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(54) LIQUID DETERGENT COMPOSITION

FLÜSSIGE REINIGUNGSMITTELZUSAMMENSETZUNG

COMPOSITION DE DÉTERGENT LIQUIDE

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Description

Field of the invention

[0001] The present invention is in the field of stable detergent compositions; in particular liquid crystal ternary lamellar phase detergent compositions, for use in laundry and/or household cleaning amongst others.

Background of the invention

[0002] Liquid detergent compositions are widely known in the art and are widely favoured by modern day consumers. Such liquid detergent compositions are principally used in fabric cleaning and household care applications. In today's world the consumer becomes more and more conscious of the environment and looks for ways to reduce waste.

[0003] Detergent transport, packaging and production add to the product carbon footprint. A lot of the cost in processing, transport and packaging is caused by the high amounts of water in the product. Therefore, a concentrated liquid detergent composition is highly desired, as it reduces packaging material (per wash), it reduces the cost of transport and the cost of processing.

[0004] Liquid detergent compositions generally comprise a surfactant active and a solvent. They may further comprise perfume, bleach, thickeners, fluorescers, and other common detergent ingredients. Such compositions are often structured, e.g. to control the viscosity of the liquid or to improve stability and prevent phase separation or to be able to incorporate ingredients that are water insoluble.

[0005] The removal of oily soils and stains from fabrics has been an important area of concern in fabric cleaning and there have been several approaches to solve the problem.

[0006] Lamellar phase cleaning compositions as a vehicle for delivering typically surfactant blends to a cleaning location provide a solution to that has proved useful to a large extent.

[0007] A lamellar phase system consist of a surfactant bilayer packed with hydrophobic (water-rejecting) alkyl tails inwardly directed and polar hydrophilic (water-attracting) head groups on the outside surfaces. The lamellar phase can be obtained above a certain transition temperature and can, under certain conditions. It is known to the skilled person that lamellar phases possess very high capacity to solubilise oil and fats.

[0008] Another option is to make the detergent composition in the form of a micro emulsion with an aqueous phase and a solvent. Typical micro-emulsion compositions, however, do not provide desired soil removal when challenged with cleaning of tough soils and mixtures of oily and particulate soils.

[0009] EP 637 629 A1 (Colgate Palmolive) discloses a stable, clear, all-purpose microemulsion cleaner with surfactants 1- 20 %. Under low temperature and high temperature conditions, often encountered while shipping product or storing product in a warehouse, microemulsions exhibiting stability in a fairly narrow temperature range tend to become unstable. As a result, the microemulsion phase separates and the effectiveness of the composition for removing soil is decreased. In addition, when such a phase separation occurs, it may take a considerable amount of time for the microemulsion to reform.

[0010] Accordingly, a stable and clear detergent composition that does not show phase separation on increased temperatures (e.g. up to 50°C), remains to be desired.

[0011] EP 160 762 A1 (The Procter and Gamble Company) discloses a micro-emulsion sample having surfactant 1-40%. It uses paraffin as solvents. Paraffin is not considered an effective solvent for sebum and polymerized fats majorly found in cuffs and collars. Also, paraffin has a reduced rate of biodegradability. Biodegradation refers to the ability of a material to be broken down by the action of bacteria and other living organisms. Most of the detergents containing paraffin have slow biodegradation and hence they may cause pollution.

[0012] WO 97/32967 A1 (Colgate Palmolive) discloses a liquid crystal detergent composition, and micro emulsions with 2-66% surfactants. However, it is found that the cleaning performance of the compositions of WO97/32967 leaves to be desired, especially for fatty stains, such as sebum. This is thought to be caused by the lack of fat solubilising materials in the composition.

[0013] Hence, efficient cleaning of fabric articles, especially the removal of soils such as sebum from cuffs and collars, remains to be desired.

[0014] Our co-pending application WO 2011/073062 discloses a bi-continuous micro-emulsion detergent composition comprising a short chain non-ionic surfactant, however microemulsions are typically less viscous and less temperature stable and therefore not appreciated by modern day consumers. To provide a temperature stable thickened detergent composition remains to be desired.

[0015] EP-A1-2 361 963 discloses bi-continuous micro-emulsion detergent compositions which comprise a It is an object of the present invention to provide a composition that provides fast dissolution of fatty material based stains and soils.

[0016] It is another object of the invention to provide a stable detergent composition with high levels of surfactant.

[0017] It is still another object of the invention to provide a stable detergent composition that does not irreversibly phase separate upon fluctuation of the temperature.

[0018] It is yet another object of the invention to provide a pourable concentrated detergent composition having a low viscosity.

[0019] Surprisingly it has been found that a lamellar phase detergent composition comprising a surfactant selected from non-ionic and anionic surfactants in a ratio of non-ionic:anionic surfactant between 5:1 and 1:1; having a fat solubilising oil and water, provides an effective solution that removes soils and/or stains of solid or solidified fatty material; is stable at normal storage and washing conditions and may be delivered as a pourable liquid.

Summary of the invention

[0020] The present invention provides a liquid detergent composition comprising 40-90% by weight of a surfactant, selected from non-ionic and anionic surfactants in a ratio of non-ionic : anionic between 5:1 and 1:1, 1-30% by weight of a fat solubilizing oil, having a Hansen solubility parameter (δ_{HSP}) that ranges from 14-22 MPa1/2 (at 25°C), and wherein the Hansen polar component (δP) is in the range of 0.5-10 MPa1/2 (at 25°C), the dispersion component (δH) is in the range of 3-10 MPa1/2 (at 25°C) and the hydrogen bond component (δD) is in the range of 13-18 MPa1/2 (at 25°C), and 5-55% by weight of water, and wherein, the fat solubilising oil/(oil+water) fraction ranges from 0.1 to 0.3.

[0021] These and other aspects, features and advantages will become apparent to those of ordinary skill in the art from a reading of the following detailed description and the appended claims. For the avoidance of doubt, any feature of one aspect of the present invention may be utilized in any other aspect of the invention. The word "comprising" is intended to mean "including" but not necessarily "consisting of" or "composed of." In other words, the listed steps or options need not be exhaustive. It is noted that the examples given in the description below are intended to clarify the invention and are not intended to limit the invention to those examples per se. Similarly, all percentages are weight/weight percentages unless otherwise indicated. Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts of material or conditions of reaction, physical properties of materials and/or use are to be understood as modified by the word "about". Numerical ranges expressed in the format "from x to y" are understood to include x and y. When for a specific feature multiple preferred ranges are described in the format "from x to y", it is understood that all ranges combining the different endpoints are also contemplated.

Brief Description of Figure

[0022] A ternary diagram of the detergent composition is represented in the Figure **(Figure 1)** in form of a triangle, where each of the three apexes represents a component of the composition, such as surfactant (S), oil (O) and water (W).

Detailed description of the invention

[0023] The present invention provides a liquid detergent composition comprising of a surfactant, a fat solubilising oil and water.

Surfactant

[0024] The detergent compositions according to the invention include 40 wt% to 90 wt% surfactant. Surfactants are included in the formulation for primary cleaning action and are chosen from anionic and non-ionic surfactants. Non-ionic and anionic surfactants in a ratio such that the non-ionic : anionic ratio is between 5:1 and 1:1, preferably between 3.5:1 and 1:1.

[0025] Anionic surfactants are well known in the art and are primarily important for soil removal. These include, but not limited to, carboxylates (soaps), such as Sodium laurate and Sodium myristate, dicarboxylates, sulphates, e.g. Sodium dodecyl sulphate (SDS) and sulphonates, e.g. Sodium salts of linear alkyl benzene sulphonates, more preferably, Sodium lauryl ether sulphate (SLES), preferably having 1 to 9 ethylene oxide groups; and Linear Alkylbenzene Sulfonate (LAS).

[0026] Non-ionic surfactants are also well-known in the art and are known for oil removal from soiled fabric. The preferred non-ionic surfactant is alkoxylated fatty alcohol, which typically comprises from 1 to 100 ethoxy and/or propoxy groups, more preferably 1-12 ethoxy or propoxy groups. Other non-ionic surfactants include mono- or di-alkanolamide groups in chemical combination with an organic hydrophobic group derived from, for example, fatty alcohols with from 8 to 16 carbon atoms (optionally branched, e.g. methyl branched), alkylphenols (preferably from 8 to 20 carbon atoms) in which the alkyl group contains from about 6 to about 12 carbon atoms, dialkylphenols in which each alkyl group contains from 6 to 2 carbon atoms, primary, secondary or tertiary aliphatic alcohols (or alkyl-capped derivatives thereof) monocarboxylic acids having from 8 to about 24 carbon atoms in the alkyl group and polyoxypropylenes. Alkyl poly

glucosides are also considered in the context of the present invention.

[0027] These and other surfactants are described in "Surface Active Agents" Vol. I, by Schwartz & Perry, Interscience 1949; "Surface Active Agents" Vol II, by Schwartz, Perry & Berch, Interscience 1958; the current editions of "McCutcheon's Emulsifiers & Detergents" published by the McCutcheon Manufacturing Confectioners Company; in "Tensid-Taschenbuch" H. Stache 2nd Edition, Carl Hanser Verlag, Munchen & Wien, 1981; and in the various patent literature describing various types of liquid detergent compositions, which for the purpose of the invention need no further detailing.

[0028] Preferably the composition comprises not more than 80%, still more preferably not more than 75%, or even not more than 70%, while the composition preferably comprises at least 45%, still more preferably at least 50% by weight of the composition of total surfactant.

The fat solubilising solvent

[0029] The composition includes a fat solubilising solvent at 1 wt% to 30 wt%. The solvent helps solubilise sebum present in sebaceous soil. The Hansen Solubility Parameter (HSP, or δ_{HSP}) of the solvent is from 14 to 22 $MPa^{1/2}$ (at 25°C), preferably 15 to 20 $MPa^{1/2}$ (at 25°C), more preferably from 15 to 18.5 $MPa^{1/2}$ (at 25°C).

[0030] While not wishing to be bound by theory, it is believed that the Hansen Solubility Parameter (δ_{HSP}) of sebum is from 15 to 18.5 $Mpa^{1/2}$. In order to be able to dissolve the sebum adequately, it is believed that the δ_{HSP} of the solvent should not deviate too much from the δ_{HSP} of the sebum, hence the above ranges.

[0031] While the Hansen Solubility Parameter for Paraffin oil closely matches that of sebum, Paraffin oil is not preferred, because the P and H values do not closely match that of sebum. This means that the polarity and hydrogen bonding of paraffin oil is less than optimal.

[0032] Hansen Solubility Parameters were developed by Charles Hansen as a way of predicting if one material will dissolve in another to form a solution. The parameters are based on the idea that like dissolves like where one molecule is defined as being 'like' another if it bonds to itself in a similar way. Specifically, each molecule is given three Hansen parameters, each generally measured in $MPa^{1/2}$.

[0033] The solubility parameter has been defined as the square root of the cohesive energy density and describes the attractive strength between molecules of the material. Hansen assumed that the cohesive energy arises from the dispersive, permanent dipole-dipole interactions and hydrogen bonding forces. The basis of the Hansen solubility parameter (δ_{HSP}) is that the total energy of vaporisation of a liquid consists of several individual parts. Hansen has defined three types of contributions to the energy of vaporisation, namely: dispersive (D), polar (P) and hydrogen bonding (H).

[0034] The three parameters are:

(i) the energy from dispersion bonds between molecules (D);
(ii) the energy from dipolar intermolecular force between molecules (P);
(iii) the energy from hydrogen bonds between molecules (H).

[0035] Each of the three parameters (i.e., dispersion, polar and hydrogen bonding) represents a different characteristic of solvency, or solvent capability. In combination, the three parameters are a measure of the overall strength and selectivity of a solvent. The total Hansen solubility parameter, which is the square root of the sum of the squares of the three parameters mentioned previously, provides a more general description of the solvency of the solvents.

[0036] The HSP is defined as the square root of the sum of the squares of the dispersion, polar and hydrogen bond components:

Formula 1: $$\delta_{HSP} = \sqrt{\delta_D^2 + \delta_H^2 + \delta_P^2}$$

[0037] The polar component (δ_P) is in the range of 0.5 - 10 $MPa^{1/2}$ (at 25°C), preferably 1 to 8 $MPa^{1/2}$ (at 25°C), more preferably 2 - 6 MPa1/2 (at 25°C), still more preferably 3 - 5 $MPa^{1/2}$ (at 25°C).

[0038] The hydrogen bond component (δ_H) is in the range of 3 - 10 $MPa^{1/2}$ (at 25°C), preferably 3 to 8 $MPa^{1/2}$ (at 25°C), more preferably 3 - 7 $MPa^{1/2}$ (at 25°C), still more preferably 3 - 6 $MPa^{1/2}$ (at 25°C).

[0039] The dispersion component (δ_D) is in the range of 13 - 18 $MPa^{1/2}$ (at 25°C), preferably 14 to 17 $MPa^{1/2}$ (at 25°C), more preferably 15 - 16 $MPa^{1/2}$ (at 25°C).

[0040] This HSP for mixture of solvents are additive according to the respective concentrations of its components.

[0041] The Hansen Solubility Parameter may either be calculated or predicted using the methods disclosed in "Hansen Solubility Parameters: a User's Handbook", by Charles M. Hansen, CRC Press, Boca Raton, 2000. Hansen Solubility Parameters of any solvent may also be calculated by "Molecular Modelling Pro" software, version 5.1.9 (ChemSW, Fairfield CA, www.chemsw.com) or Hansen Solubility from Dynacomp Software.

[0042] Preferred fat solubilising solvents are oils selected from alkyl esters of fatty acids, mono, di- or tri-glycerides of fatty acids and fatty alcohol having a chain length 8 to 16, preferably 10-12 carbon atoms.

[0043] Examples of alkyl esters of fatty acids include methyl octanoate, ethyl octanoate, propyl dodecanoate and butyl tetradocanoate.

[0044] Examples of mono, di- and tri-glycerides of fatty acids include glycerol trioleate, glycerol tri-iso-myristate, glycerol mono caproate, glycerol dioleate, and glycerol tricaprylate.

[0045] Examples of fatty alcohol include decanol, dodecanol.

[0046] Some examples of alkyl esters and their HSP values are given in the table below:

Table 1

fat solubilizers	δ_D $MPa^{1/2}$	δ_P $MPa^{1/2}$	δ_H $MPa^{1/2}$	Total SP $MPa^{1/2}$
Methyl octanoate	15.9	4.4	6.1	17.9
Ethyl octanoate	15.9	4.3	5.8	17.7
Methyl dodecanoate	16.2	3.5	5.1	17.3
Ethyl dodecanoate	16.2	3.5	5.3	17.2
Butyl oleate	16.3	3.7	4.2	16.7
Ethyl caproate	15.5	3.2	5.9	17.4
Ethyl oleate	14.5	3.8	3.7	16.8
Isopropyl palmitate	14.3	3.9	3.7	17.2

[0047] The fat solubilising oil is typically present in the composition in a concentration of at least 3%, more preferably at least 5%, even more preferably at least 8% or still more preferably at least 10%, while the composition typically comprises not more than 28%, more preferably not more than 25%, still more preferably not more than 22%, or even not more than 20% by weight of the composition.

Water

[0048] The composition comprises between 5 and 55% by weight of water, preferably not more than 50%, still more preferably not more than 45%, yet more preferably not more than 40%, even more preferably not more than 35%, or most preferably not more than 30% by weight of the composition.

Viscosity

[0049] The composition is preferably somewhat viscous. Consumers typically do not associate water thin compositions with high active (i.e. concentrated) detergent compositions. However, the viscosity should not be so high that the liquid is no longer pourable.

[0050] Viscosity describes a fluid's internal resistance to flow and may be thought of as a measure of fluid friction. Simply put, the less viscous the fluid is, the greater its ease of movement (fluidity).

[0051] The Viscosity of the compositions according to the invention is preferably between 300 and 10000 mPa.s (25°C and 20s-1), more preferably between 500 to 5000, when measured with a TA instrument rheometer CSL-500, with a cone and plate set-up, acylic 4 cm diameter, 2° angle, truncation gap 56 micrometer, in steady flow operation.

Oil on oil+water fraction

[0052] The stability of a lamellar phase detergent is affected by the storage temperature. Therefore a lamellar phase detergent composition is preferably stable in ambient temperature throughout the year. A lamellar phase liquid detergent composition has a transition temperature beyond which phase separation occurs. The transition temperature is preferably higher than the storage / ambient temperature throughout the year. Ideally the transition temperature for a liquid detergent composition is more than 40 °C.

[0053] It is found that the compositions of the invention, when having a fraction of fat solubilising oil upon the total of fat solubilising oil and water of less than 0.5 the transition temperature is above 40°C.

[0054] When the fraction of fat solubilising oil upon the total of fat solubilising oil and water is less than 0.1 the viscosity

is found to be too high. It is also found that the cleaning performance is less good below a fraction of 0.1.

[0055] Therefore the fraction of fat solubilising oil upon the total of fat solubilising oil and water is between 0.1 and 0.3.

Other ingredients

[0056] In addition to the essential ingredients, preferred compositions may also include other ingredients.

[0057] It is preferred that the composition includes a benefit agent. The benefit agent may be hydrophobic or hydrophilic. The benefit agent may be selected from an electrolyte, a shading dye, a perfume or an optical brightener.

[0058] The composition typically comprises between 1 and 20% by weight of combined other ingredients, preferably at least 2%, or even at least 5%, but preferably not more than 18%, still more preferably not more than 16%, yet more preferably not more than 10% by weight of the composition.

[0059] The composition preferably comprises 0.1-10% by weight of an electrolyte.

[0060] In compositions, all concentrations are given by weight based on the total composition.

Detailed description of the figure

[0061] A ternary diagram of the detergent composition is represented in the Figure (Figure 1) in form of a triangle, where each of the three apexes represents a component of the composition, such as surfactant (S), fat solubilising oil (O) and water (W).

[0062] A point plotted at the top of the vertical line nearest S indicates 100% S. A horizontal bar at the bottom of the line (farthest from S) represents 0% of S. Point O is at the lower right apex of the triangle. Point W is at the lower left apex of the triangle.

[0063] Note the letters A - D on the diagram. The composition for each of these points is shown below.

Table 2

Points	Proportion in (wt %)			R= O/(O+W)
	S	O	W	
A	40	6	54	0.1
B	40	30	30	0.5
C	90	1	9	0.1
D	90	5	5	0.5

[0064] Below the line A-B, the phase separates and a non transparent emulsion is formed; above C-D and left to A-D, the composition appears highly viscous; right to B-C, the phase separates.

Examples

[0065] The invention will now be explained with the help of non-limiting examples of preferred embodiments.

Methods

Preparation of lamellar gel

[0066] Preparation of lamellar gel was done by adding each ingredient in appropriate amount in a plastic container and was mixed by using overhead stirrer. Process conditions are given below:

Motor:	Remi Motors, Mumbai, 0.014HP (10.4 W), 230/240 V AC
RPM:	500
Mixer blade type:	Two Flat blades at 90 degree attached to a SS rod which was fitted to the Motor, having a blade diameter of 8cm.
Mixing time:	1 hr for a 2 kg batch size.
Temperature:	25 °C (Lab temp.)

Viscosity measurement

[0067] Viscosity measurement was done using Viscometer both at constant temp (varying shear rate) and at constant shear (varying temperature). Parameters associated with the viscosity measurement are given below:

Viscometer	: TA Instruments, CSL Rheometer.
Operating pressure	: 4 kg/cm2
Geometry	: Cone and Plate, Acrylic 4 cm diameter. 2 Degree angle, gap 56 micron (zero gap correction)
Procedure	: Steady flow

[0068] In statistics, Z-value indicates how many standard deviations an observation or datum is above or below the mean. It is a dimensionless quantity derived by subtracting the population mean from an individual raw score and then dividing the difference by the population standard deviation.

Reflectance measurement

[0069] The reflectance of the fabric swatches was measured at ΔR460 (values at 460 nanometer, UV excluded and included) using a Macbeth 7100 color eye reflectometer. SAV aperture and SAV lens were used for the measurement. Reflectance measurements were carried out on new fabric pieces and after wash. 'SRI' is defined as soil removal index. This is mostly used for colored stains. A positive delta SRI means a better soil removal.

Lamellar phase detection

[0070] Lamellar phase in the present invention is detected through a microscope using polarized light or by x- ray diffraction. Lamellar phase can be seen as "the Maltese crosses" when viewed through a microscope using polarized light and as having a spacing of 1:1/2;1/3 between bilayers when detected through small angle x-ray diffraction.

EXAMPLE 1: Oil on oil+water fraction

[0071] The detergency of the preferred percentage of ingredients in the composition of the lamellar phase liquid detergent on poly-cotton (50:50), for composition having different oil on oil+water fractions.

Table 3

Ingredients	**Ex 1**	**Ex 2**	**Ex 3***	**Ex 4***	**Comp A**
C12EO7 (non-ionic surfactant	46	46	46	46	46
NaLAS anionic surfactants	7	7	7	7	7
SLES anionic surfactants	7	7	7	7	7
Electrolyte	6.2	6.2	6.2	6.2	6.2
Water	27	21	18	15.1	9.1
Fat solubilizer	3	9	12	15.1	21.1
Optional ingredients	3.8	3.8	3.8	3.8	3.8
Total	100	100	100	100	100
R = oil/(oil+water)	0.1	0.3	0.4	0.5	0.7
Viscosity mPa.s @ 25 C at $20S^{-1}$	6400	4000	3100	1300	100
Delta R (wfk 20 D)	59.1	59.0	60.4	61	57
* these examples do not illustrate the invention as claimed					

[0072] The table above shows that the viscosity for the comparative example is lower and therefore less appreciated by the consumer.

EXAMPLE 2: transition temperature

[0073] In this example the transition temperature (i.e. the temperature above which phase separation occurs) is determined.

[0074] R value (Oil/ (oil+water)) of the composition was calculated at different transition temperature (Temp), keeping viscosity less than 1000cp.

[0075] Relation between transition temperature and R (oil / (oil+water)) is represented in the following table (Table 4):

Table 4

Transition Temperature (°C)	R (O/(O+W))
151.3	0.00
90.3	0.20
64.5	0.33
51.2	0.42
41.6	0.50
32.1	0.60
24.8	0.70

[0076] The above results shows that the composition within the oil/oil+water fraction of between 0.1 and 0.5 has a transition temperature above 40°C, i.e. is not phase separating below 40°C.

EXAMPLE 3: cleaning examples

[0077] Improved stain removal on consumer fabrics in comparison to products available

[0078] Washing Procedure: 20 shirts (10 cotton and 10 polycotton) were given to a test panel to generate soil and soiled shirts were cleaned the following day.

[0079] The soiled shirts were cut into two halves. For each shirt, one half was tested with the composition of the invention and the other half with a control sample, both applied directly onto the collar. They were washed in a commercially available top loader washing machine.

[0080] Wash conditions were as follows:

Machine	: Top loader, whirlpool
Wash solution/ fabric ratio (wt. /wt.)	: 20
Water hardness	: 24 FH (Ca^{++}: Mg^{++}=2:1)
Number Of rinses	: 2 in 24 FH (Ca^{++}: Mg^{++}=2:1) water.

[0081] Product dose was maintained such that the total surfactant concentration (g/L) in the wash solution was equal to formulation Ex-4 as given in Example 1 as above as well as control.

[0082] The control is a commercially available liquid detergent (OMO, ex Unilever, Thailand) or Tide liquid (ex P&G, USA).

Ex 4	: 0.5 g/L (60 % surfactants)
Omo	: 1.1 g/L (27 % surfactants)
Tide Liquid	: 1 g/L (ca 30 % surfactant)

[0083] The samples were evaluated in pairs by trained panellists on various attributes. The panellists compared one half of the shirt washed with the example composition with the other half of the shirt washed with the control, to check if the result was in favour of the composition of the invention, the control or was equal.

Results

[0084] Washing results on consumer fabrics is represented in the tables below. Superior collar cleaning and brightness

over tide Liquid in 24 FH water has been shown in the following table (Table 5). The higher number in the box represents number of collars having better brightness and cleaning than the control.

Table 5

	Collar cleaning	Brightness
Win for Ex 4	15	14
Win for Tide liquid	2	3
Equal	3	3

[0085] Superior collar cleaning and brightness over tide Liquid in 6, 24 and 48 FH water has been shown in the following table (Table 6). The higher number in the box represents number of collars having better brightness and cleaning than the control.

Table 6

Attributes	Water hardness FH	Ex 4	Omo	Equal	Confidence Level
Collar Cleaning	6	19	0	1	99.9%
Brightness	6	12	2	6	99%
Collar Cleaning	24	16	3	1	99.9%
Brightness	24	13	0	7	99.9%
Collar Cleaning	48	14	5	1	95%
Brightness	48	9	6	5	NS

[0086] Superior stain removal over Omo has been shown in the following table (Table 7). "+" in the box represents stain removal is superior than the control, "=" in the box represents stain removal is parity).

[0087] Individual stains are also tested. The table below shows the performance of composition Ex4 as defined above, against OMO liquid (ex Unilever Thailand).

Table 7

Stains	Ex 4	Omo
Tomato	+	-
Lipstick	+	-
Choco Ice-cream	+	-
Black Berry fruit	+	-
Black shoe police	+	-
Garden soil	+	-
Indian red soil	+	-
Yellow pottery clay	+	-
Face Makeup	+	-
Black tea	+	-
Lard + violet Dye	+	-
Anatto Oil	+	-
Dirty Motor Oil	+	-
Blood	-	+
Grass	-	+

(continued)

Stains	Ex 4	Omo
Gravy	-	+
Choc Pudding	-	+
Red Curry	-	+
Black Current Juice	-	+
Red Wine	-	+
Yellow Curry	=	=
Cooking Oil	=	=

[0088] The table above shows that the composition according to the invention scores better than OMO on 13 stains, less good on 7 and equal on 2.

[0089] Specific tests have been done on collar cleaning. Collars soils contain high amounts of sebum and are difficult to clean with commercially available liquid detergent compositions.

Table 8

Collar Cleaning	2nd Wash	5th wash	10th wash	15th wash	20th wash
Ex 4	16	17	17	19	19
Omo	3	6	4	4	2
Parity	5	1	3	1	3
Confidence level	99%	99%	99%	99.9%	99.9%

[0090] The table above shows that the composition according to the invention scores better than OMO on collar cleaning, even after repeated use.

Claims

1. A lamellar phase liquid detergent composition comprising:

a 40-90% by weight of a surfactant, selected from non-ionic and anionic surfactants in a ratio of non-ionic : anionic between 5:1 and 1:1;
b 1-30% by weight of a fat solubilizing oil, having a Hansen solubility parameter (δ_{HSP}) that ranges from 14-22 $MPa^{1/2}$ (at 25°C), and wherein the Hansen polar component (δ_P) is in the range of 0.5-10 $MPa^{1/2}$ (at 25°C), the dispersion component (δ_H) is in the range of 3-10 $MPa^{1/2}$ (at 25°C) and the hydrogen bond component (δ_D) is in the range of 13-18 $MPa^{1/2}$ (at 25°C); and
c 5-55% by weight of water; and

wherein, the fat solubilising oil/(oil+water) fraction ranges from 0.1 to 0.3.

2. A composition according to claim 1 wherein, the said fat solubilising oil is selected from alkyl esters of fatty acids, mono, di- or tri-glycerides of fatty acids and fatty alcohol having a chain length 8 to 16, preferably 10-12 carbon atoms.

3. A composition according to claim 1, wherein the viscosity of the composition is between 300 and 10000 mPa.s (at 25°C and $20s^{-1}$).

4. A composition according to claim 1, wherein the fat solubilizing oil has a Hansen solubility parameter (δHSP) that ranges from 15-18.5 $MPa^{1/2}$ (at 25°C), and wherein the Hansen polar component (δP) is in the range of 1-8 $MPa^{1/2}$ (at 25°C), the dispersion component (δH) is in the range of 3-8 $MPa^{1/2}$ (at 25°C) and the hydrogen bond component (δD) is in the range of 14-17 $MPa^{1/2}$ (at 25°C).

5. A composition according to claim 1 wherein, the said composition comprises perfume.

6. A composition according to claim 1 wherein, the said composition comprises 0.1-10% by weight of an electrolyte.

Patentansprüche

1. Flüssige Reinigungsmittelzusammensetzung mit lamellarer Phase, umfassend:

a 40-90 Gewichts-% eines Tensids, ausgewählt unter nicht-ionischen und anionischen Tensiden in einem Verhältnis von nicht-ionisch : anionisch zwischen 5:1 und 1:1,
b 1-30 Gewichts-% eines Fett-löslichmachenden Öls mit einem Hansen-Löslichkeitsparameter (δ_{HSP}), der in dem Bereich von 14-22 $MPa^{1/2}$ (bei 25°C) liegt und wobei die Hansen-Polarkomponente (δ_P) in dem Bereich von 0,5-10 $MPa^{1/2}$ (bei 25°C) liegt, die Dispersionskomponente (δ_H) in dem Bereich von 3-10 $MPa^{1/2}$ (bei 25°C) liegt und die Wasserstoffbrückenbindungskomponente (δ_D) in dem Bereich von 13-18 $MPa^{1/2}$ (bei 25°C) liegt, und
c 5-55 Gewichts-% Wasser und

worin die Fett-löslichmachende Öl/(Öl + Wasser)-Fraktion in dem Bereich von 0,1 bis 0,3 liegt.

2. Zusammensetzung nach Anspruch 1, wobei das Fett-löslichmachende Öl unter Alkylestern von Fettsäuren, Mono-, Di- oder Triglyceriden von Fettsäuren und Fettalkohol mit einer Kettenlänge von 8 bis 16, vorzugsweise 10 bis 12 Kohlenstoffatomen, ausgewählt ist.

3. Zusammensetzung nach Anspruch 1, wobei die Viskosität der Zusammensetzung zwischen 300 und 10000 mPa.s (bei 25°C und 20 s^{-1}) liegt.

4. Zusammensetzung nach Anspruch 1, wobei das Fett-löslichmachende Öl einen Hansen-Löslichkeitsparameter (δ_{HSP}) aufweist, der in dem Bereich von 15-18,5 $MPa^{1/2}$ (bei 25°C) liegt und wobei die Hansen-Polarkomponente (δ_P) in dem Bereich von 1-8 $MPa^{1/2}$ (bei 25°C) liegt, die Dispersionskomponente (δ_H) in dem Bereich von 3-8 $MPa^{1/2}$ (bei 25°C) liegt und die Wasserstoffbrückenbindungskomponente (δ_D) in dem Bereich von 14 bis 17 $MPa^{1/2}$ (bei 25°C) liegt.

5. Zusammensetzung nach Anspruch 1, wobei die Zusammensetzung Parfüm umfasst.

6. Zusammensetzung nach Anspruch 1, wobei die Zusammensetzung 0,1-10 Gewichts-% eines Elektrolyten umfasst.

Revendications

1. Composition de détergent liquide en phase lamellaire comprenant :

a 40-90 % en masse d'un tensioactif, choisi parmi des tensioactifs non-ioniques et anioniques dans un rapport de non-ionique : anionique de 5:1 à 1:1 ;
b 1-30 % en masse d'une huile solubilisant une graisse, présentant un paramètre de solubilité Hansen (δ_{HSP}) qui est de 14-22 $MPa^{1/2}$ (à 25°C), et dans laquelle le constituant polaire Hansen (δ_P) se trouve dans l'intervalle de 0,5-10 $MPa^{1/2}$ (à 25°C), le constituant de dispersion (δ_H) se trouve dans l'intervalle de 3-10 $MPa^{1/2}$ (à 25°C) et le constituant de liaison hydrogène (δ_D) se trouve dans l'intervalle de 13-18 $MPa^{1/2}$ (à 25°C) ; et
c 5-55 % en masse d'eau ; et

dans laquelle, la fraction huile solubilisant une graisse/(huile+eau) est de 0,1 à 0,3.

2. Composition selon la revendication 1, dans laquelle ladite huile solubilisant une graisse est choisie parmi des esters alkyliques d'acides gras, des mono, di- ou tri-glycérides d'acides gras et d'alcool gras ayant une longueur de chaine de 8 à 16, de préférence de 10-12 atomes de carbone.

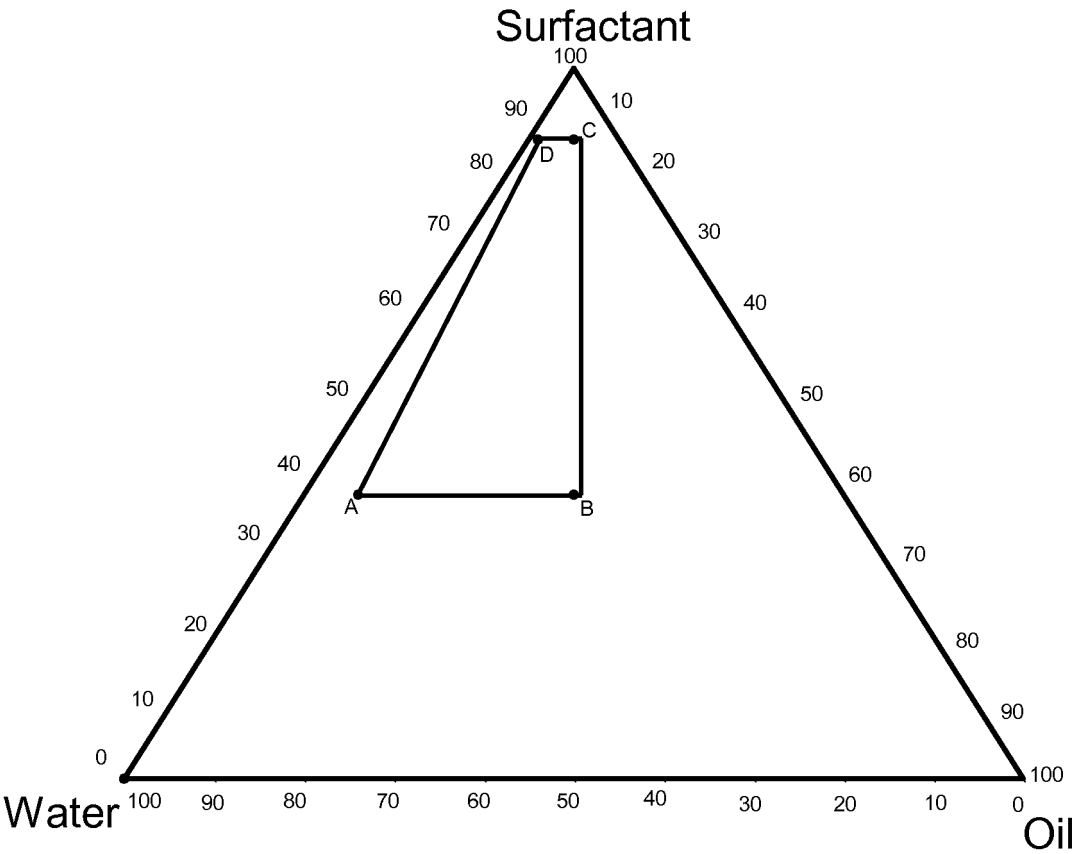
3. Composition selon la revendication 1, dans laquelle la viscosité de la composition est de 300 à 10 000 mPa.s (à 25°C et 20s^{-1}).

4. Composition selon la revendication 1, dans laquelle l'huile solubilisant une graisse présente un paramètre de solubilité Hansen (δ_{HSP}) qui se trouve dans l'intervalle de 15-18,5 $MPa^{1/2}$ (à 25°C), et dans laquelle le constituant polaire Hansen (δ_P) se trouve dans l'intervalle de 1-8 $MPa^{1/2}$ (à 25°C), le constituant de dispersion (δ_H) se trouve dans l'intervalle de 3-8 $MPa^{1/2}$ (à 25°C) et le constituant de liaison hydrogène (δ_D) se trouve dans l'intervalle de 14-17 $MPa^{1/2}$ (à 25°C).

5. Composition selon la revendication 1, dans laquelle ladite composition comprend du parfum.

6. Composition selon la revendication 1, dans laquelle ladite composition comprend 0,1-10 % en masse d'un électrolyte.

Figure 1


Surfactant
100
90
10
80
20
70
30
60
40
50
50
40
60
30
70
20
80
10
90
0
100
C
D
A
B
Water
100 90 80 70 60 50 40 30 20 10 0
Oil

REFERENCES CITED IN THE DESCRIPTION

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