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Description

5 The present invention relates to liquid detergent compositions and in particular to aqueous built liquid detergent compositions comprising a detergent active-based suspending system capable of suspending undissolved material.

Aqueous built liquid detergent compositions are well known and a vast amount of formulations have been described in the prior art. Generally such compositions comprise one or more detergent-active compounds and one or more builder salts in an aqueous medium which is capable of suspending undissolved builder and/or adjuvant materials.

10 However, an important disadvantage of this type of conventional built liquid detergent is its extreme sensitivity to electrolyte level. This sensitivity results in formulation regions of physical stability and acceptable viscosity which greatly vary in magnitude and position as a function of the amount of dissolved electrolyte. In particular, sufficient quantities of the more soluble builders, such as NTA, are difficult to incorporate without rendering the liquid unstable and liable to precipitation or phase separation.

15 It is therefore an object of invention to provide compositions of the above type which have reduced sensitivity to electrolyte material and which tolerate larger quantities of such material without giving rise to unacceptable viscosities.

FR 2 014 084 (Hoechst) describes unstructured detergent compositions which comprise fatty alcohol polyalkylene oxide carboxylate salts.

20 It has now been found that inclusion of relatively small quantities of specific fatty alcohol polyglycoetherderived anionic surfactants, replacing part of the conventional anionic surfactant, reduces the sensitivity of the rheology to electrolyte materials, in particular, to builder and simple electrolyte salts.

25 Accordingly, the present invention provides an aqueous built liquid detergent composition capable of suspending particulate material, which comprises from 1% to 15% by weight of synthetic anion detergent-active material and from 5% to 30% by weight of electrolyte salts, characterized in that it comprises from 0.5-10% by weight of a fatty alcohol polyalkylene oxide carboxylate salt or a mixture of such salts according to the formula:



35 wherein R is an aliphatic hydrocarbon group having 8-20 carbon atoms or an aliphatic-aromatic hydrocarbon group having 4-20 carbon atoms in the aliphatic part; n is a number in the range of from 2 to 3 inclusive; x is a number in the range of from 1 to 16 inclusive; y is a number in the range of from 0 to 2 inclusive; and M is a cation.

R will normally comprise a mixture of aliphatic hydrocarbon groups of different lengths which may be straight or branched, saturated or unsaturated. Preferably R is a straight saturated aliphatic hydrocarbon group having from 1-14 carbon atoms.

40 The polyalkylene oxide portion $(OC_nH_{2n})_x$ preferably comprises only ethylene oxide units ($n=2$) but also propylene oxide or mixtures of propylene oxide and ethylene oxide are suitable ($2 < n \leq 3$). The number of ethylene and/or propylene oxide units (x) may range from 1-16, in particular from 1-12. Preferably the polyalkylene oxide portion comprises from 2-5 ethylene oxide units.

45 The carboxylate portion $((CH_2)_y-COOM)$ preferably comprises no alkyl chain ($y=0$), but short alkyl chains such as methylene and ethylene are also suitable. M is a cation and is selected from the group of hydrogen, sodium, potassium, ammonium, mono-, di- and triethanol ammonium, the alkali metal cations being preferred.

50 In the detergent compositions according to the present invention the fatty alcohol polyalkylene oxide carboxylate salt or a mixture of such salts is included in an amount of from 0.5-10%, partly replacing the synthetic anionic detergent-active material. The preferred amount depends on the rheology of the composition without the carboxylate salt compound, and the rheology which is aimed at. In general the best results are obtained when the fatty alcohol polyalkylene oxide carboxylate salt is included in an amount of from 2-5% by weight, replacing about an equivalent amount of synthetic anionic detergent active material.

55 The invention relates to aqueous liquid built compositions on the basis of synthetic anionic detergent-active material and electrolyte salts. Suitable synthetic anionic detergent-active materials comprise the well-known anionic detergents of the alkylaryl sulphonate type, the alkyl- and alkylether sulphate type, the alkane- and alkene sulphonate type, etc. Numerous other examples can be found in Schwartz, Perry "Detergents and Surface-Active Agents", Vol. II, 1958.

60 Preferably alkylaryl sulphonates are used, in which the alkyl chain contains 10-18 carbon atoms, such as n-dodecyl benzene sulphonate, tetrapropylene benzene sulphonate, n-pentadecyl benzene sulphonate, and linear $C_{12}-C_{15}$ alkylbenzene sulphonate in which the aliphatic group is obtained from cracked wax polymers, all in the form of their sodium or potassium salts.

65 The total amount of synthetic anionic detergent active materials must lie within the range of 1-15% by weight, but preferably is 6-12% by weight of the total composition.

Although the anionic materials are the major detergent-active constituents, small amounts of other detergent-active materials can be tolerated, in particular nonionic detergent-active materials. Nonionic detergents usually consist of a hydrophobic moiety which has been reacted with an alkylene oxide.

5 Suitable examples are primary or secondary, straight or branched chain C₈-C₁₈ alcohols condensed with 1-30 moles of alkylene oxide; mono- or dialkyl phenols with an alkyl group of 9-18 carbon atoms condensed with 1-30 moles of alkylene oxide; C₁₀-C₁₈ fatty acid mono- or dialkylol amides condensed with 1-30 moles of alkylene oxide; block copolymers of different or identical alkylene oxides and so on. Usually the alkylene oxide is ethylene oxide, but propylene oxide or a mixture of ethylene oxide and propylene oxide can also be used. Further suitable examples can be found in the text book of M. Schick "Nonionic Surfactants".

10 The amount of nonionic detergent-active material which can be included in the composition ranges up to 5%, but such amounts should be less than the amount of synthetic anionic detergent active material.

The electrolytes which are used in the present invention are those which cause partial salting out of the detergent active material.

15 Typical examples are builder salts, such as the alkali metal ortho- and pyrophosphates, the alkali metal ammonium tripolyphosphates, such as sodium tripolyphosphate, the alkali metal citrates, alkali metal salts of nitrilo triacetate and alkali metal salts of carboxy methoxy succinate.

Suitable examples of electrolytes are also buffering agents, such as the alkanol amines, in particular triethanol amine, alkali metal carbonates, alkali metal borates, alkali metal silicates, and so on.

20 The compositions of the invention may further contain all ingredients usually encountered in such products, such as alkali metal sulphites, for improving detergency; enzymes, either alone or in combination with enzyme stabilizers, such as polyalcohols or alkanol amines with borax; fluorescers, further builders, such as zeolites; abrasives, such as calcite; soil-suspending agents; anti-redeposition agents; hydrotropes, corrosion inhibitors; foam boosters or depressors; opacifying agents; perfumes; colouring agents; bleaching agents, optionally in combination with bleach precursors; fluorescers.

25 The products of the present invention can be prepared using conventional techniques. In this respect it has been found that it is advantageous to shear the product at the end of the production process to its maximum stable viscosity, e.g. by post-stirring or passing the product through a desintegrator or similar high-shear exerting equipment. Further shear exerted on the product thus treated during pumping and bottling does not affect the viscosity of the product.

30 The invention will now be further illustrated by way of example, in which all percentages are by weight of the final composition.

Example

35 Compositions were prepared according to the formulations listed in Table 1, having good physical stability and clearly showing the increased tolerance to high electrolyte levels.

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TABLE I

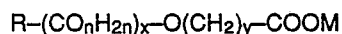
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
<u>Ingredients</u>																											
Akypo* RLM 25	3	4	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Akypo RLM 45	-	-	-	-	-	4	5	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Akypo RLM 100	-	-	-	-	-	-	-	-	3	4	5	5	5	5	5	5	5	-	-	-	-	-	-	-	-	-	-
Akypo L 140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	-	-	-	-	-	-	-	-	-
Akypo RLM 160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	5	9	-	-	-	-
Akypo O 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	4	9
Dodecyl benzene																											
sulphonic acid	6	6	6	4	2	6	-	5	5	7	6	5	5	5	-	-	7	5	7	7	5	1	9	7	6	1	
Sodium lauryl sulphate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	-	-	-	-	-	-	-	-	-	-
Sodium lauryl polyether sulphate	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-
C ₁₂ -C ₁₅ fatty alcohol condensate with 3 moles of ethylene oxide	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium nitrilo-triacetate.1 aq.	-	-	15	20	-	10	40	-	-	15	25	-	20	25	20	25	20	15	20	20	15	20	30	-	20	25	30
Sodium tripolyphosphate anh.	25	25	-	-	25	-	-	25	25	-	-	25	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-
Sodium sulphite anh.	8	8	-	-	8	-	-	-	8	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-
Water																											
balance																											

(*) Akypo is the trade-name for a series of fatty alcohol polyglycoether carboxylates sold by Chem-Y, The Netherlands.

Akypo RLM 25 : sodium lauryl poly (2.5) ethylene oxide carboxylate
 Akypo RLM 45 : sodium lauryl poly (4.5.) ethylene oxide carboxylate
 Akypo RLM 100: sodium lauryl poly (10) ethylene oxide carboxylate
 Akypo L 140 : sodium lauryl poly (14) ethylene oxide carboxylate
 Akypo RLM 160: sodium lauryl poly (16) ethylene oxide carboxylate
 Akypo O 60: sodium oleyl poly (6) ethylene oxide carboxylate

Claims

1. An aqueous built liquid detergent composition capable of suspending particulate material, which comprises a detergent-active based suspending system and a total amount of 1–15% by weight of synthetic anionic detergent-active materials, which comprise 0,5–10% by weight of a fatty alcohol polyalkylene oxide carboxylate salt or a mixture of such salts according to the formula:



wherein R is an aliphatic hydrocarbon group having 8–20 carbon atoms or an aliphatic-aromatic hydrocarbon group having 4–20 carbon atoms in the aliphatic part;

n is a number in the range of from 2 to 3 inclusive;

x is a number in the range of from 1 to 16 inclusive;

y is a number in the range of from 0 to 2 inclusive;

and M is a cation; and from 5–50% by weight of electrolyte salts.

2. A composition according to claim 1 wherein the total amount of synthetic anionic detergent-active materials lies within the range of from 6 to 12% by weight.

3. A composition according to either of the preceding claims which further comprises up to 5% by weight of a nonionic detergent-active material, the amount of nonionic detergent-active material being less than the amount of synthetic anionic detergent-active materials.

4. A composition according to any preceding claim which comprises from 5–30% by weight of electrolyte.

5. A composition according to any preceding claims wherein $n=2$.

6. A composition according to any one of the preceding claims wherein x is 2 to 5.

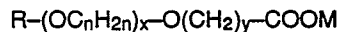
7. A composition according to any one of the preceding claims wherein y is 0.

8. A composition according to any one of the preceding claims wherein M is an alkali metal ion.

9. A composition according to any one of the preceding claims which comprises of from 2 to 5% by weight of the fatty alcohol polyalkylene oxide carboxylate salt.

Patentansprüche

1. Wäßrige Gerüststoff-haltige, flüssige Detergensenzusammensetzung, die zur Suspension von teilchenförmigem Material fähig ist, umfassend ein auf Detergens-aktiven Materialien basierendes suspendierendes System und eine Gesamtmenge von 1–15 Gew.-% synthetischer anionischer Detergens-aktiver Materialien, umfassend 0,5–10 Gew.-% eines Fettalkohol-Polyalkylenoxidcarboxylat-Salzes oder eine Mischung von solchen Salzen gemäß der Formel:



worin R eine aliphatische Kohlenwasserstoff-Gruppe mit 8–20 Kohlenstoffatomen oder eine aliphatisch-aromatische Kohlenwasserstoffgruppe mit 4–20 Kohlenstoffatomen in dem aliphatischen Teil ist;

n eine Zahl im Bereich von 2 bis einschließlich 3 ist;

x eine Zahl im Bereich von 1 bis einschließlich 16 ist;

y eine Zahl im Bereich von 0 bis einschließlich 2 ist;

und M ein Kation ist und

5–50 Gew.-% Elektrolyten-Salze.

2. Zusammensetzung nach Anspruch 1, worin die Gesamtmenge an synthetischen, anionischen, Detergens-aktiven Materialien im Bereich von 6 bis 12 Gew.-% liegt.

3. Zusammensetzung nach einem der vorhergehenden Ansprüche, weiterhin umfassend bis zu 5 Gew.-% eines nichtionischen, Detergens-aktiven Materials, wobei die Menge an nichtionischem Detergens-aktivem Material kleiner als die Menge an synthetischen, anionischen, Detergens-aktiven Materialien ist.

4. Zusammensetzung nach einem der vorhergehenden Ansprüche, umfassend 5–30 Gew.-% Elektrolyt.

5. Zusammensetzung nach einem der vorhergehenden Ansprüche, worin $n=2$ ist.
 6. Zusammensetzung nach einem der vorhergehenden Ansprüche, worin x von 2 bis 5 ist.
 7. Zusammensetzung nach einem der vorhergehenden Ansprüche, worin y 0 ist.
 8. Zusammensetzung nach einem der vorhergehenden Ansprüche, worin M ein Alkalimetallion ist.
 5 9. Zusammensetzung nach einem der vorhergehenden Ansprüche, umfassend 2 bis 5 Gew.-% des Fettalkohol-Polyalkylenoxidcarboxylat-Salzes.

Revendications

- 10 1. Composition détergente liquide aqueuse avec adjuvant capable de mettre en suspension une matière particulaire, qui comprend un système de suspension à base de détergent actif et un total de 1 à 15% en poids de détergents anioniques synthétiques actifs qui comprennent 0,5 à 10% en poids d'un carboxylate d'oxyde de polyalkylène d'alcool gras ou d'un mélange de tels sels selon la formule:



dans laquelle R est un radical hydrocarboné aliphatique de 8 à 20 atomes de carbone ou un radical hydrocarboné aliphatique-aromatique contenant dans le fragment aliphatique de 4 à 20 atomes de carbone;

20 \underline{n} est un nombre compris entre 2 et 3 inclus;

\underline{x} est un nombre compris entre 1 et 16 inclus;

\underline{y} est un nombre compris entre 0 et 2 inclus;

et M est un cation; et de 5 à 50% en poids de sels d'électrolytes.

2. Composition selon la revendication 1, dans laquelle le total des détergents anioniques synthétiques actifs est compris entre 6 et 12% en poids.

- 25 3. Composition selon la revendication 1 ou 2, qui comprend en outre jusqu'à 5% en poids d'un détergent non ionique actif, la quantité de détergent non ionique actif étant inférieure à la quantité de détergent anionique synthétique actif.

4. Composition selon l'une quelconque des revendications précédentes, qui comprend de 5 à 30% en poids d'électrolytes.

- 30 5. Composition selon l'une quelconque des revendications précédentes, dans laquelle $\underline{n} = 2$.

6. Composition selon l'une quelconque des revendications précédentes, dans laquelle \underline{x} est de 2 à 5.

7. Composition selon l'une quelconque des revendications précédentes, dans laquelle \underline{y} est 0.

8. Composition selon l'une quelconque des revendications précédentes, dans laquelle M est un ion de métal alcalin.

- 35 9. Composition selon l'une quelconque des revendications précédentes, qui comprend de 2 à 5% en poids de carboxylate d'oxyde de polyalkylène d'alcool gras.

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