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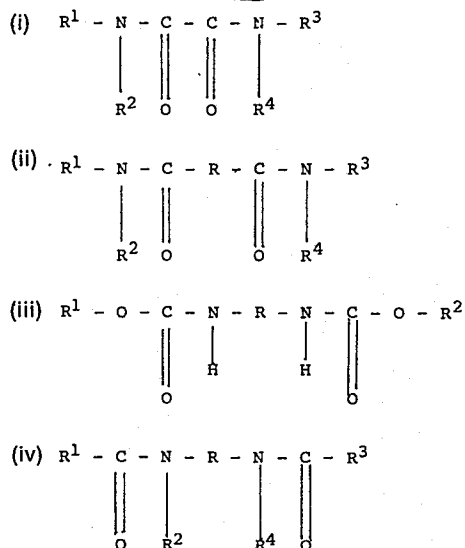
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(54) Low-sudsing liquid detergent compositions.

(57) The invention pertains to low-sudsing liquid detergent composition comprising a micellar structured liquid and a suds-suppressant, characterized in that the suds-suppressant comprises an intimate mixture of an oily substance and a nitrogen compound of the general formula:



where R¹ and R³ represent aliphatic hydrocarbon residues containing 14–22 carbon atoms, R² and R⁴ represent hydrogen atoms or aliphatic hydrocarbon residues containing 1–22 carbon atoms, and R represents an aliphatic residue containing 1–9 carbon atoms. The invention provides low-sudsing liquid compositions which do not suffer from deactivation of the suds-suppressant.

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LOW-SUDSING LIQUID DETERGENT COMPOSITIONS

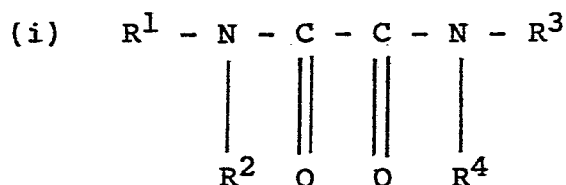
This invention relates to low-sudsing liquid detergent compositions.

5 Low-sudsing detergent compositions are increasing in popularity as the number of front-loading, drum-type washing machines and fully automatic industrial washing machines increases. Although much of the market is concentrated in the powder sector, liquid compositions are now being introduced in a number of European
10 countries.

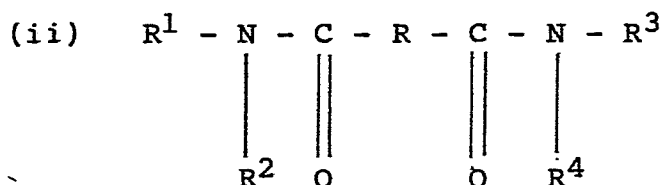
The conventional suds-suppressant for liquid compositions is a hydrocarbon oil or a silicone oil, since these materials are themselves liquid and in
15 theory at least are capable of incorporation into liquid compositions without undue complication. In practice there are a number of difficulties with incorporating suds-suppressants into liquid compositions. For example it has been found that in
20 general silicone oils are deactivated by the alkaline medium of a liquid detergent composition, and need to be protected.

We have now discovered that suds-suppressant
25 combinations of various complex nitrogen compounds with oily substances can be incorporated into certain liquid detergent compositions relatively simply and without problems of deactivation.

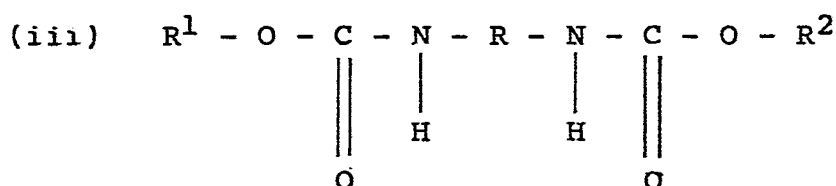
30 Accordingly, the present invention provides a low-sudsing liquid detergent composition comprising a micellar structured liquid and a suds-suppressant, characterised in that the suds-suppressant comprises an intimate mixture of an oily substance and a nitrogen
35 compound of the general formula:



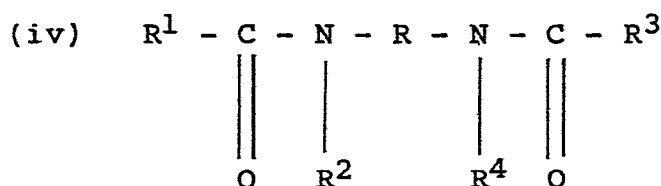
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15



20

where R^1 and R^3 represent aliphatic hydrocarbon residues containing 14-22 carbon atoms, R^2 and R^4 represent hydrogen atoms or aliphatic hydrocarbon residues containing 1-22 carbon atoms, and R represents an aliphatic residue containing 1-9 carbon atoms.

25

It will now be apparent that this invention relates to a micellar structured liquid.

30 There are two basic ways of making structured or false body liquids. One way is to rely on the micellar interaction set up between an anionic surfactant, a nonionic surfactant and an electrolyte. If a combination of this sort is incorporated into a liquid
35 it is possible to produce a structure which is capable of suspending as much as 50% of quite dense particles such as sodium tripolyphosphate.

The second way of making a structured liquid is to use an auxiliary thickener such as a clay or a polymer. Again quite larger amounts of particulate material can be suspended in such liquids, but in our experience
 5 their viscosity is more sensitive to changes in formulation.

We believe we are one of the very few organisations who have investigated the application of micellar
 10 structured liquids to the field of fabric washing in automatic washing machines. Hitherto, the structured liquids produced or patented by our competitors have generally been part of hard surface cleaning compositions such as scouring cleansers. Such
 15 compositions are very different from fabric washing compositions in that the detergency required of them is much lower. Furthermore, the amount of foam developed is not especially important. In fabric washing compositions, on the other hand, the amount of foam
 20 developed is critical, since if the compositions develop large amounts of foam, then they will not be suitable for use in automatic washing machines.

In a preferred aspect, the invention provides a stable
 25 homogeneous aqueous structured micellar liquid detergent composition, containing suspended sodium tripolyphosphate and 6 to 20% by weight of an active detergent mixture comprising:

- 30 (a) a water-soluble anionic sulphonate or sulphate detergent;
- (b) an alkali metal soap of a fatty acid having 12 to 22 carbon atoms;
- 35 (c) a nonionic detergent;

and an intimate mixture of an alkylene distearamide and wax.

Water-soluble anionic sulphonate detergents suitable
5 for use in the compositions of the invention are, for
example, the alkali metal salts of C_{10} - C_{16}
alkylbenzene sulphonates, C_{10} - C_{20} alkane
sulphonates, and C_{10} - C_{20} olefin sulphonates, the
alkali metal salts of alkylbenzene sulphonates being
10 preferred, especially those derived from alkylbenzenes
having a C_{10} - C_{14} alkyl chain and average molecular
weight of approximately 225-245.

Water-soluble anionic sulphate detergent are for
15 example primary and secondary alkyl sulphates and
alkylether sulphates having an alkyl chain length of
about 8 to 20 carbon atoms, preferably 12 to 18 carbon
atoms e.g. lauryl sulphate.

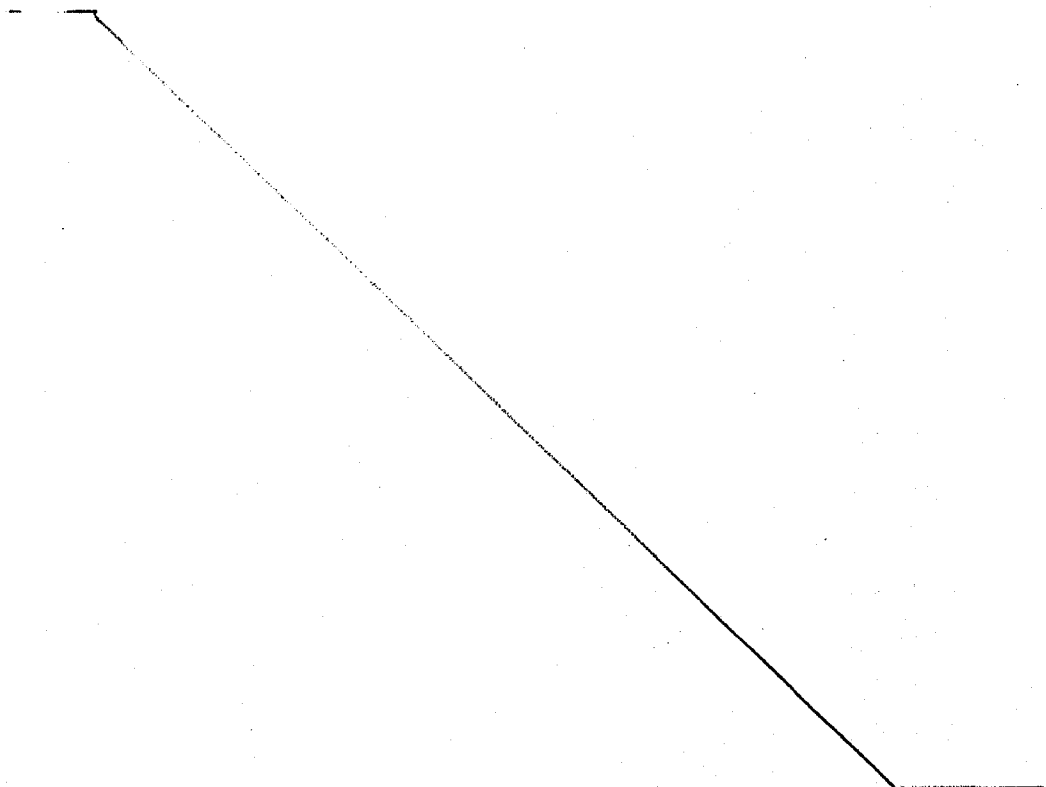
20 Typical examples of fatty acids having 12 to 22 carbon
atoms are oleic acid, ricinoleic acid, and fatty acids
derived from castor oil, rapeseed oil, groundnut oil,
coconut oil, palmkernel oil or mixtures thereof. The
sodium or potassium soaps of these acids can be used,
25 the sodium soaps being preferred.

Suitable nonionic detergents for use in the present
invention are fatty acid alkylolamides; alkylene oxide
condensates of alkyl phenols or aliphatic alcohols,
30 alkylamines, fatty acid alkylolamides and amine oxides.
Ethylene oxide condensates of alkyl phenols or
aliphatic alcohols are preferred.

Particularly suitable ethylene oxide condensates, such
35 as C_{12} - C_{15} alcohols condensed with 6-8 moles of
ethylene oxide per mole of alcohol have hydrophilicli-
pophilic balance (HLB) values of between 11 and 15.

Preferably the compositions of the invention have a viscosity of from 0.3 to 1.5 Pa.s measured at 20°C and at a shear rate of 21 seconds⁻¹; a sodium tripolyphosphate content of 8 to 30% by weight and an
5 active detergent mixture content of 8 to 20% by weight.

While it is normally necessary to have the surfactant mixture in the stated ratios in the aqueous compositions in order to achieve a stable product
10 within the desired viscosity range, it has been found that it is also important to mix the ingredients, properly agitated, in the proper sequence in order to produce a product of uniform quality from batch to batch. If the mixing sequence and proper agitation
15 disclosed below are not followed, varying rheological properties and reduced suspending capability can occur. If the mixing order and proper agitation as described below are followed, then successive batches especially when mixed in the same vessel will produce products of
20 uniform viscosity and stability.



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Example 1

		<u>% by weight</u>
	Linear C ₁₂ alkyl benzene sulphonic acid	6.2
5	Fatty alcohol 6EO ethoxylate	3.6
	Oleic acid	3.3
	Sodium hydroxide	1.1
	Sodium tripolyphosphate	20.0
	Sodium metasilicate	5.0
10	Fluorescer	0.3
	Methylene <u>bis</u> -stearamide) (in intimate	0.17-0.51
	Petroleum jelly) mixture)	0.85-2.25
	Water	balance to 100.0

- 15 The pH of this product was adjusted to a value of 13.

When used in an automatic washing machine of the (semi)-industrial type the suds generated by the liquid composition was at a controlled level, even after

20 prolonged storage of the liquid.

The ingredients are preferably mixed in the following manner.

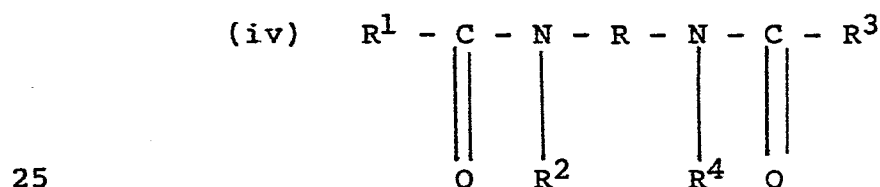
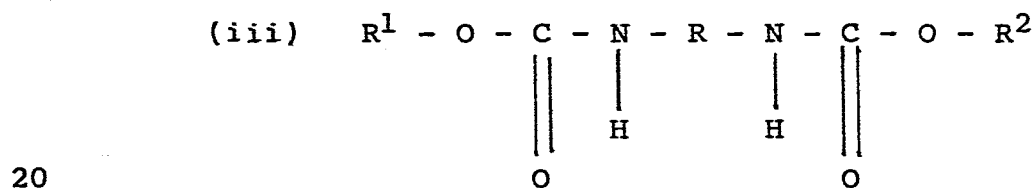
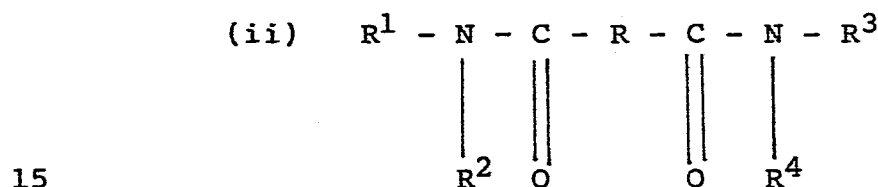
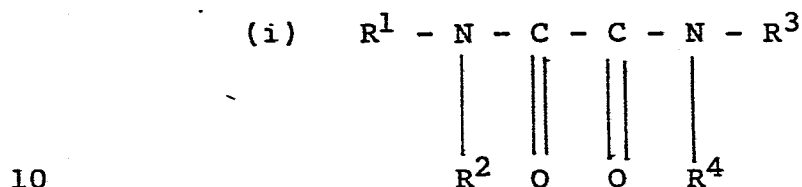
- 25 The required quantity of water is charged into a suitable mixing vessel provided with a stirrer. Sodium tripolyphosphate and sodium metasilicate are then mixed into the water and sodium hydroxide is added with heating to about 60°C. The oleic acid is then mixed
- 30 into the mass and stirring is continued at 60°C to saponify the oleic acid. Methylene bis-stearamide and petroleum jelly are then pre-mixed with nonionic surfactant at 60°C and this mix is then added to the main mix with continuous stirring. Subsequently the
- 35 alkyl benzene sulphonic acid is mixed into the mass. Finally the mixture is cooled under constant agitation and water is added, if necessary, to compensate for

evaporation loss during the first stages of operation. Thereafter, perfume may be added when the product is at substantially ambient temperature.

- 5 The liquid detergent composition of the invention may further contain any of the adjuncts normally used in fabric washing detergent compositions e.g. sequestering agents such as ethylene-diaminetetraacetate and sodium gluconate; alkali silicates for adjusting the pH; soil
- 10 suspending and anti-redeposition agents such as sodium carboxymethylcellulose, polyvinyl-pyrrolidone etc; fluorescent agents; perfumes, germicides and colourants.
- 15 Further the addition of suds-suppressants other than those defined; enzymes, particularly proteolytic and amylolytic enzymes, particularly proteolytic and amylolytic enzymes; reducing peroxygen or chlorine bleaches, such as sodium sulphite, sodium perborate and
- 20 potassium dichlorocyanurate, including bleach activators, such as N,N,N',N'- tetraacetylene-diamine, may be necessary or desirable to formulate a complete heavy duty detergent composition suitable for use in washing machine operations. These ingredients
- 25 can be employed in the liquid detergent compositions of the invention without danger of undue decomposition during storage if a proper protective coating is applied.

CLAIMS

1. A low-sudsing liquid detergent composition comprising a micellar structured liquid and a suds-suppressant, characterized in that the suds-suppressant comprises an intimate mixture of an oily substance and a nitrogen compound of the general formula:



where R^1 and R^3 represent aliphatic hydrocarbon residues containing 14-22 carbon atoms, R^2 and R^4 represent hydrogen atoms or aliphatic hydrocarbon residues containing 1-22 carbon atoms, and R represents an aliphatic residue containing 1-9 carbon atoms.

2. A composition according to claim 1, characterized in that it comprises:

- (I) 6 to 20% by weight of an active detergent mixture comprising:
- (a) a water-soluble anionic sulphonate or sulphate detergent;
 - 5 (b) an alkalimetal soap of a fatty acid having 12 to 22 carbon atoms; and
 - (c) a nonionic detergent;
- (II) suspended sodium tripolyphosphate; and
- 10 (III) an intimate mixture of an alkylene distearamide and wax.

3. A composition according to claim 1 or 2 characterized in that it comprises 8 to 20% by weight of an active detergent mixture, and 8 to 30% by weight
15 of a sodium tripolyphosphate, having a viscosity within the range of from 0.3 to 1.5 Pa.s measured at 20°C and at a shear rate of 21 sec.⁻¹.

4. A composition according to any of the preceding
20 claims characterized in that it comprises an intimate mixture of methylene distearamide and petroleum jelly.

5. A process for the preparation of a composition according to any of the preceding claims characterized
25 in that the nitrogen compound is premixed with the oily substance to intimate mixture before addition to the remaining ingredients of the composition.



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EUROPEAN SEARCH REPORT

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Application number

EP 84 20 0508

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
X,P	EP-A-0 087 233 (UNILEVER NV) * Page 3, lines 23-34; page 5, lines 1-30; page 8, example 2; claims 1, 4, 8 *	1,2,5	C 11 D 3/00 C 11 D 3/26
A	--- DE-A-2 043 088 (HENKEL & CIE) * Claims 1-8 * -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			C 11 D 3/00
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 12-07-1984	Examiner SCHULTZE D
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	