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(54) LAUNDRY DETERGENT COMPOSITION

WASCHMITTELZUSAMMENSETZUNG

COMPOSITION DE DÉTERGENT POUR LESSIVE

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EP 3 433 346 B1

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Description

Field of Invention

[0001] The present invention provides an alkoxylated polyethylene imine polymer and surfactant formulation for use in domestic laundry.

Background of the Invention

[0002] Domestic Laundry liquid formulation containing Linear Alkyl benzene sulfonate surfactant, Alkyl Ether Sulfate surfactant, and low levels of non-ionic surfactant and zwitterionic surfactant are ubiquitous. To enhance cleaning performance alkoxylated polyethylene imine polymers, preferably in combination with polyethylene terephthalate soil removal polymers. The addition of these polymers greatly reduces the viscosity of the formulation. Effective methods to increase the viscosity of the formulation are required, which do not reduce the surfactant level.

[0003] WO2013/087286 (Unilever) discloses liquids formulations containing alkyl ether carboxylic acids, betaines, anionic surfactant, non-ionic surfactant for providing softening benefits.

[0004] WO2014/060235 (Unilever) discloses a laundry detergent composition comprising (a) nonionic surfactant, (b) anionic surfactant, (c) alkyl ether carboxylic acid or carboxylate salt thereof, and, (d) a polyglucosamine or a copolymer of glucosamine and N-acetylglucosamine; and to its use to soften fabrics.

Summary of the Invention

[0005] Surprisingly it is found that partial or complete replacement of the alkyl ether sulfate anionic surfactant with alkyl ether carboxylic acid anionic surfactant, increases the viscosity of the formulation.

[0006] In one aspect the present invention provides an aqueous liquid laundry detergent composition comprising:

(i) from 2 to 10 wt%, preferably from 2.5 to 5 wt%, of linear alkyl benzene anionic sulfonate surfactant;
(ii) from 0.5 to 4 wt%, preferably 1.5 to 2.5 wt%, of zwitterionic surfactant selected from: amine oxide; and, carbobetaines;
(iii) from 0.1 to 4 wt%, preferably 0.5 to 2 wt%, of an alkali metal salt, preferably NaCl;
(iv) from 1 to 5 wt%, preferably 1.5 to 4 wt%, of an alkoxylated polyethylene imine, preferably ethoxylated polyethylene imine;
(v) from 1 to 10 wt%, preferably 2 to 6 wt%, most preferably 3 to 5 wt%, of an alkyl ether carboxylic acid anionic surfactant of the following structure:

$$R_2\text{-}(OCH_2CH_2)_n\text{-}OCH_2\text{-}COOH,$$

wherein:
R_2 is selected from saturated and mono-unsaturated C10 to C26 linear or branched alkyl chains, preferably a C12 to C20 linear alkyl chains, most preferably a C16 to C18 linear alkyl chain, and wherein n is selected from: 6 to 20, preferably 7 to 13, more preferably 8 to 12, most preferably 9.5 to 10.5;
(vi) from 0 to 10 wt%, preferably from 2.5 to 5 wt%, of alkyl ether sulfate anionic surfactant with 0.5 to 1.5 mole equivalent of ethoxylation, preferably 0.9 to 1.2;
(vii) from 0 to 2 wt%, preferably 0.2 to 1wt% of a terephthalate polyester soil release polymer;
(viii) from 0 to 4 wt%, preferably from 0 to 1wt%, of a non-ionic surfactant; and
(ix) from 0.0 to 0.2 wt%, preferably from 0.002 to 0.02 wt%, of a protease enzyme, wherein the laundry detergent composition comprises in total from 10 to 20 wt% of anionic surfactant.

[0007] In another aspect the present invention provides a domestic method of treating a textile, the method comprising the steps of:

(i) treating a textile with from 1 g/L of an aqueous solution of the laundry detergent composition as defined in any one of the preceding claims; and,
(ii) allowing said aqueous laundry detergent solution to remain in contact with the textile for 10 minutes to 2 days then rinsing and drying the textile.

[0008] In the method aspects of the present invention the surfactant used is preferably as preferred for the composition aspects of the present invention.

[0009] Domestic methods are preferably conducted in a domestic washing machine or by hand washing. The temperature of the wash is preferably from 285 to 313K. The main wash time is preferably 5 to 30 minutes.

[0010] The textile is preferably an item of clothing, bedding or table cloth. Preferred items of clothing are cotton containing shirts, trousers, underwear and jumpers.

Detailed Description of the Invention

Linear alkyl benzene sulfonate

[0011] Weights of Linear alkyl benzene sulfonate are calculated as the protonated form. The linear alkyl benzene sulfonate has an alkyl chain length of C8 to C15, preferably C12 to C14.

[0012] Linear alkyl benzene sulphonate (LAS) may be obtained, by sulphonating commercially available linear alkyl benzene (LAB); suitable LAB includes low 2-phenyl LAB, such as those supplied by Sasol under the tradename Isochem® or those supplied by Petresa under the tradename Petrelab®, other suitable LAB include high 2-phenyl LAB, such as those supplied by Sasol under the tradename Hyblene®. Another suitable route is alkyl benzene sulphonate that is obtained by DETAL catalyzed process, preferably having 8 to 15 carbon atoms. Other synthesis routes, such as HF, may also be suitable.

Alkyl ether sulfate

[0013] Weights of alkyl ether sulfate are calculated as the protonated form, R_1-$(OCH_2CH_2)_m$-OSO_3H. Preferably R_1 is C10 to C22 saturate or unsaturated linear alkyl chain, more preferably a saturated C12 to C16 linear alkyl chain, most preferably C12 linear alkyl chain (lauryl). The average number of moles of ethoxylation per mole of surfactant is m, m is preferably 0.5 to 1.5.

Alkyl ether carboxylic acid

[0014] Weights of alkyl ether carboxylic acid are calculated as the protonated form, R_2-$(OCH_2CH_2)_n$-OCH_2COOH. They may be used as salt version for example sodium salt, or amine salt.

[0015] The alkyl chain may be linear or branched, preferably it is linear.

[0016] The alkyl chain may be aliphatic or contain one cis or trans double bond.

[0017] The alkyl chain is preferably selected from $CH_3(CH_2)_{15}$, $CH_3(CH_2)_{17}$, $CH_3(CH_2)_7CH{=}CH(CH_2)_8$-.

[0018] The alkyl ether carboxylic acid is most preferably of the structure:

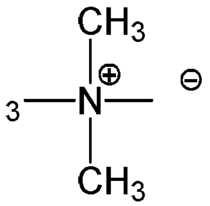
$$CH_3(CH_2)_7CH{=}CH(CH_2)_8(OCH_2CH_2)_{10}OCH_2COOH.$$

[0019] Alkyl ether carboxylic acid are available from Kao (Akypo®), Huntsman (Empicol®) and Clariant (Emulsogen®).

Zwitterionic surfactant

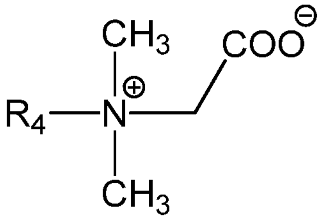
[0020] The zwitterionic surfactant contains a linear C8 to C16 aliphatic alkyl chain and a positive and negative charged atom within the surfactant molecule. The zwitterionic surfactants are betaines and amine oxides.

[0021] The amine oxide is preferably of the structure:



[0022] Preferably R_3 is C12-C14, most preferably C12 (lauryl). Amine Oxides are available from Huntsman, for example, Empigen® OB.

[0023] The betaine is preferably a carbobetaine. The carbobetaine is preferably selected from the structures:



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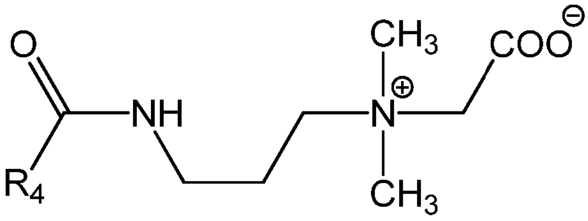


[0024] Preferably R_4 is C12-C14, most preferably C12 (lauryl). Betaines are available from Huntsman, for example Empigen® BB. Cocoamidopropyl betaine (Cas-No 61789-40-0) is most preferred.

[0025] The zwitterionic is most preferably a carbobetaine.

Non-ionic surfactant

[0026] The aqueous liquid laundry detergent may comprise Non-ionic surfactant, preferably an alkyl ethoxylated non-ionic surfactant.

[0027] Suitable nonionic detergent compounds which may be used include, in particular, the reaction products of compounds having an aliphatic hydrophobic group and a reactive hydrogen atom, for example, aliphatic alcohols, acids or amides, especially ethylene oxide either alone or with propylene oxide. The preferred nonionic detergent compounds are the condensation products of aliphatic C_8 to C_{18} primary or secondary linear or branched alcohols with ethylene oxide.

[0028] Preferably the alkyl ethoxylated non-ionic surfactant is a C_8 to C_{18} primary alcohol with a mole average ethoxylation of 7EO to 9EO units.

[0029] Preferably the fraction (weight% of non-ionic)/(weight% of anionic surfactant) is from 0 to 0.2, more preferably 0 to 0.05. Most preferably the formulation does not contain non-ionic.

Further Surfactant

[0030] The aqueous liquid laundry detergent may comprises from 0 to 4wt% of further surfactants, for example thos described in "Surface Active Agents" Vol. 1, by Schwartz & Perry, Interscience 1949, Vol. 2 by Schwartz, Perry & Berch, Interscience 1958, in the current edition of "McCutcheon's Emulsifiers and Detergents" published by Manufacturing Confectioners Company or in "Tenside-Taschenbuch", H. Stache, 2nd Edn., Carl Hauser Verlag, 1981 or in Anionic Surfactants: Organic Chemistry edited by Helmut W. Stache (Marcel Dekker 1996) .

[0031] Examples of suitable further anionic detergent compounds are; alkyl sulphates, especially those obtained by sulphating linear or branched C_8 to C_{18} alcohols; soaps; alkyl (preferably methyl) ester sulphonates, and mixtures thereof.

Alkoxylate Polyethylene Imine

[0032] The alkoxylated polyethyelene imine comprises a polyethyleneimine backbone wherein the modification of the polyethyleneimine backbone is intended to leave the polymer without quaternisation. Such materials may be represented as PEI(X)YAO where X represents the molecular weight of the unmodified PEI and Y represents the average moles of alkoxylation (AO) per available NH in the unsubstituted polyethyleneimine backbone. Y is preferably from 7 to 40 more preferably it is in the range of 16 to 26, most preferably 18 to 22. X is selected to be from about 300 to about 10000 weight average molecular weight and is preferably about 600.

[0033] The alkoxylation is preferably selected from ethoxylation or propoxylation, or a combination of the two, Ethoxylation is most preferred. The alkoxy chains may be capped with groups selected from: H; CH_3; SO_3^-; CH_2COO^-; PO_3^{2-}; C_2H_5; n-propyl, i-propyl; n-butyl; t-butyl; and, sulfosuccinate, most preferably H.

[0034] Most preferably the alkoxylated PEI is PEI(600)20EO.

Terephthalate Polyester Soil Release Polymer

[0035] Terephthalate Polyester Soil Release Polymer comprise polymers of aromatic dicarboxylic acids and alkylene glycols (including polymers containing polyalkylene glycols), as described in WO2009/153184, EP2692842 and WO2014/019903.

[0036] Examples of Terephthalate Polyester Soil Release Polymer are the REPEL-O-TEX® line of polymers supplied by Rhodia, including REPEL-O-TEX® SRP6 and REPEL-O-TEX® SF-2.

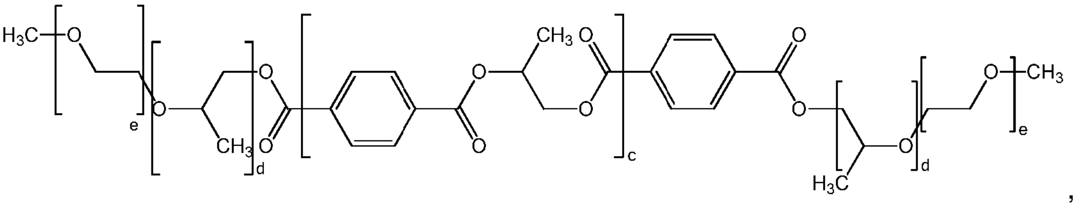
[0037] Other suitable soil release polymers include TexCare® polymers, including TexCare® SRA-100, TexCare® SRA-300, TexCare® SRN-100, TexCare® SRN-170, TexCare® SRN-240, TexCare® SRN-300, and TexCare® SRN-

325, all supplied by Clariant.

[0038] Preferred structure are -[(Z)$_a$-O-OC-Ar-CO-]$_b$ and (Z)$_a$-O-OC-[Ar-CO-O-C_3H_6-O-OC]$_b$-Ar-COO-(Z)$_a$, where Ar is selected from 1,4 substituted phenylene and 1,3 substituted phenylene substituted in the 5 position with a sulphonates (SO_3^-) group; Z is selected from ethoxy;propoxy; and mixtures of ethoxy and propoxy; a is from 5 to 100 and b from 2 to 40. C_3H_6 is i-propyl.

[0039] The alkoxy chains are capped with groups selected from H; CH_3; SO_3^-; CH_2COO^-; PO_3^{2-}; C_2H_5; n-propyl, i-propyl; n-butyl; t-butyl; and, sulfosuccinate.

[0040] Most preferably the Terephthalate Polyester Soil Release Polymer is:



,

wherein c is from 4 to 9; d is from 1 to 3; e is from 40 to 50.

Polymers

[0041] The composition may comprise one or more further polymers. Examples are carboxymethylcellulose, poly (ethylene glycol), poly(vinyl alcohol), polycarboxylates such as polyacrylates, maleic/acrylic acid copolymers and lauryl methacrylate/acrylic acid copolymers.

[0042] Polymers present to prevent dye deposition may be present, for example poly(vinylpyrrolidone), poly(vinylpyridine-N-oxide), and poly(vinylimidazole).

[0043] Such polymers are preferably present at levels of less then 0.5wt%.

[0044] The composition is preferably devoid of silicone polymers and polymers bearing quaternised N groups.

Builders and Sequestrants

[0045] The detergent compositions may also optionally contain relatively low levels of organic detergent builder or sequestrant material. Examples include the alkali metal, citrates, succinates, malonates, carboxymethyl succinates, carboxylates, polycarboxylates and polyacetyl carboxylates. Specific examples include sodium, potassium and lithium salts of oxydisuccinic acid, mellitic acid, benzene polycarboxylic acids, ethylene diamine tetra-acetic acid, diethylene-triamine-pentaacetic acid, alkyl- or alkenylsuccinic acid, nitrilotriacetic acid, and citric acid. Other examples are DEQUEST™, organic phosphonate type sequestering agents sold by Monsanto and alkanehydroxy phosphonates.

[0046] Other suitable organic builders include the higher molecular weight polymers and copolymers known to have builder properties. For example, such materials include appropriate polyacrylic acid, polymaleic acid, and polyacrylic/polymaleic acid copolymers and their salts, such as those sold by BASF under the name SOKALAN™.

[0047] If utilised, the aqueous liquid laundry detergent formunation comprise from 0.1% to 2.0 wt% builder and sequesterant material. Citrate is most preferred.

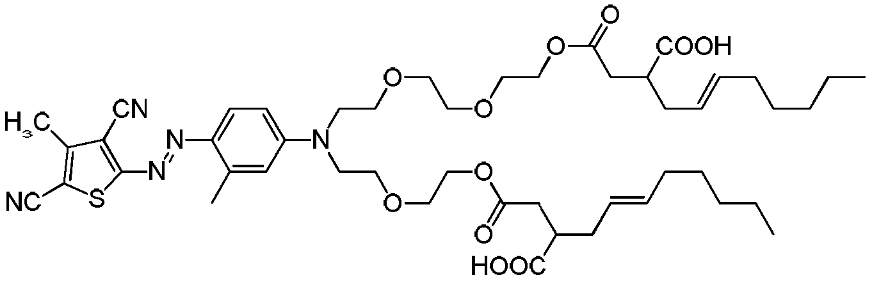
Shading Dye

[0048] Dyes are described in Color Chemistry Synthesis, Properties and Applications of Organic Dyes and Pigments, (H Zollinger, Wiley VCH, Zurich, 2003) and, Industrial Dyes Chemistry, Properties Applications. (K Hunger (ed), Wiley-VCH Weinheim 2003).

[0049] Shading Dyes for use in laundry detergents preferably have an extinction coefficient at the maximum absorption in the visible range (400 to 700nm) of greater than 5000 L mol^{-1} cm^{-1}, preferably greater than 10000 L mol^{-1} cm^{-1}. The dyes are blue or violet in colour.

[0050] Preferred shading dye chromophores are azo, azine, anthraquinone, and triphenylmethane.

[0051] Preferred mono-azo dyes contain a heterocyclic ring and are most preferably thiophene dyes. The mono-azo dyes are preferably alkoxylated and are preferably uncharged or anionically charged at pH=7. Alkoxylated thiophene dyes are discussed in WO/2013/142495 and WO/2008/087497. Preferred examples of thiophene dyes are shown below: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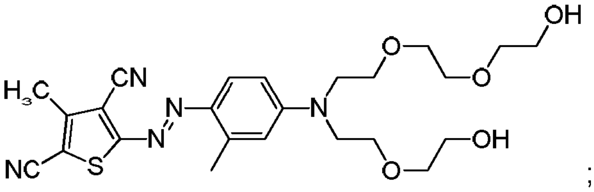
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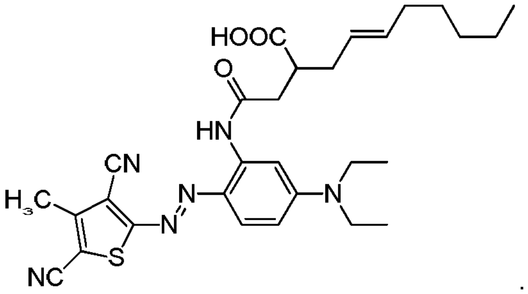
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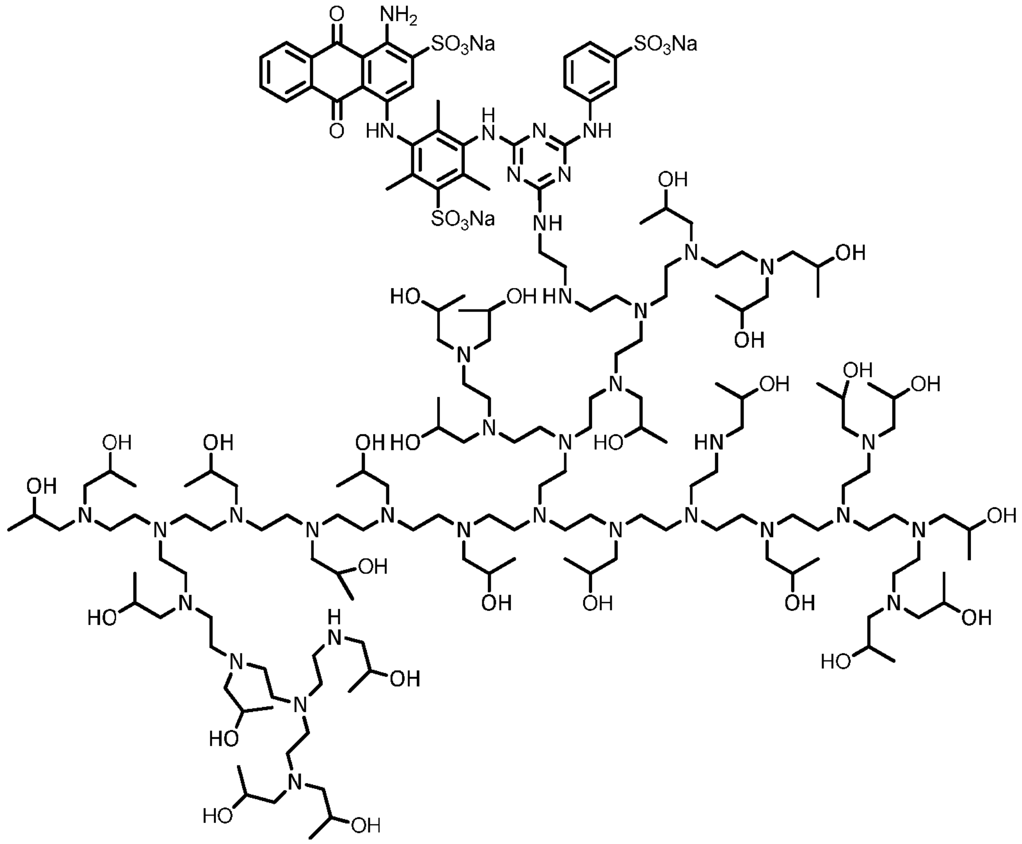
[0052] Azine dye are preferably selected from sulphonated phenazine dyes and cationic phenazine dyes. Preferred examples are acid blue 98, acid violet 50, dye with CAS-No 72749-80-5, acid blue 59.

[0053] The shading dye may be present in the composition in range from 0.0001 to 0.5 wt %, preferably 0.001 to 0.1 wt%. Depending upon the nature of the shading dye there are preferred ranges depending upon the efficacy of the shading dye which is dependent on class and particular efficacy within any particular class. As stated above the shading dye is a blue or violet shading dye.

[0054] A mixture of shading dyes may be used.

[0055] The shading dye is most preferably a reactive blue anthraquinone dye covalently linked to an alkoxylated polyethyleneimine. The alkoxylation is preferably selected from ethoxylation and propoxylation, most preferably propoxylation. Preferably 80 to 95 mol% of the N-H groups in the polyethylene imine are replaced with iso-propyl alcohol groups by propoxylation. Preferably the polyethylene imine before reaction with the dye and the propoxylation has a molecular weight of 600 to 1800.

[0056] An example structure of a preferred reactive anthraquinone covalently attached to a propoxylated polyethylene imine is:



(Structure I).

[0057] Preferred reactive anthraquinone dyes are: Reactive blue 1; Reactive blue 2; Reactive blue 4; Reactive blue 5; Reactive blue 6; Reactive blue 12; Reactive blue 16; reactive blue 19; Reactive blue 24 ; Reactive blue 27; Reactive blue 29; Reactive blue 36; Reactive blue 44; Reactive blue 46 ; Reactive blue 47; reactive blue 49; Reactive blue 50; Reactive blue 53; Reactive blue 55; Reactive blue 61; Reactive blue 66; Reactive blue 68; Reactive blue 69; Reactive blue 74; Reactive blue 86; Reactive blue 93; Reactive blue 94; Reactive blue101; Reactive blue103; Reactive blue114; Reactive blue117; Reactive blue125; Reactive blue141; Reactive blue142; Reactive blue 145; Reactive blue 149; Reactive blue 155; Reactive blue 164; Reactive blue 166; Reactive blue 177; Reactive blue 181; Reactive blue 185; Reactive blue 188; Reactive blue 189; Reactive blue 206; Reactive blue 208; Reactive blue 246; Reactive blue 247; Reactive blue 258; Reactive blue 261; Reactive blue 262; Reactive blue 263; and Reactive blue 172.

[0058] The dyes are listed according to Colour Index (Society of Dyers and Colourists/American Association of Textile Chemists and Colorists) classification.

Protease Enzyme

[0059] Protease enzymes hydrolyse bonds within peptides and proteins, in the laundry context this leads to enhanced removal of protein or peptide containing stains. Examples of suitable proteases families include aspartic proteases; cysteine proteases; glutamic proteases; aspargine peptide lyase; serine proteases and threonine proteases. Such protease families are described in the MEROPS peptidase database (http://merops.sanger.ac.uk/). Serine proteases are preferred. Subtilase type serine proteases are more preferred. The term "subtilases" refers to a sub-group of serine protease according to Siezen et al., Protein Engng. 4 (1991) 719-737 and Siezen et al. Protein Science 6 (1997) 501 -523. Serine proteases are a subgroup of proteases characterized by having a serine in the active site, which forms a covalent adduct with the substrate. The subtilases may be divided into 6 subdivisions, i.e. the Subtilisin family, the Thermitase family, the Proteinase K family, the Lantibiotic peptidase family, the Kexin family and the Pyrolysin family.

[0060] Examples of subtilases are those derived from Bacillus such as Bacillus lentus, B. alkalophilus, B. subtilis, B. amyloliquefaciens, Bacillus pumilus and Bacillus gibsonii described in; US7262042 and WO09/021867, and subtilisin lentus, subtilisin Novo, subtilisin Carlsberg, Bacillus licheniformis, subtilisin BPN', subtilisin 309, subtilisin 147 and subtilisin 168 described in WO89/06279 and protease PD138 described in (WO93/18140). Other useful proteases may be those described in WO92/175177, WO01/016285, WO02/026024 and WO02/016547. Examples of trypsin-like proteases are trypsin (e.g. of porcine or bovine origin) and the Fusarium protease described in WO89/06270, WO94/25583 and WO05/040372, and the chymotrypsin proteases derived from Cellumonas described in WO05/052161 and WO05/052146.

[0061] Further Examples of useful proteases are the variants described in: WO92/19729, WO96/034946, WO98/201 15, WO98/201 16, WO99/01 1768, WO01/44452, WO03/006602, WO04/03186, WO04/041979, WO07/006305, WO1 1/036263, WO1 1/036264, especially the variants with substitutions in one or more of the following positions: 3, 4, 9, 15, 27, 36, 57, 68, 76, 87, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 106, 1 18, 120, 123, 128, 129, 130, 160, 167, 170, 194, 195, 199, 205, 206, 217, 218, 222, 224, 232, 235, 236, 245, 248, 252 and 274 using the BPN' numbering. More preferred the subtilase variants may comprise the mutations: S3T, V4I, S9R, A15T, K27R, *36D, V68A, N76D, N87S,R, *97E, A98S, S99G,D,A, S99AD, S101 G,M,R S103A, V104I,Y,N, S106A, G1 18V,R, H120D,N, N123S, S128L, P129Q, S130A, G160D, Y167A, R170S, A194P, G195E, V199M, V205I, L217D, N218D, M222S, A232V, K235L, Q236H, Q245R, N252K, T274A (using BPN' numbering).

[0062] Most preferably the protease is a subtilisins (EC 3.4.21.62).

[0063] Examples of subtilases are those derived from Bacillus such as Bacillus lentus, B. alkalophilus, B. subtilis, B. amyloliquefaciens, Bacillus pumilus and Bacillus gibsonii described in; US7262042 and WO09/021867, and subtilisin lentus, subtilisin Novo, subtilisin Carlsberg, Bacillus licheniformis, subtilisin BPN', subtilisin 309, subtilisin 147 and subtilisin 168 described in WO89/06279 and protease PD138 described in (WO93/18140). Preferably the subsilisin is derived from Bacillus, preferably Bacillus lentus, B. alkalophilus, B. subtilis, B. amyloliquefaciens, Bacillus pumilus and Bacillus gibsonii as described in US 6,312,936 BI, US 5,679,630, US 4,760,025, US7,262,042 and WO09/021867. Most preferably the subtilisin is derived from Bacillus gibsonii or Bacillus Lentus.

[0064] Suitable commercially available protease enzymes include those sold under the trade names names Alcalase®, Blaze®; DuralaseTm, DurazymTm, Relase®, Relase® Ultra, Savinase®, Savinase® Ultra, Primase®, Polarzyme®, Kannase®, Liquanase®, Liquanase® Ultra, Ovozyme®, Coronase®, Coronase® Ultra, Neutrase®, Everlase® and Esperase® all could be sold as Ultra® or Evity® (Novozymes A/S).

[0065] Those sold under the tradename Maxatase®, Maxacal®, Maxapem®, Properase®, Purafect®, Purafect Prime®, Purafect Ox®, FN3®, FN4®, Excellase® and Purafect OXP® by Genencor International.

[0066] Those sold under the tradename Maxatase®, Maxacal®, Maxapem®, Purafect®, Purafect Prime®, PreferenzTm, Purafect MA®, Purafect Ox®, Purafect OxP®, Puramax®, Properase®, EffectenzTm, FN2®, FN3®, FN4®, Excellase®, Opticlean® and Optimase® (Danisco/DuPont), Axapem™ (Gist-Brocases N.V.),

[0067] Those available from Henkel/Kemira, namely BLAP (sequence shown in Figure 29 of US 5,352,604 with the following mutations S99D + SIOI R + S103A + V104I + G159S, hereinafter referred to as BLAP), BLAP R (BLAP with S3T + V4I + V199M + V205I + L217D), BLAP X (BLAP with S3T + V4I + V205I) and BLAP F49 (BLAP with S3T + V4I + A194P + V199M + V205I + L217D) - all from Henkel/Kemira; and KAP (Bacillus alkalophilus subtilisin with mutations A230V + S256G + S259N) from Kao.

[0068] Inclusion of protease in the formulation enhances cleaning.

Further Enzymes

[0069] One or more further enzymes are preferred present in a laundry composition of the invention and when practicing a method of the invention.

[0070] Preferably the level of each enzyme in the laundry composition of the invention is from 0.0001 wt% to 0.1 wt% protein.

[0071] Preferably the further enzyme is selected from: alpha-amylases; lipases; and, cellulases.

[0072] Suitable lipases include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful lipases include lipases from *Humicola* (synonym *Thermomyces*), e.g. from *H. lanuginosa* (*T. lanuginosus*) as described in EP 258 068 and EP 305 216 or from *H. insolens* as described in WO 96/13580, a *Pseudomonas* lipase, e.g. from *P. alcaligenes* or *P. pseudoalcaligenes* (EP 218 272), *P. cepacia* (EP 331 376), *P. stutzeri* (GB 1,372,034), *P. fluorescens, Pseudomonas* sp. strain SD 705 (WO 95/06720 and WO 96/27002), *P. wisconsinensis* (WO 96/12012), a *Bacillus* lipase, e.g. from *B. subtilis* (Dartois et al. (1993), Biochemica et Biophysica Acta, 1131, 253-360), *B. stearothermophilus* (JP 64/744992) or *B. pumilus* (WO 91/16422).

[0073] Other examples are lipase variants such as those described in WO 92/05249, WO 94/01541, EP 407 225, EP 260 105, WO 95/35381, WO 96/00292, WO 95/30744, WO 94/25578, WO 95/14783, WO 95/22615, WO 97/04079 and WO 97/07202, and WO 00/60063.

[0074] Preferred commercially available lipase enzymes include Lipolase™ and Lipolase Ultra™, Lipex™ and Lipoclean™ (Novozymes A/S).

[0075] The method of the invention may be carried out in the presence of phospholipase classified as EC 3.1.1.4 and/or EC 3.1.1.32. As used herein, the term phospholipase is an enzyme which has activity towards phospholipids.

[0076] Phospholipids, such as lecithin or phosphatidylcholine, consist of glycerol esterified with two fatty acids in an outer (sn-1) and the middle (sn-2) positions and esterified with phosphoric acid in the third position; the phosphoric acid, in turn, may be esterified to an amino-alcohol. Phospholipases are enzymes which participate in the hydrolysis of phospholipids. Several types of phospholipase activity can be distinguished, including phospholipases A_1 and A_2 which hydrolyze one fatty acyl group (in the sn-1 and sn-2 position, respectively) to form lysophospholipid; and lysophospholipase (or phospholipase B) which can hydrolyze the remaining fatty acyl group in lysophospholipid. Phospholipase C and phospholipase D (phosphodiesterases) release diacyl glycerol or phosphatidic acid respectively.

[0077] The method of the invention may be carried out in the presence of cutinase classified in EC 3.1.1.74. The cutinase used according to the invention may be of any origin. Preferably cutinases are of microbial origin, in particular of bacterial, of fungal or of yeast origin.

[0078] Suitable amylases (alpha and/or beta) include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Amylases include, for example, alpha-amylases obtained from *Bacillus,* e.g. a special strain of *B. licheniformis,* described in more detail in GB 1,296,839, or the *Bacillus* sp. strains disclosed in WO 95/026397 or

[0079] WO 00/060060. Commercially available amylases are Duramyl™, Termamyl™, Termamyl Ultra™, Natalase™, Stainzyme™, Fungamyl™ and BAN™ (Novozymes A/S), Rapidase™ and Purastar™ (from Genencor International Inc.).

[0080] Suitable cellulases include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Suitable cellulases include cellulases from the genera *Bacillus, Pseudomonas, Humicola, Fusarium, Thielavia, Acremonium,* e.g. the fungal cellulases produced from *Humicola insolens, Thielavia terrestris, Myceliophthora thermophila,* and *Fusarium oxysporum* disclosed in US 4,435,307, US 5,648,263, US 5,691,178, US 5,776,757, WO 89/09259, WO 96/029397, and WO 98/012307. Commercially available cellulases include Celluzyme™, Carezyme™, Celluclean™, Endolase™, Renozyme™ (Novozymes A/S), Clazinase™ and Puradax HA™ (Genencor International Inc.), and KAC-500(B)™ (Kao Corporation). Celluclean™ is preferred.

[0081] Suitable peroxidases/oxidases include those of plant, bacterial or fungal origin. Chemically modified or protein engineered mutants are included. Examples of useful peroxidases include peroxidases from *Coprinus,* e.g. from *C. cinereus,* and variants thereof as those described in WO 93/24618, WO 95/10602, and WO 98/15257. Commercially available peroxidases include Guardzyme™ and Novozym™ 51004 (Novozymes A/S).

[0082] Further enzymes suitable for use are discussed in WO2009/087524, WO2009/090576, WO2009/107091, WO2009/111258, and WO2009/148983.

Enzyme Stabilizers

[0083] Any enzyme present in the composition may be stabilized using conventional stabilizing agents, e.g., a polyol such as propylene glycol or glycerol, a sugar or sugar alcohol, lactic acid, boric acid, or a boric acid derivative, e.g., an aromatic borate ester, or a phenyl boronic acid derivative such as 4-formylphenyl boronic acid, and the composition may be formulated as described in e.g., WO 92/19709 and WO 92/19708.

[0084] Where alkyl groups are sufficiently long to form branched or cyclic chains, the alkyl groups encompass branched, cyclic and linear alkyl chains. The alkyl groups are preferably linear or branched, most preferably linear.

Fluorescent Agent

[0085] The composition preferably comprises a fluorescent agent (optical brightener). Fluorescent agents are well known and many such fluorescent agents are available commercially. Usually, these fluorescent agents are supplied and used in the form of their alkali metal salts, for example, the sodium salts.

[0086] Preferred classes of fluorescer are: Di-styryl biphenyl compounds, e.g. Tinopal (Trade Mark) CBS-X, Di-amine stilbene di-sulphonic acid compounds, e.g. Tinopal DMS pure Xtra and Blankophor (Trade Mark) HRH, and Pyrazoline compounds, e.g. Blankophor SN.

[0087] Preferred fluorescers are: sodium 2 (4-styryl-3-sulphophenyl)-2H-napthol[1,2-d]triazole, disodium 4,4'-bis{[(4-anilino-6-(N methyl-N-2 hydroxyethyl) amino 1,3,5-triazin-2-yl)]amino}stilbene-2-2' disulophonate, disodium 4,4'-bis{[(4-anilino-6-morpholino-1,3,5-triazin-2-yl)]amino} stilbene-2-2' disulphonate, and disodium 4,4'-bis(2-sulphostyryl)biphenyl.

[0088] The total amount of the fluorescent agent or agents used in the composition is preferably from 0.0001 to 0.5 wt %, more preferably 0.005 to 2 wt %, most preferably 0.05 to 0.25 wt %.

[0089] The aqueous solution used in the method has a fluorescer present. The fluorescer is present in the aqueous solution used in the method preferably in the range from 0.0001 g/l to 0.1 g/l, more preferably 0.001 to 0.02 g/l.

Perfume

[0090] The composition may comprise a perfume. The perfume is preferably in the range from 0.001 to 3 wt %, more preferably 0.05 to 0.5 wt%, most preferably from 0.1 to 1 wt %. Many suitable examples of perfumes are provided in the

CTFA (Cosmetic, Toiletry and Fragrance Association) 1992 International Buyers Guide, published by CFTA Publications and OPD 1993 Chemicals Buyers Directory 80th Annual Edition, published by Schnell Publishing Co.

[0091] Preferably the perfume comprises at least one note (compound) from: alpha-isomethyl ionone, benzyl salicylate; citronellol; coumarin; hexyl cinnamal; linalool; Pentanoic acid, 2-methyl-, ethyl ester; octanal; benzyl acetate; 1,6-octadien-3-ol, 3,7-dimethyl-, 3-acetate; cyclohexanol, 2-(1,1-dimethylethyl)-, 1-acetate; delta-damascone; beta-ionone; verdyl acetate; dodecanal; hexyl cinnamic aldehyde; cyclopentadecanolide; benzeneacetic acid, 2-phenylethyl ester;amyl salicylate; beta-caryophyllene; ethyl undecylenate; geranyl anthranilate; alpha-irone; beta-phenyl ethyl benzoate; alpasantalol; cedrol; cedryl acetate; cedry formate; cyclohexyl salicyate; gamma-dodecalactone; and, beta phenylethyl phenyl acetate.

[0092] Useful components of the perfume include materials of both natural and synthetic origin. They include single compounds and mixtures. Specific examples of such components may be found in the current literature, e.g., in Fenaroli's Handbook of Flavor Ingredients, 1975, CRC Press; Synthetic Food Adjuncts, 1947 by M. B. Jacobs, edited by Van Nostrand; or Perfume and Flavor Chemicals by S. Arctander 1969, Montclair, N.J. (USA).

[0093] It is commonplace for a plurality of perfume components to be present in a formulation. In the compositions of the present invention it is envisaged that there will be four or more, preferably five or more, more preferably six or more or even seven or more different perfume components.

[0094] In perfume mixtures preferably 15 to 25 wt% are top notes. Top notes are defined by Poucher (Journal of the Society of Cosmetic Chemists 6(2):80 [1955]). Preferred top-notes are selected from citrus oils, linalool, linalyl acetate, lavender, dihydromyrcenol, rose oxide and cis-3-hexanol.

[0095] The International Fragrance Association has published a list of fragrance ingredients (perfumes) in 2011. (http://www.ifraorg.org/en-us/ingredients#.U7Z4hPldWzk)

[0096] The Research Institute for Fragrance Materials provides a database of perfumes (fragrances) with safety information.

[0097] Perfume top note may be used to cue the whiteness and brightness benefit of the invention.

[0098] Some or all of the perfume may be encapsulated, typical perfume components which it is advantageous to encapsulate, include those with a relatively low boiling point, preferably those with a boiling point of less than 300, preferably 100-250 Celsius. It is also advantageous to encapsulate perfume components which have a low CLog P (ie. those which will have a greater tendency to be partitioned into water), preferably with a CLog P of less than 3.0. These materials, of relatively low boiling point and relatively low CLog P have been called the "delayed blooming" perfume ingredients and include one or more of the following materials: allyl caproate, amyl acetate, amyl propionate, anisic aldehyde, anisole, benzaldehyde, benzyl acetate, benzyl acetone, benzyl alcohol, benzyl formate, benzyl iso valerate, benzyl propionate, beta gamma hexenol, camphor gum, laevo-carvone, d-carvone, cinnamic alcohol, cinamyl formate, cis-jasmone, cis-3-hexenyl acetate, cuminic alcohol, cyclal c, dimethyl benzyl carbinol, dimethyl benzyl carbinol acetate, ethyl acetate, ethyl aceto acetate, ethyl amyl ketone, ethyl benzoate, ethyl butyrate, ethyl hexyl ketone, ethyl phenyl acetate, eucalyptol, eugenol, fenchyl acetate, flor acetate (tricyclo decenyl acetate), frutene (tricyclco decenyl propionate), geraniol, hexenol, hexenyl acetate, hexyl acetate, hexyl formate, hydratropic alcohol, hydroxycitronellal, indone, isoamyl alcohol, iso menthone, isopulegyl acetate, isoquinolone, ligustral, linalool, linalool oxide, linalyl formate, menthone, menthyl acetphenone, methyl amyl ketone, methyl anthranilate, methyl benzoate, methyl benyl acetate, methyl eugenol, methyl heptenone, methyl heptine carbonate, methyl heptyl ketone, methyl hexyl ketone, methyl phenyl carbinyl acetate, methyl salicylate, methyl-n-methyl anthranilate, nerol, octalactone, octyl alcohol, p-cresol, p-cresol methyl ether, p-methoxy acetophenone, p-methyl acetophenone, phenoxy ethanol, phenyl acetaldehyde, phenyl ethyl acetate, phenyl ethyl alcohol, phenyl ethyl dimethyl carbinol, prenyl acetate, propyl bornate, pulegone, rose oxide, safrole, 4-terpinenol, alpha-terpinenol, and /or viridine. It is commonplace for a plurality of perfume components to be present in a formulation. In the compositions of the present invention it is envisaged that there will be four or more, preferably five or more, more preferably six or more or even seven or more different perfume components from the list given of delayed blooming perfumes given above present in the perfume.

[0099] Another group of perfumes with which the present invention can be applied are the so-called 'aromatherapy' materials. These include many components also used in perfumery, including components of essential oils such as Clary Sage, Eucalyptus, Geranium, Lavender, Mace Extract, Neroli, Nutmeg, Spearmint, Sweet Violet Leaf and Valerian.

[0100] It is preferred that the laundry treatment composition does not contain a peroxygen bleach, e.g., sodium percarbonate, sodium perborate, and peracid.

[0101] The indefinite article "a" or "an" and its corresponding definite article "the" as used herein means at least one, or one or more, unless specified otherwise.

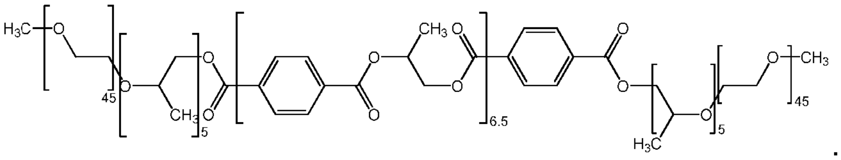
Experimental

[0102] The following formulations were made with varying level of salt and SRP addition.

Ingredient	Weight% (pure material)		
	Control	F1	F2
Linear alkyl benzene sulfonate.	3.0	3.0	3.0
C12 alkyl ether sulfate with 1 mole equivalent of ethoxylation	9.0	4.5	4.5
Oleyl ether carboxylate with 10 mole equivalent of ethoxylation	0.0	4.5	0.0
Lauryl ether carboxylate with 10 mole equivalent of ethoxylation	0.0	0.0	4.5
Cocamidopropyl Betaine	2.0	2.0	2.0
EPEI	1.6	1.6	1.6
triethylamine	1.0	1.0	1.0
perfume	0.4	0.4	0.4
Citric acid	0.3	0.3	0.3
NaOH (to pH =8.0)	0.3	0.3	0.3
Fluorescer (Tinopal CBS-X ex BASF)	0.1	0.1	0.1
NaCl	See text		
SRP	See text		
Demineralised water	*remainder*		

[0103] The EPEI (Ethoxylated PolyEthylene Imine) used was a PEI of 600 molecular weight with 20 moles of ethoxylate per NH on the base PEI; it is available as Sokalan HP20 ex BASF.

[0104] The SRP (Soil Removal Polymer) was used at a level of 0.0 wt% and 0.5 wt%. The SRP used was:



[0105] The SRP is as described in WO2014/019903 (Unilever).

[0106] The viscosity of the formulation were measured using a Paar Physica MCR300 is a commercial stress rheometer.

[0107] The results are presented in the table below for formulation in the absence of the SRP polymer (0.0 wt%).

Weight % NaCl	Viscosity / N s m^{-2} x10^{-3}		
	Control *reference*	F1 *inventive*	F2 *inventive*
1.0	53	237	186
1.5	151	1170	730
2.0	385	2910	1680

[0108] The inventive formulation F1 and F2 containing the alkyl ether carboxylic acid have higher viscosity then the control with sodium lauryl ether sulfate alone.

[0109] The results are presented in the table below for formulation in the presence of the SRP polymer (0.5 wt%).

Weight % NaCl	Viscosity / N s m^{-2}x10^{-3}		
	Control *reference*	F1 *inventive*	F2 *inventive*
2.0	345	1100	805

[0110] The inventive formulation F1 and F2 containing the alkyl ether carboxylic acid have higher viscosity then the control with sodium lauryl ether sulfate alone.

Claims

1. An aqueous liquid laundry detergent composition comprising:

(i) from 2 to 10 wt% of a linear alkyl benzene anionic sulfonate surfactant;
(ii) from 0.5 to 4 wt% of zwitterionic surfactant selected from: amine oxide and carbobetaines;
(iii) from 0.1 to 4 wt% of an alkali metal salt;
(iv) from 1 to 5 wt% of an alkoxylated polyethylene imine;
(v) from 1 to 10 wt% of an alkyl ether carboxylic acid anionic surfactant of the following structure:

$$R_2\text{-}(OCH_2CH_2)_n\text{-}OCH_2\text{-}COOH,$$

wherein:
R_2 is selected from saturated and mono-unsaturated C10 to C26 linear or branched alkyl chains, preferably a C12 to C20 linear alkyl chains, most preferably a C16 to C18 linear alkyl chain, and wherein n is selected from 6 to 20;
(vi) from 0 to 10 wt% of an alkyl ether sulfate anionic surfactant with 0.5 to 1.5 mole equivalent of ethoxylation;
(vii) from 0 to 2 wt% of a terephthalate polyester soil release polymer;
(viii) from 0 to 4 wt% of a non-ionic surfactant; and,
(ix) from 0.0 to 0.2 wt% of a protease enzyme, wherein the laundry detergent composition comprises in total from 10 to 20 wt% of anionic surfactant.

2. An aqueous liquid laundry detergent composition according to claim 1, wherein the composition comprises from 1.5 to 2.5 wt% of a zwitterionic surfactant and from 0.5 to 2 wt% of an alkali metal salt.

3. An aqueous liquid laundry detergent composition according to claim 1 or 2, wherein the composition comprises from 2.5 to 5 wt% of an alkyl ether sulfate anionic surfactant.

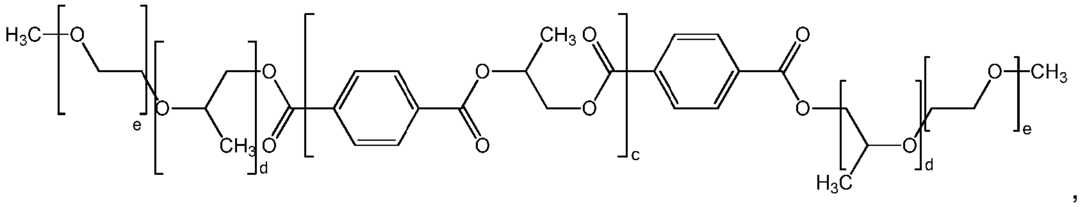
4. An aqueous liquid laundry detergent composition according to any one of the preceding claims, wherein the composition comprises from 3 to 5 wt% of an alkyl ether carboxylic acid anionic surfactant.

5. An aqueous liquid laundry detergent composition according to any one of the preceding claims, wherein the composition comprises from 2.5 to 5 wt% of a linear alkyl benzene anionic sulfonate surfactant.

6. An aqueous liquid laundry detergent composition according to any one of the preceding claims, wherein the alkoxylated polyethylene imine is an ethoxylated polyethylene imine,

7. An aqueous liquid laundry detergent composition according to any one of the preceding claims, wherein the composition comprises from 0.2 to 1 wt% of a terephthalate polyester soil release polymer.

8. An aqueous liquid laundry detergent composition according to claim 7, wherein the Terephthalate Polyester Soil Release Polymer is:



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wherein c is from 4 to 9; d is from 1 to 3; e is from 40 to 50.

9. An aqueous liquid laundry detergent composition according to any one of the preceding claims, wherein n is selected from 8 to 12, and R_2 is selected from saturated and mono-unsaturated C16 to C18 linear alkyl chain.

10. An aqueous liquid laundry detergent composition according to any one of the preceding claims, wherein the alkali metal salt is sodium chloride.

11. A domestic method of treating a textile, the method comprising the steps of:

(i) treating a textile with from 1 g/L of an aqueous solution of the laundry detergent composition as defined in any one of the preceding claims; and,
(ii) allowing said aqueous laundry detergent solution to remain in contact with the textile for 10 minutes to 2 days then rinsing and drying the textile.

Patentansprüche

1. Wässrige flüssige Waschmittelzusammensetzung, umfassend:

(i) 2 bis 10 Gew.-% eines linearen anionischen Alkylbenzolsulfonat-Tensids;
(ii) 0,5 bis 4 Gew.-% zwitterionisches Tensid, ausgewählt aus: Aminoxid und Carbobetainen;
(iii) 0,1 bis 4 Gew.-% eines Alkalimetallsalzes;
(iv) 1 bis 5 Gew.-% eines alkoxylierten Polyethylenimins;
(v) 1 bis 10 Gew.-% eines anionischen Alkylethercarbonsäure-Tensids der folgenden Struktur:

$$R_2\text{-}(OCH_2CH_2)_n\text{-}OCH_2\text{-}COOH,$$

worin:
R_2 ausgewählt ist aus gesättigten und einfach ungesättigten linearen oder verzweigten C10- bis C26-Alkylketten, bevorzugt linearen C12- bis C20-Alkylketten, am meisten bevorzugt einer linearen C16- bis C18-Alkylkette, und wobei n ausgewählt ist von 6 bis 20;
(vi) 0 bis 10 Gew.-% eines anionischen Alkylethersulfat-Tensids mit 0,5 bis 1,5 Moläquivalent Ethoxylierung;
(vii) 0 bis 2 Gew.-% eines Terephthalatpolyester-Soil-release-Polymers;
(viii) 0 bis 4 Gew.-% eines nichtionischen Tensids; und
(ix) 0,0 bis 0,2 Gew.-% eines Proteaseenzyms, wobei die Waschmittelzusammensetzung insgesamt 10 bis 20 Gew.-% anionisches Tensid umfasst.

2. Wässrige flüssige Waschmittelzusammensetzung nach Anspruch 1, wobei die Zusammensetzung 1,5 bis 2,5 Gew.-% eines zwitterionischen Tensids und 0,5 bis 2 Gew.-% eines Alkalimetallsalzes umfasst.

3. Wässrige flüssige Waschmittelzusammensetzung nach Anspruch 1 oder 2, wobei die Zusammensetzung 2,5 bis 5 Gew.-% eines anionischen Alkylethersulfat-Tensids umfasst.

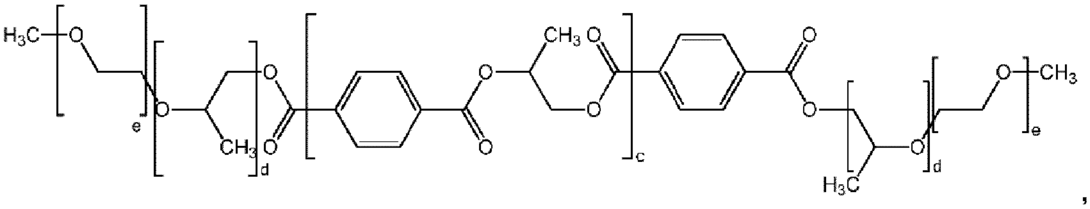
4. Wässrige flüssige Waschmittelzusammensetzung nach irgendeinem der vorhergehenden Ansprüche, wobei die Zusammensetzung 3 bis 5 Gew.-% eines anionischen Alkylethercarbonsäure-Tensids umfasst.

5. Wässrige flüssige Waschmittelzusammensetzung nach irgendeinem der vorhergehenden Ansprüche, wobei die Zusammensetzung 2,5 bis 5 Gew.-% eines linearen anionischen Alkylbenzolsulfonat-Tensids umfasst.

6. Wässrige flüssige Waschmittelzusammensetzung nach irgendeinem der vorhergehenden Ansprüche, wobei das alkoxylierte Polyethylenimin ein ethoxyliertes Polyethylenimin ist.

7. Wässrige flüssige Waschmittelzusammensetzung nach irgendeinem der vorhergehenden Ansprüche, wobei die Zusammensetzung 0,2 bis 1 Gew.-% eines Terephthalatpolyester-Soil-release-Polymers umfasst.

8. Wässrige flüssige Waschmittelzusammensetzung nach Anspruch 7, wobei das Terephthalatpolyester-Soil-release-Polymer:



ist, worin c von 4 bis 9 ist; d von 1 bis 3 ist; e von 40 bis 50 ist.

9. Wässrige flüssige Waschmittelzusammensetzung nach irgendeinem der vorhergehenden Ansprüche, wobei n ausgewählt ist aus 8 bis 12 und R_2 ausgewählt ist aus einer gesättigten und einfach ungesättigten linearen C16-bis C18-Alkylkette.

10. Wässrige flüssige Waschmittelzusammensetzung nach irgendeinem der vorhergehenden Ansprüche, wobei das Alkalimetallsalz Natriumchlorid ist.

11. Verfahren für den Haushalt zur Behandlung eines Textils, wobei das Verfahren die folgenden Schritte umfasst:

(i) Behandeln eines Textils mit ab 1 g/L einer wässrigen Lösung der Waschmittelzusammensetzung wie in irgendeinem der vorhergehenden Ansprüche definiert; und
(ii) Ermöglichen, dass die wässrige Waschmittellösung für 10 Minuten bis 2 Tage mit dem Textil in Kontakt bleibt, dann Spülen und Trocknen des Textils.

Revendications

1. Composition de détergent de lessive liquide aqueuse comprenant :

(i) de 2 à 10 % en masse d'un tensioactif anionique de benzènesulfonate d'alkyle linéaire ;
(ii) de 0,5 à 4 % en masse de tensioactif zwitterionique choisi parmi : oxyde d'amine et carbobétaïnes ;
(iii) de 0,1 à 4 % en masse d'un sel de métal alcalin ;
(iv) de 1 à 5 % en masse d'une polyéthylène imine alcoxylée ;
(v) de 1 à 10 % en masse d'un tensioactif anionique d'acide alkyléther carboxylique de la structure suivante :

$$R_2\text{-}(OCH_2CH_2)_n\text{-}OCH_2\text{-}COOH,$$

dans laquelle :
R_2 est choisi parmi des chaînes alkyle linéaires ou ramifiées en C10 à C26 saturées et mono-insaturées, de préférence des chaînes alkyle linéaires en C12 à C20, encore mieux une chaîne alkyle linéaire en C16 à C18, et dans laquelle n est choisi de 6 à 20 ;
(vi) de 0 à 10 % en masse d'un tensioactif anionique d'alkyléther sulfate avec de 0,5 à 1,5 mol d'équivalent d'éthoxylation ;
(vii) de 0 à 2 % en masse d'un polymère détachant les salissures de polyester de téréphtalate ;
(viii) de 0 à 4 % en masse d'un tensioactif non-ionique ; et,
(ix) de 0,0 à 0,2 % en masse d'une enzyme protéase, dans laquelle la composition de détergent de lessive comprend au total de 10 à 20 % en masse de tensioactif anionique.

2. Composition de détergent de lessive liquide aqueuse selon la revendication 1, dans laquelle la composition comprend de 1,5 à 2,5 % en masse d'un tensioactif zwitterionique et de 0,5 à 2 % en masse d'un sel de métal alcalin.

3. Composition de détergent de lessive liquide aqueuse selon la revendication 1 ou 2, dans laquelle la composition comprend de 2,5 à 5 % en masse d'un tensioactif anionique d'alkyléther sulfate.

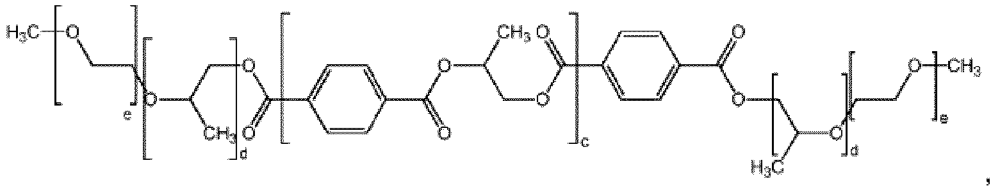
4. Composition de détergent de lessive liquide aqueuse selon l'une quelconque des revendications précédentes, dans laquelle la composition comprend de 3 à 5 % en masse d'un tensioactif anionique d'acide alkyléther carboxylique.

5. Composition de détergent de lessive liquide aqueuse selon l'une quelconque des revendications précédentes, dans laquelle la composition comprend de 2,5 à 5 % en masse d'un tensioactif anionique de benzènesulfonate d'alkyle linéaire.

6. Composition de détergent de lessive liquide aqueuse selon l'une quelconque des revendications précédentes, dans laquelle la polyéthylène imine alcoxylée est une polyéthylène imine éthoxylée.

7. Composition de détergent de lessive liquide aqueuse selon l'une quelconque des revendications précédentes, dans laquelle la composition comprend de 0,2 à 1 % en masse d'un polymère détachant les salissures de polyester de téréphtalate.

8. Composition de détergent de lessive liquide aqueuse selon la revendication 7, dans laquelle le polymère détachant les salissures de polyester de téréphtalate est :



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dans laquelle c est de 4 à 9 ; b est de 1 à 3 ; e est de 40 à 50.

9. Composition de détergent de lessive liquide aqueuse selon l'une quelconque des revendications précédentes, dans laquelle n est de 8 à 12, et R_2 est choisi parmi une chaîne alkyle linéaire en C16 à C18 saturée et mono-insaturée.

10. Composition de détergent de lessive liquide aqueuse selon l'une quelconque des revendications précédentes, dans laquelle le sel de métal alcalin est le chlorure de sodium.

11. Procédé domestique de traitement d'un textile, le procédé comprenant les étapes consistant à :

(i) traiter un textile avec 1 g/l d'une solution aqueuse de la composition de détergent de lessive comme définie dans l'une quelconque des revendications précédentes ; et,
(ii) laisser ladite solution de détergent de lessive aqueuse rester en contact avec le textile pendant de 10 minutes à 2 jours puis rincer et sécher le textile.

REFERENCES CITED IN THE DESCRIPTION

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