils selected from the following list: bergamot oil, eucalyptus oil, lavandin oil, geranium oil, tea tree oil, clove oil, niaouli oil, peppermint oil, basil oil, and eucalyptus maculata citriodora (the latter preferably in the form of an oil sold by Chemian Technology Limited of Darlington under the trade mark Citrepel 75) wherein each of the foregoing oils, with the exception of eucalyptus maculata citriodora is present in a quantity by weight of less than 1%, the balance being made up of the polymer base.

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Isopropyl Myristate can be added as a fixative to slow down the rate of dissipation of the fragrances.

5 The polymer base is preferably an ethylene vinyl acetate copolymer which has been found to be suitable for accepting additions of fragrance oils while allowing the polymer base to remain homogenous. The grade of EVA copolymer should be chosen such that the oils blend into the polymer without significantly disrupting the polymer structure and do not sweat out of the polymer.

10 The master batch is made by mixing the required quantity of oils with the copolymer under elevated temperature conditions such that the oils are absorbed into the co-polymer. The polymer mixture is then extruded and the extrudate fed to a granulator to form the master batch produce into granules. The master batch granules will then be added to a raw plastics feed to an extruder or moulding machine or the like. Typically the extruder, moulding machine or the like will be fed with a batch of raw plastics of which the master batch will be between about 3.5 % to 7 % by weight of the total. Thus a 500kg master batch will be added to between 15,000 and 7,500 kg of raw plastics.

20 The applicants aim to achieve a concentration of between 5% and 1% of Citrepel in the finished product manufactured from plastics to which the master batch has been added. the final concentration may vary depending on the degree of insect repellence required which may, for example, be different in different climates.

25 The master batch will be added to a larger body of plastics material in a plastics processing plant, mixed with the body of plastics, melted with the plastics so that the master batch is evenly distributed within the larger body of plastics which is then extruded, moulded to other wise processed to produce a finished plastics product. The finished product will benefit from the addition of the fragrant oils and, 30 by using the master batch described here, will have insect repellent properties.

A particularly important use for the master batch is in the manufacture of refuse

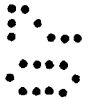
sacks as regular refuse sacks, when filled with organic refuse and left to stand, attract flies and other insects.

The present invention thus extends to refuse sacks made from a plastics mix to  
5 which a master batch in accordance with the invention has been added.

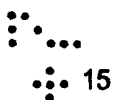
Clearly other products can be manufacture using the master batch

Example:

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The following master batch composition has proved effective



Citrepel 75	12.5 kilos
bergamot oil,	10.0 kilos
15 eucalyptus oil,	10.0 kilos
lavandin oil,	10.0 kilos
geranium oil,	10.0 kilos
tea tree oil,	10.0 kilos
20 clove oil,	10.0 kilos
niaouli oil,	10.0 kilos
peppermint oil,	10.0 kilos
basil oil,	10.0 kilos
EVA copolymer	442.5 kilos

25 This mix is designed to produce 500 kg of product master batch. There are small losses of vapour from hot material as the mixture is extruded before cooling.

Those skilled in the art of producing polymer master batches will be able to develop suitable processes for blending the oils into the polymer base.

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The applicants have used Citrepel 75 in their development of this invention, and understand the active ingredient of Citrepel 75 to be eucalyptus maculata citriodora. The identification of eucalyptus maculata citriodora. as the active ingredient is made to the best of the inventors' knowledge. and if incorrect, the  
35 applicants claim whatever active ingredient is present in Citrepel 75.

Claims

- 5 1. An insect repellent master batch composition for incorporation into a plastics matrix, the composition comprising a polymer base and up to 20% by weight of eucalyptus maculata citriodora and at least five other fragrance oils selected from the following list: bergamot oil, eucalyptus oil, lavandin oil, geranium oil, tea tree oil, clove oil, niaouli oil, peppermint oil, basil oil, each of the other oils being present in the maser batch at a proportion less than 1%, the balance being made up of the polymer base.
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2. A master batch as claimed in Claim 1, wherein the eucalyptus maculata citriodora is in the form of an oil sold by Chemian Technology Limited of Darlington under the trade mark Citrepel 75.
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3. An insect repellent master batch composition for incorporation into a plastics matrix, the composition comprising a polymer base and up to 20% by weight of fragrant oils selected from the following list: bergamot oil, eucalyptus oil, lavandin oil, geranium oil, tea tree oil, clove oil, niaouli oil, peppermint oil, basil oil, and eucalyptus maculata citriodora wherein each of the foregoing oils, with the exception of eucalyptus maculata citriodora is present in a quantity by weight of less than 1%, the balance being made up of the polymer base.
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4. A master batch as claimed in Claim 2, wherein the eucalyptus maculata citriodora is in the form of an oil sold by Chemian Technology Limited of Darlington under the trade mark Citrepel 75.
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5. A master batch as claimed in any preceding claim, wherein isopropyl myristate is added as a fixative to slow down the rate of dissipation of the fragrances.
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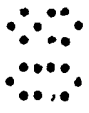
6. A master batch as claimed in any preceding claim, wherein the polymer base is an ethylene vinyl acetate copolymer.

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7. A master batch as claimed in Claim 6, wherein the grade of EVA copolymer is chosen such that the oils blend into the polymer without significantly disrupting the polymer structure and do not sweat out of the polymer.

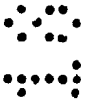
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8. A method of making a master batch as claimed in any preceding claim, wherein the required quantity of oils are mixed with the copolymer under elevated temperature conditions such that the oils are absorbed into the copolymer, the polymer mixture is then extruded and the extrudate fed to a granulator to form the master batch produce into granules.



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9. A method of manufacturing a plastics article, wherein master batch granules prepared by the method of Claim 8 are added to a raw plastics feed to an extruder or moulding machine at a percentage between about 3.5 % to 7 % by weight of the total weight of the raw plastics feed.



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10. A plastics article made by the method of Claim 9, having a concentration of between 5% and 1% of Citrepel in the finished article.

11. A plastics article as claimed in Claim 10, being a refuse sack.

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12. A plastics article made by the method of Claim 9, being a refuse sack.

13. A refuse sack made from a plastics material incorporating an isect repellent master batch as claimed in any one of Claims 1 to 7.

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14. A refuse sack substantially as herein described with reference to the Example.

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**Application No:** GB0711904.3

**Examiner:** Gareth Prothero

**Claims searched:** 1 to 14

**Date of search:** 16 October 2008

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	-	GB2302542 A (FMC) See pages 1 and 2.
A	-	GB1480125 A (DOW) See page 1.
A	-	US2006/0083763 A1 (NEALE et al.) See paragraphs [0010], [0011] and [0017].

**Categories:**

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup>:

Worldwide search of patent documents classified in the following areas of the IPC

A01M; A01N; B65D; B65F

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC, CAPLUS, REGISTRY

**International Classification:**

Subclass	Subgroup	Valid From
None		