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Description

Field of the Invention

[0001] This invention relates to a process for preparing stable non-cationic-based fabric conditioners and to the compositions obtained by the process.

Background of the Invention

[0002] It is well known to provide liquid fabric conditioning compositions which soften in the rinse cycle.

[0003] Such compositions are commonly available in both dilute and concentrated forms. Dilute products typically contain up to about 8 % by weight of active, whereas concentrated products may contain from about 8 to about 25 % by weight active. Compositions of more than about 25 % by weight of active are defined as "super concentrated", depending on the active system. The storage stability of these products, over a range of ambient temperatures, is an important issue in both dilute and concentrated forms. Viscosity changes, phase separation and olfactory/appearance changes are some of the markers of an unstable formulation and affect the pourability, dispensability etc of the product.

[0004] Conventional fabric conditioners contain cationic actives. Non-cationic conditioning materials such as sucrose polyesters, vegetable and mineral oils and soaps are less widely used. Liquid fabric conditioners containing cationic actives and those containing non-cationic actives have inherently different microstructures (cationic conditioners are characterised by a lamellar-type microstructure, whereas non-ionic based fabric conditioners are emulsion droplets stabilised in a crystal network). These two types of liquid microstructure present very different challenges to the skilled person seeking to improve the stability of the liquid.

[0005] There are two general routes to achieving a fabric conditioning composition of the required concentration. First, a synthesis whereby all of the ingredients are processed in a high aqueous media such that the product is produced at the concentration at which it is used by the consumer. The second route involves the formation of a low aqueous concentrated format, which is subsequently diluted to the required concentration either by the manufacturer or by the consumer. Both routes are well known for the production of stable cationic based fabric conditioners.

[0006] WO2003/022972 discloses a method for preparing concentrated and super concentrated fabric conditioner compositions comprising cationic ester-linked quaternary ammonium softening active, fatty complexing agent and perfume, wherein the method comprises the steps of co-melting the cationic active and the fatty complexing agent, adding the co-melt to heated water, agitating and cooling the mixture, with the addition of perfume taking place at or above the melting point of the co-melt.

[0007] WO2006/124338 discloses fabric conditioning compositions comprising cationic fabric conditioner actives, and a polyol. Non-cationic actives, including sugar polyesters may optionally be included.

[0008] Our as yet unpublished, co-pending application GB0610801.3 discloses liquid fabric treatment compositions comprising from 50 to 92% by weight of water, and a mixture of non-cationic actives *viz* from 1 to 15% by weight of one or more alkylated sugars, from 1 to 15% by weight of one or more fatty acids, from 5 to 25% by weight of one or more fatty acid esters, and from 1 to 15% by weight of fatty acid soap.

[0009] We have now found that the processing method used in the production of fabric conditioners comprising a mixture of non-cationic actives (namely alkylated sugars, fatty acids and their esters and fatty acid soap) has a surprisingly big impact on the physical stability of the end product. We have found that the product of the high aqueous route is unstable and suffers from phase separation, whereas a conditioner prepared initially in a concentrated form, and then subsequently diluted (by the manufacturer or by the consumer) has a stable and useable micro-structure. The advantage of the latter route over the alternative high aqueous synthesis is much bigger than expected.

Statement of the Invention

[0010] In a first aspect of the invention there is provided a process for the preparation of a dilute liquid fabric treatment composition, in the form of a stable emulsion, comprising the steps of:-

a) preparing a concentrated premix,
b) allowing the premix to crystallise and form a crystalline premix, and
c) diluting the crystalline premix with water;

wherein the composition comprises:

(i) from 50 to 92% by weight of water;
(ii) from 1 to 15% by weight of one or more alkylated sugars;

(iii) from 1 to 15% by weight of one or more fatty acids;
(iv) from 5 to 25% by weight of one or more fatty acid esters; and
(v) from 1 to 15% by weight of fatty acid soap;

and wherein the emulsion has a viscosity of from 800 to 6000 $mPas^{-1}$ measured at 20°C using a spindle No. 2 at 10 r.p.m.

[0011] There is also provided in a second aspect, a composition obtainable by the process according to the first aspect of the invention.

[0012] In a further aspect of the invention, there is provided a method of treating textiles wherein the composition of the second aspect of the invention is applied to the textiles during a laundering process.

Detailed Description of the Invention

The Process

[0013] A concentrated premix is prepared by co-melting one or more alkylated sugars, one or more fatty acids, one or more fatty acid esters and fatty acid soap to form a co-melt. Suitable temperatures will be known to a person skilled in the art but may typically be in the range of from 50 to 100°C.

[0014] Alternatively, the fatty acid soap may be formed in-situ, in which case the temperature is preferably about 70°C.

[0015] Crystallisation of the premix may be achieved by any suitable method. The preferred method is by cooling the premix to below its crystallisation temperature. The crystallisation temperature is normally dependant on the fatty acid used and is usually below 50°C.

[0016] The crystalline premix is then diluted with water such that a final composition results which comprises from 50 to 92 wt % of water.

The Composition

[0017] The composition of the invention is an emulsion.

[0018] The emulsion has a viscosity of from 800 to 6000 $mPas^{-1}$ measured at 20°C using a spindle No. 2 at 10 r.p.m. Suitable methods for measuring viscosity of viscous materials are given in "Corporate Test Method 004", Dow Corning Corporation, July 29, 1970. A preferred method is the use of a Brookfield DV-II+ Pro, with an RV spindle No. 2 operating at 10 r.p.m.

Alkylated Sugar

[0019] The alkylated sugar, also referred to as an oily sugar derivative, is a liquid or soft solid derivative of a cyclic polyol or of a reduced saccharide. The sugar is typically is typically derivatised by esterifying or etherifying from 10 to 100%, more preferably 20 to 100%, e.g. from 35 to 100% of the hydroxyl groups in the polyol or saccharide. The derivative usually has two or more ester or ether groups independently attached to a C_8-C_{22} alkyl or alkenyl chain.

[0020] The oily sugar derivatives of the invention are also referred to herein as "derivative-CP" and "derivative-RS" dependent upon whether the derivative is a product derived from a cyclic polyol or from a reduced saccharide starting material respectively.

[0021] Preferably the derivative-CP and derivative-RS contain 35% by weight tri or higher esters, e.g. at least 40%.

[0022] Preferably 35 to 85% most preferably 40 to 80%, even more preferably 45 to 75%, such as 45 to 70% of the hydroxyl groups in said cyclic polyol or in said reduced saccharide are esterified or etherified to produce the derivative-CP and derivative-RS respectively.

[0023] For the derivative-CP and derivative-RS, the tetra, penta etc prefixes only indicate the average degrees of esterification or etherification. The compounds exist as a mixture of materials ranging from the monoester to the fully esterified ester. It is the average degree of esterification as determined by weight that is referred to herein.

[0024] The derivative-CP and derivative-RS used do not have substantial crystalline character at 20°C. Instead they are preferably in a liquid or soft solid state, as hereinbelow defined, at 20°C.

[0025] The starting cyclic polyol or reduced saccharide material is esterified or etherified with C_8-C_{22} alkyl or alkenyl chains to the appropriate extent of esterification or etherification so that the derivatives are in the requisite liquid or soft solid state. These chains may contain unsaturation, branching or mixed chain lengths.

[0026] Typically the derivative-CP or derivative-RS has 3 or more, preferably 4 or more, for example 3 to 8, e.g. 3 to 5, ester or ether groups or mixtures thereof. It is preferred if two or more of the ester or ether groups of the derivative-CP and derivative-RS are independently of one another attached to a C_8 to C_{22} alkyl or alkenyl chain. The alkyl or alkenyl groups may be branched or linear carbon chains.

[0027] The derivative-CPs are preferred for use as the oily sugar derivative. Inositol is a preferred cyclic polyol, and

Inositol derivatives are especially preferred.

[0028] In the context of the present invention the terms derivative-CP and derivative-RS encompass all ether or ester derivatives of all forms of saccharides, which fall into the above definition. Examples of preferred saccharides for the derivative-CP and derivative-RS to be derived from are monosaccharides and disaccharides.

[0029] Examples of monosaccharides include xylose, arabinose, galactose, fructose, sorbose and glucose. Glucose is especially preferred. An example of a reduced saccharide is sorbitan. Examples of disaccharides include maltose, lactose, cellobiose and sucrose. Sucrose is especially preferred.

[0030] If the derivative-CP is based on a disaccharide it is preferred if the disaccharide has 3 or more ester or ether groups attached to it. Examples include sucrose tri, tetra and penta esters.

[0031] Where the cyclic polyol is a reducing sugar it is advantageous if each ring of the derivative-CP has one ether group, preferably at the C_1 position. Suitable examples of such compounds include methyl glucose derivatives.

[0032] Examples of suitable derivative-CPs include esters of alkyl(poly)glucosides, in particular alkyl glucoside esters having a degree of polymerisation from 1 to 2.

[0033] The HLB of the derivative-CP and derivative-RS is typically between 1 and 3.

[0034] The derivative-CP and derivative-RS may have branched or linear alkyl or alkenyl chains (with varying degrees of branching), mixed chain lengths and/or unsaturation. Those having unsaturated and/or mixed alkyl chain lengths are preferred.

[0035] One or more of the alkyl or alkenyl chains (independently attached to the ester or ether groups) may contain at least one unsaturated bond.

[0036] For example, predominantly unsaturated fatty chains may be attached to the ester/ether groups, e.g. those attached may be derived from rape oil, cotton seed oil, soybean oil, oleic, tallow, palmitoleic, linoleic, erucic or other sources of unsaturated vegetable fatty acids.

[0037] The alkyl or alkenyl chains of the derivative-CP and derivative-RS are preferably predominantly unsaturated, for example sucrose tetratallowate, sucrose tetrarapeate, sucrose tetraoleate, sucrose tetraesters of soybean oil or cotton seed oil, cellobiose tetraoleate, sucrose trioleate, sucrose triapeate, sucrose pentaoleate, sucrose pentarapeate, sucrose hexaoleate, sucrose hexarapeate, sucrose triesters, pentaesters and hexaesters of soybean oil or cotton seed oil, glucose trioleate, glucose tetraoleate, xylose trioleate, or sucrose tetra-,tri-, penta- or hexa- esters with any mixture of predominantly unsaturated fatty acid chains.

[0038] However some derivative-CPs and derivative-RSs may be based on alkyl or alkenyl chains derived from polyunsaturated fatty acid sources, e.g. sucrose tetralinoleate. It is preferred that most, if not all, of the polyunsaturation has been removed by partial hydrogenation if such polyunsaturated fatty acid chains are used.

[0039] The most highly preferred liquid or soft solid derivative-CPs and derivative-RSs are any of those mentioned in the above three paragraphs but where the polyunsaturation has been removed through partial hydrogenation.

[0040] Particularly effective derivative-CPs and derivative-RSs are obtained by using a fatty acid mixture (to react with the starting cyclic polyol or reduced saccharide) which comprises a mixture of tallow fatty acid and oleyl fatty acid in a weight ratio of 10:90 to 90:10, more preferably 25:75 to 75:25, most preferably 30:70 to 70:30. A fatty acid mixture comprising a mixture of tallow fatty acid and oleyl fatty acid in a weight ratio of 60:40 to 40:60 is especially preferred.

[0041] Particularly preferred are fatty acid mixtures comprising a weight ratio of approximately 50wt% tallow chains and 50wt% oleyl chains. It is especially preferred that the fatty acid fieldstock for the chains consists of only tallow and oleyl fatty acids.

[0042] Preferably 40% or more of the chains contain an unsaturated bond, more preferably 50% or more, most preferably 60% or more e.g. 65% or 95%.

[0043] Oily sugar derivatives suitable for use in the compositions include sucrose pentalaurate, sucrose tetraoleate, sucrose pentaerucate, sucrose tetraerucate, and sucrose pentaoleate and the like. Suitable materials include some of the Ryoto series available from Mitsubishi Kagaku Foods Corporation.

[0044] The liquid or soft solid derivative-CPs and derivative-RSs are characterised as materials having a solid:liquid ratio of between 50:50 and 0:100 at 20°C as determined by T_2 relaxation time NMR, preferably between 43:57 and 0:100, most preferably between 40:60 and 0:100, such as, 20:80 and 0:100. The T_2 NMR relaxation time is commonly used for characterising solid:liquid ratios in soft solid products such as fats and margarines. For the purpose of the present invention, any component of the NMR signal with a T_2 of less than 100 microsecond is considered to be a solid component and any component with T_2 greater than 100 microseconds is considered to be a liquid component.

[0045] The liquid or soft solid derivative-CPE and derivative-RSE can be prepared by a variety of methods well known to those skilled in the art. These methods include acylation of the cyclic polyol or of a reduced saccharide with an acid chloride; trans-esterification of the cyclic polyol or of a reduced saccharide material with short chain fatty acid esters in the presence of a basic catalyst (e.g. KOH); acylation of the cyclic polyol or of a reduced saccharide with an acid anhydride, and, acylation of the cyclic polyol or of a reduced saccharide with a fatty acid. Typical preparations of these materials are disclosed in US 4 386 213 and AU 14416/88 (Procter and Gamble).

[0046] The compositions comprise between 1%-15% wt of alkylated sugar, preferably 3-10% wt, based on the total

weight of the composition.

Fatty Acid

[0047] A fatty acid is present in the composition.

[0048] Any reference to "fatty acid" herein means "free fatty acid" unless otherwise stated and it is to be understood that any fatty acid which is reacted with another ingredient is not defined as a fatty acid in the final composition, except insofar as free fatty acid remains after the reaction.

[0049] Preferred fatty acids are those where the weighted average number of carbons in the alkyl/alkenyl chains is from 8 to 24, more preferably from 10 to 22, most preferably from 12 to 18.

[0050] The fatty acid can be saturated or unsaturated.

[0051] The fatty acid may be an alkyl or alkenyl mono- or polycarboxylic acid, though monocarboxylic acids are particularly preferred.

[0052] The fatty acid can be linear or branched. Non-limiting examples of suitable branching groups include alkyl or alkenyl groups having from 1 to 8 carbon atoms, hydroxyl groups, amines, amides, and nitriles.

[0053] Suitable fatty acids include both linear and branched stearic, oleic, lauric, linoleic, and tallow - especially hardened tallow - acids, and mixtures thereof.

[0054] The amount of free fatty acid is preferably from 1 to 15wt%, preferably from 2 to 5wt%, based on the total weight of the composition.

Fatty Acid Ester

[0055] The composition comprises one or more fatty acid esters.

[0056] Suitable fatty acid esters are fatty esters of mono or polyhydric alcohols having from 8 to about 24 carbon atoms in the fatty acid chain. Such fatty esters are preferably substantially odourless.

[0057] The fatty acid ester is present in an amount of from 5 to 25wt%, preferably 8 to 20wt%, based on the total weight of the composition.

Fatty Acid Soap

[0058] A fatty acid soap is present in the composition.

[0059] Useful soap compounds include the alkali metal soaps such as the sodium, potassium, ammonium and substituted ammonium (for example monoethanolamine) salts or any combinations of this, of higher fatty acids containing from about 8 to 24 carbon atoms.

[0060] In a preferred embodiment of the invention the fatty acid soap has a carbon chain length of from C_{10} to C_{22}, more preferably C_{12} to C_{20}.

[0061] Suitable fatty acids can be obtained from natural sources such as plant or animal esters e.g. palm oil, coconut oil, babassu oil, soybean oil, caster oil, rape seed oil, sunflower oil, cottonseed oil, tallow, fish oils, grease lard and mixtures thereof. Also fatty acids can be produced by synthetic means such as the oxidation of petroleum, or hydrogenation of carbon monoxide by the Fischer Tropsch process. Resin acids are suitable such as rosin and those resin acids in tall oil. Naphthenic acids are also suitable. Sodium and potassium soaps can be made by direct saponification of the fats and oils or by the neutralisation of the free fatty acids which are prepared in a separate manufacturing process.

[0062] Particularly useful are the sodium and potassium salts and the mixtures of fatty acids derived from coconut oil and tallow, i.e. sodium tallow soap, sodium coconut soap, potassium tallow soap, potassium coconut soap.

[0063] For example Prifac 5908 a fatty acid from Uniqema which was neutralised with caustic soda. This soap is an example of a fully hardened or saturated lauric soap, which in general is based on coconut or palm kernel oil.

[0064] Also mixtures of coconut or palm kernel oil and for example palm oil, olive oil, or tallow can be used. In this case more palmitate with 16 carbon atoms, stearate with 18 carbon atoms, palmitoleate with 16 carbon atoms and with one double bond, oleate with 18 carbon atoms and with one double bond and/or linoleate with 18 carbon atoms and with two double bonds are present.

[0065] Thus, the soap may be saturated or unsaturated

[0066] It is particularly preferred that the alkali metal hydroxide is potassium or sodium hydroxide, especially potassium hydroxide.

[0067] The fatty acid soap is present at a level of from 1 to 15wt%, more preferably from 3 to 10wt%, based on the total weight of the composition.

[0068] The soap is preferably formed in situ.

[0069] The method of preparing the soap comprises the steps of reacting together, in the presence of water, an ester-containing soap precursor, a base material, and optionally a solvent to produce one or more soaps and a plasticiser.

Ester-containing Soap Precursor

[0070] The precursor is an agent which, under the desired conditions, liberates soap and a lower alcohol plasticiser.

[0071] Particularly preferred ester-containing soap precursors include fatty acid esters, particularly fatty acid triglycerides and alkylated sugar esters, particularly sucrose polyesters as described above.

Base Material

[0072] A base, which may be either inorganic or organic.

[0073] Inorganic bases are particularly preferred. Suitable examples of inorganic bases include alkali metal hydroxides or alkaline earth metal hydroxides. Potassium hydroxide and sodium hydroxide are particularly preferred.

[0074] Organic bases suitable for use in the method of the present invention include secondary, and tertiary amines, such as dimethylamine and triethanolamine.

[0075] The soap may be prepared in premix from which the final composition is prepared. It is preferred that the level of base material is from 0.5 to 20wt%, more preferably from 2 to 15wt%, most preferably from 4 to 10wt%, e.g. from 5 to 8wt%, based on the total weight of the premix. It is preferred that the level of ester-containing soap precursor is from 0.5 to 60wt%, more preferably from 2 to 30wt%, most preferably from 5 to 20wt%, e.g. from 8 to 15wt%, based on the total weight of the premix.

[0076] In the reaction, it is preferred that the weight ratio of ester-containing soap precursor to base material is from 80 to 1, more preferably from 60 to 1, most preferably from 30 to 1, e.g. from 15 to 1.

Water in the Premix

[0077] The reaction takes place in the presence of water.

[0078] It is preferred that the level of water in the premix is from 0.1 to 20wt%, more preferably from 1 to 10wt%, most preferably from 2 to 5wt%, e.g. from 1 to 4wt%, based on the total weight of the premix.

Solvent

[0079] Solvents can be present in the premix and/or the final composition. Preferred solvents include ethers, polyethers, alkylamines and fatty amines, (especially di- and trialkyl- and/or fatty-N- substituted amines), alkyl (or fatty) amides and mono- and di- N-alkyl substituted derivatives thereof, alkyl (or fatty) carboxylic acid lower alkyl esters, ketones, aldehydes, polyols, and glycerides.

[0080] Specific examples include respectively, di-alkyl ethers, polyethylene glycols, alkyl ketones (such as acetone) and glyceryl trialky1carboxylates (such as glyceryl tri-acetate), glycerol, propylene glycol, dipropylene glycol and sorbitol. Dipropylene glycol is particularly preferred.

[0081] Glycerol is particularly preferred since it provides the additional benefit of plasticising the water soluble film.

[0082] Other suitable solvents are lower (C14) alcohols, such as ethanol, or higher (C5-9) alcohols, such as hexanol, as well as alkanes and olefins. It is often desirable to include them for lowering the viscosity of the product and/or assisting soil removal during cleaning.

[0083] Preferably, the solvent is present in the premix at a level of at least 0.1% by weight of the total premix. The amount of the solvent present may be as high as about 60%, but in most cases the practical amount will lie between 1 and 30% and sometimes, between 2 and 20% by weight of the premix.

[0084] In the final composition the amount of solvent is generally from 1 to 15wt%, preferably 2 to 7wt%, based on the total weight of the composition.

[0085] It is to be understood that certain solvents which are also plasticisers, e.g. lower alcohols and polyols, can also be produced by the reaction of the soap precursor and base material. Such plasticisers are described below.

Reaction Conditions

[0086] It is desirable that the reaction takes place at elevated temperature. In particular, the reaction is preferably carried out at a temperature of from 50 to 100°C, more preferably 60 to 80°C in order that the process is more economically viable.

[0087] In a most preferred method, the soap precursor is heated to 60 to 80°C, after which the base material is added and the mixture stirred for between 10 minutes and 4 hours. After this time, other ingredients are added.

Plasticiser

[0088] The reaction of the soap precursor and the base material preferably liberate a plasticiser. Typically the plasticiser is a lower alcohol.

[0089] Examples of plasticisers which can be produced by the method of the invention include lower (C1-4) alcohols, such as ethanol, or higher (C5-9) alcohols, such as hexanol, as well as polyols such as glycerol.

[0090] Preferably, the level of plasticiser is at least 0.1% by weight of the total composition. The amount of the solvent present in the composition may be as high as about 60%, but in most cases the practical amount will lie between 1 and 30% and sometimes, between 2 and 20% by weight of the composition.

Nonionic Surfactant

[0091] Nonionic surfactants suitable for use in the compositions include any of the alkoxylated materials of the particular type described hereinafter can be used as the nonionic surfactant.

[0092] Substantially water soluble surfactants of the general formula:

$$R\text{-}Y\text{-}(C_2H_4O)_z\text{-}C_2H_4OH$$

where R is selected from the group consisting of primary, secondary and branched chain alkyl and/or acyl hydrocarbyl groups; primary, secondary and branched chain alkenyl hydrocarbyl groups; and primary, secondary and branched chain alkenyl-substituted phenolic hydrocarbyl groups; the hydrocarbyl groups having a chain length of from 8 to about 25, preferably 10 to 20, e.g. 14 to 18 carbon atoms.

[0093] In the general formula for the ethoxylated nonionic surfactant, Y is typically:

--O--, --C(O)O--, --C(O)N(R)-- or --C(O)N(R)R--

in which R has the meaning given above or can be hydrogen; and Z is at least about 3, preferably about 5, more preferably at least about 7 or 11.

[0094] Preferably the nonionic surfactant has an HLB of from about 7 to about 20, more preferably from 10 to 18, e.g. 12 to 16.

[0095] Examples of nonionic surfactants follow. In the examples, the integer defines the number of ethoxy (EO) groups in the molecule.

A. Straight-Chain, Primary Alcohol Alkoxylates

[0096] The deca-, undeca-, dodeca-, tetradeca-, and pentadecaethoxylates of n-hexadecanol, and n-octadecanol having an HLB within the range recited herein are useful viscosity/dispersibility modifiers in the context of this invention. Exemplary ethoxylated primary alcohols useful herein as the viscosity/dispersibility modifiers of the compositions are C_{18} EO(10); and C_{18} EO(11). The ethoxylates of mixed natural or synthetic alcohols in the "tallow" chain length range are also useful herein. Specific examples of such materials include tallow alcohol-EO(11), tallow alcohol-EO(18), and tallow alcohol-EO(25).

B. Straight-Chain, Secondary Alcohol Alkoxylates

[0097] The deca-, undeca-, dodeca-, tetradeca-, pentadeca-, octadeca-, and nonadeca-ethoxylates of 3-hexadecanol, 2-octadecanol, 4-eicosanol, and 5-eicosanol having an HLB within the range recited herein are useful viscosity and/or dispersibility modifiers in the context of this invention. Exemplary ethoxylated secondary alcohols useful herein as the viscosity and/or dispersibility modifiers of the compositions are: C_{16} EO(11); C_{20} EO(11); and C_{16}EO(14).

C. Alkyl Phenol Alkoxylates

[0098] As in the case of the alcohol alkoxylates, the hexa- to octadeca-ethoxylates of alkylated phenols, particularly monohydric alkylphenols, having an HLB within the range recited herein are useful as the viscosity and/or dispersibility modifiers of the instant compositions. The hexa- to octadeca-ethoxylates of p-tri-decylphenol, m-pentadecylphenol, and the like, are useful herein. Exemplary ethoxylated alkylphenols useful as the viscosity and/or dispersibility modifiers of the mixtures herein are: p-tridecylphenol EO(11) and p-pentadecylphenol EO(18).

[0099] As used herein and as generally recognized in the art, a phenylene group in the nonionic formula is the equivalent of an alkylene group containing from 2 to 4 carbon atoms. For present purposes, nonionics containing a phenylene

group are considered to contain an equivalent number of carbon atoms calculated as the sum of the carbon atoms in the alkyl group plus about 3.3 carbon atoms for each phenylene group.

D. Olefinic Alkoxylates

[0100] The alkenyl alcohols, both primary and secondary, and alkenyl phenols corresponding to those disclosed immediately hereinabove can be ethoxylated to an HLB within the range recited herein and used as the viscosity and/or dispersibility modifiers of the instant compositions.

E. Branched Chain Alkoxylates

[0101] Branched chain primary and secondary alcohols which are available from the well-known "OXO" process can be ethoxylated and employed as the viscosity and/or dispersibility modifiers of compositions herein.

[0102] The above ethoxylated nonionic surfactants are useful in the present compositions alone or in combination, and the term "nonionic surfactant" encompasses mixed nonionic surface active agents.

[0103] The nonionic surfactant is preferably present in an amount from 0.1 to 5%, more preferably 0.5 to 2% by weight, based on the total weight of the composition.

Perfume

[0104] It is desirable that the compositions of the present invention also comprise one or more perfumes. Suitable perfume ingredients include those disclosed in "Perfume and Flavour Chemicals (Aroma Chemicals)", by Steffen Arctander, published by the author in 1969, the contents of which are incorporated herein by reference.

[0105] The perfume is preferably present in the composition at a level of from 0.1 to 15wt%, more preferably from 0.5 to 5wt% based on the total weight of the composition.

[0106] As used herein and in the appended claims the term "perfume" is used in its ordinary sense to refer to and include any non-water soluble fragrant substance or mixture of substances including natural (i.e. obtained by extraction of flower, herb, blossom or plant), artificial (i.e. mixture of natural oils or oil constituents) and synthetically produced odoriferous substances. Typically, perfumes are complex mixtures of blends of various organic compounds such as alcohols, aldehydes, ethers, aromatic compounds and varying amounts of essential oils (e.g., terpenes) such as from 0% to 80%, usually from 1% to 70% by weight, the essential oils themselves being volatile odoriferous compounds and also serving to dissolve the other components of the perfume.

Cationic Polymer

[0107] It is desirable that the composition further comprises a cationic polymer. The cationic polymer significantly boosts softening performance on fabrics delivered by the composition.

[0108] A particularly preferred class of cationic polymer is cationic celloluse ethers. Such ethers are commercially available under the tradename Ucare LR-400 ([2-hydroxy-3(trimethylammonio)propyl]-w-hydroxypoly(oxy-1,2-ethanediyl)chloride) or the Jaguar polymers such as Guar hydroxypropyl trimonium chloride, Jaguar C13 ex Rhodia.

[0109] The polymer is preferably present at a level of from 0.1 to 5wt%, more preferably from 0.2 to 2wt%, most preferably from 0.25 to 1wt%, based on the total weight of the composition.

Water

[0110] The final composition comprises from 50 to 92wt%, preferably from 60 to 92 wt%, more preferably from 70 to 90wt% based on the total weight of the composition.

Cationic Surfactants

[0111] The compositions of the invention are preferably substantially free, more preferably entirely free of cationic surfactants, since the compositions are primarily for use in the wash cycle of an automatic washing machine. Thus, it is preferred that the maximum amount of cationic surfactant present in the composition is 5wt% or less, more preferably 4wt% or less, even more preferably 3wt% or less, most preferably 2wt% or less, e.g. 1wt% or less, based on the total weight of the composition.

[0112] It is well known that anionic surfactants are typically present in the wash detergent and so would complex undesirably with any cationic surfactant in the composition thereby reducing the effectiveness of the wash detergent.

Other Optional Ingredients

[0113] The compositions may also contain one or more optional ingredients conventionally included in fabric treatment compositions such as pH buffering agents, perfume carriers, fluorescers, colourants, hydrotropes, antifoaming agents, antiredeposition agents, polyelectrolytes, enzymes, optical brightening agents, pearlescers, anti-shrinking agents, anti-wrinkle agents, anti-spotting agents, germicides, fungicides, anti-corrosion agents, drape imparting agents, anti-static agents, ironing aids crystal growth inhibitors, antioxidants, anti-reducing agents, dyes, and water activity modifiers such as sugars, salts, proteins and water soluble homo- and co-polymers.

Product Form

[0114] The product is in the form of a liquid which is provided to the customer in conventional containers, such as bottles, sachets etc. The composition may be concentrated providing the customer with the opportunity to dilute the composition with water and store the diluted composition prior to use. The composition may be dosed directly into the rinse water in hand washing or a washing machine or may be dosed in a drawer of an automatic washing machine.

[0115] In a further embodiment a super-concentrate may be prepared by substantially reducing the water content e.g. at least 4 fold or even to a substantially anhydrous composition. The super-concentrate may be shipped to appropriate destinations, thereby saving shipping costs, where it is diluted with water, generally by simple agitation at room temperature, to form compositions to be provided to the customer.

Example

[0116] The following Example illustrates a liquid laundry treatment composition used in the invention.

[0117] Unless otherwise specified, the amounts and proportions in the compositions and films are by weight.

Example 1: Preparation of composition E1

[0118] Coconut oil (48.3 g) and dipropylene glycol (49.8 g) were placed in a beaker fitted with an overhead stirrer, a water bath and a thermocouple. The ingredients were melted at 60°C and then warmed to 70°C. After 5 minutes at 70°C stearic acid (6.6 g) was added and the contents stirred at 800 r.p.m. until the stearic acid had solubilized and a clear solution had been obtained. Potassium hydroxide (50% aqueous solution, 23.3 g) was added over 15 minutes in 3 aliquots. The resulting exothermic reaction temperature was kept below 80°C. 10 minutes after the third aliquot of KOH was added, the mixture was cooled to 70°C. At 70°C a further quantity of stearic acid was added (20 g), and when this had dissolved, the contents were then cooled to 50°C. At 50°C Genapol C-200 (5 g; an ethoxylated non-ionic surfactant) and sucrose pentacocoate (Danox SCR-32 ex. Kao 133 g) were added. At about 45°C the free stearic acid started to crystallize to form an opaque structured liquid. At 40°C perfume (12 g), and Baypure CX-100 (50 % aqueous solution 1.98 g; tetra sodium amine disuccinate) were added and the mixture then cooled with stirring until it reached 30°C. At 30°C the agitation was stopped and the structured liquid allowed to mature for 24 hours. After 24 hours 70 g of the above mixture was placed in a beaker, with overhead stirring and demineralised water (120 g) at ambient temperature was added with stirring for 15 minutes. A white creamy aqueous product was formed. The aqueous product was left for 24 hours under ambient conditions. Phase separation and viscosity were then measured under ambient conditions over 1,2,6 weeks. The results are given in Table 1 below.

Example 2: Preparation of comparative composition A

[0119] Coconut oil (17.4 g), dipropylene glycol (18 g) and stearic acid (2.4 g) were mixed together. The mixture was melted at 70°C. At 70°C Potassium hydroxide (50 % aqueous solution 8.4 g) was added in 3 aliquots over 15 minutes keeping the exotherm below 80°C. The resulting clear solution was cooled to 70°C and a further amount of stearic acid added (7.2 g). After the free stearic acid was melted demineralised water (220 g at 70°C) was added and the mixture cooled to 50°C. At 50 C sucrose pentacocoate (ex. Kao Danox SCR-32 48 g) and Genapol C-200 (0.7 g) were added. At 40°C the perfume (4.4 g), and Baypure CX-100 (50 % aqueous solution 1.7 g). The mixture was cooled to ambient and a thin straw coloured liquid was formed, which was left to mature under ambient conditions for 24 hours. Phase separation and viscosity were then measured under ambient conditions over 1,2,6 weeks.

Measurements

[0120] The compositions E1 and A were placed in 200 ml plastic vials. The clear phase was measured from the bottom of the container by a ruler in mm.

[0121] The viscosity was measured at ambient temperature (20°C) using a Brookfield DV-II+ Pro, using an RV spindle No. 2 operating at 10 r.p.m..

Table 1:- Viscosity of compositions after storage for 1, 2 and 6 weeks.

Parameter	E1	A
Phase Separation		
1 week	0	2
2 weeks	0	9
6 weeks	0	16
Viscosity		
1 week	2900	180
2 weeks	3000	380
6 weeks	5000	700

[0122] The results show that the process of the invention results in a product that is far more phase stable and visco-stable compared with the alternative high aqueous processing route used to produce composition A.

Claims

1. A process for the preparation of a non-cationic based dilute liquid fabric treatment composition, in the form of a stable emulsion, comprising the steps of:-

a) preparing a concentrated premix,
b) allowing the premix to crystallise to form a crystalline premix, and
c) diluting the crystalline premix with water;

wherein the composition comprises:

(i) from 50 to 92% by weight of water;
(ii) from 1 to 15% by weight of one or more alkylated sugars;
(iii) from 1 to 15% by weight of one or more fatty acids;
(iv) from 5 to 25% by weight of one or more fatty acid esters; and
(v) from 1 to 15% by weight of fatty acid soap;

and wherein the emulsion has a viscosity of from 800 to 6000 $mPas^{-1}$ measured at 20°C using a spindle No. 2 at 10 r.p.m.

2. A process for preparing a composition as claimed in claim 1, which includes preparing the fatty acid soap in situ by reacting together:

an ester-containing soap precursor,
a base material,
and optionally a solvent,

in the presence of water, during step (a).

3. A process according to claim 2 wherein the reaction is carried out at a temperature of from 50 to 100°C, preferably 60 to 80°C.

4. A process according to claim 2 or claim 3 wherein the ester-containing soap precursor is an alkylated sugar ester.

5. A process according to claim 4 wherein the alkylated sugar ester is a sucrose polyester.

6. A process according to claim 2 wherein the ester-containing soap precursor is a fatty acid ester.

7. A process according to claim 6 wherein the fatty acid ester is a fatty acid triglyceride.

8. A process according to claim 2 wherein the base material is an inorganic base.

9. A process according to claim 8 wherein the base material is an alkali metal hydroxide.

10. A process according to claim 2 wherein the base material is an organic base.

11. A composition obtainable by the process according to claim 1.

12. A composition as claimed in claim 11 in which the fatty acid is present in an amount of from 2 to 5% by weight based on the total weight of the composition

13. A composition according to claim 11 or claim 12 wherein the alkylated sugar is present in an amount of from 3 to 10wt% based on the total weight of the composition.

14. A composition according to any one of claims 11 to 13 in which the fatty acid ester soap is present in an amount from 2 to 5% by weight based on the total composition.

15. A composition according to any one of claims 11 to 14 wherein the fatty acid ester is coconut oil.

16. A composition according to any one of claims 11 to 15 wherein the fatty acid ester is palm kernel oil.

17. A composition according to any one of claims 11 to 16 which additionally comprises the cationic cellulose ether deposition polymer in an amount of from 0.1 to 5% by weight based on the total weight of the composition.

18. A composition according to any one of claims 11 to 17 wherein the amount of water is from 70 to 92% by weight based on the total weight of the composition.

19. A method of treating textiles wherein the composition of any one of claims 11 to 18 is applied to the textiles during a laundering process.

Patentansprüche

1. Verfahren zur Herstellung einer nicht-kationisch basierten verdünnten flüssigen Textilbehandlungszusammensetzung in Form einer stabilen Emulsion, umfassend die Schritte:

    a) Herstellen einer konzentrierten Vormischung,
    b) Kristallisierenlassen der Vormischung, um eine kristalline Vormischung zu bilden, und
    c) Verdünnen der kristallinen Vormischung mit Wasser,

    wobei die Zusammensetzung umfasst:

    (i) von 50 bis 92 Gewichts-% Wasser,
    (ii) von 1 bis 15 Gewichts-% eines oder mehrerer alkylierter Zucker,
    (iii) von 1 bis 15 Gewichts-% einer oder mehrerer Fettsäuren,
    (iv) von 5 bis 25 Gewichts-% eines oder mehrerer Fettsäureester und
    (v) von 1 bis 15 Gewichts-% Fettsäureseife,

    und wobei die Emulsion eine Viskosität von 800 bis 6000 $mPas^{-1}$, gemessen bei 20°C unter Verwendung einer Spindel Nr. 2 bei 10 U/min, aufweist.

2. Verfahren zur Herstellung einer Zusammensetzung, wie im Anspruch 1 beansprucht, welche die Herstellung der Fettsäureseife in situ durch gemeinsames Umsetzen
einer Ester-haltigen Seifenvorstufe,

eines basischen Materials
und gegebenenfalls eines Lösungsmittels,
in Gegenwart von Wasser, während des Schrittes (a),
einbezieht.

3. Verfahren nach Anspruch 2, wobei die Umsetzung bei einer Temperatur von 50 bis 100°C, vorzugsweise 60 bis 80°C, durchgeführt wird.

4. Verfahren nach Anspruch 2 oder Anspruch 3, wobei die Ester-haltige Seifenvorstufe ein alkylierter Zuckerester ist.

5. Verfahren nach Anspruch 4, wobei der alkylierte Zuckerester ein Sucrosepolyester ist.

6. Verfahren nach Anspruch 2, wobei die Ester-haltige Seifenvorstufe ein Fettsäureester ist.

7. Verfahren nach Anspruch 6, wobei der Fettsäureester ein Fettsäuretriglycerid ist.

8. Verfahren nach Anspruch 2, wobei das basische Material eine anorganische Base ist.

9. Verfahren nach Anspruch 8, wobei das basische Material ein Alkalimetallhydroxid ist.

10. Verfahren nach Anspruch 2, wobei das basische Material eine organische Base ist.

11. Zusammensetzung, erhältlich durch das Verfahren nach Anspruch 1.

12. Zusammensetzung, wie in Anspruch 11 beansprucht, in welcher die Fettsäure in einer Menge von 2 bis 5 Gewichts-%, bezogen auf das Gesamtgewicht der Zusammensetzung, vorliegt.

13. Zusammensetzung nach Anspruch 11 oder Anspruch 12, wobei der alkylierte Zucker in einer Menge von 3 bis 10 Gew.-%, bezogen auf das Gesamtgewicht der Zusammensetzung, vorliegt.

14. Zusammensetzung nach irgendeinem der Ansprüche 11 bis 13, in welcher die Fettsäureesterseife in einer Menge von 2 bis 5 Gewichts-%, bezogen auf die gesamte Zusammensetzung, vorliegt.

15. Zusammensetzung nach irgendeinem der Ansprüche 11 bis 14, wobei der Fettsäureester Kokosnussöl ist.

16. Zusammensetzung nach irgendeinem der Ansprüche 11 bis 15, wobei der Fettsäureester ein Palmkernöl ist.

17. Zusammensetzung nach irgendeinem der Ansprüche 11 bis 16, die zusätzlich das kationische Celluloseether-Abscheidungspolymer in einer Menge von 0,1 bis 5 Gewichts-%, bezogen auf das Gesamtgewicht der Zusammensetzung, umfasst.

18. Zusammensetzung nach irgendeinem der Ansprüche 11 bis 17, wobei die Menge des Wassers von 70 bis 92 Gewichts-%, bezogen auf das Gesamtgewicht der Zusammensetzung, beträgt.

19. Verfahren zur Behandlung von Textilien, wobei die Zusammensetzung nach irgendeinem der Ansprüche 11 bis 18 während eines Waschverfahrens auf die Textilien aufgetragen wird.

Revendications

1. Procédé pour la préparation d'une composition de traitement de textile liquide diluée de base non-cationique, dans la forme d'une émulsion stable, comprenant les étapes de :

    a) préparation d'un pré-mélange concentré,
    b) laisser le pré-mélange se cristalliser pour former un pré-mélange cristallin, et
    c) diluer le pré-mélange cristallin avec de l'eau ;

    dans lequel la composition comprend :

(i) de 50 à 92 % en masse d'eau ;
(ii) de 1 à 15 % en masse d'un ou plusieurs sucres alkylés ;
(iii) de 1 à 15 % en masse d'un ou plusieurs acides gras ;
(iv) de 5 à 25 % en masse d'un ou plusieurs esters d'acides gras ; et
(v) de 1 à 15 % en masse de savon d'acide gras ;

et dans lequel l'émulsion présente une viscosité de 800 à 6 000 $mPas^{-1}$ mesurée à 20° C en utilisant une broche n° 2 à 10 tours par minute.

2. Procédé pour la préparation d'une composition selon la revendication 1, lequel comprend la préparation du savon d'acide gras in situ par réaction ensemble :

d'un précurseur de savon contenant un ester,
d'un matériau de base,
et éventuellement d'un solvant,

en présence d'eau, pendant l'étape (a).

3. Procédé selon la revendication 2, dans lequel la réaction est réalisée à une température de 50 à 100° C , de préférence de 60 à 80° C.

4. Procédé selon la revendication 2 ou la revendication 3, dans lequel le précurseur de savon contenant un ester est un ester de sucre alkylé.

5. Procédé selon la revendication 4, dans lequel l'ester de sucre alkylé est un polyester de saccharose.

6. Procédé selon la revendication 2, dans lequel le précurseur de savon contenant un ester est un ester d'acide gras.

7. Procédé selon la revendication 6, dans lequel l'ester d'acide gras est un triglycéride d'acide gras.

8. Procédé selon la revendication 2, dans lequel le matériau de base est une base inorganique.

9. Procédé selon la revendication 8, dans lequel le matériau de base est un hydroxyde de métal alcalin.

10. Procédé selon la revendication 2, dans lequel le matériau de base est une base organique.

11. Composition pouvant être obtenue par le procédé selon la revendication 1.

12. Composition selon la revendication 11, dans laquelle l'acide gras est présent dans une quantité de 2 à 5 % en masse rapportée à la masse totale de la composition.

13. Composition selon la revendication 11 ou la revendication 12, dans laquelle le sucre alkylé est présent dans une quantité de 3 à 10 % en masse rapportée à la masse totale de la composition.

14. Composition selon l'une quelconque des revendications 11 à 13, dans laquelle le savon d'ester d'acide gras est présent dans une quantité de 2 à 5 % en masse rapportée à la composition totale.

15. Composition selon l'une quelconque des revendications 11 à 14, dans laquelle l'ester d'acide gras est l'huile de noix de coco.

16. Composition selon l'une quelconque des revendications 11 à 15, dans laquelle l'ester d'acide gras est l'huile de palmiste.

17. Composition selon l'une quelconque des revendications 11 à 16 qui comprend de plus le polymère de dépôt d'éther de cellulose cationique dans une quantité de 0,1 à 5 % en masse rapportée à la masse totale de la composition.

18. Composition selon l'une quelconque des revendications 11 à 17, dans laquelle la quantité d'eau est de 70 à 92 % en masse rapportée à la masse totale de la composition.

19. Procédé de traitement de textiles dans lequel la composition selon l'une quelconque des revendications 11 à 18 est appliquée aux textiles pendant un procédé de lavage.

REFERENCES CITED IN THE DESCRIPTION

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