(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 116 784 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.07.2001 Bulletin 2001/29

(51) Int Cl.[7]: **C11D 1/825**
// C11D1:66, C11D1:74

(21) Application number: **00100833.3**

(22) Date of filing: **17.01.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

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(54) Composition and method for removing oil from birds and aquatic animals

(57) A liquid mixture consisting essentially of (i) one or more fatty esters and (ii) one or more non-ionic surface-active agents is used in the cleaning of oiled birds and aquatic animals.

Oil is removed from birds and aquatic animals essentially by:

(i) externally applying an effective amount of the composition to the oiled surfaces of the birds or animals to form a mixture of oil with said composition; (ii) washing said mixture with a liquid selected from the group consisting of water and mixtures of water with one or more surface-active agents.

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Description

[0001] The present invention relates to the cleaning of birds and aquatic animals oiled as a result of a hydrocarbon oil spill. More particularly, it relates to the cleaning of sea birds and animals.

[0002] One of the major casualties of hydrocarbon oil spills are the water birds and animals, particularly sea birds, seals and otters, when they come into contact with the oil which floats on the water. They need to be cleaned promptly in order to survive. The task is even more difficult with viscous oil, particularly crude oil and viscous fractions thereof such as heavy oils, refined heavy oil and bituminous residues.

[0003] The cleaning method traditionally employed for birds is described in an article by G. Bents published in issue 15 of "L'oiseau magazine" (1989; cited in US-A-5553568) and consists in manually washing birds using a mixture of hot water and detergent and then washing them with water. The time needed to clean one bird is typically between half an hour and one hour, depending on the oil, i.e. the process is very slow and laborious. The same process is applied to other aquatic animals, such as seals and otters. Unfortunately, the longer the period of time the wild animals have to be handled by humans, the greater the trauma they suffer. There is thus a need for a more efficient method for removing oil from birds and aquatic animals that would allow them to be treated in a shorter period of time.

[0004] In addition, the products used for the cleaning operation may not be harmful for the animals and must be environmental friendly (i.e. biodegradable).

[0005] US-A-5215595 to J.P. Popino discloses a method for removing oil from the internal and external surfaces of birds, fish and water fowl or from the internal and external surface of seals, otters and other mammals affected by hydrocarbon oil spills. The method comprises internal or external treatment with a composition comprising a preponderance of polyisobutylene.

[0006] US-A-5009197 to E.C. Cottell discloses the decontamination of birds and other animals which are the victims of oil spills, by adding a low viscosity oil, by means of agitated tanks or sprays, to fur or feathers as a diluent followed by a water-in-oil emulsion, which is then inverted to an oil-in-water emulsion which can then be washed away with water.

[0007] EP-A-0648411 to Elf Aquitaine discloses a method and device for cleaning a bird whose plumage has been soiled by pollution, in which the bird is placed in a cage and the bird, with the exception of its head, is subjected to the action of jets of cleaning and rinsing liquid issuing from a plurality of nozzles rotating inside a tank in which said cage is placed.

[0008] The present invention provides a composition for use in the cleaning of oiled aquatic animals and particularly of oiled birds. It also provides for the use of said composition in the cleaning of oiled birds and aquatic animals.

[0009] The composition of the invention essentially consists of a mixture of (i) one or more fatty esters and (ii) one or more surface-active agents.

[0010] As fatty ester, there may be used the ester of a monofunctional alcohol and a monocarboxylic fatty acid.

[0011] The monoalcohol may have from 1 to 18 carbon atoms, preferably from 1 to 8 carbon atoms, more preferably from 1 to 3 carbon atoms, and it may be linear or branched.

[0012] The monocarboxylic fatty acid may have from 6 to 22 carbon atoms, preferably from 12 to 18 carbon atoms, and it may be linear or branched. The monocarboxylic fatty acid may further contain olefinic unsaturation; saturated C12-C14 and unsaturated C16-C18 monocarboxylic fatty acids and mixtures thereof are most preferred.

[0013] The fatty ester should be liquid at the envisaged operation temperature. Preferably, the fatty ester should have a viscosity below 10 mm2/s, preferably below 5 mm2/s, at 40°C (measured according to DIN standard method 51562). Also, the ester should have a Kauri Butanol value (ASTM test method D1133) of at least 30, preferably at least 40, more preferably at least 50.

[0014] The esters to be used in the compositions of the invention have no acute toxicity (LD50 > 2000), are not irritating and are readily biodegradable. Also, they are not ecotoxic (96 hours LC50 fish > 100 mg/L).

[0015] As surface active agents (also called surfactant), there may be used any non-ionic surfactant or blend having a HLB (hydrophilic/lipophylic balance) value of minimum 7, preferably of 7 to 10, more preferably from 8 to 10, and containing no aromatic ring in its structure. The preferred surface active agents for use in the invention are selected from the group consisting of polyoxyalkylene esters of fatty acids and mixtures thereof, preferably polyoxyethylene and polyoxypropylene esters.

[0016] The surface active agents to be used in the compositions of the invention have no acute toxicity (LD50 > 2000), are not irritating and are biodegradable.

[0017] The compositions of the invention contain at least 40 wt% of the fatty esters, preferably at least 55 wt%, more preferably at least 75 wt% and most preferably at least 90 wt%, the remainder of the composition being essentially the surfactant.

[0018] The composition must be liquid at the envisioned operation temperature. Thus, the viscosity of the composition should be of at most 80 mm2/s, preferably at most 50 mm2/s, more preferably at most 30 mm2/s, most preferably at most 10 mm2/s, measured at 40°C.

[0019] The method of the invention for removing oil from a bird having oil on its feathers or from an aquatic animal essentially consists of the steps of:

(i) externally applying an effective amount of the composition to the oiled surfaces to form a mixture

of oil with said composition;
(ii) washing said mixture with a liquid selected from the group consisting of water and mixtures of water with one or more surface-active agents.

[0020] The application of the composition may be made as usual, e.g. by spraying, by pouring, by dipping or with a brush, including allowing the composition to mix with the oil or, if desired, rubbing the surface of the animal to accelerate the mixing of the composition with the oil.

[0021] The compositions of the invention have an appropriate combination of viscosity and solvency power to allow a good and fast penetration on the surface of the animals while dissolving the oil or other hydrocarbon product to be removed from the surface of the animals. The resulting mixture is easily emulsified in water; thus, the oil or other hydrocarbon product is easily removed from the surface of the animals. This combined effect renders the cleaning operation easier thus shorter, and results in a lower stress for the animals if compared with a cleaning done in traditional ways. Typically, the time required for cleaning one bird is reduced from about one hour to about ten minutes (under comparable conditions). Consequently, not only is the stress lower for each animal (hence the rate of success higher), but also more animals can be treated.

[0022] The formulation has no adverse effect on the birds and aquatic animals, although the animals will obviously have to rebuild their own external fat protection before being released to nature.

[0023] The oil is thus removed in the form of an oil-in-water emulsion wherein the oily phase comprises fatty esters. The dispersed state increases the accessibility to the bacteria that are performing the biodegradation (whether the biodegradation occurs naturally or in wastewater treatment plants). The biodegradability of the emulsion is increased (with respect to simple emulsions) as a result of the presence of readily biodegradable products (the fatty esters) that stimulate the metabolism of the bacteria.

[0024] Another advantage of the composition and method of the invention was totally unexpected. Using the traditional methods for removing oil from birds, there remained a light brown colour, particularly noticeable on white birds. Using the composition and method of the invention, the birds recover their natural colour, thus indicating that the cleaning is particularly efficient.

[0025] The composition and method of the invention are particularly efficient for removing oil from a bird having oil on its feathers

Example 1

[0026] There was prepared a blend of:

- 90 wt% of methyl esters of rapeseed fatty acids, commercially available from TotalFina Oleochemicals under the trade name Radia 7961 (Kauri Butanol value = 56, viscosity = 4.2 mm2/s at 40°C); and
- 10 wt% of polyoxyethylene (8) di-tri-ricinoleate, commercially available from TotalFina Oleochemicals under the trade name Radiasurf 7445.

[0027] Both components are listed in the INCI (International Nomenclature of Cosmetic Ingredients). Also, the composition is not ecotoxic (96 hours LC50 fish > 100 mg/L).

[0028] The composition had a low viscosity (less than 30 mm2/s at 40°C).

[0029] The birds (guillemots) treated had been in contact with refined heavy oil and had most of their external surface covered with said oil. An effective amount of the composition was applied to the oiled surfaces of the birds during about 5 minutes, which were then washed with tap water. The operation did not take more than ten minutes per bird, and the birds recovered their initial white belly colour.

Example 2

[0030] Example 1 was repeated with the following composition:

- 90 wt% of isopropyl esters of C12-C18 fatty acids (topped coconut fatty acids), available from TotalFina Oleochemicals under the trade name Radia 30106 (Kauri Butanol value = 51; viscosity = 3.5 mm2/s at 40°C); and
- 10 wt% of polyoxyethylene 400 di-oleate, commercially available from TotalFina Oleochemicals under the trade name Radiasurf 7443 (HLB = 7.4)

[0031] The composition had a viscosity of 4.5 mm2/s at 40°C.

[0032] Similar results were obtained.

Claims

1. Composition for the cleaning of oiled birds and aquatic animals, essentially consisting of a mixture of (i) one or more fatty esters and (ii) one or more surface-active agents.

2. Composition according to claim 1, wherein the fatty ester is the ester of a monofunctional alcohol having from 1 to 18 carbon atoms and a monocarboxylic fatty acid having from 6 to 22 carbon atoms.

3. Composition according to claim 2, wherein the fatty ester is the ester of a monofunctional alcohol having from 1 to 3 carbon atoms and a monocarboxylic fatty acid selected from the group consisting of saturated acids having 12 to 14 carbon atoms, unsaturated acids having from 16 to 18 carbon atoms, and

mixtures thereof.

4. Composition according to any one of claims 1 to 3, wherein the fatty ester has a viscosity below 10 mm2/s, preferably below 5 mm2/s, and /or a Kauri Butanol value of at least 30, preferably at least 40, more preferably at least 50.

5. Composition according to any one of claims 1 to 4, wherein the surface-active agent is non-ionic and has a HLB of at least 7, preferably 7 to 10, more preferably 8 to 10.

6. Composition according to claim 5, wherein the surface-active agent is selected from the group consisting of polyalkylene esters of fatty acids and mixtures thereof.

7. Composition according to any one of claims 1 to 6, wherein the fatty acid esters represent at least 40 wt%, preferably at least 55 wt%, more preferably at least 75 wt% and most preferably at least 90 wt%.

8. Composition according to any one of claims 1 to 7 having a viscosity the viscosity of at most 80 mm2/s, preferably at most 50 mm2/s, more preferably at most 30 mm2/s, most preferably at most 10 mm2/s, measured at 40°C.

9. Use of the composition according to any one of claims 1 to 8 in the cleaning of oiled birds and aquatic animals.

10. Method for removing oil from a bird or aquatic animal, essentially consisting of the steps of:

(i) externally applying an effective amount of the composition according to any one of claims 1 to 8 to the oiled surfaces of the bird or aquatic animal to form a mixture of oil with said composition;
(ii) washing said mixture with a liquid selected from the group consisting of water and mixtures of water with one or more surface-active agents.

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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0833

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

C11D
C02F
B09C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 August 2000	Neys, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 10 0833

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82