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(54) **Dishwashing compositions with improved resistance to gelling**

Geschirrspülmittel mit verringerter Neigung zur Gelierung

Compositions détergentes améliorées pour la vaisselle résistant à la formation de gels

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DescriptionTechnical Field

5 **[0001]** The invention relates to liquid dishwashing compositions. The compositions have a robust surfactant system, they are relatively soluble in water and have an improved resistance to gelling.

Background

10 **[0002]** Liquid dishwashing compositions having good grease removal benefits are much desired by consumers and it is therefore necessary that these compositions should have a robust surfactant system. However such robust surfactant systems cause an increase in viscosity which renders such compositions inconvenient to use. Therefore, solvents are added which decrease the viscosity of the composition to an acceptable value. But a problem which occurs with these compositions is that the solvent tends to evaporate with time, and thus the compositions tend to gel.

15 **[0003]** Another requirement of dishwashing compositions is that they should be easy to dissolve in water before they are used, and that is also somewhat contradictory with the presence of a robust surfactant system. To address that need, compositions are formulated which additionally comprise a hydrotrope which improves the solubility (and stability) of the composition. However we have now found that such compositions comprising a hydrotrope are even more prone to gelling, as compared to the same compositions without hydrotrope.

20 **[0004]** It is known from EP-A-0 059 043 that compositions comprising a salt of an alcohol ether sulphate can be diluted without undue problems due to gel formation if a suitable quantity of a compound of molecular weight 500 to 10,000 which comprises at least one polyalkylene glycol chain and at least two ether linkages per seven carbon atoms is present.

25 **[0005]** It is also known that the addition of inorganic salts such as chlorine salts can alleviate the gelling effect to some extent. However, there are drawbacks to the use of inorganic salts, namely, they can negatively impact the solubility of the compositions, and furthermore can cause formulability or corrosivity problems.

[0006] It is thus an object of the present invention to provide liquid dishwashing compositions, which comprise a robust surfactant system, which are easy to dissolve and which have an improved resistance to gelling.

[0007] In response, we have now found that the formulation - in a composition comprising a robust surfactant system together with a solvent and a hydrotrope - of a polyalkylene glycol anti-gelling polymer addresses that need.

Summary of the Invention

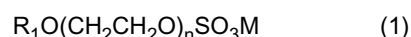
[0008] The compositions of the present invention are liquid dishwashing compositions which comprise:

- 35 - from 15% to 60% of an alkyl ethoxy sulfate surfactant;
 - from 0% to 30% of an amine oxide surfactant;
 - from 0% to 2.0% of magnesium ions;
 - an effective amount of a solvent;
 - an effective amount of a hydrotrope; and
 40 - an anti-gelling amount of a polyalkylene glycol polymer.

[0009] The invention further encompasses a method of washing dishes with these compositions.

Detailed Description of the InventionAlkyl ethoxy sulfate surfactant :

45 **[0010]** As an essential component, the compositions herein comprise an alkyl ethoxy sulfate surfactant. Such surfactants are according to formula (1)



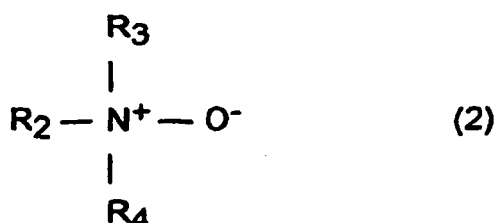
wherein, R_1 represents a straight chain or a branched alkyl group or an alkenyl group having 9 to 15 carbons, n represents 0.5 to 7 of real number in average, and M shows an alkalic metal, alkalic earth metal, ammonium group or alkanol substitution ammonium group. If the number of carbons of R_1 is less than 9, the detergency is insufficient, and if more than 16, the stability at low temperature of the composition deteriorates remarkably and is not preferable. Especially, preferable number of carbons is 10 to 13. Further, when the number of adduct moles n of the ethylene oxide in the formula (1) is less than 0.5, the stimulus to the hand and skin increases and is not preferable, while if more than 3, the

detergency deteriorates greatly, which is not desirable. Accordingly, the desirable range of the number of adduct moles of ethylene oxide is 0.5 to 3.

[0011] The compositions of the present invention comprise from 15% to 60% by weight of the total composition of such surfactant, or mixtures thereof, preferably from 15% to 40%, most preferably 20% to 30%.

Amine oxide surfactant :

[0012] As an optional but preferred component, the compositions of the invention may further comprise an amine oxide surfactant. Such surfactants are according to formula (2)



wherein R_2 represents a straight chain or a branched alkyl group or an alkenyl group having 10 to 16 carbons, and R_3 and R_4 represent a methyl group or an ethyl group respectively. When the carbons of R_2 are less than 10, the detergency of the composition is low and if exceeds 16, the stability at low temperature deteriorates remarkably, which is not preferable.

[0013] The compositions of the present invention comprise from 0% to 30% by weight of the total composition of such surfactant, preferably 1.5% to 15%, most preferably 1.5% to 10%.

Magnesium ions :

[0014] As another optional but preferred component of the compositions of the invention, from 0% to 2.0%, preferably 0.1% to 2%, most preferably from 0.3% to 2% by weight of the composition, of magnesium ions may be added to the liquid detergent compositions of the invention for improved product stability, as well as improved sudsing and skin mildness.

[0015] It is preferred that the magnesium ions are introduced by neutralization of the acid form of alkylethoxy surfactants with a magnesium oxide or magnesium hydroxide slurry in water. Normally, this method is limited by the amount of anionic surfactants in the composition. An alternative method is to use MgCl_2 , MgSO_4 or other inorganic Mg salts. These materials are less desirable because they can cause corrosivity problems (chloride salts), decrease the solubility of the formulations, or cause formulatability/stability problems in the compositions. It is desirable for these reasons to limit the addition of inorganic salts to less than 2%, preferably less than 1% by weight of the anionic inorganic counterion.

Solvent :

[0016] As another essential component, the compositions of the invention comprise a solvent in an effective amount so that the viscosity of the compositions herein be of from 50 cps to 2000 cps, preferably 100 cps to 450 cps, most preferably from 100 cps to 350 cps, measured at 20°C, with a Brookfield viscometer, spindle no. 18.

[0017] Suitable solvents for use herein include low molecular weight alcohols such as C_1 - C_{10} , preferably C_1 - C_4 mono- and dihydric alcohols, preferably ethyl alcohol, isopropyl alcohol, propylene glycol and hexylene glycol.

[0018] The compositions herein typically comprise from 3% to 20% by weight of the total composition of a solvent, or mixtures thereof, preferably 3% to 15%, most preferably 5% to 10%.

Hydrotrope :

[0019] As another essential component, the compositions of the invention comprise a hydrotrope in an effective amount so that the compositions are appropriately soluble in water. By "appropriately soluble in water", it is meant that the product dissolves quickly enough in water as dictated by both the washing habit and conditions of use. Products which do not dissolve quickly in water can lead to negatives in performance regarding grease cleaning, sudsing, ease of rinsing of product from dishes/glasses etc. or product remaining on dishes/glasses after washing.

[0020] Suitable hydrotropes for use herein include anionic-type hydrotropes, particularly sodium, potassium, and

ammonium xylene sulfonate (preferred), sodium, potassium and ammonium toluene sulfonate, sodium potassium and ammonium cumene sulfonate (most preferred), and mixtures thereof, and related compounds (as disclosed in U.S. Patent 3,915,903). Preferred hydrotropes are selected from sodium cumene sulphanate, sodium xylene sulphanate, sodium toluene sulphanate and mixtures thereof.

- 5 **[0021]** The compositions of the invention typically comprise from 1.5% to 20% by weight of the total composition of a hydrotropic, or mixtures thereof, preferably from 3% to 10%, most preferably from 3% to 6%.

Anti-gelling polymer :

- 10 **[0022]** As another essential component, the compositions of the invention comprise an anti-gelling polymer which improves the compositions' resistance to gelling. Suitable polymers for use herein have a molecular weight of at least 500, preferably from 500 to 20000, more preferably 1000 to 5000, most preferably 1000 to 3000.

- [0023]** The required amount of anti-gelling polymer can easily be determined by trial and error, but generally, the compositions herein comprise from 0.5% to 10%, typically 0.5% to 6% by weight of the total composition of an anti-gelling polymer, or mixtures thereof, preferably 0.5% to 4%, most preferably 1.5% to 3%.

- 15 **[0024]** Suitable polymers for use are polyalkylene glycols, preferably polyethylene glycol and polypropylene glycol.

Optionals :

- 20 **[0025]** The compositions herein can further comprise a number of optional ingredients described hereinafter.

[0026] The compositions of this invention preferably contain certain co-surfactant to aid in the foaming, detergency, and/or mildness. Included in this category are several anionic surfactants commonly used in liquid or gel dishwashing detergents. Examples of anionic co-surfactants that are useful in the present invention are the following classes :

- 25 (1) Alkyl benzene sulfonates in which the alkyl group contains from 9 to 15 carbon atoms, preferably 11 to 14 carbon atoms in straight chain or branched chain configuration. An especially preferred linear alkyl benzene sulfonate contains about 12 carbon atoms. U.S. Pat. Nos. 2,220,099 and 2,477,383 describe these surfactants in detail.

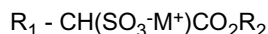
- 30 (2) Alkyl sulfates obtained by sulfating an alcohol having 8 to 22 carbon atoms, preferably 12 to 16 carbon atoms. The alkyl sulfates have the formula $\text{ROSO}_3^-\text{M}^+$ where R is the C_{8-22} alkyl group and M^+ is a mono- and/or divalent cation.

- (3) Paraffin sulfonates having 8 to 22 carbon atoms, preferably 12 to 16 carbon atoms, in the alkyl moiety. These surfactants are commercially available as Hostapur SAS from Hoechst Celanese.

- 35 (4) Olefin sulfonates having 8 to 22 carbon atoms, preferably 12 to 16 carbon atoms. U.S. Pat. No. 3,332,880 contains a description of suitable olefin sulfonates.

- (5) Alkyl glyceryl ether sulfonates having 8 to 22 carbon atoms, preferably 12 to 16 carbon atoms, in the alkyl moiety.

- 40 (6) Fatty acid ester sulfonates of the formula :



- 45 wherein R_1 is straight or branched alkyl from about C_8 to C_{18} , preferably C_{12} to C_{16} , and R_2 is straight or branched alkyl from about C_1 to C_6 , preferably primarily C_1 , and M^+ represents a mono- or divalent cation.

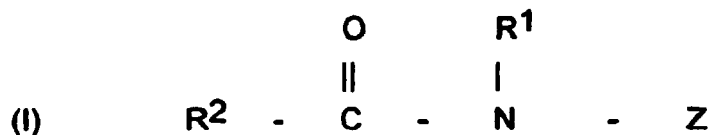
- (7) Secondary alcohol sulfates having 6 to 18, preferably 8 to 16 carbon atoms. Other suitable co-surfactants herein are

- 50 (8) Fatty acid amide surfactants having the formula :



wherein R^6 is an alkyl group containing from 7 to 21, preferably from 9 to 17, carbon atoms and each R^7 is selected from the group consisting of hydrogen, C_1 - C_4 alkyl, C_1 - C_4 hydroxyalkyl, and $-(C_2H_4O)_xH$ where x varies from 1 to about 3.

(9) Polyhydroxy fatty acid amide surfactant of the structural formula :



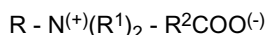
wherein R^1 is H, C_1 - C_4 hydrocarbyl, 2-hydroxy ethyl, 2-hydroxy propyl, or a mixture thereof, preferably C_1 - C_4 alkyl, more preferably C_1 or C_2 alkyl, most preferably C_1 alkyl (i.e., methyl); and R^2 is a C_5 - C_{31} hydrocarbyl, preferably straight chain C_7 - C_{19} alkyl or alkenyl, more preferably straight chain C_9 - C_{17} alkyl or alkenyl, most preferably straight chain C_{11} - C_{17} alkyl or alkenyl, or mixtures thereof; and Z is a polyhydroxyhydrocarbyl having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain, or an alkoxyated derivative (preferably ethoxylated or propoxylated) thereof. Z preferably will be derived from a reducing sugar in a reductive amination reaction; more preferably Z is a glycityl. Suitable reducing sugars include glucose, fructose, maltose, lactose, galactose, mannose, and xylose. Z preferably will be selected from the group consisting of $-CH_2-(CHOH)_n-CH_2OH$, $-CH(CH_2OH)-(CHOH)_n-CH_2OH$, $-CH_2-(CHOH)_2(CHOH)_n-CH_2OH$, where n is an integer from 3 to 5, inclusive, and R^1 is H or a cyclic or aliphatic monosaccharide, and alkoxyated derivatives thereof. Most preferred are glycityls wherein n is 4, particularly $-CH_2-(CHOH)_4-CH_2OH$.

In formula (I), R^1 can be, for example, N-methyl, N-ethyl, N-propyl, N-isopropyl, N-butyl, N-2-hydroxy ethyl, or N-2-hydroxy propyl.

$R^2-CO-N<$ can be, for example, cocamide, stearamide, oleamide, lauramide, myristamide, capricamide, palmitamide, tallowamide, etc.

Z can be 1-deoxyglucityl, 2-deoxyfructityl, 1-deoxymaltityl, 1-deoxylactityl, 1-deoxygalactityl, 1-deoxymannityl, 1-deoxymaltotriosityl, etc.

(10) Betaine detergent surfactants having the general formula :

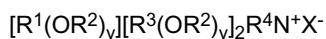


wherein R is a hydrophobic group selected from the group consisting of alkyl groups containing from 10 to 22 carbon atoms, preferably from 12 to 18 carbon atoms, alkyl aryl and aryl alkyl groups containing a similar number of carbon atoms with a benzene ring being treated as equivalent to about 2 carbon atoms, and similar structures interrupted by amide or ether linkages; each R^1 is an alkyl group containing from 1 to about 3 carbon atoms; and R^2 is an alkylene group containing from 1 to about 6 carbon atoms.

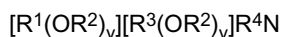
(11) Ethylene oxide condensates, which can be broadly defined as compounds produced by the condensation of ethylene oxide groups (hydrophilic in nature) with an organic hydrophobic compound, which can be aliphatic or alkyl aromatic in nature. The length of the hydrophilic or polyoxyalkylene radical which is condensed with any particular hydrophobic group can be readily adjusted to yield a water-soluble compound having the desired balance between hydrophilic and hydrophobic elements.

Examples of such ethylene oxide condensates suitable as suds stabilizers are the condensation products of aliphatic alcohols with ethylene oxide. The alkyl chain of the aliphatic alcohol can either be straight or branched and generally contains from about 8 to about 18, preferably from about 8 to about 14, carbon atoms for best performance as suds stabilizers, the ethylene oxide being present in amounts of from about 8 moles to about 30, preferably from about 8 to about 14 moles of ethylene oxide per mole of alcohol.

(12) Cationic quaternary ammonium surfactants of the formula :



or amine surfactants of the formula :



wherein R¹ is an alkyl or alkyl benzyl group having from about 6 to about 16 carbon atoms in the alkyl chain; each R² is selected from the group consisting of -CH₂CH₂-, -CH₂CH(CH₃)-, -CH₂CH(CH₂OH)-, -CH₂CH₂CH₂-, and mixtures thereof; each R³ is selected from the group consisting of C₁-C₄ alkyl, C₁-C₄ hydroxyalkyl, benzyl, and hydrogen when y is not 0; R⁴ is the same as R³ or is an alkyl chain wherein the total number of carbon atoms of R¹ plus R⁴ is from about 8 to about 16, each y is from about 0 to about 10, and the sum of the y values is from about 0 to about 15; and X is any compatible anion.

[0027] In addition to the optional co-surfactants described hereinbefore, the compositions can contain other optional components suitable for use in liquid dishwashing compositions such as perfume, dyes, opacifiers, enzymes, builders and chelants and pH buffering means so that the compositions herein generally have a pH of from 5 to 11, preferably 6.5 to 8.5, most preferably 7 to 8.

Method :

[0028] In the method aspect of this invention, soiled dishes are contacted with an effective amount, typically from about 0.5 ml. to about 20 ml. (per 25 dishes being treated), preferably from about 3 ml. to about 10 ml., of the detergent composition of the present invention. The actual amount of liquid detergent composition used will be based on the judgement of user, and will typically depend upon factors such as the particular product formulation of the composition, including the concentration of active ingredients in the composition, the number of soiled dishes to be cleaned, the degree of soiling on the dishes, and the like.

The particular product formulation, in turn, will depend upon a number of factors, such as the intended market (i.e., U.S., Europe, Japan, etc.) for the composition product.

[0029] Generally, from about 0.01 ml. to about 150 ml., preferably from about 3 ml. to about 40 ml. of a liquid detergent composition of the invention is combined with from about 2000 ml. to about 20000 ml., more typically from about 5000 ml. to about 15000 ml. of water in a sink having a volumetric capacity in the range of from about 1000 ml. to about 20000 ml., more typically from about 5000 ml. to about 15000 ml. The soiled dishes are immersed in the sink containing the diluted compositions then obtained, where they are cleaned by contacting the soiled surface of the dish with a cloth, sponge, or similar article. The cloth, sponge, or similar article may be immersed in the detergent composition and water mixture prior to being contacted with the dish surface, and is typically contacted with the dish surface for a period of time ranged from about 1 to about 10 seconds, although the actual time will vary with each application and user. The contacting of cloth, sponge, or similar article to the dish surface is preferably accompanied by a concurrent scrubbing of the dish surface.

[0030] Another method of use will comprise immersing the soiled dishes into a water bath without any liquid dishwashing detergent. A device for absorbing liquid dishwashing detergent, such as a sponge, is placed directly into a separate quantity of undiluted liquid dishwashing composition for a period of time typically ranging from about 1 to about 5 seconds. The absorbing device, and consequently the undiluted liquid dishwashing composition, is then contacted individually to the surface of each of the soiled dishes to remove said soiling. The absorbing device is typically contacted with each dish surface for a period of time range from about 1 to about 10 seconds, although the actual time of application will be dependent upon factors such as the degree of soiling of the dish. The contacting of the absorbing device to the dish surface is preferably accompanied by concurrent scrubbing.

Examples

[0031] The following compositions are made by mixing the listed ingredients in the listed proportions.

Component	[A]	[B]	[C]
Coconut Alkyl Ethoxy (x) Sulphate	25 (x=2)	25 (x=2)	25 (x=2)
Glucose Amide	5	5	5
Amine oxide	5	5	5
Betaine			
C10E8 ethoxylated alcohol	1	5	5
Mg	0.5	0.5	0.5
Hydrotrope	10 (Sodium Cumene Sulphonate)	5 (Sodium Cumene Sulphonate)	5 (Sodium Cumene Sulphonate)
Solvent (EtOH+propylene glycol)	7	7	7
Polypropylene glycol (Mw 2000)	2	2	2
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	150cps	150cps	150cps
pH	7	7	8

Component	[D]	[E]	[F]
Coconut Alkyl Ethoxy (x) Sulphate	16 (x=1.0)	25 (x=1.5)	25 (x=1.5)
Glucose Amide	10.0	5	5
Amine oxide		2.5	2.5
Betaine	2	2.5	2.5
C10E8 ethoxylated alcohol	10	4	4
Mg	0.3	0.5	0.5
Hydrotrope	2.0 (Sodium Cumene Sulfonate)	5 (Sodium Cumene Sulfonate)	5 (Sodium Cumene Sulfonate)
Solvent (EtOH+propylene glycol)	7	7	7
Polypropylene glycol	1.5 (Mw 2000)	1.5 (Mw 2000)	2.0 (Mw1000)
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	300cps	150cps	150cps
pH	7	8	8

Component	[G]	[H]	[I]
Coconut Alkyl Ethoxy (x) Sulphate	25 (x=1.5)	25 (x=1.5)	25 (x=1.5)
Glucose Amide	5	5	5
Amine oxide	5	2.5	2.5
Betaine		2.5	2.5
C10E8 ethoxylated alcohol	5	4	4
Mg	0.5	0.5	
Hydrotrope	3.0 (Sodium Cumene Sulfonate)	5 (Sodium Cumene Sulfonate)	5 (Sodium Cumene Sulfonate)
Solvent (EtOH+propylene glycol)	7	7	7
Polypropylene glycol	1.5 (Mw 2000)	1.5 (Mw 2000)	1.5 (Mw 2000)
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	150cps	250cps	250cps
pH	8	8	8

Component	[J]	[K]	[L]
Coconut Alkyl Ethoxy (x) Sulphate	25 (x=2)	25 (x=1.5)	30 (X=0.5)
Glucose Amide	5	5	2
Amine oxide	5	2.5	2
Betaine		2.5	2
C10E8 ethoxylated alcohol	1	4	5
Mg	0.5	0.5	0.5
Hydrotrope	10 (Sodium Xylene Sulfonate)	5 (Sodium Xylene Sulfonate)	5 (Sodium Xylene Sulfonate)
Solvent (EtOH+propylene glycol)	6	7	10
Polypropylene glycol	2 (Mw 2000)	1.5 (Mw 2000)	2.5 (Mw 2000)
Water and misc. (dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	150cps	250cps	200cps
pH	7	8	8

Component	[M]	[N]	[O]
Coconut Alkyl Ethoxy (x) Sulphate	30 (x=0.5)	22 (x=1)	20 (x=1)
Glucose Amide	6		7
Amine oxide	4	2	1.5
Betaine	2.5	2	1.5
C10E8 ethoxylated alcohol	3.0	7	4
Mg	1.0	0.5	0.6
Hydrotrope	5 (Sodium Xylene Sulfonate)	5.0 (Sodium Xylene Sulfonate)	5.0 (Sodium Xylene Sulfonate)
Solvent (EtOH+propylene glycol)	5	5	5
Polypropylene glycol	2.5 (Mw2000)	2.0 (Mw1000)	1.5 (Mw3000)
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	300cps	300cps	300cps
pH	9.0	7.0	7.0

Component	[P]	[Q]	[R]
Coconut Alkyl Ethoxy (x) Sulphate	30 (x=2)	15 (x=3)	35 (X=1.5)
Glucose Amide		15	
Amine oxide	3	4	
Betaine	0.5		
C10E8 ethoxylated alcohol		1.0	7
Mg	0.8	1.0	
Hydrotrope	2.0 (AmmoniumXylene Sulphonate)	8 (Sodium Toluene Sulphonate)	8 (Sodium Cumene Sulphonate)
Solvent (EtOH+propylene glycol)	5	7	7
Polypropylene glycol	3.0 (Mw 1000)	2.0 (Mw3000)	2.5 (Mw 5000)
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	300cps	200cps	150cps
pH	7.0	7.0	8.0

Component	[S]	[T]	[U]
Coconut Alkyl Ethoxy (x) Sulphate	25 (x=1.5)	25 (x=1.5)	25 (x=2.2)
Glucose Amide	5	5	5
Amine oxide	2.5	5	5
Betaine	2.5		
C10E8 ethoxylated alcohol	4	5	1.0
Mg	0.5	0.5	1.0
Hydrotrope	5 (Sodium Xylene Sulfonate)	5 (Sodium Xylene Sulphonate)	10 (Sodium Cumene Sulphonate)
Solvent (EtOH+propylene glycol)	7	7	7
Polyethylene glycol	1.5 (Mw 4000)	1.5 (Mw 600)	3.0 (Mw 2000)
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%	Balance to 100%	Balance to 100%
Viscosity	150cps	150cps	200cps
pH	8	8	7

Component	[M]
Coconut Alkyl Ethoxy (x) Sulphate	20 (x=2)
Glucose Amide	5
Amine oxide	5
Betaine	
C10E8 ethoxylated alcohol	4
Mg	0.5
Hydrotrope	1.5 (Sodium Cumene Sulphonate)
Solvent (EtOH+propylene glycol)	5
Polymer	2.5 (Polypropylene Glycol Mw2000)
Water and misc.(dye, perfume, opacifier etc)	Balance to 100%
Viscosity	300cps
pH	8.0

Claims

1. A liquid dishwashing composition comprising:

- from 15% to 60% of an alkyl ethoxy sulfate surfactant;
- from 0% to 30% of an amine oxide surfactant;
- from 0% to 2% of magnesium ions;
- a solvent in an effective amount so that viscosity of the composition be from 50 cps to 2000 cps.
- a hydrotrope in an effective amount so that the compositions appropriately soluble in water; and
- an anti-gelling amount of a polyalkylene glycol polymer which improves the compositions resistance to gelling.

2. A composition according to claim 1, which comprises:

- from 15% to 60% of said alkyl ethoxy sulfate surfactant;
- from 0% to 30% of said amine oxide surfactant;
- from 0% to 2% of said magnesium ions;
- from 3% to 20% of said solvent;
- from 1.5% to 20% of said hydrotrope; and
- from 0.5% to 6% of said polyalkylene glycol polymer.

3. A composition according to any of the preceding claims which has a viscosity of from 50 cps to 2000 cps.
4. A composition according to any of the preceding claims, wherein said polyalkylene glycol polymer has a molecular weight of from 500 to 20.000.
5. A composition according to any of the preceding claims, which comprises from 0.5% to 10% of said polymer.
6. A composition according to any of the preceding claims wherein said hydrotrope is selected from the group consisting of anionic-type hydrotropes, preferably sodium cumene sulphonate, sodium xylene sulphonate, sodium toluene sulphonate, and mixtures thereof.
7. A composition according to any of the preceding claims wherein said solvent is selected from the group consisting of C₁-C₁₀ monohydric and dihydric alcohols, and mixtures thereof,
8. A method of washing dishes, wherein 0.01 ml to 150 ml of a composition according to any of the preceding claims is diluted in 2000 ml to 20000 ml water, and the dishes are immersed in the diluted composition thus obtained and cleaned by contacting the soiled surface of the dish with a cloth, sponge or similar article.
9. A method of washing dishes, wherein the dishes are immersed in a water bath, an effective amount of a composition according to any of the claims 1-8 is absorbed onto a device, and the device with the absorbed composition is contacted individually to the surface of each of the soiled dishes.

Patentansprüche

1. Flüssige Geschirrspülzusammensetzung, umfassend:

- 15% bis 60% eines Alkylethoxysulfat-Tensids;
- 0% bis 30% eines Aminoxid-Tensids;
- 0% bis 2% Magnesiumionen;
- ein Lösungsmittel in einer wirksamen Menge, sodass die Viskosität der Zusammensetzung 50 cps bis 2.000 cps beträgt;
- ein Hydrotrop in einer wirksamen Menge, sodass die Zusammensetzung zweckentsprechend in Wasser löslich ist; und
- eine antigelierende Menge eines Polyalkylenglykol-Polymeren, das die Beständigkeit der Zusammensetzung gegenüber Gelieren verbessert.

2. Zusammensetzung nach Anspruch 1, umfassend:

- 15% bis 60% des Alkylethoxysulfat-Tensids;
- 0% bis 30% des Aminoxid-Tensids;
- 0% bis 2% der Magnesiumionen;
- 3% bis 20% des Lösungsmittels;
- 1,5% bis 20% des Hydrotrops; und
- 0,5% bis 6% des Polyalkylenglykol-Polymeren.

3. Zusammensetzung nach mindestens einem der vorangehenden Ansprüche, welche eine Viskosität von 50 cps bis 2.000 cps aufweist.

4. Zusammensetzung nach mindestens einem der vorangehenden Ansprüche, wobei das Polyalkylenglykol-Polymer ein Molekulargewicht von 500 bis 20.000 besitzt.

5. Zusammensetzung nach mindestens einem der vorangehenden Ansprüche, umfassend 0.5% bis 10% des Polyalkylenglykol-Polymeren.

6. Zusammensetzung nach mindestens einem der vorangehenden Ansprüche, wobei das Hydrotrop aus der Gruppe gewählt ist, bestehend aus Hydrotropen vom anionische Typ, vorzugsweise Natriumcumolsulfonat, Natriumxylosulfonat, Natriumtoluolsulfonat und Mischungen hiervon.

7. Zusammensetzung nach mindestens einem der vorangehenden Ansprüche, wobei das Lösungsmittel aus der Gruppe gewählt ist, bestehend aus einwertigen und zweiwertigen C₁-C₁₀-Alkoholen und Mischungen hiervon.
8. Verfahren zum Geschirrspülen, bei dem 0,01 ml bis 150 ml einer Zusammensetzung gemäß mindestens einem der vorangehenden Ansprüche in 2.000 ml bis 20.000 ml Wasser verdünnt werden, und das Geschirr in die so erhaltene verdünnte Zusammensetzung eingetaucht und gereinigt wird durch Kontaktieren der verschmutzten Oberfläche des Geschirrs mit einem Tuch, Schwamm oder ähnlichem Gegenstand.
9. Verfahren zum Geschirrspülen, wobei das Geschirr in ein Wasserbad eingetaucht wird, eine wirksame Menge einer Zusammensetzung gemäß mindestens einem der Ansprüche 1-8 auf einer Vorrichtung absorbiert wird, und die Vorrichtung mit der absorbierten Zusammensetzung einzeln mit der Oberfläche eines jeden Teils des verschmutzten Geschirrs kontaktiert wird.

Revendications

1. Composition liquide pour le lavage de la vaisselle comprenant:

- 15% à 60% d'un tensioactif alkylsulfate éthoxylé ;
- 0% à 30% d'un tensioactif oxyde d'aminé ;
- 0% à 2% d'ions magnésium,
- un solvant en une quantité efficace pour que la viscosité de la composition soit comprise entre 50 cps et 2000 cps ;
- un hydrotrope en une quantité efficace pour que la composition soit hydrosoluble de manière appropriée ; et
- une quantité anti-gélifiante d'un polymère polyalkylène glycol pour améliorer la résistance de la composition à la gélification.

2. Composition selon la revendication 1, qui comprend :

- 15% à 60% dudit tensioactif alkylsulfate éthoxylé ;
- 0% à 30% dudit tensioactif oxyde d'amine ;
- 0 à 2% desdits ions magnésium ;
- 3% à 20% dudit hydrotrope ; et
- 1,5% à 20% dudit hydrotrope ; et
- 0,5% à 6% dudit polymère polyalkylène glycol.

3. Composition selon l'une quelconque des revendications précédentes, qui a une viscosité comprise entre 50 cps et 2000 cps.

4. Composition selon l'une quelconque des revendications précédentes dans laquelle ledit polymère polyalkylène glycol a un poids moléculaire compris entre 500 et 20 000.

5. Composition selon l'une quelconque des revendications précédentes, qui comprend 0.5% à 10% dudit polymère polyalkylène glycol.

6. Composition selon l'une quelconque des revendications précédentes, dans laquelle ledit hydrotrope est choisi dans le groupe constitué par les hydrotropes de type anionique, de préférence le cumènesulfonate de sodium, le xylènesulfonate de sodium, le toluènesulfonate de sodium, et leurs mélanges.

7. Composition selon l'une quelconque des revendications précédentes, dans laquelle ledit solvant est choisi dans le groupe constitué par les alcools monovalents et divalents en C₁-C₁₀ et leurs mélanges.

8. Procédé de lavage de la vaisselle, dans lequel 0,01 ml à 150ml d'une composition selon l'une quelconque des revendications précédentes sont dilués dans 2000 ml à 20 000ml d'eau, et la vaisselle est immergée dans la composition diluée ainsi obtenu et nettoyée en mettant en contact la surface salie de la vaisselle avec un tissu, une éponge ou un article similaire.

9. Procédé de lavage de la vaisselle, dans lequel la vaisselle est immergée dans un bain d'eau, une quantité efficace

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d'une composition selon l'une quelconque des revendications 1 à 8 absorbée sur un article, et l'article contenant la composition absorbée est mis en contact de manière individuelle avec la surface de chacun des éléments de vaisselle salis.

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REFERENCES CITED IN THE DESCRIPTION

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