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(54) Title: IMPROVEMENTS IN OR RELATING TO ORGANIC COMPOSITIONS

(57) Abstract

An aqueous cleaning composition includes one or more ethoxylated quaternary ammonium groups, one or more glycol ethers and an anionic surfactant.

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Improvements in or Relating to Organic Compositions

The present invention relates to compositions for cleaning hard surfaces, and in particular to compositions suitable for cleaning glass and glossy or shiny surfaces.

A particularly important feature of such compositions is that the surface when cleaned must not have any streaks or smears and, although numerous compositions for cleaning glass and like materials have been proposed, providing compositions which clean effectively whilst avoiding streaking or smearing has been a particular technical challenge.

A further advantage of cleaning compositions for glass and shiny or glossy surfaces is the ability to reduce or to avoid the build up of static charge. It will be appreciated that the presence of static charge on the surface causes the rapid re-deposition of dust and like particles by attraction of such particles onto the surface from the air. The benefits achieved by cleaning of the surface are thus rapidly diminished.

Up until now anionic surfactants have not been added in the same composition as cationic surfactants because the anionic surfactants interfere with the activity of cationic surfactants in so far as anti-static and anti-microbial properties are concerned. Surprisingly it has now been found that by using a quaternary ammonium compound as the cationic surfactant, compositions containing a cationic and anionic surfactant can be made so that the benefit of both the anionic surfactant (i.e. high detergency and low

smearing) and the benefit of the cationic surfactants (i.e. good anti-microbial and good anti-static properties) can be obtained.

Accordingly, it is an aim of the present invention to provide a cleaning composition, in particular for glass and glossy or shiny surfaces, which has good cleaning properties, does not cause smears or streaks, and also has good anti-microbial activity as well as having good anti-static properties, that is, the ability to reduce or prevent the build up of static charge on the surface.

According to the present invention, there is provided an aqueous cleaning composition, preferably a hard surface cleaning composition, comprising:

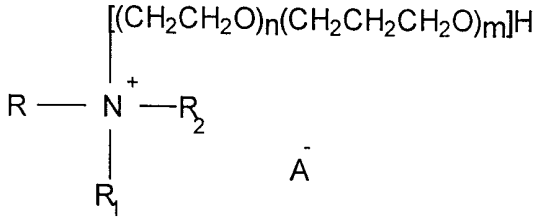
i) 0.01% - 5% of one or more ethoxylated quaternary ammonium compounds (hereinafter component i);

ii) 1% - 10% of at least one glycol ether and/or C_{1-22} alcohols (hereinafter component ii); and

iii) 0.005% to 2% of an anionic surfactant (hereinafter component iii);

all percentages being by weight.

Component i) preferably comprises one or more compounds of the formula I



(I)

in which

A^- is an anion preferably Cl^- or SO_4^- ;

R is an C_{10-25} alkyl or C_{10-25} alkenyl radical preferably C_{12-22} alkyl or C_{12-22} alkenyl;

each of R_1 and R_2 independently is selected from hydrogen and C_{1-6} alkyl;

n is preferably a number from 2 to 20, especially 3-6 ;and

m is 0 to 2, preferably 0.

More preferred quaternary ammonium compounds are C_{12-16} alkyl ethoxylated ammonium compounds. Suitable commercially available ethoxylated ammonium compounds include polyethylene glycol products e.g. cocoalkyl bis (hydroxyethyl) methyl ethoxylated methosulphate (PEG-5 cocomonium methosulphate - derived from coconut fatty acid).

For clarity in formula I the ethylene oxide recurring unit or the propylene oxide recurring unit may be directly attached to the N atom.

In preferred formulations, component i) is preferably present in a total amount of from 0.1% to 2% and more preferably from 0.1% to 0.5%.

Component ii) is preferably one or more compounds of the formula II:

$$R^3\text{-}O\text{-}CH_2\text{-}CH(OH)\text{-}R^4 \qquad (II)$$

in which

R^3 is a C_{1-6} alkyl or C_{2-6} alkenyl; and

R^4 is a C_{1-6} alkyl radical preferably, C_{1-4} alkyl.

Particularly preferred glycol ethers are butoxypropanol and methoxyisopropanol. Ethylene glycol monobutyl ether is also efficacious, but is less preferred for environmental reasons.

Component ii) is preferably present in a total amount of from 2% to 8%, more preferably from 3% - 6%, and especially from 3.5% to 5.5%.

Preferably component iii) is selected from sarcosinates, more preferably, sodium lauroyl sarcosinates. Preferably component iii) is present in a total amount of 0.01-1%, more preferably, 0.02-0.5%.

In this specification any alkyl group that is capable of being linear or branched is linear or branched unless indicated to the contrary.

The formulations of the present invention are particularly advantageous with regard to prior art compositions based on ether carboxylates and non-ethoxylated quaternary compounds as the latter result in smearing occurring on cleaning.

Thus, the combination of components i), ii) and iii) in the compositions of the present invention provide excellent anti-microbial properties and charge reduction on plastic surfaces whilst at the same time avoiding streaking and smearing on the surface.

The compositions of the invention may also advantageously include a wetting agent, in particular a fatty alcohol ethoxylate such as Volpo T7 (Trade Mark) available from Croda. Such a wetting agent may be present in an amount preferably of from 0.001% to 0.5%, more preferably from 0.002% to 0.1%

The compositions of the invention may also include minor amounts of optional ingredients such as fragrances, colourants, ammonia, acetic acid, C_{1-6} alcohols provided that such optional ingredients do not deleteriously affect the anti-smearing, antibacterial or anti-static properties of the compositions.

Preferably, these optional ingredients are present in an amount of 0 to 2%, more preferably 0 to 1%.

In order to illustrate the invention, the following examples were prepared and tested as illustrated below.

Example 1

In order to assess the level of smearing caused by this formulation, a sample of the formulation was applied in predetermined amounts to a clean dry paper towel which was then applied to a clean glass mirror tile and moved once with even pressure across the tile. After allowing the tile to dry, the level of smearing was assessed using a scale of 0 to 4 where 4 indicates severe smears or streaks and 0 indicates no smears or streaks.

The anti-static properties of the formulation was tested using a Charge Decay Test Unit from John Chubb Instrumentation, Cheltenham, UK. The test procedure involves the induction of a static charge on a surface and measurement of the time taken for the charge to dissipate. The latter time is expressed as 1/e and a lower value indicates a higher rate of charge dissipation and better anti-static properties. Tests were carried out on glass and on polycarbonate surfaces and the results are indicated below.

Butoxypropanol	2.1
Methoxypropanol	1.8
Sodium lauroyl sarcosinate	0.1
Fragrance	0.1
Acid Blue 3	0.015
PEG-5 Cocomonium methosulphate	0.205
Water	95.68

Smearing level	0.09
Charge dissipation time (glass)	0.38
Charge dissipation time (polycarbonate)	0.25
Charge dissipation time (acrylic)	0.23

Untreated surfaces were also tested for which the charge dissipation times were:

glass	1.6
polycarbonate	>600

In comparison to the formulation above, a second formulation without the cationic surfactant was made up as follows:

Butoxypropanol	2.1
Methoxypropanol	1.8
Ammonia (33%)	0.145
Fragrance	0.1
Patent Blue	0.001
PEG-5 Cocomonium methosulphate	0.205
Water	95.649
Smearing level	0.56 (faded)

Example 2

Butoxypropanol	2.1
Methoxypropanol	1.8
Ammonia (33%)	0.145
Fragrance	0.1
Duasyn Direct Turquoise	0.015
PEG-5 Cocomonium methosulphate	0.205
Sodium lauroyl sarcosinate	0.1
Water	95.535
Smearing level	0.08
Charge dissipation time (glass)	0.99
Charge dissipation time (polycarbonate)	0.33
Charge dissipation time (acrylic)	0.34

Example 3

Three formulations were made up according to Table 1 below. Two competitor products A and B were also tested. (Product A does not state it's active ingredients and Product B discloses 3.5% w/w isopropanol and 0.25% propylene glycol as the active microbiocide ingredients.)

All five formulations were tested for bacterial kill at an in test concentration of 80% v/v using EN1276 in the presence of 0.3%w/v bovine serum albumin (dirty conditions).

EN1276 is a European Standard describing a suspension test method for establishing whether a chemical disinfectant or antiseptic has or does not have a bactericidal activity. The parameters and tests methods outlined in EN1276 are incorporated herein by reference.

The microbiocidal effectiveness results are given in table 2.

Formulation Number	115	115A
	% w/w	
Butoxypropanol	2.1	2.1
Methoxypropanol	1.8	1.8
Dye	0.015	-
Peg-5 Cocomonium methosulphate	0.205	0.205
Sodium lauroyl sarcosinate	0.1	0.1
Perfume	0.1	0.1
Ammonia (25%)	0.2	0.2
Soft water	95.48	95.495

Table 1: Formulation details

Formulation Number 115 has been in storage for one year. Formulation Number 115A is newly made.

Sample	Conc (%v/v)	Microbiocidal Effect (ME) Values Against:							
		Ps. aeruginosa		*S.aureus*		*Ent. hirae*		*E.coli*	
115	80	>5.1	>5.5	>5.6	>5.6	>5.5	4.1	>5.4	>5.4
115A	80	>5.1	>5.5	>5.6	>5.6	>5.5	4.5	>5.4	>5.4
Prod A	80	>5.1	>5.5	4.7	>5.6	4.2	4.7	>5.4	>5.4
Prod B	80	>5.1	>5.5	3.5	2.6	4.6	4.5	4.6	5.4

Table 2: ME Test Results

Both competitor products fail the requirements of EN1276 by falling short of the requirements to meet classification as a disinfectant (ME values of at least 5.0 against all four test organisms.)

The compositions according to the invention show no loss of activity after 1 year of storage (Formulation 115) and both formulations achieved an EN1276 pass showing ME values >5.0 against all organisms.

Claims

1. An aqueous composition comprising:

i) 0.01-5% of one or more ethoxylated quaternary ammonium compounds (hereinafter component i);

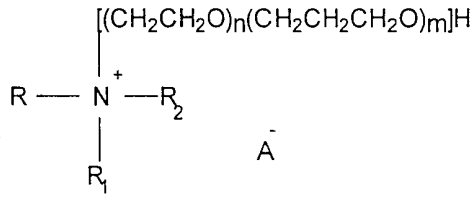
ii) 1% - 10% of at least one glycol ether and/or C_{1-22} alcohol (hereinafter component ii); and

iii) 0.005 to 2% of an anionic surfactant (hereinafter component iii),

all percentages being by weight.

2. A composition according to Claim 1 in which component i) is present in an amount of 0.1% to 2%, preferably 0.1% to 0.5%

3. A composition according to Claim 1 or 2 in which component i) is one or more compounds of the formula I:



(I)

in which

A^- is an anion preferably Cl^- or SO_4^- ;

R is an C_{10-25} alkyl or C_{10-25} alkenyl radical preferably C_{12-22} alkyl or C_{12-22} alkenyl;

each of R_1 and R_2 independently is selected from hydrogen and C_{1-6} alkyl;

n is preferably a number from 2 to 20, especially 3-6 ;and

m is 0 to 2, preferably 0.

4. A composition as claimed in claim 3 in which component i) is cocoalkyl bis (hydroxyethyl) methyl ethoxylated methosulphate (PEG-5 cocomonium methosulphate).

5. A composition as claimed in any preceding claim in which component ii) is a compound of the formula II:

$$R^3\text{-}O\text{-}CH_2\text{-}CH(OH)\text{-}R^4 \qquad (II)$$

in which

R^3 is a C_{1-6} alkyl or C_{2-6} alkenyl; and

R^4 is a C_{1-6} alkyl radical preferably, C_{1-4} alkyl.

6. A composition according to either one of Claims 4 and 5 in which component ii) is selected from butoxypropanol and methoxyisopropanol.

7. A composition according to any preceding claim in which component ii) is present in an amount of from 2% to 8%, preferably 3% to 6%.

8. A composition as claimed in Claim 1 in which component iii) is a sarcosinate, preferably sodium lauroyl sarcosinate.

9. A composition according to any preceding claim further including 0.001% to 0.5% of a wetting agent, preferably a fatty alcohol ethoxylate.

10. A composition according to any of the previous claims further including any one or more optional ingredients selected from fragrances, colourants, ammonia, acetic acid and C_{1-6} alcohols.

11. A composition as claimed in Claim 10 wherein the optional ingredients are present in an amount not exceeding 2%, preferably 1%.

12. A method of cleaning a surface, preferably a hard surface, comprising applying a composition according to any one of the preceding claims to the surface.

13. A composition substantially as hereinbefore described or exemplified.

14. A method of cleaning surfaces substantially as hereinbefore described or exemplified.

INTERNATIONAL SEARCH REPORT

Int ional Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C11D1/65 C11D3/20 C11D1/86 C11D3/00

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 C11D

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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 33812 A (JOHNSON & SON INC S C) 14 December 1995 see claims; examples	1-3,7, 10-14
P,A	US 5 795 853 A (DENIS JEAN-PIERRE ET AL) 18 August 1998 see claim 1; examples	1,5-7, 10-14
P,A	WO 98 44080 A (CLOROX CO) 8 October 1998 see claims 1,9-12; table 1	1,2,5-8, 10-14
A	US 5 252 245 A (MILLS SCOTT C ET AL) 12 October 1993 see examples	1,5,6, 9-14

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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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.
A	US 4 284 435 A (FOX DEREK J) 18 August 1981 see column 2, line 25 - line 65; claim 1	1-4

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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