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(54) **POUCH COMPRISING A HAND DISHWASHING COMPOSITION**

(57) Pouch is described comprising a surfactant composition, wherein the composition is a hand dishwashing detergent composition and wherein the viscosity of the composition when diluted three times in terms of the initial volume with demineralized water does not decrease by more than 20%, preferably does not decrease by more than 10%, more preferably remains at least constant, and more preferably increases, wherein the viscosity being measured with a Brookefield viscometer model DV-II + Pro, at 20 ° C. using a spindle number S 63 and 20 rpm.

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Description

[0001] For hand dishwashing liquids, a correct consistency or viscosity is very important to consumers' perception of the products. The desired viscosity, expected by the consumer, should not be too thick or too thin. The consumer desires a liquid viscosity providing liquid pourability and ease of dissolution in water. To be consumer acceptable, liquid cleaning products like hand dishwashing liquids must be able to provide good cleaning and manifest the foaming and rinsing properties which consumers today expect from a commercial liquid detergent. Finally, the dissolution rate of the liquid in water is desired to be rapid so that foam generation is not delayed. Foam is a signal to consumers that the detergent is high quality. Pourability and dissolution are in part linked to liquid viscosity. Furthermore, hand dishwashing compositions need to be sustainable, i.e. environmentally friendly.

[0002] All in all, the viscosity of hand dishwashing compositions needs to be suitably adjusted for guaranteeing consumer satisfaction while being environmentally friendly.

[0003] The problem is solved by a pouch comprising a surfactant composition, wherein the composition is a hand dishwashing detergent composition and wherein the viscosity of the composition when diluted three time, preferably five times, in terms of the initial volume with demineralized water does not decrease by more than 20%, preferably does not decrease by more than 10%, more preferably remains at least constant, and more preferably increases, wherein the viscosity being measured with a Brookefield viscometer model DV-II + Pro, at 20 ° C using a spindle number S 63 and 20 rpm.

[0004] Such compositions which upon dilution show only limited decrease in viscosity upon dilution, maintain a constant viscosity upon dilution or even get thicker upon dilution are sometimes referred to as "self-thickening" compositions. The skilled person will be able to provide such compositions.

[0005] In this context the expression "wherein the viscosity of the composition when diluted three time, preferably five times, in terms of the initial volume with demineralized water does not decrease by more than 20%" is to be understood in such a way that when a sample of 200 ml shows a viscosity of for instance 2500 mPas, wherein 500 mPas correspond to 20% of the initial viscosity, the sample when being diluted to a volume of 300 ml (i.e. three times meaning that the final volume is three time the starting volume of the composition) will show a maximum decrease in viscosity of 500 mPas, i.e. the viscosity of the diluted composition will be at least 2000 mPas.

[0006] Of the note, while compositions which provide the respective viscosity profile are available to the skilled person, the gist of the invention lies in the combination of such a composition being placed in a pouch being for hand dishwashing.

[0007] Hand dishwashing compositions differ from other compositions, such as floor cleaners, lavatory compositions and automatic dishwashing compositions in that they need to be particularly skin protective and provide good foaming properties and may contain enzymes.

[0008] All in all, the invention provides the desired viscosity properties and at the same time have reduced impact to the environment and being hygienically acceptable.

[0009] The diluted composition has a suitable viscosity and therefore can be used for hand dishwashing while at the same time being highly sustainable as the bottle can be reused, thereby reducing transport costs and plastic waste production.

[0010] According to a preferred embodiment, the pouch is described wherein the hand dishwashing detergent composition comprises a betaine and/or an amine oxide. The betaine and/or amine oxide provide good foaming properties to the composition, which renders the composition suitable for hand dishwashing. Such strongly foam-providing compositions are however less suitable for machine washing processes since the foam may be detrimental to the machine.

[0011] According to a preferred embodiment, the pouch is described wherein the pouch material is made from a water-soluble material.

[0012] According to a preferred embodiment, the pouch is described wherein the pouch has a longitudinal side and a head side, wherein the pouch being more extended in the direction of the longitudinal side than in the direction of the head side.

[0013] According to a preferred embodiment, the pouch is described wherein the extension of the pouch in the direction of the longitudinal side is at least twice as the extension of the pouch in the direction of the head side. In particular, a pouch of such a shape is suitable for being inserted in a bottle. Stated differently, the pouch has an elongated shape. A pouch of this shape is suitable for being inserted into a bottle even through a relatively narrow bottle neck.

[0014] According to a preferred embodiment, the pouch is described wherein the pouch is essentially rectangular. This allows for an efficient manufacturing method. In particular, a pouch of such a shape is suitable for being inserted in a bottle.

[0015] According to a preferred embodiment, the pouch is described wherein the viscosity of the composition when diluted three times, preferable five times, with demineralized water is at least 1000 mPas, more preferably more than 2000 mPas.

[0016] According to a further aspect, the invention describes the use of the pouch wherein the pouch is inserted into a bottle and dissolved in water within the bottle.

[0017] According to a further aspect, the invention describes the use of the pouch wherein the pouch is used for manual washing of dishes.

[0018] In the following, compositions which may be used as hand dishwashing compositions according to the invention are described as examples:

[0019] An aqueous liquid cleaning composition comprising a plurality of surfactants, the surfactants including surfactant active components comprising from greater than 30% to up to 55% by weight, based on the weight of the composition, wherein the plurality of surfactants includes at least one anionic surfactant, the total anionic surfactant active component comprising from greater than 20% to up to 40% by weight, based on the weight of the composition; and ii. at least one additional surfactant selected from at least one amphoteric surfactant and at least one nonionic surfactant, wherein when at least one amphoteric surfactant is present, the total amphoteric active component comprises from greater than 5% to up to 15% by weight, based on the weight of the composition; and when at least one nonionic surfactant is present, the total nonionic active component comprises from greater than 5% to up to 15% by weight, based on the weight of the composition; at least one divalent metal salt in an amount of 1.5% to 5% by weight, based on the weight of the composition; and water.

[0020] The preferred embodiments particularly provide a viscosity property in a liquid cleaning composition, which is a dilutable concentrated cleaning liquid, so that the liquid can be easily diluted with water by several folds and still retain a viscosity that is acceptable to consumers. A relatively constant viscosity is maintained, from the undiluted composition through to the desired diluted composition, irrespective of the dilution level across a broad dilution range, typically up to six times dilution with water.

[0021] Typical challenges in formulating highly concentrated surfactant-containing cleaning compositions include: reduced free water in the composition as a result of increased active ingredient content, which can render homogeneous dilution difficult; the formation of gel phases throughout the dilution process; increased processing time; longer deaeration times (i.e. for air bubble removal) upon dilution of the composition, which results from higher viscosity causing longer deaeration times; and maintaining a viscosity profile both before and after dilution that provide a similar cleaning performance at dilution as compared to conventional non-reconstitutable cleaning compositions.

[0022] These challenges are at least partly overcome by providing a substantially flat viscosity profile on dilution with the avoidance of gel phases. Mixing is facilitated, reducing processing and deaeration times. The composition remains visually clear. A desired viscosity range is not critically dependent upon the dilution level. Consumer perceived performance is made more uniform.

[0023] Unless otherwise stated, references to weight % in this specification are on an active basis in the total composition.

[0024] The aqueous liquid cleaning composition is formulated to provide the property of a pourable viscosity, both in concentrated or undiluted form, and in diluted form. The aqueous liquid cleaning composition is also desirably formulated to be visibly clear, both in concentrated or undiluted form, and in diluted form. Yet further, both in concentrated or undiluted form, and in diluted form, the aqueous liquid cleaning composition is in the form of a liquid which is homogeneous and does not include a gel phase. The compositions are visually clear, independent of the degree of dilution.

[0025] Provided is an aqueous liquid cleaning composition comprising a plurality of surfactants, the surfactants including surfactant active components comprising greater than 30% to up to 55% by weight, based on the weight of the composition. The plurality of surfactants includes at least one anionic surfactant, the total anionic surfactant active component comprising greater than 20% to up to 40% by weight or greater than 20 to 35% by weight, based on the weight of the composition; and at least one additional surfactant selected from at least one amphoteric surfactant and at least one nonionic surfactant, wherein when at least one amphoteric surfactant is present, the total amphoteric active component comprises greater than 5% to up to 15% by weight, based on the weight of the composition; and when at least one nonionic surfactant is present, the total nonionic active component comprises greater than 5% to up to 15% by weight, based on the weight of the composition.

[0026] Various active ingredient levels of the concentrated composition can be prepared by altering the weight ratio of the surfactants, in particular the weight ratio of the anionic surfactants to the amphoteric or nonionic surfactants, which in turn can alter the viscosity to a desired level and uniformity across dilution values.

[0027] The composition also includes at least one divalent metal salt in an amount of 1.5% to 5% by weight, based on the weight of the composition.

[0028] The composition has a viscosity of 100 to 500 mPas as measured at 25°C, and the composition is dilutable with water to form a non-gelling diluted composition having up to six times the volume of the undiluted composition and a viscosity within the range of 100 to 1600 mPas as measured at 25°C at any dilution up to the six times dilution.

[0029] In some embodiments, the composition has a viscosity of 125 to 275 mPas as measured at 25°C, and the composition is dilutable with water to form a non-gelling diluted composition having up to six times the volume of the undiluted composition and a viscosity within the range of 120 to 900 mPas as measured at 25°C at any dilution up to the six times dilution. W

[0030] In some embodiments, the surfactant active components comprise greater than 30% to up to 55% by weight or greater than 30 up to 45% by weight, based on the weight of the composition, and the total anionic surfactant active component comprises greater than 20% to up to 35% by weight, based on the weight of the composition.

[0031] In some embodiments, the at least one divalent metal salt comprises magnesium sulfate. In some embodiments, the at least one divalent metal salt is present in an amount of 2 to 4% by weight, based on the weight of the composition.

[0032] In some embodiments, the at least one anionic surfactant is selected from an alkyl sulfonate and an alkyl ethoxy sulfate. In some embodiments, the alkyl sulfonate is a linear alkyl benzene sulfonate, optionally magnesium linear alkyl benzene sulfonate or sodium linear alkyl benzene sulfonate. Typically, the linear alkyl benzene sulfonate is dodecyl benzene sulfonate. In some embodiments, the alkyl ethoxy sulfate is a fatty acid ethoxylate sulfate, optionally C12-C 15 alkyl ethoxysulfate with 1.3 ethoxylate groups per molecule. Typically, the fatty acid ethoxylate sulfate is ammonium laureth sulfate.

[0033] In some embodiments, the at least one anionic surfactant comprises 10 to 15% by weight linear alkyl benzene sulfonate, and from 15 to 25% by weight fatty acid ethoxylate sulfate, each weight being of the anionic surfactant active component based on the weight of the composition.

[0034] In some other embodiments, the at least one anionic surfactant consists of a fatty acid ethoxylate sulfate. Optionally, the at least one anionic surfactant consists of 20 to 34% by weight fatty acid ethoxylate sulfate as anionic active component, the weight being based on the weight of the composition.

[0035] In some embodiments, the at least one amphoteric surfactant comprises at least one of cocoamidopropyl betaine and laurylamidopropyl betaine. In some embodiments, the at least one amphoteric active component is present in an amount of 10 to 13% by weight, based on the weight of the composition.

[0036] In some embodiments, the at least one nonionic surfactant comprises an amine oxide. In some embodiments, the amine oxide is at least one of lauramidopropylamine oxide and myristamidopropylamine oxide. In some embodiments, the at least one nonionic active component is present in an amount of 8 to 12% by weight, based on the weight of the composition. In some embodiments, the surfactant components consist of 25 to 35% by weight anionic active component comprising a mixture of fatty acid ethoxylate sulfate and linear alkyl benzene sulfonate, and 8 to 12% by weight nonionic active component comprising an amine oxide, each weight based on the weight of the composition.

[0037] In some other embodiments, the surfactant components consist of at least one anionic surfactant and at least one amphoteric surfactant, wherein the weight ratio at total anionic active component to total amphoteric active component is from 1.7: 1 to 4: 1.

[0038] In some other embodiments, the surfactant components consist of 20 to 27% by weight anionic active component comprising a fatty acid ethoxylate sulfate, and 8 to 14% by weight amphoteric active component comprising at least one of cocoamidopropyl betaine and laurylamidopropyl betaine, each weight based on the weight of the composition. Optionally, the weight ratio at total anionic active component to total amphoteric active component is from 1.7: 1 to 2.5: 1.

[0039] In some other embodiments, the surfactant components consist of 28 to 34% by weight anionic active component comprising a fatty acid ethoxylate sulfate, and 8 to 12% by weight amphoteric active component comprising at least one of cocoamidopropyl betaine and laurylamidopropyl betaine, each based on the weight of the composition. Optionally, the weight ratio at total anionic active component to total amphoteric active component is from 2.7: 1 to 4: 1.

[0040] In certain embodiments, there is no more than 5, 4, 3, 2, 1, or 0.5 weight % by weight of the composition of a monovalent metal counterion, such as sodium, anionic surfactant. In other embodiments, the composition is free of monovalent metal counterion anionic surfactant.

[0041] The composition may further comprise at least one viscosity modifier selected from a polymer and a hydrotrope. Optionally, the polymer comprises a block copolymer of propylene oxide and ethylene oxide. Optionally, the polymer is present in an amount of 0.1 to 1 % by weight based on the weight of the composition.

[0042] Also provided is a package containing the composition. The package has instructions associated therewith for instructing a user to dilute the composition with water to a particular amount, the amount being selected from a dilution value and a dilution range. Typically, the dilution value is within a dilution range of three to six times the volume of the undiluted composition. Also provided is a method of preparing a diluted aqueous liquid cleaning composition, the method comprising the step of diluting, with water, a concentrated aqueous liquid cleaning composition to form a diluted composition which is non-gelling composition having up to six times the volume of the concentrated composition and a viscosity within the range of 100 to 1600 mPas as measured at 25°C at any dilution up to the six times dilution.

[0043] The aqueous liquid cleaning compositions include anionic surfactants, for example alkyl sulfonate or alkyl ethoxy sulfate surfactants, and other surfactants which may be non- ionic surfactants, for example amine oxide surfactants, and/or amphoteric surfactants, for example betaine surfactants such as cocoamidopropyl betaine and/or laurylamidopropyl betaine.

[0044] As stated above, the compositions include a divalent metal salt that is a viscosity modifier. Such salts can include any desirable salt, which is an electrolyte in aqueous solution. Examples of salts include, but are not limited to, magnesium sulfate, magnesium sulfate heptahydrate, magnesium chloride, calcium sulfate, and calcium chloride. Magnesium sulfate (heptahydrate) is particularly suitable. While such salts may have been used in previous compositions, their amounts have been less than 1.5 weight %. In the present compositions, the amount is 1.5 to 5 weight%, 2 to 5 weight%, 2 to 4 weight %, or 2, 2.5, 3, 3.5, 4, 4.5, or 5 weight%. In the compositions, the divalent metal salt is dissolved in aqueous solution, rendering the composition visually clear, independent of the degree of dilution. It is desired that the divalent metal salt be dissolved in the composition. When less water is in the composition, it may be that higher amounts of the divalent metal salt may not be able to be

used because the salt may crystallize out of the composition.

[0045] The divalent salt acts to raise the viscosity of the composition, dependent upon dilution. The divalent metal salts do not pack as closely with the anionic surfactants as do monovalent metal salts, such as sodium. Sodium ions can interact with anionic surfactants to form rod-like micelles that are more closely packed. The closer the packing, the more likely that a gel phase will be encountered upon dilution.

[0046] The surfactants and their amounts are selected in combination with the amount of divalent metal salt to create a relatively constant viscosity curve when the compositions are diluted from as high as 50 wt% active surfactant ingredients (hereinafter referred to as AI) to as low as 5 wt% AI.

[0047] Other ingredients that may be included to assist achievement of the desired viscosity profile of the compositions upon dilution are viscosity modifiers, for example a block copolymer of ethylene oxide and propylene oxide, typically Pluronic L44 available from BASF AG, Germany, and hydrotropes, for example sodium xylene sulfonate (SXS), alcohol, such as ethyl alcohol, and glycol, such as propylene glycol. The compositions can be formulated as cleaning liquids such as hand dishwashing detergents, liquid hand soaps, shampoos, and body washes, etc. The compositions also present an eco-friendly option for liquid cleaning detergents. P articularly preferred embodiments are directed to hand dishwashing detergents. The composition can be sold in a smaller pack, since it is in concentrated form. As a result, transportation energy and packaging materials can be reduced. When the concentrated composition is diluted by consumers at home, for example by being diluted with additional water in a reusable container, the consumption of plastic waste can be further reduced.

[0048] As described above, surfactants are used in the composition. These may be anionic, amphoteric or nonionic surfactants. Various examples of such surfactants that may be used in the compositions are described hereinbelow.

[0049] Anionic surfactants include, but are not limited to, those surface-active or detergent compounds that contain an organic hydrophobic group containing generally 8 to 26 carbon atoms or generally 10 to 18 carbon atoms in their molecular structure and at least one water-solubilizing group selected from sulfonate, sulfate, and carboxylate so as to form a water-soluble detergent. Usually, the hydrophobic group will comprise a C8-C22 alkyl, or acyl group. Such surfactants are employed in the form of water-soluble salts and the salt- forming cation usually is selected from sodium, potassium, ammonium, magnesium and mono-, di- or tri-C2-C3 alkanolammonium, with the sodium, magnesium and ammonium cations again being the usual ones chosen.

[0050] The anionic surfactants that are used in the composition are water soluble and include, but are not limited to, the sodium, potassium, ammonium, magnesium and ethanolammonium salts of linear C8-Cl6 alkyl benzene sulfonates (such as dodecyl benzene sulfonate), alkyl ether carboxylates, C10-C2O paraffin sulfonates, C8-C25 alpha olefin sulfonates, C8-C[8 alkyl sulfates, alkyl ether sulfates (such as C12-C 15 alkyl ethoxysulfate with 1.3 ethoxylate groups per molecule, e.g. sodium laureth sulfate) and mixtures thereof.

[0051] The paraffin sulfonates (also known as secondary alkane sulfonates) may be monosulfonates or di-sulfonates and usually are mixtures thereof, obtained by sulfonating paraffins of 10 to 20 carbon atoms. Commonly used paraffin sulfonates are those of Cl2-18 carbon atoms chains, and more commonly they are of C14-17 chains. Paraffin sulfonates that have the sulfonate group(s) distributed along the paraffin chain are described in U.S. Patent Nos. 2,503,280; 2,507,088; 3,260,744; and 3,372, 188; and also in German Patent 735,096. Such compounds may be made to specifications and desirably the content of paraffin sulfonates outside the Cl 4-17 range will be minor and will be minimized, as will be any contents of di- or poly-sulfonates. Examples of paraffin sulfonates include, but are not limited to HOSTAPUR™ SAS30, SAS 60, SAS 93 secondary alkane sulfonates from Clariant, and BIO-TERGE™ surfactants from Stepan, and CAS No. 68037-49-0.

[0052] Pareth sulfate surfactants can also be included in the composition. The pareth sulfate surfactant is a salt of an ethoxylated C10-C16 pareth sulfate surfactant having 1 to 30 moles of ethylene oxide. In some embodiments, the amount of ethylene oxide is 1 to 6 moles, and in other embodiments it is 2 to 3 moles, and in another embodiment it is 2 moles. In one embodiment, the pareth sulfate is a C12-C13 pareth sulfate with 2 moles of ethylene oxide. An example of a pareth sulfate surfactant is STEOL™ 23-2S/70 from Stepan, or (CAS No. 68585-34-2).

[0053] Examples of suitable other sulfonated anionic detergents are the well known higher alkyl mononuclear aromatic sulfonates, such as the higher alkylbenzene sulfonates containing 9 to 18 or preferably 9 to 16 carbon atoms in the higher alkyl group in a straight or branched chain, or C8-15 alkyl toluene sulfonates. In one embodiment, the alkylbenzene sulfonate is a linear alkylbenzene sulfonate having a higher content of 3 -phenyl (or higher) isomers and a correspondingly lower content (well below 50%) of 2-phenyl (or lower) isomers, such as those sulfonates wherein the benzene ring is attached mostly at the 3 or higher (for example 4, 5, 6 or 7) position of the alkyl group and the content of the isomers in which the benzene ring is attached in the 2 or 1 position is correspondingly low.

[0054] Other suitable anionic surfactants are the olefin sulfonates, including long-chain alkene sulfonates, long-chain hydroxyalkane sulfonates or mixtures of alkene sulfonates and hydroxyalkane sulfonates. These olefin sulfonate detergents may be prepared in a known manner by the reaction of sulfur trioxide (SO3) with long-chain olefins containing 8 to 25, preferably 12 to 21 carbon

atoms and having the formula RCH=CHRI where R is a higher alkyl group of 6 to 23 carbons and Rj is an alkyl group of 1 to 17 carbons or hydrogen to form a mixture of sultones and alkene sulfonic acids which is then treated to convert the sultones to sulfonates. In one embodiment, olefin sulfonates contain from 14 to 16 carbon atoms in the R alkyl group and are obtained by sulfonating an alpha-olefin.

[0055] Examples of satisfactory anionic sulfate surfactants are the alkyl sulfate salts and the alkyl ether polyethenoxy sulfate salts having the formula R(OC2H4)n OSO3M wherein n is 1 to 12, or 1 to 5, and R is an alkyl group having about 8 to about 18 carbon atoms, or 12 to 15 and natural cuts, for example, C 12-14 or C 12-16 and M is a solubilizing cation selected from sodium, potassium, ammonium, magnesium and mono-, di- and triethanol ammonium ions. The alkyl sulfates may be obtained by sulfating the alcohols obtained by reducing glycerides of coconut oil or tallow or mixtures thereof and neutralizing the resultant product.

[0056] The ethoxylated alkyl ether sulfate may be made by sulfating the condensation product of ethylene oxide and Cs-18 alkanol, and neutralizing the resultant product. The ethoxylated alkyl ether sulfates differ from one another in the number of carbon atoms in the alcohols and in the number of moles of ethylene oxide reacted with one mole of such alcohol. In one embodiment, alkyl ether sulfates contain 12 to 15 carbon atoms in the alcohols and in the alkyl groups thereof, e.g., sodium myristyl (3 EO) sulfate or ammonium laureth (1.3 EO) sulfate.

[0057] Ethoxylated C8-18 alkylphenyl ether sulfates containing from 2 to 6 moles of ethylene oxide in the molecule are also suitable for use in the compositions. These detergents can be prepared by reacting an alkyl phenol with 2 to 6 moles of ethylene oxide and sulfating and neutralizing the resultant ethoxylated alkylphenol.

[0058] In certain embodiments, the composition can exclude alkali metal alkyl ether sulfate, sodium lauryl ether sulfate, alkali metal alkyl sulfate, or sodium lauryl sulfate anionic surfactants.

[0059] The water soluble nonionic surfactants utilized are commercially well known and include the primary aliphatic alcohol ethoxylates, secondary aliphatic alcohol ethoxylates, alkylphenol ethoxylates and ethylene-oxide-propylene oxide condensates on primary alkanols, such a PLURAFAC™ surfactants (BASF) and condensates of ethylene oxide with sorbitan fatty acid esters such as the TWEEN™ surfactants (ICI). The nonionic synthetic organic detergents generally are the condensation products of an organic aliphatic or alkyl aromatic hydrophobic compound and hydrophilic ethylene oxide groups. Practically any hydrophobic compound having a carboxy, hydroxy, amido, or amino group with a free hydrogen attached to the nitrogen can be condensed with ethylene oxide or with the polyhydration product thereof, polyethylene glycol, to form a water-soluble nonionic detergent. Further, the length of the polyethenoxy chain can be adjusted to achieve the desired balance between the hydrophobic and hydrophilic elements.

[0060] The nonionic surfactant class includes the condensation products of a higher alcohol (e.g., an alkanol containing about 8 to 18 carbon atoms in a straight or branched chain configuration) condensed with about 5 to 30 moles of ethylene oxide, for example, lauryl or myristyl alcohol condensed with about 16 moles of ethylene oxide (EO), tridecanol condensed with about 6 to moles of EO, myristyl alcohol condensed with about 10 moles of EO per mole of myristyl alcohol, the condensation product of EO with a cut of coconut fatty alcohol containing a mixture of fatty alcohols with alkyl chains varying from 10 to about 14 carbon atoms in length and wherein the condensate contains either about 6 moles of EO per mole of total alcohol or about 9 moles of EO per mole of alcohol and tallow alcohol ethoxylates containing 6 EO to 1 1 EO per mole of alcohol. [0059] In one embodiment, the nonionic surfactants are the NEODOL™ ethoxylates (Shell Co.), which are higher aliphatic, primary alcohol containing about 9-15 carbon atoms, such as C9-C 1 1 alkanol condensed with 2.5 to 10 moles of ethylene oxide (NEODOL™ 91-2.5 OR -5 OR -6 OR -8), C12-I 3 alkanol condensed with 6.5 moles ethylene oxide (NEODOL™ 23-6.5), <¾-ï 5 alkanol condensed with 12 moles ethylene oxide (NEODOL™ 25-12), Ci4_i 5 alkanol condensed with 13 moles ethylene oxide (NEODOL™ 45- 13), and the like.

[0061] Additional satisfactory water soluble alcohol ethylene oxide condensates are the condensation products of a secondary aliphatic alcohol containing 8 to 18 carbon atoms in a straight or branched chain configuration condensed with 5 to 30 moles of ethylene oxide. Examples of commercially available nonionic detergents of the foregoing type are C\ 1-C1 5 secondary alkanol condensed with either 9 EO (TERGITOL™ 15-S-9) or 12 EO (TERGITOL™ 15-S-12) marketed by Union Carbide.

[0062] Other suitable nonionic surfactants include the polyethylene oxide condensates of one mole of alkyl phenol containing from about 8 to 18 carbon atoms in a straight- or branched chain alkyl group with about 5 to 30 moles of ethylene oxide. Specific examples of alkyl phenol ethoxylates include, but are not limited to, nonyl phenol condensed with about 9.5 moles of EO per mole of nonyl phenol, dinonyl phenol condensed with about 12 moles of EO per mole of phenol, dinonyl phenol condensed with about 15 moles of EO per mole of phenol and di-isoctylphenol condensed with about 15 moles of EO per mole of phenol. Commercially available nonionic surfactants of this type include IGEPAL™ CO-630 (nonyl phenol ethoxylate) marketed by GAF Corporation.

[0063] Also among the satisfactory nonionic surfactants are the water-soluble condensation products of a Cg-C20 alkanol with a heteric mixture of ethylene oxide and propylene oxide wherein the weight ratio of ethylene oxide to propylene oxide is from 2.5: 1 to 4: 1 , preferably 2.8: 1 to 3.3: 1, with the total of the ethylene oxide and propylene oxide (including the terminal ethanol or pro-

panol group) being from 60-85%, preferably 70-80%, by weight. Such detergents are commercially available from BASF and a particularly preferred detergent is a Ci Q-Ci g alkanol condensate with ethylene oxide and propylene oxide, the weight ratio of ethylene oxide to propylene oxide being 3: 1 and the total alkoxy content being about 75% by weight. [0063] Condensates of 2 to 30 moles of ethylene oxide with sorbitan mono- and tri-C iQ-C20 alkanoic acid esters having a HLB of 8 to 15 also may be employed as the nonionic detergent ingredient in the described composition. These surfactants are well known and are available from Imperial Chemical Industries under the TWEEN™ trade name. Suitable surfactants include, but are not limited to, polyoxy ethylene (4) sorbitan monolaurate, polyoxyethylene (4) sorbitan monostearate, polyoxyethylene (20) sorbitan trioleate and polyoxyethylene (20) sorbitan tristearate.

[0064] Other suitable water-soluble nonionic surfactants are marketed under the trade name PLURONIC™. The compounds are formed by condensing ethylene oxide with a hydrophobic base formed by the condensation of propylene oxide with propylene glycol. The molecular weight of the hydrophobic portion of the molecule is of the order of 950 to 4000 and preferably 200 to 2,500. The addition of polyoxyethylene radicals to the hydrophobic portion tends to increase the solubility of the molecule as a whole so as to make the surfactant water-soluble. The molecular weight of the block polymers varies from 1,000 to 15,000 and the polyethylene oxide content may comprise 20% to 80% by weight. Preferably, these surfactants will be in liquid form and satisfactory surfactants are available as grades L 62 and L 64.

[0065] Alkyl polysaccharide nonionic surfactants can be used in the instant composition. Such alkyl polysaccharide nonionic surfactants have a hydrophobic group containing from about 8 to about 20 carbon atoms, preferably from about 10 to about 16 carbon atoms, or from about 12 to about 14 carbon atoms, and polysaccharide hydrophilic group containing from about 1.5 to about 10, or from about 1.5 to about 4, or from about 1.6 to about 2.7 saccharide units (e.g., galactoside, glucoside, fructoside, glucosyl, fructosyl; and/or galactosyl units). Mixtures of saccharide moieties may be used in the alkyl polysaccharide surfactants. The number x indicates the number of saccharide units in a particular alkyl polysaccharide surfactant. For a particular alkyl polysaccharide molecule x can only assume integral values. In any physical sample of alkyl polysaccharide surfactants there will be in general molecules having different x values. The physical sample can be characterized by the average value of x and this average value can assume non-integral values. In this specification the values of x are to be understood to be average values. The hydrophobic group (R) can be attached at the 2-, 3-, or 4- positions rather than at the 1 -position, (thus giving e.g. a glucosyl or galactosyl as opposed to a glucoside or galactoside). However, attachment through the 1- position, i.e., glucosides, galactoside, fructosides, etc., is preferred. In one embodiment, the additional saccharide units are predominately attached to the previous saccharide unit's 2-position. Attachment through the 3-, 4-, and 6- positions can also occur. Optionally and less desirably there can be a polyalkoxide chain joining the hydrophobic moiety (R) and the polysaccharide chain. The preferred alkoxide moiety is ethoxide.

[0066] Typical hydrophobic groups include alkyl groups, either saturated or unsaturated, branched or unbranched containing from about 8 to about 20, preferably from about 10 to about 18 carbon atoms. In one embodiment, the alkyl group is a straight chain saturated alkyl group. The alkyl group can contain up to 3 hydroxy groups and/or the polyalkoxide chain can contain up to about 30, preferably less than about 10, alkoxide moieties.

[0067] Suitable alkyl polysaccharides include, but are not limited to, decyl, dodecyl, tetradecyl, pentadecyl, hexadecyl, and octadecyl, di-, tri-, tetra-, penta-, and hexaglucosides, galactosides, lactosides, fructosides, fructosyls, lactosyls, glucosyls and/or galactosyls and mixtures thereof.

[0068] The alkyl monosaccharides are relatively less soluble in water than the higher alkyl polysaccharides. When used in admixture with alkyl polysaccharides, the alkyl monosaccharides are solubilized to some extent. The use of alkyl monosaccharides in admixture with alkyl polysaccharides can be used. Suitable mixtures include coconut alkyl, di-, tri-, tetra-, and pentaglucosides and tallow alkyl tetra-, penta-, and hexaglucosides.

[0069] The amount of unreacted alcohol (the free fatty alcohol content) in the desired alkyl polysaccharide surfactant is generally less than about 2%, or less than about 0.5% by weight of the total of the alkyl polysaccharide. For some uses it is desirable to have the alkyl monosaccharide content less than about 10%.

[0070] "Alkyl polysaccharide surfactant" is intended to represent both the glucose and galactose derived surfactants and the alkyl polysaccharide surfactants. Throughout this specification, "alkyl polyglucoside" is used to include alkyl polyglycosides because the stereochemistry of the saccharide moiety is changed during the preparation reaction.

[0071] In one embodiment, APG glycoside surfactant is APG 625 glycoside manufactured by the Henkel Corporation of Ambler, PA. APG25 is a nonionic alkyl polyglycoside.

[0072] Solvents can include any water soluble solvents, which preferably act as hydrotropes. Water soluble solvents include, but are not limited to, C2 -4 mono, dihydroxy, or polyhydroxy alkanols and/or an ether or diether, such as ethanol, isopropanol, diethylene glycol monobutyl ether, dipropylene glycol methyl ether, diproyleneglycol monobutyl ether, propylene glycol n-butyl ether, propylene glycol, and hexylene glycol, and alkali metal cumene, alkali metal toluene, or alkali metal xylene sulfonates such as sodium cumene sulfonate and sodium xylene sulfonate (SXS). In some embodiment, the solvents include ethanol and diethylene glycol

monobutyl ether, both of which are miscible with water. Urea can be optionally used at a concentration of 0.1% to 7 weight%. Solvents such as ethanol (typically used at 5 to 12 wt%), SXS (typically used at 0.25 to 1 wt%) and propylene glycol (typically used at 0.5 to 5 wt%) act to lower the viscosity of the composition, dependent upon dilution.

[0073] Further viscosity modifiers may also be included, such as a polymer, for example a block copolymer of propylene oxide and ethylene oxide, e.g. the block copolymer sold under the trade mark Pluronic L44 by BASF AG, Germany.

[0074] Additional optional ingredients may be included to provide added effect or to make the product more attractive. Such ingredients include, but are not limited to, perfumes, fragrances, abrasive agents, disinfectants, radical scavengers, bleaches, acids, chelating agents, antibacterial agents/preservatives, optical brighteners, or combinations thereof. [0078] In some embodiments, preservatives can be used in the composition at a concentration of 0 wt, % to 3 wt. %, more preferably 0.01 wt. % to 2.5 wt. %. Examples of preservatives include, but are not limited to, benzalkonium chloride; benzethonium chloride,5-bromo-5-nitro-l,3dioxane; 2-bromo-2-nitropropane-l,3-diol; alkyl trimethyl ammonium bromide; N-(hydroxymethyl)-N-(1,3-dihydroxy methyl-2,5-dioxo-4-imidaxolidinyl-N'- (hydroxy methyl) urea; l-3-dimethyol-5,5-dimethyl hydantoin; formaldehyde; iodopropynl butyl carbamate, butyl paraben; ethyl paraben; methyl paraben; propyl paraben, mixture of methyl isothiazolinone/methyl-chloroisothiazoline in a 1 :3 wt. ratio; mixture of phenoxythanol/butyl paraben/methyl paraben/propylparaben; 2-phenoxyethanol; tris- hydroxyethyl-hexahydrotriaz- ine; methylisothiazolinone; 5-chloro-2-methyl-4-isothiazolin-3- one; 1 ,2-dibromo-2, 4-dicyanobutane; l-(3-chloroalkyl)-3,5,7-triaza-azoniaadamantane chloride; and sodium benzoate.

[0075] Water is included in the aqueous composition. The amount of water is variable depending on the amounts of other materials added to the composition.

[0076] The compositions can be made by simple mixing methods from readily available components which, on storage, do not adversely affect the entire composition. Mixing can be done by any mixer that forms the composition. Examples of mixers include, but are not limited to, static mixers and in-line mixers. Solubilizing agents such as a C1 -C3 alkyl substituted benzene sulfonate such as sodium cumene or sodium xylene sulfonate (SXS) and mixtures thereof can be used at a concentration of 0.5 wt. % to 10 wt. % to assist in solubilizing the surfactants.

EXAMPLES AND EMBODIMENTS

[0077] The following example illustrates a composition suitable for the pouch according to the invention. Unless otherwise specified, the proportions in the examples and elsewhere in the specification are by active weight. The active weight of a material is the weight of the material itself excluding water or other materials that may be present in the supplied form of the material.

Component	Amount wt.-%
MgLAS	12
LMDO	10
AEOS	17
MgSO4*7H20	3,5
Water	rest

[0078] LMDO is a lauryl/myristyl amidoamine oxide which provides excellent foaming properties. Further, the composition comprises enzymes, e.g. proteases, as well as further additives such as perfumes and colorants.

[0079] The composition was inserted into a pouch hull material made of a water soluble PVA film. The pouch was then inserted into a bottle and diluted three times in terms of the initial volume with demineralized water. It was demonstrated that viscosity remained nearly constant.

[0080] In the following, a preferred embodiment of the pouch according to the invention is described by making reference to Figure 1 and Figure 2:

Figure 1 shows a pouch 20 comprising a hand dishwashing detergent composition which preferably includes a betaine and/or an amine oxide. The betaine and/or amine oxide provides suitable foaming properties to the composition, which renders the composition suitable for hand dishwashing. Such strongly foam-providing compositions are however less suitable for machine washing processes since the foam may be detrimental to the machine. Optionally, the compositions comprise enzymes, e.g. proteases. Such enzymes are usually used in dishwashing while in textile cleaning compositions they may be harmful since they tend to degrade the textile material, e.g. the wool. The pouch, more precisely its hull, which contains the hand dishwashing composition is made from a water-soluble material, e.g. polyvinylalcohol, PVA. The skilled person is aware of other materials which are water soluble and which may be used as pouch material.

[0081] The pouch 20 has a longitudinal side 22 and a head side 25, wherein the pouch being more extended in the direction of the longitudinal side 22 than in the direction of the head side 25. In particular, the extension of the pouch in the direction of the longitudinal side 22 is at least twice as long as the extension of the pouch in the direction of the head side 25. The pouch is essentially rectangular.

[0082] As shown in Figure 2, the pouch is inserted into a bottle 10 by the consumer. The bottle has a longitudinal side 12 and a head side 15 which has an aperture for pouring of the liquid content of the bottle. The pouch has an elongated shape, i.e. the pouch being more extended in the direction of the longitudinal side 22 than in the

direction of the head side 25 - as already described in conjunction with Figure 1. A pouch of this shape is suitable for being inserted into a bottle even through a relatively narrow bottle neck, represented by the head side 15 of the bottle 10.

[0083] Water is added by the user and the water-soluble pouch material dissolves within the bottle 10. The viscosity of the composition when diluted three times up to five time in terms of the initial volume with demineralized water does not decrease by more than 20%, preferably does not decrease by more than 10%, more preferably remains at least constant.

[0084] The diluted composition has a suitable viscosity and therefore can be used for hand dishwashing while at the same time being highly sustainable as the bottle can be reused, thereby reducing transport cost and plastic waste production.

Claims

1. Pouch (20) comprising a surfactant composition, **characterized in that** the composition is a hand dishwashing detergent composition and wherein the viscosity of the composition when diluted three times in terms of the initial volume with demineralized water does not decrease by more than 20%, preferably does not decrease by more than 10%, more preferably remains at least constant, and more preferably increases, wherein the viscosity being measured with a Brookefield viscometer model DV-II + Pro, at 20 ° C. using a spindle number S 63 and 20 rpm.

2. Pouch (20) comprising a surfactant composition, **characterized in that** the hand dishwashing detergent composition comprises a betaine and/or an amine oxide.

3. The pouch (20) according to any of the preceding claim, **characterized in that** the pouch material is made from a water-soluble material.

4. The pouch (20) according to any of the preceding claims, **characterized in that** the pouch has a longitudinal side (22) and a head side (25), wherein the pouch being more extended in the direction of the longitudinal side (22) than in the direction of the head side (25).

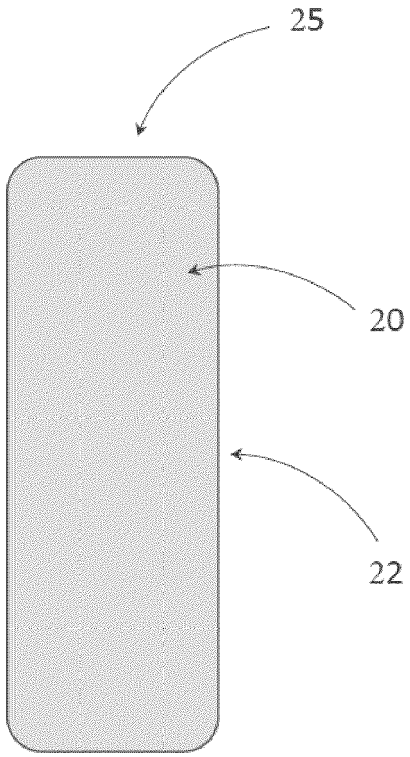
5. The pouch (20) according to the preceding claim, wherein the extension of the pouch in the direction of the longitudinal side (22) is at least twice as the extension of the pouch in the direction of the head side (25).

6. The pouch (20) according to any one of the preceding claims, **characterized in that** the pouch is essentially rectangular.

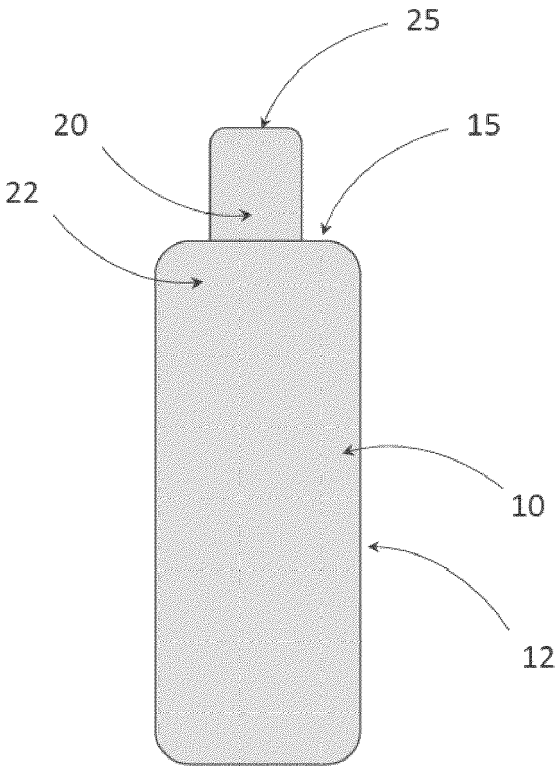
7. Pouch (20) according to any one of the preceding claims, **characterized in that** the viscosity of the composition when diluted five times with demineralized water is at least 1000 cPs.

8. Use of the pouch (20) according to any of the preceding claims, wherein the pouch is inserted into a bottle (10) and dissolved in water within the bottle (10).

9. Use of the pouch (20) according to any of the preceding claims, wherein the pouch is used for manual washing of dishes.



Figur 1



Figur 2

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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 8532

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Place of search	Date of completion of the search	Examiner
The Hague	9 September 2021	Gault, Nathalie

CATEGORY OF CITED DOCUMENTS

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