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(71) Applicant: **Henkel AG & Co. KGaA**
40589 Düsseldorf (DE)

(72) Inventors:
• **EISSA, Hesham**
Dubai (AE)
• **ELGHANDOUR, Nahla**
Dubai (AE)

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(54) **LIQUID DETERGENT COMPOSITION**

(57) The present invention relates to a liquid detergent composition comprising at least one pro-fragrance and at least one blueing agent in specific amounts, which is low-cost yet nonetheless, provides premium cleaning properties. Furthermore, the present invention relates to methods of cleaning textiles using said liquid detergent composition

EP 3 045 518 A1

Description

[0001] The present invention relates to a liquid, detergent composition comprising at least one pro-fragrance and at least one blueing agent, which is low-cost yet nonetheless, provides premium cleaning properties. Furthermore, the present invention relates to the use of such a liquid detergent composition for the cleaning of laundry, as well as a process for the cleaning of laundry using said liquid detergent composition.

[0002] Perfume in cleaning products provides an olfactory aesthetic benefit and serves as a signal of cleanliness. These are especially important features of these products. Continuous efforts are made to improve both delivery effectiveness and longevity on fabrics. During a cleaning process, a substantial amount of perfume is lost with the wash water and/or with the rinse water and/or in the subsequent drying process. It is extremely important that any perfume provide the maximum effect with the minimum amount of material, and that the material be as safe and as non-irritating as possible.

[0003] As an alternative to the direct addition of fragrances or perfumes for detergents and cleaners, fabric softeners and cosmetics, the addition of so-called pro-fragrances has been proposed. Pro-fragrances, like pro-drugs, are chemical derivatives of fragrances, which reduce, for example, the volatility of the fragrance and allow a delayed release of the fragrance under ambient conditions. By derivatization of fragrance ketones or fragrance aldehydes, the vapor pressure of these compounds can be decreased. Since the derivatization reaction is reversible, the chemically bound fragrance aldehyde or ketone can, under certain conditions, such as ambient conditions, be cleaved at the binding site. Thus, the actual perfume or fragrance is released again, which can lead to a prolonged fragrance impression.

[0004] In general, many customers prefer using only one product for the main wash, instead of two or more (main laundry detergent, fabric softener, etc.). However, they nevertheless expect appealing aesthetics and pleasant, long-lasting odors, which endure the washing process and remain in the fabric material for a considerable amount of time after drying.

[0005] Often, customers prefer detergent formulations, that allows them to perceive cleanliness and freshness, and create the overall impression of a product featuring powerful stain removal properties.

[0006] It is therefore an object of the present invention to provide a new low-cost, pleasantly fragrant detergent composition, which further provides the superior cleaning and fabric care properties of leading premium formulas that customers are used to.

[0007] It has been surprisingly found that a specific blueing agent, which preferably additionally provides the detergent composition with a blue color shade. Thus, usage of the amount of surfactant active is reduced, which incidentally reduces production costs of the resulting detergent formulation, contributes to sustainability and low carbon footprint and allows for market placement at customer-friendly and -acceptable prices.

[0008] In a first aspect, the present invention thus relates to a liquid detergent composition comprising:

- a) at least one pro-fragrance in an amount of 0.05 % to 1 % by weight of said liquid detergent composition,
- b) at least one soluble blueing agent in an amount of 0.005 % to 0.1 % by weight of said liquid detergent composition.

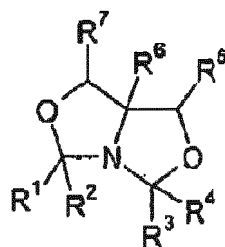
[0009] In another aspect, the present invention relates to a method for cleaning textiles, wherein a washing liquor containing the liquid detergent composition of the invention contacts the textile in at least one method step.

[0010] The liquid detergent composition according to the present inventions comprises at least one pro-fragrance. In liquid detergent composition according to the present invention, the at least one pro-fragrance is present in an amount of 0.05 % to 1 % by weight of said liquid detergent composition, preferably in an amount of 0.1 % to 0.6 % by weight of said liquid detergent composition, more preferably in an amount of 0.4 % to 0.5 % by weight of said liquid detergent composition.

[0011] In the context of the present invention, the term "pro-fragrance" denotes derivatives of fragrance aldehydes and ketones, which release the original fragrance aldehydes and fragrance ketones under ambient conditions. Ambient conditions refer to the typical conditions in the human habitat or encountered on the human skin. Under ambient conditions, pro-fragrances decompose and release the original fragrances, fragrance aldehydes or fragrance ketones. This is, because the chemically bound fragrance aldehydes or ketones are cleaved at their binding site.

[0012] For example, 1-aza-3,7-dioxabicyclo[3.3.0]octane compounds (bicyclic oxazolidine derivatives) constitute excellent pro-fragrances, as they are stable in aqueous detergent compositions and release their respective fragrance ketones or aldehydes only upon hydrolysis at ambient temperatures. Moreover, these bicyclic oxazolidine derivatives of fragrance aldehydes and ketones allow reduction of the vapor pressure of the fragrance aldehydes and ketones, and thus a prolongation of the overall fragrance impression.

[0013] In a preferred embodiment, the liquid detergent composition comprise at least one, pro-fragrance of the 1-aza-3,7-dioxabicyclo[3.3.0]octane compound type have the general formula (I)



wherein R¹, R², R³, R⁴ are independently groups that in a compound of the general formula R¹-C(=O)-R² or R³-C(=O)-R⁴ constitute either a fragrance aldehyde or a fragrance ketone, wherein R¹ and R² or R³ and R⁴ cannot both be hydrogen.

R⁵ is H or an alkyl, which may be substituted by one or two hydroxyl groups and/or an amino group and/or wherein up to 8 non-adjacent -CH₂ groups are replaced by -O-

R⁶, R⁷ are independently H or C₁₋₆ alkyl.

[0014] Said pro-fragrance of the 1-aza-3,7-dioxabicyclo[3.3.0]octane compound type having the general formula (I) are most preferably comprised in an amount of 0.05 % to 1 % by weight of said liquid detergent composition, preferably in an amount of 0.1 % to 0.6 % by weight of said liquid detergent composition, more preferably in an amount of 0.4 % to 0.5 % by weight of said liquid detergent composition.

[0015] The fragrance ketone may be selected from the group consisting of buccoxime, isojasnone, methyl beta naphthyl ketone, musk indanone, tonalid/musk plus, alpha damascone, beta damascone, delta damascone, isodamascone, damascenone, damarose, methyl dihydrojasmonate, menthone, carvone, camphor, fenchone, alpha-ionone, beta-ionone, dihydro-beta-ionone, gamma-methyl ionone, fleuramon, dihydrojasnone, cis-jasnone, 7-acetyl-1,2,3,4,5,6,7,8-octahydro-1,1,6,7-tetramethyl naphthalene, methyl cedrenyl ketone or methyl cedrylon, acetophenone, methyl acetophenone, para-methoxy-acetophenone, methyl-beta-naphthyl ketone, benzyl acetone, benzophenone, para-hydroxy-phenyl-butanone, 3-methyl-5-propyl-2-cyclohexenone, 6-Isopropyldecahydro-2-naphton, dimethyl octenone, 2-sec-butylcyclohexanone, 4-(1-ethoxyvinyl)-3,3,5,5,-tetramethyl-cyclohexanone, methyl heptenon, 2-(2-(4-methyl-3-cyclohexen-1-yl)propyl)-cyclopentanone, 1-(p-menthene-6(2)-yl)-1-propanone, 4-(4-hydroxy-3-methoxyphenyl)-2-butanone, 2-acetyl-3,3-dimethyl-norbornane, 6,7-dihydro-1,1,2,3,3-pentamethyl-4(5H)-indanone, 4-damascol, dulcinyll (heliotropyl acetone) or cassion, gelsone, hexalone (isobornylcyclohexanol), isocyclemon E (1,2,3,4,5,6,7,8-octahydro-2,3,8-tetramethyl-2-acetonaphthone), methyl-cyclocitronone, methyl lavender ketone (1-hydroxy-3-decamone), orivone, para-tert-butyl-cyclohexanone, verdone (2-tert-butyl cyclohexanone), delphone (2-pentylcyclopentan-1-one), muscone, neobutenone, plicatone, veloutone, 2,4,4,7-tetramethyl-oct-8-en-3-one, tetrameran ((E)-6,10-dimethylundec-3-en-2-one), hedione (methyl dihydrojasmonate) and mixtures thereof. Preferably, the ketones can be selected from alpha damascone, delta damascone, iso damascone, carvone, gamma-methyl-ionone, 7-acetyl-1,2,3,4,5,6,7,8-octahydro-1,1,6,7-tetramethyl naphthalene, 2,4,4,7-tetramethyl-oct-6-en-3-one, benzyl acetone, beta damascone, damascenone, methyl dihydrojasmonate, methyl cedrylone, hedione and mixtures thereof.

[0016] The fragrance aldehyde may be selected from melonal, triplal, ligustral, adoxal, anisaldehyde, cymal, ethyl vanillin, florhydral, helional, heliotropine, hydroxycitronellal, koavone, lauralaldehyd, lyral, methyl-nonyl-acetaldehyde, p,t-bucinal, phenylacetaldehyde, undecylenaldehyde, vanillin, 2,6,10-trimethyl-9-undecenal, 3-dodecen-1-al, α-amyl cinnamic aldehyde, 4-methoxybenzaldehyde, benzaldehyde, 3-(4-tert-butylphenyl)-propanal, 2-methyl-3-(para-methoxyphenyl)propanal, 2-methyl-4-(2,6,6-trimethyl-2(1)cyclohexen-1-yl)butanal, 3-phenyl-2-propenal, cis-/trans-3,7-dimethyl-2,6-octadiene-1-al, 3,7-dimethyl-6-octen-1-al, [(3,7-dimethyl-6-octenyl)oxy]acetaldehyde, 4-isopropyl-benzaldehyde, 1,2,3,4,5,6,7,8-octahydro-8,8-dimethyl-2-naphthaldehyde, 2,4-dimethyl-3-cyclohexene-1-carboxaldehyde, 2-methyl-3-(isopropylphenyl)propanal, decyl aldehyde, 2,6-dimethyl-5-heptenal, 4-(tricyclo[5.2.1.0(2,6)]-decylidene-8)butanal, octahydro-4,7-methano-1H-indenecarboxaldehyd, 3-ethoxy-4-hydroxybenzaldehyde, para-ethyl-alpha,alpha-dimethylhydro cinnamic aldehyde, alpha-methyl-3,4-(methylenedioxy)-hydro cinnamic aldehyde, 3,4-methylenedioxybenzaldehyd, alpha-n-hexyl cinnamic aldehyde, m-cymene-7-carboxaldehyde, alpha-methylphenyl acetaldehyde, 7-hydroxy-3,7-dimethyl octanal, undecenal, 2,4,6-trimethyl-3-cyclohexene-1-carboxaldehyde, 4-(3)(4-methyl-3-pentenyl)-3-cyclohexene-carboxaldehyde, 1-dodecanal, 2,4-dimethylcyclohexene-3-carboxaldehyde, 4-(4-hydroxy-4-methylpentyl)-3-cyclohexene-1-carboxaldehyde, 7-methoxy-3,7-dimethyloctan-1-al, 2-methylundecanal, 2-methyldecenal, 1-nonanal, 1-oc-tanal, 2,6,10-trimethyl-5,9-undecadienal, 2-methyl-3-(4-tertbutyl)propanal, dihydrocinnamic aldehyde, 1-methyl-4-(4-methyl-3-pentenyl)-3-cyclohexene-1-carboxaldehyde, 5 or 6-methoxyhexahydro-4,7-methanoindan-1 or 2-carboxaldehyde, 3,7-dimethyloctan-1-al, 1-undecanal, 10-undecen-1-al, 4-hydroxy-3-methoxybenzaldehyde, 1-methyl-3-(4-methylpentyl)-3-cyclohexenecarboxaldehyde, 7-hydroxy-3,7-dimethyloctanal, trans-4-decenal, 2,6-nonadienal, para-tolylal-cetaldehyde, 4-methylphenylacetaldehyd, 2-methyl-4-(2,6,6-trimethyl-1-cyclohexene-1-yl)-2-butenal, ortho-methoxy cinnamic aldehyde, 3,5,6-trimethyl-3-cyclohexenecarboxaldehyde, 3,7-dimethyl-2-methylene-6-octenal, phenoxya-

cetaldehyde, 5,9-dimethyl-4,8-decadienal, peony aldehyde (6,10-dimethyl-3-oxa-5,9-undecadien-1-al), hexahydro-4,7-methanoindan-1-carboxaldehyde, 2-methyloctanal, alpha-methyl-4-(1-methylethyl)benzeneacetaldehyde, 6,6-dimethyl-2-norpinene-2-propionaldehyd, para-methylphenoxyacetaldehyde, 2-methyl-3-phenyl-2-propen-1-al, 3,5,5-trimethylhexanal, hexahydro-8,8-dimethyl-2-naphthaldehyde, 3-propyl-bicyclo[2.2.1]hept-5-ene-2-carbaldehyde, 9-decenal, 3-methyl-5-phenyl-1-pentanal, methyl-nonylacetaldehyde, 1-p-menthene-q-carboxaldehyde, citral, lillial, 1-decanal, or mixtures thereof. Preferred aldehydes can be selected from cis/trans-3,7-dimethyl-2,6-octadien-1-al, heliotropine, 2,4,6-trimethyl-3-cyclohexene-1-carboxaldehyde, 2,6-nonadienal, alpha-n-amyl cinnamic aldehyde, alpha-n-hexyl cinnamic aldehyde, p-t buccinal, lylal, cymal, methyl nonyl acetaldehyde, trans-2-nonenal, lillial, trans-2-nonenal, and mixtures thereof. The fragrances, which are introduced via the pro-fragrances as described above, are selected from the group of fragrance aldehydes or ketones.

[0017] Other fragrances, which can be incorporated in a conventional manner, however, are unrestricted. Thus, as perfume oils or fragrances individual odorant compounds of natural or synthetic origin may be used, for example, of the ester, ether, aldehyde, ketone, alcohol and hydrocarbon type. Fragrance compounds of the ester type are, for example, benzyl acetate, p-tert-butyl cyclohexyl acetate, linalyl acetate, dimethyl benzyl (DMBCA), phenylethyl acetate, benzyl acetate, ethylmethylphenylglycinate, allyl cyclohexyl propionate, styryl propionate, benzyl salicylate, cyclohexyl salicylate, floramate, melusate and jasmacyclate. The ethers include, for example, benzyl ethyl ether and ambroxan. The aldehydes, for example, include the linear alkanals having 8-18 carbon atoms, citral, citronellal, cyclamen, lillial and bourgeonal. Ketones include, for example, the ionones, α -isomethyl ionon und methyl cedryl ketone. The alcohols include, for example, anethole, citronellol, eugenol, geraniol, linalool, phenylethyl alcohol and terpineol, and the hydrocarbons include primarily terpenes such as limonene and pinene. Preferably, however, mixtures of different perfume compounds, which, together, produce an agreeable fragrance, may be used.

[0018] Such perfume oils may also contain natural odorant mixtures, which are obtainable from vegetable sources, such as pine, citrus, jasmine, patchouli, rose or ylang-ylang oil. Also suitable are clary sage oil, camomile oil, clove oil, melissa oil, mint oil, cinnamon leaf oil, lime blossom oil, juniper berry oil, vetiver oil, olibanum oil, galbanum oil and labdanum oil and orange blossom oil, neroli oil, orange peel oil and sandalwood oil.

[0019] Other conventional fragrances, which may be additionally used in compositions according to the present invention are, for example, essential oils such as angelica root oil, anise oil, arnica blossom oil, basil oil, bay oil, champaca blossom oil, silver fir oil, noble fir cone oil, elemi oil, eucalyptus oil, fennel oil, pine needle oil, galbanum oil, geranium oil, ginger grass oil, guaiac wood, gurjun balm oil, helichrysum oil, Ho-oil, ginger oil, iris oil, cajeput oil, calamus oil, chamomile oil, camphor oil, kanaga oil, cardamom oil, cassia oil, pine needle oil, kopaiva balm oil, coriander oil, spearmint oil, caraway oil, cumin oil, lavender oil, lemongrass oil, Lime oil, mandarin oil, melissa oil, ambrette seed oil, myrrh oil, clove oil, neroli oil, niaouli oil, olibanum oil, oregano, palmarosa oil, patchuli oil, Peru balm oil, petitgrain oil, pepper oil, peppermint oil, allspice oil, pine oil, rose oil, rosemary oil, sandalwood oil, celery oil, spike oil, star anise oil, turpentine oil, thuja oil, thyme oil, verbena, vetiver oil, juniper berry oil, wormwood oil, wintergreen oil, ylang-ylang oil, hyssop oil, cinnamon oil, cinnamon leaf oil, citronella oil, lemon oil and cypress oil as well as ambrettolide, ambroxan, α -amyl cinnamic aldehyde, anethole, anisaldehyde, anise alcohol, anisole, methyl anthranilate, acetophenone, benzyl acetone, benzaldehyde, ethyl benzoate, benzophenone, benzyl alcohol, benzyl acetate, benzyl benzoate, benzyl formate, benzylvalerianate, borneol, bornyl acetate, boisambrene forte (ethoxymethoxycyclododecane), α -bromo styrene, n-decyl aldehyde, n-dodecyl aldehyde, eugenol, eugenol methyl ether, eucalyptol, farnesol, fenchone, fenchyl acetate, geranyl acetate, geranyl formate, heliotropine, heptine carboxylic acid methylester, heptaldehyde, hydroquinone dimethyl ether, hydroxy cinnamic aldehyde hydroxy cinnamic alcohol, indole, irone, isoeugenol, isoeugenol methyl ether, isosafrole, jasmone, camphor, carvacrol, carvone, p-cresol methylether, coumarin, p-methoxyacetophenone, methyl n-amyl ketone, methylanthranilic acid methylester, p-methylacetophenone, methyl chavicol, p-methylquinoline, methyl β -naphthyl ketone, methyl-n-nonylacetaldehyd, methyl-n-nonylketon, muscon, β -naphthoyl ethylether, β -naphthoyl methyl ether, nerol, n-nonyl aldehyde, nonyl alcohol, n-octyl aldehyde, p-oxy-acetophenone, pentadecanolide, β -phenylethyl alcohol, phenylacetaldehyde dimethyl acetal, phenylacetic acid, pulegone, safrole, salicylic isoamylester, methyl salicylate, salicylic hexylester, salicylic cyclohexylester, santalol, sandelice, skatole, terpineol, thymen, thymol, troenan, γ -undelactone, vanillin, veratraldehyde, cinnamaldehyde, cinnamic acid, ethyl cinnamate, cinnamic acid benzylester, diphenyl oxide, limonene, linalool, linalyl acetate and propionate, melusat, menthol, menthone, methyl-n-heptenone, pinene, phenylacetaldehyde, terpinyl acetate, citral, citronellal, and mixtures thereof.

[0020] If used, other perfumes or fragrances may constitute, for example, up to about half of the amount given for pro-fragrances in detergent compositions according to the present invention.

[0021] The liquid detergent composition according to the present invention further comprises at least one soluble blueing agent.

[0022] A blueing agent is a dye, which has at pH 9,5 and 25°C in solution (water/ethanol mixture with a weight ratio 1:1) an absorption maximum of visible light having a wave length in the range of 530 nm to 700 nm. Blueing agents are known to absorb light in said range and are able to compensate the yellow color of a yellowed textile by mixing the complementary colors of yellowish and blueish on the textile, so that the textile is perceived as white.

[0023] The blueing agent is soluble, if at least 0.001 g of the blueing agent are soluble in 100 g pure water at 25°C.

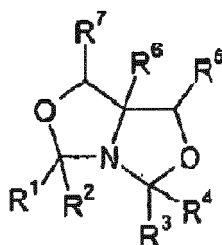
[0024] A preferred blueing agent has at pH 9,5 and 25°C in solution (water/ethanol mixture with a weight ratio 1:1) an absorption maximum of visible light having a wave length in the range of 530 nm to 700 nm and an absorption maximum in the range of 330 nm to 370 nm.

[0025] In liquid detergent compositions according to the present invention, the at least one blueing agent is present in an amount of 0.005 % to 1 % by weight of said liquid detergent composition, preferably in an amount of 0.009 % to 0.05 % by weight of said liquid detergent composition, more preferably in an amount of 0.01 % to 0.03 % by weight of said liquid detergent composition.

[0026] In a preferred embodiment of the present invention, the blueing agent is a phthalocyanine compound. Appropriate phthalocyanine compounds are disclosed in US 4,166,718 and US 4,648,992, which are incorporated herein by reference. Particularly preferred phthalocyanine compounds are anionic. Most preferred, the blueing agent is at least a sulphonated Zn or Al phthalocyanine compound. Such compounds are for example commercially available under the tradename Tinolux® (BASF SE, formerly from CIBA), especially as Tinolux BBS®.

[0027] A particularly preferred embodiment of the invention is a liquid detergent composition, comprising:

a) an amount of 0.05 % to 1 % by weight of said liquid detergent composition of at least one pro-fragrance of the 1-aza-3,7-dioxabicyclo[3.3.0]octane compound type have the general formula (I)



wherein R¹, R², R³, R⁴ are independently groups that in a compound of the general formula R¹-C(=O)-R² or R³-C(=O)-R⁴ constitute either a fragrance aldehyde or a fragrance ketone, wherein R¹ and R² or R³ and R⁴ cannot both be hydrogen.

R⁶ is H or an alkyl, which may be substituted by one or two hydroxyl groups and/or an amino group and/or wherein up to 8 non-adjacent -CH₂ groups are replaced by -O-,

R⁵, R⁷ are independently H or C₁₋₆ alkyl,

b) an amount of 0.005 % to 0.1 % by weight of said liquid detergent composition of at least one soluble blueing agent selected from at least one phthalocyanine compound, preferably from at least one anionic phthalocyanine compound.

[0028] In addition to the blueing agent blueing agent, other whitening and/or bleaching agents may be used in detergent formulations according to the present invention.

[0029] Suitable bleaching agents may be selected from inorganic peroxy-compounds and organic peracids and the salts derived therefrom.

[0030] Examples of inorganic perhydrates include persulfates such as peroxymonopersulfate (KMPS), perborates or percarbonates. The inorganic perhydrates are normally alkali metal salts, such as lithium, sodium or potassium salts, in particular sodium salts. The inorganic perhydrates may be present in the detergent composition as crystalline solids without further protection.

[0031] Organic peracids include all organic peracids traditionally used as bleaches, including, for example, perbenzoic acid and peroxy-carboxylic acids such as mono- or diperoxyphthalic acid, 2-octyldiperoxy succinic acid, diperoxydodecanedicarboxylic acid, diperoxy-azelaic acid and imidoperoxy-carboxylic acid and, optionally, the salts thereof. Especially preferred is phthalimidoperoxhexanoic acid (PAP).

[0032] Additionally, the liquid detergent composition according to the present invention may contain one or more optical brightener(s). These substances are also called "whiteners" or "whitening agents". Optical brighteners are organic dyes that convert a portion of the invisible ultraviolet radiation of sunlight into longer-wavelength blue light. The blue light emission of this adds to the "gap" in the reflected light from the fabric so that a textile treated with an optical brightener to the eye appear whiter and brighter. With respect to the mechanism of action of brighteners, which requires installation onto the fibers, a distinction depending on the "to be colored" fibers, for example, brightener for cotton, polyamide or polyester fibers, is essential. The standard suitable for incorporation in detergent brighteners are thereby essentially five structural groups: the stilbene, the diphenylstilbene, the coumarin-quinoline, the diphenylpy-razolingroup and the com-

bination group of benzoxazole or benzimidazole with conjugated systems. An overview of common brighteners can be found for example in G. Yeskobi, A. Löhner "Detergents and Textile Washing", VCH, Weinheim, 1987, pages 94 to 100. Examples of suitable compounds include the salts of 4,4'-bis[(4-anilino-6-morpholino-s-triazine-2-yl) amino]stilbene-2,2'-disulfonic acid or compounds of similar structure, or compounds, which instead of the morpholino group carry a diethanolamino group, a methylamino group, an anilino group or a 2-methoxyethylamino group. Furthermore, brighteners of the substituted diphenyl styryl type may be listed, for example alkali metal salts of 4,4'-bis(2-sulfostyryl)-diphenyl (e.g. granulate with 90 wt.% active matter sold as Tinopal CBS-X® by BASF, formerly CIBA), 4,4'-bis(4-chloro-3-sulfostyryl)diphenyl or 4-(4-chlorostyryl)-4'-(2-sulfostyryl)-diphenyl. Mixtures of the brighteners mentioned above may also be used.

[0033] In liquid detergent composition according to the present invention, the overall content of whitening and/or bleaching agents may range from 0.005 % to 2 % by weight of said liquid detergent composition, preferably in an amount of 0.01 % to 0.5 % by weight of said liquid detergent composition, more preferably in an amount of 0.04 % to 0.1 % by weight of said liquid detergent composition.

[0034] In the context of the present invention, usage of the soluble blueing agent, especially of Tinolux®, allows for omission of conventional colorants. This results in cost and material savings, which allows for market placement of the end product at rather low, affordable prices.

[0035] However, addition of actual colorants is not per se precluded and may very well be carried out on demand. Suitable colorants to be used in liquid detergent compositions according to the present invention are well known in the art and include, for example, naphthol (Colour Index (CI) Part 1: Acid Green 1, Part 2: 10020), purchasable, for example, under the brand name Basacid® Green 970 from BASF, Pigmosol® 6900 Blue (CI 74160), Pigmosol® 8730 Green (CI 74260), FL Basonyl® Red 545 (CI 45170), Rhodamine Sandolan® EB400 (CI 45100), Basacid® Yellow 094 (CI 47005), Sicovit® E131 Patent Blue 85 (CI 42051), Acid Blue 183 (CAS 12217-22-0, CI Acidblue 183), Pigment Blue 15 (CI 74160), Blue Supranol® GLW (CAS 12219-32-8, CI Acidblue 221), Nylosan® Yellow N-7GL SGR (CAS 61814-57-1, CI Acidyellow 218) and Sandolan® blue (CI Acid Blue 182, CAS 12219-26-0).

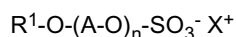
[0036] In general, however, suitable dyes include all colorants, which can be destroyed by oxidation in the washing process. This is of particular importance, as a color transfer to the fabric material to be cleaned is, by all means, to be avoided. It has proved to be advantageous to use dyes, which are soluble in water or in liquid organic substances at room temperature.

[0037] In addition to the pro-fragrance and the blueing agent the liquid detergent composition according to the present invention may contain other ingredients typically used in detergent compositions. In the context of the present invention, the liquid detergent composition thus additionally contains one or more substances selected from the group of, without limitation, surfactants, detergency builders, other bleaching agents, bleach activators, bleach catalysts, enzymes, non-aqueous solvents, pH adjusting agents, perfumes, fluorescing agents, dyes, hydrotopes, silicone oils, anti-redeposition agents, anti-graying agents, shrinkage preventers, wrinkle protection agents, dye transfer inhibitors, antimicrobial active substances, germicides, fungicides, antioxidants, preservatives, corrosion inhibitors, antistatic agents, bittering agents, ironing adjuvants, proofing and impregnation agents, swelling and anti-slip agents, softening compounds, complexing agents and UV absorbers.

[0038] The liquid detergent composition preferably comprises at least one surfactant in an amount of 5 to 20 wt.% (particularly preferred of 7,5 to 17,5 wt.%) of said liquid detergent composition. Said surfactants are preferably selected from anionic surfactants, nonionic surfactants, amphoteric surfactants or mixtures thereof. It is particularly preferred that the liquid detergent composition additionally comprises at least one anionic surfactant and at least one nonionic surfactant.

[0039] In a preferred embodiment of this invention, the liquid detergent compositions comprises additionally at least one anionic surfactant.

[0040] In a preferred embodiment, the liquid detergent composition comprises at least one anionic surfactant of formula (II)



wherein

R¹ means a linear or branched, substituted or unsubstituted (C₈-C₂₀)-alkyl group, an aryl group or an (C₈-C₂₀)-alkylaryl group, preferably a linear, unsubstituted (C₈-C₂₀)-alkyl group,

A means ethane-1,2-diyl- or propane-1,2-diyl, preferably ethane-1-2-diyl,

n means an integer from 1 to 50, preferably from 1 to 20, especially from 2 to 10, most preferably for 2, 3, 4, 5, 6, 7 or 8,

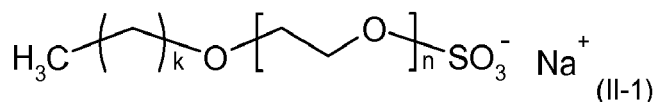
X⁺ means a monovalent cation or an equivalent of a polyvalent cation.

[0041] According to formula (II) R¹ denotes preferably a group selected from decyl-, undecyl-, dodecyl-, tridecyl-, tetradecyl-, pentadecyl-, hexadecyl-, heptadecyl-, octadecyl-, nonadecyl-, eicosyl group or mixtures thereof, whereas the

before mentioned groups having an even number of carbon atoms are particularly preferred. Most preferred residues R^1 are derived from C_{12} - C_{18} -fatty alcohols. Examples are Coco fatty alcohol, tallow fatty alcohol, lauryl-, myristyl-, cetyl- oder stearyl alcohol or from C_{10} - C_{20} -Oxoalcohols.

[0042] X^+ of formula (II) is preferably selected from alkali metal ions, especially Na^+ or K^+ , whereas Na^+ is most preferred. Other cations X^+ may be selected from NH_4^+ , $\frac{1}{2} Zn^{2+}$, $\frac{1}{2} Mg^{2+}$, $\frac{1}{2} Ca^{2+}$, $\frac{1}{2} Mn^{2+}$, or mixtures thereof.

[0043] Preferred liquid compositions of this invention comprise an anionic surfactant of formula I, selected from at least one anionic surfactant of formula (II-1)



wherein k means an integer of 11 to 19, preferably 2, 3, 4, 5, 6, 7 or 8.

[0044] Particularly preferred liquid detergent compositions comprise an anionic surfactant of formula (II) chosen from sodium- C_{12-14} fatty alcohol ether sulfate with two units of ethylene oxide (according to formula (II-1) k means an integer of 11 to 13 and n is 2).

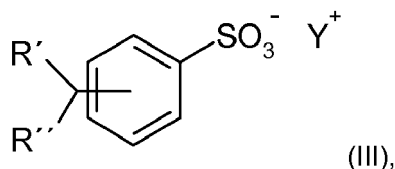
[0045] Preferred the liquid detergent compositions according to this invention comprise said portion of anionic surfactant of formula (II) in an amount of 1.0 to 7.0 wt.%, preferably of 2.0 to 5.5 wt.%, of said liquid detergent composition.

[0046] In a preferred embodiment of this invention, the liquid detergent compositions comprises additionally at least one alkylbenzene sulfonate as an anionic surfactant. Most preferably, the liquid detergent composition comprises at least one anionic surfactant of formula (II) and at least one alkylbenzene sulfonate.

[0047] The alkylbenzene sulphonate is preferably a linear alkylbenzene sulphonate having an alkyl chain length of C_8 - C_{15} . In particular, the linear alkylbenzene sulphonate is a C_9 - C_{13} alkyl benzene sulphonate, a C_{10} - C_{13} alkyl benzene sulphonate ora C_{10} - C_{15} alkyl benzene sulphonate. The amount of linear alkylbenzene sulphonate in the liquid detergent composition is preferably from 1.5 to 8.0 wt.%, preferably 2.5 to 6.0 wt.%, of said liquid detergent composition.

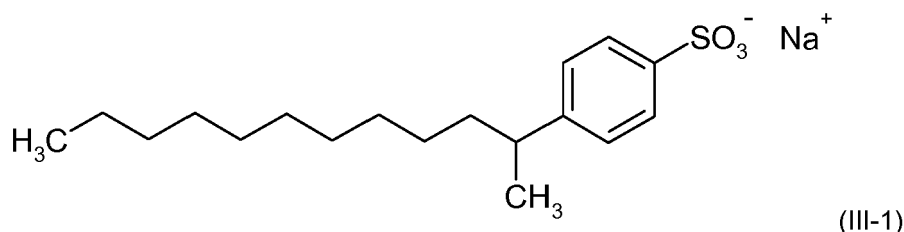
[0048] The alkylbenzene sulphonate can be present in the form of the sodium, potassium, or ammonium salts and as soluble salts of organic bases such as mono-, di-, or triethanolamine. The alkylbenzene sulphonate are preferably present in the form of their sodium or potassium salts; in particular in the form of the sodium salts.

[0049] It is particularly preferred, if the liquid detergent composition additionally comprises at least one anionic surfactant of formula (III)



wherein the combination of R' and R'' comprises 9 to 19, preferably 11 to 15 carbon atoms, Y^+ means a monovalent cation or an equivalent of a polyvalent cation.

[0050] It is most preferred when the liquid detergent composition comprises as the anionic surfactant of formula (III) an anionic surfactant of formula (III-1)



If the liquid detergent composition comprises at least one anionic surfactant according to formula (III) it is preferred, if the liquid detergent composition comprises said portion of anionic surfactant of formula (III) in an amount of 1.5 to 8.0 wt.%, preferably 2.5 to 6.0 wt.%, of said liquid detergent composition.

[0051] The liquid detergent composition of this invention preferably comprises as a surfactant additionally a fatty acid

compound selected from fatty acid, fatty acid salt or mixtures thereof. The fatty acid compound can be the sole additional anionic surfactant. It is particularly preferred that the liquid detergent composition comprises at least anionic surfactant of formula (II) and at least one alkylbenzene sulfonate and at least one fatty acid compound.

[0052] The liquid detergent composition preferably comprises fatty acid compound in an amount of 0.005 to 4,0 wt.%, particularly preferred 0.05 to 3,0 wt.%, most preferred 0,5 to 2,0 wt.%, of said liquid detergent composition.

[0053] According to this invention a fatty acid is a monocarboxylic acid comprising 10 to 20 carbon atoms. Preferred fatty acids are selected from Coco fatty acid, tallow fatty acid, lauric acid, myristic acid, palmitic acid, oleic acid, stearic acid or mixtures thereof.

[0054] The fatty acid compound is preferably selected from fatty acid salts. The sodium, potassium, or ammonium salts as well as soluble salts of organic bases such as mono-, di-, or triethanolamine are appropriate. The fatty acid compounds are particularly preferably present in the form of sodium or potassium salts of fatty acids; in particular in the form of the sodium salts of fatty acids.

[0055] In a further embodiment it may also be preferred that the liquid detergent composition additionally comprises a nonionic detergent active compound. The presence of a nonionic detergent active compound improves the cleaning power of the fabric washing liquid composition and helps to stably and homogeneously disperse the pro-fragrance in the liquid detergent composition.

[0056] The nonionic active detergent species that can be used are by preference alkoxyated, advantageously ethoxylated, in particular primary alcohols having by preference 8 to 18 carbon atoms and an average of 1 to 12 mol ethylene oxide (EO) per mol of alcohol, in which the alcohol residue can be linear or preferably methyl-branched in the 2-position, or can contain mixed linear and methyl-branched residues, such as those that are usually present in oxo alcohol residues. Particularly preferred, however, are alcohol ethoxylates having linear residues made up of alcohols of natural origin having 12 to 18 carbon atoms, e.g. from coconut, palm, tallow, or oleyl alcohol, and an average of 2 to 8 EO per mol of alcohol. The preferred ethoxylated alcohols include, for example, C₁₂₋₁₄ alcohols with 3 EO, 4 EO, 5 EO, or 7 EO, C₉₋₁₁ alcohols with 7 EO, C₁₃₋₁₅ alcohols with 3 EO, 5 EO, 7 EO, or 8 EO, C₁₂₋₁₈ alcohols with 3 EO, 5 EO, or 7 EO, and mixtures thereof, such as mixtures of C₁₂₋₁₄ alcohol with 3 EO and C₁₂₋₁₈ alcohol with 7 EO. The degrees of ethoxylation indicated represent statistical averages, which can correspond to an integral or a fractional number for a specific product. Preferred alcohol ethoxylates exhibit a restricted distribution of homologs (narrow range ethoxylates, NRE). In addition to these nonionic active detergent species, fatty alcohols with more than 12 EO can also be used. Examples of these are tallow fatty alcohol with 14 EO, 25 EO, 30 EO, or 40 EO. Nonionic active detergent species that contain EO and PO groups together in the molecule are also usable according to the present invention. Block copolymers having EO-PO block units or PO-EO block units, but also EO-PO-EO copolymers or PO-EO-PO copolymers, can be used in this context. Also usable, of course, are mixed alkoxyated nonionic active detergent species in which EO and PO units are distributed statistically rather than in block fashion. Such products are obtainable by the simultaneous action of ethylene oxide and propylene oxide on fatty alcohols. These nonionic active detergent species are obtainable, for example, under the commercial name Dehydol® (from Cognis).

[0057] Also suitable nonionic active detergent species are mixtures of a (more) branched ethoxylated fatty alcohol and a non-branched ethoxylated fatty alcohol, such as mixtures of C₁₆₋₁₈ fatty alcohol having 7 EO and 2-propylheptanol having 7 EO.

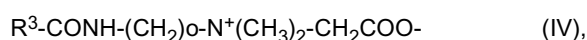
[0058] Most preferred the fabric washing liquid composition comprises a C₁₂₋₁₈ fatty alcohol having 7 EO or a C₁₃₋₁₅ oxo alcohol having 7 EO as nonionic surfactant.

[0059] In yet a further embodiment it may also be preferred that the liquid detergent composition additionally comprises an amphoteric detergent active compound, preferably a (C₈-C₂₀)alkylamido-(C₂-C₃)-alkyl betaine. The presence of an amphoteric detergent active compound, especially of a betaine improves the cleaning power of the cleaning liquid composition and enhances the foam level of the fabric washing liquid composition.

[0060] The liquid detergent composition may also additionally comprise an amphoteric active detergent compound. The amphoteric active detergent compound is particularly preferably present in the liquid detergent composition in an amount of from 0 to 5,0 wt.% of said liquid detergent composition.

[0061] In a special embodiment, the amphoteric active detergent compound is a betaine. A betaine is any neutral chemical compound with a positively charged cationic functional group such as a quaternary ammonium or phosphonium cation (generally: onium ions) which bears no hydrogen atom and with a negatively charged functional group such as a carboxylate group which may not be adjacent to the cationic site.

[0062] Suitable betaines comprise compounds represented by the following formula



wherein

R³ is a linear or branched, substituted or unsubstituted alkyl-, aryl- or alkylarylgroup, and

o is an integer of from 1 to 4, preferably 3.

[0063] Especially suitable surfactants represented by formula (IV) are those wherein

5 R³ is a linear or branched, substituted or unsubstituted C₈-C₁₈-alkylgroup, preferably an alkylgroup which is derived from coconut oil, and
o is 3.

10 **[0064]** A betaine for use in the liquid detergent composition is cocamidopropyl betaine (CAPB), an organic compound derived from coconut oil and dimethylaminopropylamine.

[0065] Preferably, the liquid detergent composition is a liquid laundry detergent composition or a liquid cleaning detergent composition and most preferred the liquid detergent composition is an aqueous liquid laundry detergent composition.

15 **[0066]** Liquid or pasty detergents according to the invention in the form of solutions containing conventional solvents are generally produced by simply mixing the constituents, which may be introduced into an automatic mixer as an undissolved material or as a solution.

20 **[0067]** The invention further encompasses methods for cleaning textiles, wherein a washing liquor containing the detergent composition according to the invention contacts the textile in at least one method step. These include both manual and machine methods, wherein machine methods are preferred, due to their being more precisely controllable, for example in terms of the quantities used and periods of exposure. Methods for cleaning textiles are in general distinguished in that in two or more method steps various substances with a cleaning action are applied onto the material to be cleaned and, after the period of exposure, are washed off, or that the material to be cleaned is treated in some other manner with a washing agent or a solution or dilution of this agent. Any conceivable washing methods may be enhanced in at least one of the method steps by application of a detergent composition according to the invention and then constitute
25 embodiments of the present invention.

[0068] In various embodiments, the method is characterized in that it is carried out at a temperature of between 10°C and 60°C, preferably between 20°C and 50°C and more preferably of between 30°C and 50°C.

30 **[0069]** All factors, aspects and embodiments which have been described for detergent compositions according to the invention are also applicable to this aspect of the invention. Express reference is therefore made at this point to the disclosure at corresponding points, it being pointed out that this disclosure also applies to the above methods according to the invention.

Examples

35 Example 1: liquid detergent formulation according to the present invention and comparative formula

[0070]

Table 1

| Raw Material Brand Name | E1 % in the formula a.s. | V1 % in the formula a.s. |
|--|--------------------------|--------------------------|
| pro-fragrance on the basis of 1-aza-3,7-dioxabicyclo[3.3.0]-octane compound of the general formula (I) | 0.42 | - |
| 45 Perfume (no pro-fragrance) | - | 0.6 |
| Sicovit patent blue | - | 0.0004 |
| Sodium laurylbenzene sulfonate | 3.4 | 5.4 |
| 50 Sodium lauryl ether sulfate, ethoxylated with 2 EO | 4.3 | 6.9 |
| C ₁₂₋₁₄ -fatty alcohol, ethoxylated with 2 EO | 3.4 | 5,4 |
| C ₁₂₋₁₈ -fatty acid, sodium salt | 1.8 | 3,0 |
| Caustic soda | ad pH 8.3 | ad pH 8.3 |
| 55 Citric acid | 1.1 | 1.4 |
| Bacillat TOK (Tetramethylolglycoluril, 2-methyl-2H-isothiazol-3-one, 2-Octyl-4-isothiazolin-3-one mixture) | 0.1 | 0.1 |

EP 3 045 518 A1

(continued)

| | | | |
|----|--|--------------------------|--------------------------|
| | Raw Material Brand Name | E1 % in the formula a.s. | V1 % in the formula a.s. |
| 5 | Tinopal CBS-X® | 0.03 | 0.03 |
| | Tinolux BBS® | 0.01 | - |
| | Polydimethylsiloxane emulsion | 0.006 | 0.006 |
| 10 | copolymer of acrylic acid and C ₁₀₋₃₀ -alkyl acrylate | 0.1 | 0.1 |
| | NaCl | 1.1 | 1.1 |
| | Ethanol | 0.8 | 1.2 |
| | Glycerin | 1.5 | 2.5 |
| 15 | Diethylene triamine penta(methylene phosphonic acid) hepta sodium salt | 0.15 | 0.15 |
| | Water | ad 100 | ad 100 |

20 **[0071]** Washing results with E1 (less surfactant) confirm same stain removal properties like V1 with higher surfactant level and without inventive components.

Example 2: consumer satisfaction as determined in a use test

25 **[0072]** Before any test wash was done, 204 test persons were informed about the product concept (see introductory paragraphs of this application). After that, the formula E1 was independently tested by said persons for 4 weeks. After the test period a survey with the following questions was performed:

1. Do you agree, that the product delivers high value for money?
- 30 2. Do you agree, that the product meets your quality expectation?
3. Do you agree, that the product fulfills the product concept?
- 35 4. Was the experienced product performance better, the same as or worse compared to your expectations raised by the product concept.

Table 2:

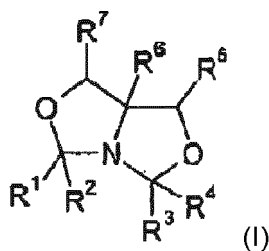
| | | |
|----|------------------------------|-------------------------------------|
| | | Amount "agree" of test persons in % |
| 40 | Value for money | 77 |
| | Quality Expectation | 87 |
| | Overall Evaluation | 85 |
| 45 | Product delivery vs. concept | |
| | better than expectations | 36 |
| | same as expectations | 58 |
| 50 | worse than expectations | 6 |

Claims

55 **1.** Liquid detergent composition comprising:

- a) at least one pro-fragrance in an amount of 0.05 % to 1 % by weight of said liquid detergent composition,
- b) at least one blueing agent in an amount of 0.005 % to 0.1 % by weight of said liquid detergent composition.

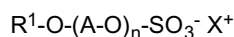
2. The liquid detergent composition according to claim 1, wherein the at least one pro-fragrance is selected from at least one pro-fragrance of the 1-aza-3,7-dioxabicyclo[3.3.0]octane compound type have the general formula (I)



15 wherein R¹, R², R³, R⁴ are independently groups that in a compound of the general formula R¹-C(=O)-R² or R³-C(=O)-R⁴ constitute either a fragrance aldehyde or a fragrance ketone, wherein R¹ and R² or R³ and R⁴ cannot both be hydrogen.

20 R⁶ is H or an alkyl, which may be substituted by one or two hydroxyl groups and/or an amino group and/or wherein up to 8 non-adjacent -CH₂ groups are replaced by -O-,
R⁵, R⁷ are independently H or C₁₋₆ alkyl.

- 20
3. The liquid detergent composition according to any one of claims 1 or 2, wherein the at least one pro-fragrance is present in an amount of 0.1 % to 0.6 % by weight of said liquid detergent composition, preferably in an amount of 0.4 % to 0.5 % by weight of said liquid detergent composition.
- 25
4. The liquid detergent composition according to any one of claims 1 to 3, wherein the at least one blueing agent is present in an amount of 0.009 % to 0.05 % by weight of said liquid detergent composition, preferably in an amount of 0.01 % to 0.03 % by weight of said liquid detergent composition.
- 30
5. The liquid detergent composition according to any one of claims 1 to 3, wherein the at least one blueing agent has at pH 9,5 and 25°C in solution (water/ethanol mixture with a weight ratio 1:1) an absorption maximum of visible light having a wave length in the range of 530 nm to 700 nm and an absorption maximum in the range of 330 nm to 370 nm.
- 35
6. The liquid detergent composition according to any one of claims 1 to 5, wherein the at least one blueing agent is a phthalocyanine compound,
- 40
7. The liquid detergent composition according to any one of claims 1 to 6, wherein the at least one blueing agent is an anionic phthalocyanine compound, preferably a sulphonated Zn or Al phthalocyanine compound.
- 45
8. The liquid detergent composition according to any one of claims 1 to 7, wherein said liquid detergent composition additionally comprises at least one, preferably two or more other substance selected from the group consisting of surfactants, detergency builders, other bleaching agents, bleach activators, bleach catalysts, enzymes, non-aqueous solvents, pH adjusting agents, perfumes, fluorescing agents, dyes, hydrotopes, silicone oils, anti-redeposition agents, anti-gray agents, shrinkage preventers, wrinkle protection agents, dye transfer inhibitors, antimicrobial active substances, germicides, fungicides, antioxidants, preservatives, corrosion inhibitors, antistatic agents, bittering agents, ironing adjuvants, proofing and impregnation agents, swelling and anti-slip agents, softening compounds, complexing agents and UV absorbers.
- 50
9. The liquid detergent composition according to any one of claims 1 to 8, wherein said liquid detergent composition additionally comprises at least one surfactant an amount of 5 to 20 wt.% (preferred of 7,5 to 17,5 wt.%) of said liquid detergent composition.
- 55
10. The liquid detergent composition according to any one of claims 1 to 9, wherein said liquid detergent composition additionally comprises at least one anionic surfactant and at least one nonionic surfactant.
11. The liquid detergent composition according to any one of claims 1 to 10, wherein said liquid detergent composition additionally comprises at least one anionic surfactant of formula (II)



wherein

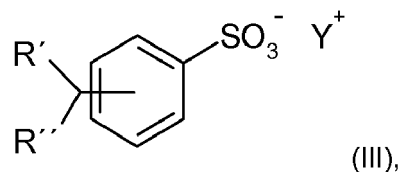
R¹ means a linear or branched, substituted or unsubstituted (C₈-C₂₀)-alkyl group, an aryl group or an (C₈-C₂₀)-alkylaryl group, preferably a linear, unsubstituted (C₈-C₂₀)-alkyl group,

A means ethane-1,2-diyl- or propane-1,2-diyl, preferably ethane-1-2-diyl,

n means an integer from 1 to 50, preferably from 1 to 20, especially from 2 to 10, most preferably for 2, 3, 4, 5, 6, 7 or 8,

X⁺ means a monovalent cation or an equivalent of a polyvalent cation.

12. The liquid detergent composition according to any one of claims 1 to 11, wherein said liquid detergent composition additionally comprises at least one anionic surfactant formula (III)



wherein the combination of R' and R'' comprises 9 to 19, preferably 11 to 15 carbon atoms,

Y⁺ means a monovalent cation or an equivalent of a polyvalent cation.

13. The liquid detergent composition according to any one of claims 1 to 13, wherein said liquid detergent composition is an aqueous liquid laundry detergent composition.

14. A method for cleaning textiles, wherein a washing liquor containing the liquid detergent composition according to any one of claims 1 to 13 contacts the textile in at least one method step.



EUROPEAN SEARCH REPORT

Application Number
EP 15 19 8709

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| Place of search The Hague | | Date of completion of the search 17 May 2016 | Examiner Martin, Emmeline |
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