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Description

The present invention relates to aqueous liquid detergent compositions of the suspending type, i. e. compositions in which particles of a different density can be stably suspended. In particular, the invention relates to aqueous liquid detergent compositions of the suspending type which exhibit good cleaning performance and simultaneously impart a softening quality to the fabrics being laundered.

5 Simultaneous cleaning and softening is desirable, as it provides the user with increased convenience in the laundering operation, rendering redundant the afterwash softening/rinse cycle and the separate dosing of special-purpose softening compositions.

A number of attempts have been made to formulate fabric-washing detergent compositions which exhibit the cleaning performance as expected by the modern user and simultaneously provide sufficient softening efficacy. In the field of solid detergent compositions, proposals have been made to incorporate cationic fabric softeners in anionic detergent-based compositions by inclusion of means which overcome the natural incompatibility of anionic and cationic detergent actives due to complexation of these compounds resulting in a consequent decrease in detergency and softening efficacy.

Fatty amines in combination with celluloses have been described in the context of fabric softening in 15 EP-A-120,528. Tertiary amines have been described for similar application in combination with surfactants and clay, according to EP-A-11,340.

To our knowledge, no proposals have been made to formulate aqueous liquid compositions based on structured active systems including a combination of anionic and cationic detergent actives.

20 Surprisingly, it has now been found that long-chain fatty amines, which are suitable to impart through-the-wash softening, can be stably incorporated in aqueous suspending liquid detergent compositions at a pH equal to or below the isoelectric point of the amine without adverse effect on the suspending properties of the composition if a hydrotropic agent is included in an amount which will be defined hereunder more precisely.

Accordingly, the present invention provides an aqueous suspending liquid detergent composition for 25 the cleaning and softening of fabrics which comprises :

- a) a nonionic detergent-active material and/or an anionic derivative of a polyalkoxylated nonionic detergent-active material ;
- b) an anionic detergent-active material other than component (a) ; and
- c) from 10-35 % by weight of electrolytes of the salting-out type
- 30 characterized in that it further comprises :
- d) from 0.5 to 15 % by weight of a long-chain fatty amine of general formula :



40 wherein

- R₁ is a C₁₀-C₂₆ alkyl or alkenyl group,
- R₂ is H or a C₁-C₂₆ alkyl or alkenyl group, and
- R₃ is H or a C₁-C₇ alkyl, alkenyl or alkylaryl group.

and

- 45 e) 1-10 % by weight of a hydrotropic agent ; the pH of said composition being equal to or below the isoelectric point of said amine.

Thus the composition also comprises one or more electrolytes as part of the active system, thereby providing the structure necessary for the suspending properties of the composition.

The invention will now be discussed in more detail.

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The nonionic detergent-active material

Suitable nonionic detergent-actives for use in the present invention may be found in the following classes : fatty acid alkylolamides, alkylene oxide condensates of alkylphenols or primary and secondary 55 aliphatic alcohols, alkylamines, alkyl mercaptans and amine oxides.

The ethylene oxide condensates and mixtures of ethylene oxide condensates with fatty acid alkylolamides are preferred. Particularly suitable have been found ethylene oxides having a hydrophilic-lipophilic balance of between 11 and 15, such as C₁₃-C₁₅ alcohols condensed with 6-8 ethylene oxides.

Also anionic derivatives of, in particular, polyalkoxylated nonionic detergent materials which have 60 retained to a large extent a nonionic character, can be used instead of or in combination with nonionic detergent-actives. Suitable examples are the sulphated, phosphated or carboxylated polyalkoxylated nonionic detergent-actives, such as the alkyl and alkylaryl polyethoxy ether sulphates. Suitable alkyl

polyethoxy ether sulphates have 10 to 18 carbon atoms in the alkyl chain and have an average of 1 to 12, preferably 1 to 6 ethylene oxide units.

The anionic detergent-active material

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A wide range of anionic surfactants can be used in the compositions of the present invention.

Suitable anionic non-soap surfactants are water-soluble salts of alkyl benzene sulphonates, alkyl sulphates, paraffin sulphonates, alpha-olefin sulphonates, alphasulphocarboxylates and their esters, alkyl glyceryl ether sulphonates, fatty acid monoglyceride sulphates and sulphonates, 2-acyloxy-alkane-1-sulphonates, and beta-alkoxy alkane sulphonates. Soaps are also suitable anionic surfactants.

Especially preferred alkyl benzene sulphonates have 9 to 15 carbon atoms in a linear or branched alkyl chain, more especially 11 to 13 carbon atoms. Suitable alkyl sulphates have 10 to 22 carbon atoms in the alkyl chain, more especially from 12 to 18 carbon atoms.

Suitable paraffin sulphonates are essentially linear and contain from 8 to 24 carbon atoms, more especially from 14 to 18 carbon atoms. Suitable alpha-olefin sulphonates have 10 to 24 carbon atoms, more especially 14 to 16 carbon atoms; alpha-olefin sulphonates can be made by reaction with sulphur trioxide, followed by neutralization under conditions such that any sultones present are hydrolyzed to the corresponding hydroxy alkane sulphonates. Suitable alpha-sulphocarboxylates contain from 6 to 20 carbon atoms; included herein are not only the salts of alpha-sulphonated fatty acids, but also their esters made from alcohols containing 1 to 14 carbon atoms.

Suitable alkyl glyceryl ether sulphates are ethers of alcohols having 10 to 18 carbon atoms, more especially those derived from coconut oil and tallow. Suitable alkyl phenol polyethoxy ether sulphates have 8 to 12 carbon atoms in the alkyl chain and an average of 1 to 6 ethylene oxide units per molecule. Suitable 2-acyloxy-alkane-1-sulphonates contain from 2 to 9 carbon atoms in the acyl group and 9 to 23 carbon atoms in the alkane moiety. Suitable beta-alkyloxy alkane sulphonates contain 1 to 3 carbon atoms in the alkyl group and 8 to 20 carbon atoms in the alkane moiety.

The alkyl chains of the foregoing non-soap anionic surfactants can be derived from natural sources such as coconut oil or tallow, or can be made synthetically, as for example by using the Ziegler or Oxo processes. Water-solubility can be achieved by using alkali metal, ammonium, or alkanolammonium cations; sodium is preferred. Mixtures of anionic surfactants are contemplated by this invention; a satisfactory mixture contains alkyl benzene sulphonate having 11-13 carbon atoms in the alkyl group and alkyl sulphate having 12 to 18 carbon atoms in the alkyl group.

Suitable soaps contain 8 to 18 carbon atoms, more especially 12 to 18 carbon atoms. Soaps can be made by direct saponification of natural fats and oils such as coconut oil, tallow and palm oil, or by neutralization of free fatty acids obtained from either natural or synthetic sources. The soap cation can be alkali metal, ammonium or alkanolammonium; sodium is preferred.

The amount of the active detergent material may vary from 1 to 60 %, preferably from 2-40 % and especially preferably from 5-25 %; when mixtures of e. g. anionics and nonionics are used, the relative weight ratio varies from 10 : 1 to 1 : 10, preferably from 6 : 1 to 1 : 6. When a soap is also incorporated, the amount thereof is from 1-40 % by weight.

A particularly preferred active detergent mixture is that of a water-soluble anionic sulphonate or sulphate detergent and a nonionic detergent in a weight ratio of from 6 : 1 to 1 : 1, with or without a soap in a ratio of up to 2 : 1 with respect to the nonionic detergent constituent.

45 The electrolytes

In order to establish the suspending properties of the compositions according to the present invention, the inclusion of one or more electrolytes, of the salting-out type, is essential.

It is well known that the extent to which a nonionic detergent-active or derivative thereof is salted out by a salting-out electrolyte, resulting in a certain lowering of the cloud point, is dependent upon the nature and the amount of salting-out electrolyte used.

The composition contains from 10 to 35 % by weight of the salting-out electrolytes.

Typical examples of such salting-out electrolytes are water-soluble builder salts, such as the alkali metal ortho- and pyrophosphates, the alkali metal tripolyphosphates, such as sodium tripolyphosphate, the alkali metal silicates, alkali metal borates, alkali metal carbonates, alkali metal sulphates, alkali metal citrates; alkali metal salts of nitrilotriacetate; alkali metal salts of carboxymethyloxy succinate. Instead of the alkali metal salts, the ammonium and ethanol-substituted ammonium salts can be used.

Depending upon type and level of salting-out electrolyte used, it may be advantageous to include also a certain level of a non-salting-out electrolyte. This can be determined by routine experimentation, using the general indications below as to level and type of auxiliary electrolytes.

Typical examples of suitable auxiliary electrolytes are alkali metal iodides, alkali metal (per)chlorates, alkali metal rhodanides, and alkali metal nitrates, and alkali metal bromides and alkali metal chlorides. The corresponding ammonium and ethanol-substituted ammonium salts can also be used. The auxiliary electrolyte is generally used in the composition in an amount of 0.5 to 35 % by weight, preferably 1 to 30 % by weight, and particularly preferably 2 to 25 % by weight.

The long chain fatty amine

Preferred long-chain fatty amines suitable for the purpose of the invention are substantially water-insoluble compounds.

5 Preferably those according the general formula hereinbefore defined, wherein R_3 is methyl or ethyl.

Suitable amines include :

monotallowyl amine

ditallowyl amine

10 dilauryl methylamine

dimyristyl methylamine

dicetyl methylamine

distearyl methylamine.

15 Preferred are monotallowyl amine, ditallowyl amine and ditallowyl methylamine. These are commercially available as Armeen HT, 2HT and M2HT (Trade Marks of Akzo N.V.).

Mixtures of any of these amines may be used.

The compositions should contain from 0.5 % to 15 % by weight of the amine, preferably from 1 % to 10 % by weight and most preferably from 2 % to 5 % by weight.

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The hydrotropic agent

An essential aspect of the present invention is the inclusion of a hydrotropic agent. It has been found that such inclusion compensates the normally adverse effect on stability due to the incorporation of the at least partially charged amines.

Suitable hydrotropic agents for use in the present invention are those conventionally used for this purpose in the art. Suitable examples are the watersoluble organic solvents such as the lower alcohols, diols and triols, water-soluble organic compounds such as urea, the short alkyl chain aromatic sulphonic acid salts such as sodium toluene sulphonate and sodium xylene sulphonate.

30 The group of the short alkyl chain aromatic sulphonates is preferred.

The optimal amount of the hydrotropic agent depends on the type and concentration of the fatty amine, and can be simply determined by standard routines used in the art. In the present invention the hydrotropic agent is included in an amount of 1 to 10 % by weight.

35 The pH

The pH of the composition is such that the fatty amine is at least partially protonated, and therefore is equal to or below the isoelectric point of the amine.

40 The isoelectric point of any given amine can be determined by measuring the electrophoretic mobility of an aqueous dispersion of the amine under standard conditions of concentration and temperature at a series of pHs, with plotting of the mobilities against pH to determine the pH of zero mobility.

The isoelectric points of a series of amines are given in the following table, in which T and Co represent the mixed alkyl radical derived from hydrogenated tallow acid and coconut oil acid, respectively.

45

T_2NH	7.4
T_3N	8.2
T_2NCH_3	8.8
Co_2NCH_3	9.1
$TN(CH_3)_2$	10.0
THN_2	10.9

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Minor ingredients

55 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 diamine tetraacetate ; alkali silicates for adjusting the pH ; soil-suspending and anti-redeposition agents such as sodium carboxymethylcellulose, polyvinylpyrrolidone, etc. ; fluorescent agents ; perfumes, germicides and colourants.

60 Further, the addition of lather depressors such as silicones ; and enzymes, particularly proteolytic and amylolytic enzymes ; and peroxygen or chlorine bleaches, such as sodium perborate and potassium dichlorocyanurate, including bleach activators, such as N,N,N',N'-tetraacetythylenediamine, may be necessary to formulate a complete heavy duty detergent composition suitable for use in washing machine operations. These ingredients can be employed in the liquid detergent compositions of the invention without the danger of undue decomposition during storage if a proper protective coating is applied.

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Preferably the composition of the invention has a viscosity of up to 1.2 Pas, and most preferably from 0.4 to 1.0 Pas as measured at 20 °C and at a shear rate of 21 seconds⁻¹.

The invention will now be further illustrated by way of examples, percentages in which are by weight of the total composition unless otherwise indicated.

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Specifications and properties of ingredients :

Armeen HT = primary hardened tallow amine R-NH₂

melting range : 47-55 °C

10 isoelectric pH : 10.9 M = 256

R : C₁₆ = 31 %

C₁₈ = 59 %

supplier : AKZO Chemie

Synperonic K87 (Trade Mark) = C₁₃-C₁₅ fatty alcohol condensed with 7 moles of alkylene oxide

15 (92 % ethylene oxide, 8 % propylene oxide)

STP = Na₅P₃O₁₀ ; Thermphos NW ; (Trade Mark of Knapsack)

Glycerol = C₃H₈O₃ (86.5 %), water (13.5 %)

Example

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Ingredients	%
Armeen HT	3.4
Sodium soap of groundnut fatty acids	1.1
Sodium dodecyl benzene sulphonate	6.4
25 Sodium toluene sulphonate	8.0
Glycerol	5.0
Pentaborate	2.0
Sodium tripolyphosphate	24.0
Synperonic K87	1.9
30 Lauryl diethanolamide	1.3
Enzymes	0.8
Water	balance

Viscosity : 690/775 mPas · s at 21 sec⁻¹

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Claims

1. Aqueous suspending liquid detergent composition for the cleaning and softening of fabrics, comprising :

40 a) a nonionic detergent-active material and/or an anionic derivative of a polyalkoxylated nonionic detergent-active material ;

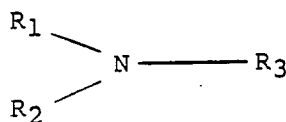
b) an anionic detergent-active material other than component (a) ; and

c) from 10-35 % by weight of electrolytes of the salting-out type

45 characterized in that the composition further comprises :

d) from 0.5 to 15 % by weight of a long-chain fatty amine of general formula :

50



wherein

R₁ is a C₁₀-C₂₆ alkenyl group,

55 R₂ is a H or a C₁-C₂₆ alkyl or alkenyl group, and

R₃ is H or a C₁-C₇ alkyl, alkenyl or alkylaryl group ; and

e) 1-10 % by weight of a hydrotropic agent ;

the pH of the composition being equal to or below the isoelectric point of said amine.

2. Composition according to claim 1, which further comprises as component (f) from 0.5-35 % by weight of electrolytes of the non-salting-out type.

3. Composition according to any one of the preceding claims, wherein R₃ is methyl or ethyl.

4. Composition according to any one of the preceding claims, wherein the amine is a monotallowyl amine, a ditallowyl amine or a ditallowyl methyl amine.

5. Composition according to any one of the preceding claims, wherein component (e) is a short alkyl chain aromatic sulphonate.

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Patentansprüche

1. Wäßrige, suspendierende, flüssige Reinigungsmittelzusammensetzung zum Reinigen und Weich-

5 a) ein nichtionisches detergens-aktives Material und/ oder ein anionisches Derivat eines polyalkö-
xylierten nichtionischen detergens-aktiven Materials ;

b) ein anionisches detergens-aktives Material unterschiedlich zu dem der Komponente (a) ; und

c) 10-35 Gew.-% von Elektrolyten des Aussalz-Typs, dadurch gekennzeichnet, daß die Zusammen-

setzung weiterhin umfaßt

10 d) 0,5-15 Gew.-% eines langkettigen Fettamins der allgemeinen Formel :



in welcher

R_1 eine C_{10} - C_{26} Alkenylgruppe,

20 R_2 Wasserstoff oder eine C_1 - C_{26} Alkyl- oder Alkenylgruppe, und

R_3 Wasserstoff oder eine C_1 - C_7 Alkyl-, Alkenyl- oder Alkylarylgruppe bedeuten,

sowie

e) 1-10 Gew.-% eines hydrotropen Mittels, wobei der ph-Wert der Zusammensetzung gleich oder unterhalb des isoelektrischen Punktes des Amins liegt.

25 2. Zusammensetzung gemäß Anspruch 1, welche weiterhin als Komponente (f) 0,5-35 Gew.-% von Elektrolyten des Nicht-Aussalz-Typs umfaßt.

3. Zusammensetzung gemäß einem der vorgehenden Ansprüche, worin R_3 Methyl oder Ethyl bedeutet.

4. Zusammensetzung gemäß einem der vorgehenden Ansprüche, worin das Amin ein Monotalgamin, ein Ditalgamin oder ein Ditalg-Methyl-Amin ist.

5. Zusammensetzung gemäß einem der vorgehenden Ansprüche, worin Komponente (e) ein aromatisches Sulfonat mit kurzer Alkylkette ist.

35 Revendications

1. Composition détergente liquide aqueuse en suspension pour le nettoyage et l'adoucissement des textiles, qui comprend :

40 a) un détergent actif non ionique et/ou un dérivé anionique d'un détergent actif non ionique polyalcoxylé ;

b) un détergent actif anionique autre que le composant (a) ; et

c) de 10 à 35 % en poids d'électrolytes du type à relargage ;

caractérisée en ce qu'elle comprend en outre :

45 d) de 0,5 à 15 % en poids d'une amine grasse à chaîne longue de formule générale :



dans laquelle R_1 est un radical alkyle ou alcényle en C_{10-26} , R_2 est H ou un radical alkyle ou alcényle en C_{1-26} et R_3 est H ou un radical alkyle, alcényle ou alkylaryle en C_{1-7} ; et

e) 1 à 10 % en poids d'un agent hydrotrope,

55 le pH de ladite composition étant égal ou inférieur au point isoélectrique de ladite amine.

2. Composition selon la revendication 1, qui comprend en outre à titre de composant (f) de 0,5 à 35 % en poids d'électrolytes du type à non-relargage.

3. Composition selon l'une quelconque des revendications précédentes, dans laquelle R_3 est le radical méthyle ou éthyle.

60 4. Composition selon l'une quelconque des revendications précédentes, dans laquelle l'amine est une monsuifylamine, une disuifylamine ou une disuifylméthylamine.

5. Composition selon l'une quelconque des revendications précédentes, dans laquelle le composant (e) est un sulfonate aromatique à chaîne alkylque courte.