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(54) Stable liquid detergent composition containing hydrophobic brightener

Stabile flüssige Detergenszusammensetzung, die einen hydrophoben optischen Aufheller enthält

Composition détergente stable liquide contenant un agent de blanchiment optique hydrophobe

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Description

Technical Field

The present invention relates to stable, preferably single-phase, isotropic liquid laundry detergents containing a particular hydrophobic disulfonate brightener which reduces or eliminates brightener staining of fabrics while maintaining an excellent level of whitening. Particularly preferred are disulfonated tetra-anilino naphthotriazolyl stilbene brighteners. In some embodiments, the hydrophobic brighteners herein may be combined with variable levels of conventional liquid detergent brighteners to further improve and optimize overall fabric appearance. In the event such mixed brighteners are employed, the hydrophobic brightener herein should represent at least 40% of the total brightener in order to provide the desirable performance benefits.

Optical brighteners, also known as fluorescent whitening agents, are commonly used in laundry detergents. Brighteners deposit onto fabrics where they absorb ultraviolet radiant energy and reemit it as a blue light. This reduces or eliminates any yellowish cast to fabrics and gives them a brighter appearance. However, undesirable brightener staining can occur when liquid detergents come in direct contact with cotton-containing fabrics. The present invention reduces or eliminates such staining while maintaining an acceptable level of fabric whitening.

Background Art

To overcome and reduce undesirable brightener staining substantial effort had been directed towards using asymmetrical monosulfonated naphthotriazolyl stilbene brighteners (MSB). Representative of these art undertakings are a series of published patents.

British Patent 2,028,365, Gray, published March 5, 1980, discloses built liquid detergents containing anionic surfactants and one or more brighteners, including MSB.

U.S. Patent 3,812,041, Inamorato, issued May 21, 1974, discloses unbuilt liquid detergents containing nonionic surfactants and anionic surfactants in a weight ratio of nonionic to anionic of at least 1. Optional brighteners can include the MSB type.

U.S. Patent 3,959,157, Inamorato, issued May 25, 1976, discloses liquid detergents containing nonionic surfactants, quaternary ammonium softening agents and optional brighteners, equally including MSB.

US Patent 4,430,236, Franks, issued February 7, 1984, discloses liquid detergents containing nonionic surfactants optional anionic surfactants, hydrogen peroxide, brightener and preferably quaternary ammonium softening compounds. MSB's are specifically mentioned as being useful.

Japanese Patent Application J74-017004, published April 26, 1977, discloses liquid detergents containing MSB said to be stable to light.

German Patent Application 25 43 998, published April 7, 1977, discloses clear liquid detergents containing certain diphenyl distyryl brighteners. Examples 1 and 2 are of liquid detergents containing mixtures of MSB and disulfonated brighteners.

German Patent Application 26 09 752, published September 22, 1977, relates to improving the low temperature stability of brightener-containing detergent compositions and makes no distinction between brighteners of differing hydrophobicity or solubility.

European Application 85200988.5, filed June 21, 1985, teaches the use of MSB, optionally in combination with conventional di-anilino di-morpholino distilbene brighteners with a view to reduce undesirable brightener deposits.

While those prior art attempts can yield considerable improvements versus conventional brighteners as regards reducing staining, their washing performance, e.g., whiteness maintenance, is not better than what is obtained from current disulfonate brightener.

FR-A-2 130 106 published 3 November, 1972 teaches a composition and method of solubilization of water insoluble brighteners. It discloses liquid detergents containing anionic and/or nonionic surfactants, organic builder, hydrotope, optical brightener, ethylene glycol ether and/or dimethyl sulphoxide.

It is a main object of this invention to formulate brightener containing concentrated heavy-duty liquid detergent compositions which do not exhibit brightener staining negatives during use while delivering, at least equivalent, whiteness maintenance as compared to conventional detergent brighteners.

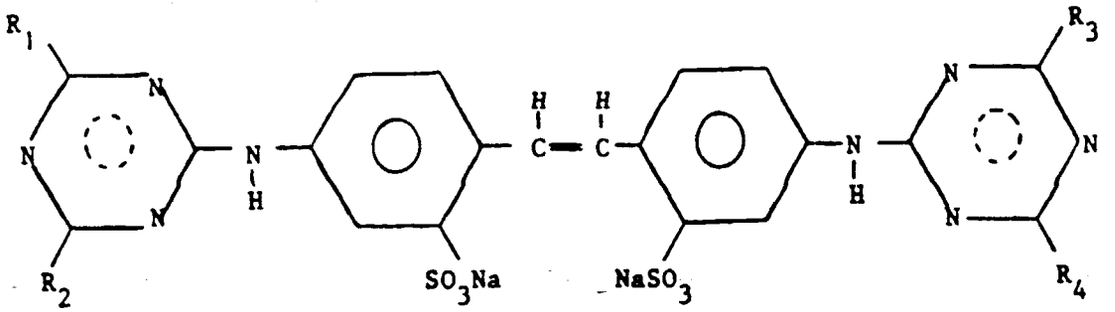
The above and other objects can now be obtained by the incorporation in heavy-duty liquid detergent of disulfonated brighteners which are more hydrophobic than current disulfonated brightener.

Summary of the Invention

The present invention relates to aqueous stable isotropic heavy-duty laundry detergent compositions comprising, by weight,

(a) from 3% to 60% of a surface-active agent selected from anionic and nonionic surfactants and mixtures thereof; and

(b) from 0,01% to 1% of a hydrophobic disulfonated brightener which represents at least 40% of the total brightener in the composition, the hydrophobic brightener having the formula:



wherein R_1, R_2, R_3 and R_4 represent, tetra-anilino, tetra-piperazino, tetracyclohexylamino, dianilino-dipiperazino, and dianilino-dicyclohexylaminno; and

(c) a solvent selected from lower aliphatic alcohols having from 2 to 6 carbon atoms and from 1 to 3 hydroxyl groups with the proviso that the detergent composition excludes binary combinations of sodium 4,4'-bis(4,6-di-anilino-s-triazo-zylamino)-2,2' stilbene disulfonate with sodium 2-sulfo-4-(2-naphto[1,2]triazolyl)stilbene.

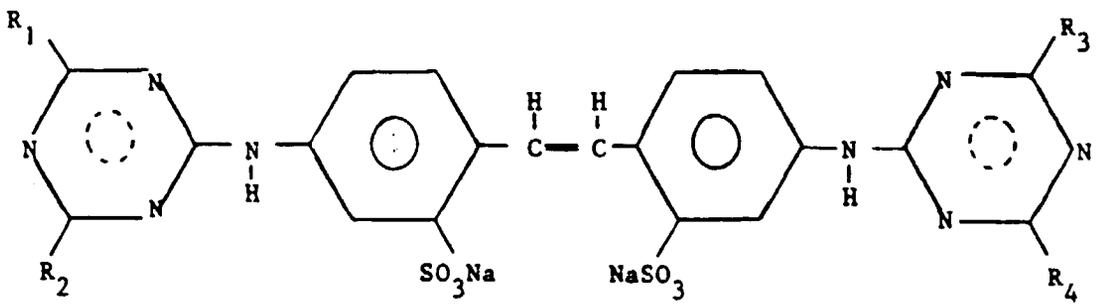
The Patentee hereby disclaims aqueous liquid detergent compositions containing the brightener combinations disclosed in Example II of German DAS 1072348.

Detailed Description of the Invention

The compositions of the present invention comprise from 3% to 60% of a surface-active agent, from 0,01% to 1% of a hydrophobic brightener and a lower aliphatic alcohol solvent. The essential ingredients of the invention as well as optional components that can desirably be incorporated in the compositions of this invention are described hereinafter.

The percent indications, throughout the specification, stand, unless indicated otherwise, for "percent by weight"

The hydrophobic brightener herein has the formula:



wherein R_1, R_2, R_3 and R_4 are, selected from the tetra-anilino, tetra-piperazino, tetra-cyclohexylamino, dianilino-dip-iperazino; and the dianilino-dicyclohexylamino species.

Highly preferred for reasons of minimizing brightener staining are the tetraanilino derivatives, having the following formula:

4,4'-bis(4-anilino-6-anilino-s-triazin-2-yl)amino)-2,2'-stilbene disulfonic acid sodium salt (A). A preferred brightener system in the context of this invention contains at least 40% (by reference to the total amount of the detergent brightener) of the specific hydrophobic brightener referred to hereinbefore in combination with a conventional detergent brightener, e.g., a di-sulfonated dianilino, dimorpholino stilbene brightener.

Conventional detergent brighteners for use in combination with the hydrophobic species described hereinabove embrace common detergent brighteners inclusive of:

4-(2H-naphtho(1,2-d)triazol-2-yl)-2-stilbenesulfonic acid, sodium salt; (i)
4,4'-bis((4-anilino-6(N-2-hydroxyethyl-N-methylamino)-s-triazin-2-yl)amino)-2,2'-stilbenedisulfonic acid disodium salt; (ii)
4,4'-bis((4-anilino-6-morpholino-s-triazin-2-yl)amino)-2,2'-stilbenedisulfonic acid, sodium salt; (iii)
2,2-(4,4'-biphenylene divinylene)-dibenzenesulfonic acid, disodium salt; (ivi)
4,4'-bis(4-phenyl-2H-1,2,3-triazol-2-yl) disodium salt (vi)
4,4'-bis((4-anilino-6-morpholino-1,3,5-triazin-2-yl)amino)-2-stilbene sulfonate sodium salt. (vii)

While the hydrophobic brightener shall represent, at least, 40% of the total brightener, it is understood that the level can very depending upon the particular nature of the conventional brightener. As an example, the tetra-anilino hydrophobic brighteners can desirably represent from 55%-80% of the total brightener in the event the conventional brightener is represented by (i).

The surface-active agent can be represented by anionic and nonionic surfactants and mixtures thereof. The surfactant usually represents from 3% to 60%, preferably from 10% to 50%. Suitable anionic surfactants are disclosed in U.S. Patent 4,285,841, Barrat et al., issued August 25, 1981, and in U.S. Patent 3,929,678, Laughlin et al., issued December 30, 1975, both incorporated herein by reference.

Useful anionic surfactants include the water-soluble salts, particularly the alkali metal, ammonium and alkylolammonium (e.g., monoethanolammonium or triethanolammonium) salts, of organic sulfuric reaction products having in their molecular structure an alkyl group containing from 10 to 20 carbon atoms and a sulfonic acid or sulfuric acid ester group. (Included in the term "alkyl" is the alkyl portion of aryl groups.) Examples of this group of synthetic surfactants are the alkyl sulfates, especially those obtained by sulfating the higher alcohols (C_8-C_{18} carbon atoms) such as those produced by reducing the glycerides of tallow or coconut oil; and the alkylbenzene sulfonates in which the alkyl group contains from 9 to 15 carbon atoms, in straight chain or branched chain configuration, e.g., those of the type described in U.S. Patents 2,220,099 and 2,477,383. Especially valuable are linear straight chain alkylbenzene sulfonates in which the average number of carbon atoms in the alkyl group is from about 11 to 14.

Other anionic surfactants herein are the water-soluble salts of: paraffin sulfontes containing from 8 to 24 (preferably 12 to 18) carbon atoms; alkyl glyceryl ether glyceryl ether sulfonates, especially those ethers of C_{8-18} alcohols (e.g., those derived from tallow and coconut oil); alkyl phenol ethylene oxide ether sulfates containing from 1 to 4 units of ethylene oxide per molecule and from 10 to 20 carbon atoms in the alkyl group.

Other useful anionic surfactants herein include the water-soluble salts of esters of alpha-sulfonated fatty acids containing from 6 to 20 carbon atoms in the fatty acid group and from about 1 to 10 carbon atoms in the ester group; water-soluble salts of 2-acyloxyalkane-1-sulfonic acids containing from 2 to 9 carbon atoms in the acyl group and from 9 to 23 carbon atoms in the alkane moiety; water-soluble salts of olefin sulfonates containing from 12 to 24 carbon atoms; and beta-alkyloxy alkane sulfonates containing from 1 to 3 carbon atoms in the alkyl group and from 8 to 20 carbon atoms in the alkane moiety.

Preferred anionic surfactants are the C_{10}-C_{18} alkyl sulfates containing an average of from 0 to 4 ethylene oxide units per mole of alkyl sulfate, C_{11}-C_{13} linear alkylbenzene sulfonates, and mixtures thereof.

The nonionic surface-active agent can be represented by known species which are eminently well-known in the technical community and many of which have found widespread commercial acceptance. Suitable ethoxylated nonionic surfactants for use herein have the formula $R^1(OC_2H_4)_nOH$, wherein R^1 is a C_{10}-C_{16} alkyl group or a C_8-C_{12} alkyl phenyl group, n is from 3 to 9, said nonionic surfactant having an HLB (hydrophile-lipophile balance) of from 10 to 13. These surfactants are more fully described in U.S. Patent 4,285,841, Barrat et al., issued August 25, 1981; and 4,284,532, Leikhim et al., issued August 18, 1981, both incorporated herein by reference. Particularly preferred are condensation products of C_{12}-C_{15} alcohols with from 3 to 8 moles of ethylene oxide per mole of alcohol, e.g., C_{12}-C_{13} alcohol condensed with 6.5 moles of ethylene oxide per mole of alcohol.

A well-known non-ionic for use herein can be represented by amine oxide surfactants such as the $C_{12\text{-}16}$ alkyl dimethyl amine oxides.

Amine oxide surfactants are frequently used in levels of from 0.5% to 4% in combination with conventional ethoxylated nonionics.

In such nonionic systems, the weight ratio of amine oxide:nonionic ethoxylate is frequently in the range from 1:8 to 1:50.

While the compositions herein can be based on an-all anionic or all-nonionic surfactant combination, it is frequently desirable to use anionic and nonionic surfactants in a weight ratio of from 1:1 to 3:1. In this weight ratio expression, the nonionic surfactant can be represented by a mixture of a nonionic ethoxylate and amine oxide surfactant.

The compositions herein can in addition to the essential surfactants described hereinbefore, also contain as optional ingredients other synthetic surfactants known in the art such as the cationic, zwitterionic and ampholytic surfactants. These optional surfactants can be used at additive levels and should normally represent less than 40% of the total surfactant in the formula. Suitable examples of these optional surfactants are disclosed in US Patents

4.285.841 and 3.929.678.

The compositions herein are aqueous compositions and contain, depending upon the relative levels of essential ingredients and the possible levels of optional ingredients, a level of water to make the balance to 100%. In some preferred heavy duty liquid executions herein, the water level can be in the range from e.g. 60% to 20%.

The compositions of this invention frequently have a pH, measured at a 1% aqueous solution, at 20°C, in the neutral to mildly alkaline range, i.e., from 6,5 to 9.

In addition to the essential ingredients described hereinbefore, the compositions herein frequently contain a series of optional ingredients which are used for their known functionality in conventional quantities. These optional ingredients augment and enhance, generally, the detergent performance of the claimed compositions. Examples of the like optional ingredients include: perfumes, dyes, opacifiers, germicides, antioxidants, suds regulants inclusive of silicones and hydrogenated fatty acids, builders inclusive of tartrate monosuccinic acid, sodium tripolyphosphate and sodium pyrophosphate, citric acid, completely hydrated zeolite having a particle diameter in the range of from 1-10 μm; and alkenylsuccinates having from 10 to 16 carbon atoms in the alkenyl moiety. Further optional components include soil release agents such as polyethylene glycol terephthalate, performance boosters e.g. tetraethylene pentamine with 15-19 EO, corrosion inhibitors such as aminosilanes, enzymes, cationic surfactants, textile softening agents such as quaternary ammonium salts and bentonite clays, ethylene diaminetetra-acetic acid, diethylenetriamine pentaacetic acid, fatty acids, alkylene polyaminopolyalkylenephosphonic acids, enzyme stabilizing systems, as well as liquid matrix ingredients inclusive of water and suitable solvents.

Suitable fatty acids, saturated or unsaturated, have from 10 to 18 carbon atoms in the alkyl chain. Preferred are unsaturated species having from 12 to 18 carbon atoms in the alkyl chain, most preferably oleic acid. The corresponding soaps can equally be used. The optional fatty acid/soaps are used in levels up to 20%, frequently from 5% to 15%.

Detergent enzymes generally aid and augment the removal of specific stains. Suitable enzymes can be represented by proteases, amylases, lipases, glucose-oxidases, cellulase, or mixtures thereof. Proteases and amylases are preferred in the claimed liquid concentrated compositions. They are frequently employed in a level from 0.01% to 2%.

All generally known enzyme stabilizing systems can be used in the compositions herein in the art established level. Examples of suitable stabilizing systems include short C_{1-4} chain carboxylic acid, particularly formic acid, in combination with low level of calcium, boric acid and the water-soluble salts thereof possibly in combination with polyols.

Suitable alkylene-polyaminopolyalkylene phosphonic acids for use herein include ethylene diamine tetramethylene phosphonic acid, diethylene triamine pentamethylene phosphonic acid, or the salts thereof. These polyphosphonates are advantageously utilized in an amount from 0.1%-3%, preferably 0.4%-1.2%; the preferred tetra- and pentamethylene phosphonate species can also be used in combination e.g. in a weight ratio of tetra to penta of from 3:1 to 1:3.

Acceptable detergent suds regulants herein include hydrogenated fatty acids having from 16 to 22 carbon atoms in the alkyl chain and alkylated polysiloxanes such as dimethylpolysiloxanes. The fatty acids suds regulant is frequently used in a level from 0.5 to 5% whereas the silicone can be effectively used in levels in the range from 0.05 to 0.5%. The suds regulant can also be represented by a combination of hydrogenated fatty acid and silicone.

In the presence of oxidizable materials, the compositions herein can also contain known antioxidants in the art established levels, i.e., 0.01% to 0.25% (by reference to total composition). These antioxidants are frequently introduced in conjunction with unsaturated organic acids. While many suitable antioxidants are readily known and available for that purpose, especially preferred for use in the compositions herein are: 2,6 ditertiary butyl-p-cresol, more commonly known as butylated hydroxytoluene, BHT, and 2-tertiarybutyl-4-hydroxyanisole. Other suitable antioxidants are 4,4'thiobis(6-ter-butyl-m-cresol) and 2-methyl-4,6-dinonyl phenol

Builders such as sodium tripolyphosphate, sodium pyrophosphate, tartrate monosuccinic acid, citric acid, (C_{12}-C_{16}) alkenylsuccinates, completely hydrated zeolite A having a particle diameter of from 1-10 μm or combinations thereof are frequently used at levels from2% to 25%.

Chelants such as alkylene polyamino-polyalkylene polycarboxylic and/or polyphosphonic are frequently used at levels from0.1 to 3%.

Known textile softening agents inclusive of ditallowdimethylammonium salts and imidazolinium salts as well bentonite clays such as known from DE-PS 23 34 899 can also be used depending upon the envisaged Functionality of the composition. If the softening agents are present they normally can represent from 2% to 8%.

The liquid matrix ingredients should also comprise a solvent selected from the lower aliphatic alcohols having from 2 to 6 carbon atoms and from 1 to 3 hydroxyl groups, for example ethanol; n-propanol; iso propanol; butanol; 1,2-propanediol; 1-3-propane diol.

Other liquid matrix ingredients are further optional components in the compositions herein. This component together with water and the lower aliphatic alcohols can constitute the solvent matrix for e.g. the concentrated liquid executions. Suitable ingredient classes include ethers of diethyleneglycol and lower aliphatic monoalcohols having from 1 to 4 carbon atoms. Specific examples of phase regulants are: ; monomethyl-, ethyl-, propyl-, and monobutyl ethers of di-ethylene glycol. The liquid matrix ingredients can be used at varying levels, depending upon e.g. the total level of ingredients in the composition. In the concentrated HDL executions herein, the liquid solvent can represent

from 5% to 30%. The concentrated heavy duty liquid compositions herein constitute a preferred execution of the claimed technology. These compositions can have the following formula.

Component	% by weight	
	General	Preferred
Surface-active agent anionic	10 - 50	10 - 30
Surface-active agent nonionic		5 - 20
Builder	2 - 25	5 - 22
Chelant	0.1 - 3	0.4 - 1.2
Enzyme - protease(1.5 AU/g.)	0.1 - 1.5	0.4 - 1.2
- amylase(7000 TAU/g.)	0.05- 0.8	0.1 - 0.5
Brightener - hydrophobic	0.01- 1	0.07- 0.3
- conventional	0 - 0.5	0.05- 0.3
Water	70 - 20	60 - 30
Solvent(liquid matrix)	3 - 30	5 - 14

EXAMPLE I

The fabric staining tendency of various brighteners is evaluated in the following composition.

Component	Wt.%
C_{12} linear alkylbenzene sulfonic acid	10.0
C_{12-14} alkyl sulfuric acid	3.0
C_{14-15} alcohol polyethoxylate (7EO)	12.0
C_{12-14} fatty acid	11.0
Oleic acid	4.0
Citric acid (anhydrous)	1.0
Diethylenetriamine pentamethylene phosphonic acid	0.8
Triethanolamine	6.0
Sodium hydroxide to pH 7.7	3.4
Propylene glycol	1.6
Ethanol	6.0
Alkaline protease (1.5 AU/g)	0.9
Formic acid	0.66
Alpha-amylase (300 KAU/g)	0.1
Brightener	0.175
Minors and water	balance to 100

Non-diluted (as is) detergent samples containing the above detergent brighteners are applied to unbrightened 100% cotton swatches and left for 10 minutes. The swatches are thereafter washed with the same detergent solution (1% product concentration, 30°C, mild agitation) and tumble tried. The swatches are then graded under U.V. light for brightener staining, using the following scale.

0 no visible staining
T trace of stain
1.0 very light stain
1.5 light stain
2.0 medium light stain
2.5 medium stain
3.0 heavy stain

The results are as follows:

	Brightener	Staining Grade
Blue Nightdress	iii	3.0
	A	1.0
	vii	1.0
Pink Undershirt	iii	3.0
	A	1.5
	vii	1.5
Green shorts	iii	3.0
	A	1.5
	vii	1.5
Blue Undershirt	iii	3.0
	A	1.0
	vii	1.0
Pink Nightdress	iii	2.8
	A	1.0
	vii	1.0
Blue Pillow case	iii	2.5
	A	0.5
	vii	0.5
Beige muslin (technical swatch)	iii	3.0
	A	1.0
	vii	1.0
Beige knitted cotton (technical swatch)	iii	3.0
	A	1.0
	vii	1.0
Indian cotton (technical swatch)	iii	3.0
	A	1.0
	vii	1.0
Pink Jogging	iii	2.8
	A	1.0
	vii	1.0

The above results confirm the reduced brightener staining, on a large variety of fabric, of the tetra-anilino brightener (A) in accordance with the invention.

The brightener deposition superiority during the laundry operation is, in a complementary manner, demonstrated with the aid of brightener build-up measurements.

Brightener build-up means the speed with which a brightener deposits onto swatches, brightened and non-brightened. The build-up measurement is carried out as follows:

Test conditions : Miele® W765, 60°C short cycle, 180 ml product usage (1% product concentration) ballast load = 2 kg 100% cotton bleached (90°C wash with perborate/Sodium tripolyphosphate), unbrightened.

Tracers : terry unbrightened = unbleached unbrightened terry bleached by 1 wash at 90°C with perborate/Sodium tripolyphosphate; terry brightened = bleached brightened terry washed 5 times with a heavy duty detergent at 90°C.

Measurement : reemission 440nm terry unbrightened start: 83.88
reemission 440nm terry brightened start : 149.13

Results : reemission 440nm

n of washes	1	4	8
Swatch unbrightened			
(A)	120.52	130.68	136.59
(vii)	111.68	119.23	124.84
Swatch brightened			
(A)	150.27	149.73	150.33
(vii)	140.64	140.78	141.20

EXAMPLE II

Additional liquid compositions in accordance with the invention contain the following ingredients:

	% by weight
C_{12}-Linear alkylbenzene sulfonic acid	6
C_{13}-C_{15} Oxoalcohol condensed with 7 moles of ethylene oxide	3
C_{12}-C_{14} fattty diethanolamide	2
Sodiumtripolyphosphate	23
Carboxymethylcellulose	.3
Hydrogenated fatty acid (C_{18}-C_{22})	1
Polydimethylsiloxane	0.2
Brightener (see below)	0.15 - 0.20
Proteolytic enzyme (1.5 AU-basis)	.5
Glycerine	5
Sodium tetraborate	2
Sodium hydroxide (1% solution)	to 9.0
Optional ingredients inclusive of perfume, whitener	1.

The brightener is represented by:

- A
- a mixture of (1:1 by weight) A and vii; and
- a mixture of (9:1 by weight) A and iii.

	EXAMPLES					
	III	IV	V	VI	VII	VIII
Dodecylbenzene sulfonic acid	-	-	-	8.3	11	7
C_{12-14}-alkyltriethoxy sulfate-Na	12	12	-	12	1	10
C_{12-14}-dimethylamine oxide	-	-	4	2	-	2
C_{12-13}-oxo alcohol condensed with 6.5 moles of EO	23	21	18	5	12	5
C_{12}-C_{18} fatty acid	-	-	-	10	-	2
Oleic acid	-	-	-	5	5	-
Citric acid	1.5	-	-	6	2	1
Tartrate monosuccinic acid	-	-	-	-	-	6
Ditallowdimethylammonium chloride	-	-	4	-	-	-
Diethylenetriamine penta-acetic acid	-	-	-	.8	-	.2
Tetraethylene pentamine-15-19 EO	-	-	-	2.5	-	2
C_{12}-C_{14}-alkenylsuccinic acid	-	-	-	-	15	-
Ethanol	9	10	7.5	10	-	3
Polyethylene glycol terephthalate(1)	-	-	-	0.5	0.5	0.5
Diethylenetriaminopentamethylene phosphonic acid	-	-	-	-	1	-
Monoethanolamine	-	-	-	2	-	-
Triethanolamine	-	-	-	-	5	-
Propanediol	-	-	-	4	2	4
Proteolytic enzyme (1,5 AU/g basis)	-	1.5	-	1	1	1
Amylolytic enzyme (7000 TAU/g)	-	-	-	0.2	0.1	0.2
Brightener						
A	0.1	.2	.1	0.15	0.13	0.10
vii			.05	0.03		
iii				0.02	0.02	0.02
Sodium formate	-	1	-	1.5	1	1
Sodium hydroxide to adjust pH to: (1% solution) *	8.8	7.5	7	8.3	7.8	8.3
Optionals inclusive of perfume, dye, silicone, suds regulant, aminosilane, opacifier, water	-----balance to 100 - - - - -					

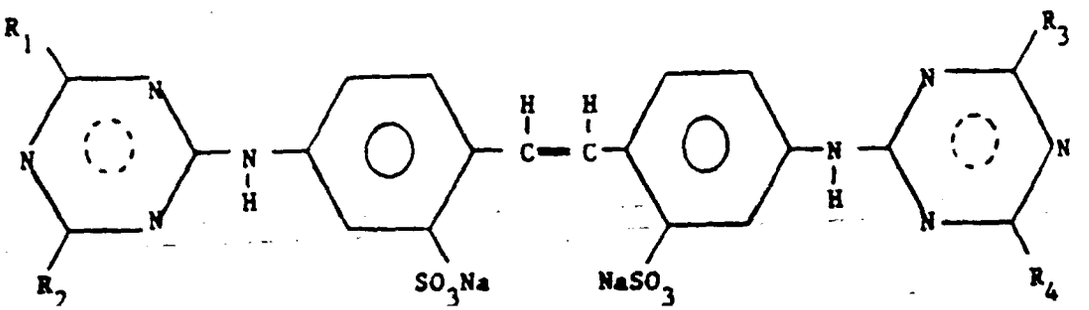
* expressed as pH units

(1) as described in more detail in European Patent Application 85202053.6 of 12.12.1985.

Claims

1. A liquid aqueous heavy duty detergent composition comprising

(a) from 3% to 60% by weight of a surface-active agent selected from anionic and nonionic surfactants and mixtures thereof: and
(b) from 0.01% to 1% by weight of a hydrophobic disulfonated brightener which represents at least 40% by weight of the total brightener in the composition, the hydrophobic brightener having the formula :



wherein the R 1-4 moieties are selected from the group of : tetra-anilino, tetra-piperazino, tetra-cyclohexylamino, dianilino-dipiperazino, and dianilino-dicyclohexylamino; and
(c) a solvent selected from lower aliphatic alcohols having from 2 to 6 carbon atoms and from 1 to 3 hydroxyl groups, with the provise that the detergent composition excludes binary combinations of sodium 4,4'-bis(4,6-dianilino-s-triazo-zylamino)-2,2' stilbene disulfonate with sodium 2-sulfo-4-(2-naphtho[1,2] triazolyl) stilbene.

2. The composition in accordance with claim 1 wherein the surface-active agent represents from 10% to 50% by weight.

3. The composition in accordance with Claim 2 wherein the hydrophobic brightener is represented by the tetra-anilino derivative which is present in a level from 0.07% to 0.3% by weight.

4. The composition in accordance with Claim 1 wherein the surface-active agent is represented by a mixture of anionic and nonionic surface-active agents in a weight ratio of anionic : nonionic of from 1:1 to 3: 1.

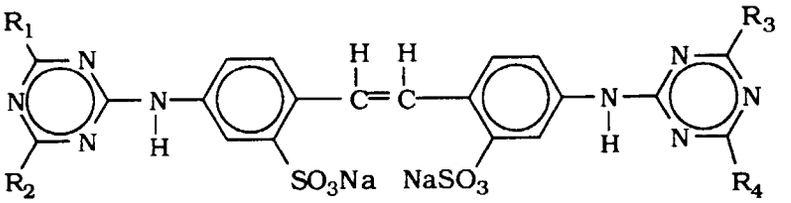
5. The composition in accordance with Claims 1 and 4 wherein the nonionic surface-active agent is represented by a combination of nonionic ethoxylates and amine oxides in a weight ratio of ethoxylate to amine oxide of from 50: 1 to 8:1.

6. The composition in accordance with Claim 1 wherein the brightener is represented by a mixture of the hydrophobic brightener and 4,4',bis((4-anilino-6-morpholino-1,3,5-triazin-2-yl)amino)-2-stilbene sulfonate sodium salt.

Patentansprüche

1. Flüssige, wäßrige Vollwaschmittelzusammensetzung, umfassend

(a) 3 Gew.-% bis 60 Gew.-% eines grenzflächenaktiven Mittels, welches unter anionischen und nichtionischen grenzflächenaktiven Mitteln und Gemischen hiervon ausgewählt ist; und
(b) 0,01 Gew.-% bis 1 Gew.-% eines hydrophoben, disulfonierten Aufhellers, welcher mindestens 40 Gew.-% des gesamten Aufhellers in der Zusammensetzung darstellt. welcher hydrophobe Aufheller die Formel



besitzt, worin die R_{1-4}-Reste aus der aus Tetra-anilino, Tetra-peperazino, Tetra-cyclohexylamino. Dianilino-dipeperazino und Dianilino-dicyclohexylamino bestehenden Gruppe ausgewählt sind; und
(c) ein Lösungsmittel, welches unter niederen aliphatischen Alkoholen mit 2 bis 6 Kohlenstoffatomen und 1 bis 3 Hydroxylgruppen ausgewählt ist, mit der Maßgabe, daß in der Waschmittelzusammensetzung binäre Kombinationen aus Natrium-4,4'-bis(4,6)-dianilino-s-triazo-2-ylamino)-2,2'-stilbendisulfonat und Natrium-2-sulfo-4-(2-naphtho[1,2]triazolyl)-stilben ausgeschlossen sind.

2. Zusammensetzung nach Anspruch 1, worin das grenzflächenaktive Mittel 10 Gew.-% bis 50 Gew.-% darstellt.

3. Zusammensetzung nach Anspruch 2, worin der hydrophobe Aufheller vom Tetra-anilino Derivat gebildet wird, welches in einer Menge von 0,07 Gew.-% bis 0,3 Gew.-% vorliegt.

4. Zusammensetzung nach Anspruch 1, worin das grenzflächenaktive Mittel von einem Gemisch aus anionischen und nichtionischen grenzflächenaktiven Mitteln in einem Gewichtsverhältnis von anionischen grenzflächenaktiven Mitteln zu nichtionischen grenzflächenaktiven Mitteln von 1:1 bis 3: 1 gebildet wird.

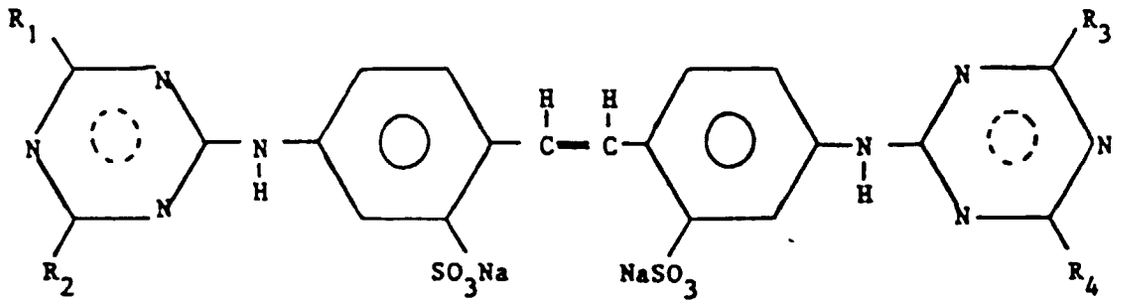
5. Zusammensetzung nach den Ansprüchen 1 und 4, worin das nichtionische grenzflächenaktive Mittel von einer Kombination aus nichtionischen Ethoxylaten und Aminoxiden in einem Gewichtsverhältnis von Ethoxylat zu Aminoxid von 50:1 bis 8:1 gebildet wird.

6. Zusammensetzung nach Anspruch 1, worin der Aufheller durch ein Gemisch aus dem hydrophoben Aufheller und 4,4'-Bis((4-anilino-6-morpholino-1,3,5-triazin-2-yl)-amino)-2-stilbensulfonat-natriumsalz gebildet wird.

Revendications

1. Composition détergente aqueuse liquide pour gros travaux, comprenant

(a) de 3 à 60 % en poids d'un agent tensioactif choisi parmi les tensioactifs anioniques et non ioniques et leurs mélanges ; et
(b) de 0,01 à 1 % en poids d'un azurant disulfoné hydrophobe, qui représente au moins 40 % en poids de la totalité de l'azurant optique se trouvant dans la composition, l'azurant hydrophobe ayant la formule



dans laquelle les radicaux R_1 à R_4 sont choisis parmi l'ensemble comprenant les radicaux tétraanilino, tétrapipérazino, tétracyclohexylamino, dianilinodipipérazino et dianilinodicyclohexylamino ; et
(c) un solvant choisi parmi les alcools aliphatiques inférieurs ayant de 2 à 6 atomes de carbone et de 1 à 3 groupes hydroxyle, avec la condition que la composition détergente exclut les combinaisons binaires de 4,4'-

bis (4,6-dianilino-5-triazo-2ylamino)-2,2'-stilbène disulfonate de sodium avec le 2-sulfo-4-(2-naphto[1,2]triazolyl) stilbène sodique.

2. Composition selon la revendication 1, dans laquelle l'agent tensioactif est présent en une quantité de 10 à 50% en poids.

3. Composition selon la revendication 2, dans laquelle l'azurant hydrophobe est représenté par le dérivé tétra-anilino, présent en une quantité de 0,07 à 0,3 % en poids.

4. Composition selon la revendication 1, dans laquelle l'agent tensioactif est représenté par un mélange d'agents tensioactifs anioniques et non ioniques selon un rapport pondéral anionique:non ionique de 1:1 à 3:1.

5. Composition selon les revendications 1 et 4, dans laquelle l'agent tensioactif non ionique est représenté par une combinaison de produits d'éthoxylation non ioniques et d'oxydes d'amine selon un rapport pondéral du produit d'éthoxylation à l'oxyde d'amine de 50:1 à 8:1.

6. Composition selon la revendication 1, dans laquelle l'azurant est représenté par un mélange de l'azurant hydrophobe et le sel de sodium de l'acide 4,4'-bis((4-anilino-6-morpholino-1,3,5-triazine-2-yl)amino)-2-stibènesulfonique.