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(54) **Container for wet wipes**

(57) According to the present invention there is provided a sealable container. The container containing a

substrate which incorporates a composition comprising an anionic surfactant, a nonionic surfactant and an amphoteric and/or zwitterionic surfactant.

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DescriptionTechnical field

[0001] The present invention relates to a sealable container containing a substrate which incorporates a composition. The composition comprises a cleaning and/or antimicrobial compositions. The substrate in combination with the composition can be used to clean and/or disinfect animate surfaces (e.g., human skin, mouth and the like) and inanimate surfaces including, but not limited to, hard surfaces like walls, tiles, table tops, glass, bathroom surfaces, kitchen surfaces, dishes as well as fabrics, clothes, carpets and the like.

Background of the invention

[0002] Cleaning and/or disinfecting compositions are well known in the art. The compositions are available in many forms, for example, as liquids, sprays and more recently as wet wipes.

[0003] Wet wipes provide an easy and fast way of cleaning and/or disinfecting any kind of surfaces. Indeed, wet wipes may be utilised in a variety of applications both domestic and industrial. Typically, wet wipes are used to clean and/or disinfect animate surfaces (e.g., human skin, mouth and the like) and inanimate surfaces including, but not limited to, hard surfaces like walls, tiles, table tops, glass, bathroom surfaces, kitchen surfaces, dishes as well as fabrics, clothes, carpets and the like.

[0004] In general, such wet wipes essentially consist of a substrate which incorporates a composition. Indeed, the composition used for cleaning wet wipes has to exhibit at least some cleaning performance benefits. Disinfecting wet wipes can be similar to cleaning wet wipes, but the composition incorporated thereon additionally comprises a disinfecting material. It is generally recognised that such a disinfecting material greatly reduces or even eliminates micro-organisms, e.g., bacteria, existing on a surface. In other more preferred disinfecting compositions residual antimicrobial benefits are delivered over time (i.e., 12, 24 hrs) since the application is a non-rinsing one.

[0005] Wet wipes consisting of a substrate which incorporates a composition are already known in the art. For example, WO 89/05114 discloses disposable wipes for hard surface cleaning which are impregnated with a liquid composition.

[0006] However, the cleaning and/or disinfecting performance benefits of the currently used wet wipes may still be further improved. In addition to the cleaning and/or disinfecting performance benefits, other key benefits sought include reducing the presence of residue on drying of the composition and improving shine. These benefits can in some instance work against each other and thus it is the constant effort of the manufacturer to provide improved cleaning and/or disinfecting performance without negatively impacting the level of remaining residue and/or shine.

[0007] Furthermore, a drawback associated with the currently used wet wipes is that fluid, including the composition incorporated onto the substrate may partially or even completely evaporate during storage, resulting in the drying of the wipe. Drying of the wipe significantly reduces the cleaning and/or disinfecting performance originally provided by the wet wipes. Thus, wet wipes can be packaged in a closeable container, for example a plastic box, as described in the Applicant's co-pending patent application EP 99870131.2. However, the evaporation of the composition may still take place even though a closeable container is employed, this may for example be due to the insufficient sealing or complete lack of sealing provided by such containers and/or insufficient closing mechanisms of such containers. Thus, the reduction or prevention of the evaporation of the composition incorporated onto a substrate may still be further improved.

[0008] It is therefore an objective of the present invention to provide a cleaning and/or disinfecting wet wipe exhibiting improved cleaning, shine, suds suppression and reduced level of residue on drying and in addition, in disinfecting embodiments, improved disinfecting efficacy and at least maintain, but preferably improve residual disinfecting benefit.

[0009] It is a further objective of the present invention to provide cleaning and/or disinfecting wet wipe wherein the evaporation of the composition incorporated onto the substrate is reduced or even substantially prevented.

[0010] These objectives are met by the sealable container containing a substrate which incorporates a composition comprising a multiple surfactant system, according to the present invention.

Background art

[0011] WO 89/05114 discloses disposable impregnated wipes for cleaning hard surfaces impregnated with an aqueous composition comprising at least one water-miscible solvent.

[0012] US 4,666,621 discloses pre-moistened wipes for cleaning hard surfaces impregnated with a liquid cleaning solution comprising surfactants and up to 40% of a monohydric aliphatic alcohol of 1 to 6 carbon atoms.

[0013] WO 94/25554, WO 96/31586, WO 96/24655, WO 96/14378, WO 98/50507 as well as co-pending patent applications all describe compositions comprising alkyl sulphate, nonionic and betaine and/or amine oxide surfactants.

However, none of these prior art documents disclose the use of these combination of surfactants with a wet wipe.

Summary of the invention

[0014] The present invention encompasses a sealable container containing a substrate which incorporates a composition comprising an anionic surfactant, a nonionic surfactant and an amphoteric and/or zwitterionic surfactant.

Detailed description of the invention

Sealable Container

[0015] The present invention relates to a sealable container containing a wipe comprising a cleaning composition. The container as used herein must be sealable. Preferably the container is re-sealable, meaning that it can be opened and then re-sealed.

[0016] The container comprises a container body having at least one opening and a sealable element, more preferably a re-sealable element by which the container can be sealed.

[0017] The container may be for example a box, bag, pouch, envelope or any other suitable construction. The container is made using any suitable material. More preferably the container is made from plastic and/or metal.

[0018] In a particularly preferred embodiment the container herein is a box, wherein said box is molded from a polypropylene material or any other suitable thermoplastic materials such as polyethylene, polystyrene, acrylonitril butadiene styrene (ABS), polyester, polyvinyl chloride, polycarbonate or elastomer, or a blend of these compounds. In another particularly preferred embodiment the container herein is a pouch, wherein said pouch consists essentially of a laminate film of polyethylene, polypropylene and/or other suitable thermoplastic materials.

[0019] In a preferred embodiment the substrate incorporating the composition (i.e. the wipe) is housed within a pouch and the pouch housed within a box. The benefit of using such a container system of both box and pouch, is the further optimisation of the sealing capabilities of the container.

[0020] The sealable element may be, for example a lid, hatch, cover or any other suitable means which occludes the opening of the container body. In a preferred aspect of the present invention the container when sealed is substantially airtight. Thus when in the airtight sealed position, the container is substantially impermeable to air, even through the container opening.

[0021] In a preferred aspect of the present invention the container is as described in co-pending Application number EP 98870244.5.

Substrate

[0022] The substrate according to the present invention incorporates a composition comprising a surfactant system. The substrate is provided by a web, typically as a sheet of material cut from the web.

[0023] The web may be woven or nonwoven, foam, sponge, battings, balls, puffs, films, or tissue paper comprising synthetic and/or man-made fibres. Most preferably the web is nonwoven comprising synthetic and/or man-made fibres.

[0024] According to the present invention the web may be produced by any method known in the art. For example nonwoven material substrates can be formed by dry forming techniques such as air-laying or wet laying, such as on a paper making machine. Other nonwoven manufacturing techniques such as melt blown, spun bonded, needle punched and spun laced methods may also be used. A preferred method is air laying.

[0025] While various embodiments of a web, to provide a substrate, are within the scope of the present invention and are detailed below, in a preferred embodiment the web is air-laid and non-woven comprising man-made fibres.

[0026] Man-made fibres, as used herein, includes fibres manufactured from cellulose, either derivative or regenerated. They are distinguishable from synthetic fibres which are based on synthetic organic polymers. A derivative fibre, as used herein, is a fibre formed when a chemical derivative of a natural polymer, e.g., cellulose, is prepared, dissolved, and extruded as a continuous filament, and the chemical nature of the derivative is retained after the fibre formation process. A regenerated fibre, as used herein, is a fibre formed when a natural polymer, or its chemical derivative, is dissolved and extruded as a continuous filament, and the chemical nature of the natural polymer is either retained or regenerated after the fibre formation process. Typical examples of man made fibres include: regenerated viscose rayon and cellulose acetate. Preferred man-made fibres have a fineness of 0.5 dtex to 3.0 dtex, more preferably of 1.0 dtex to 2.0 dtex, most preferably of 1.6 dtex to 1.8 dtex.

[0027] Preferred man-made fibres used in the present invention are Lyocell® fibres that are produced by dissolving cellulose fibres in N-methylmorpholine-N-oxide and which are supplied by Tencel Fibres Europe, UK.

[0028] Man-made fibres are preferred herein due to their high consumer acceptance and their cheap and typically ecological production. Importantly, man-made fibres and in particular cellulose derived man-made fibres, exhibit a high

biodegradability and hence are environment friendly after disposal.

[0029] According to the present invention the web may comprise man-made fibres at a level of preferably from 5% to 50%, more preferably from 10% to 30%, most preferably from 12% to 25%. Preferably, the web may further comprise a number of different fibre materials. Such fibre materials include hydrophilic fibre material such as viscose, cotton, or flax and hydrophobic fibre material such as polyethylene terephthalate (PET) or polypropylene (PP). In a preferred aspect the hydrophilic and hydrophobic fibres are present in a ratio of 10%-90% hydrophilic and 90%-10% hydrophobic material by weight. A particularly preferred web comprises 70% wood pulp, 12% man-made fibres and 18% latex binder, preferably a butadiene-styrene emulsion.

[0030] The web preferably has a weight of at least 20 gm⁻² and preferably less than 150 gm⁻², and most preferably the base weight is in the range of 20 gm⁻² to 100 gm⁻², more preferably from 50 gm⁻² to 95 gm⁻². The web may have any calliper. Typically, when the web is made by an air laying process, the average web calliper is less than 1.0 mm. More preferably the average calliper of the web is from 0.1 mm to 0.9 mm. The web calliper is measured according to standard EDANA nonwoven industry methodology, reference method # 30.4-89.

[0031] In addition to the fibres used to make the web, the web can comprise other components or materials added thereto as known in the art, including binders as specified. Furthermore, the web may also comprise agents to improve the optical characteristics of the web, such as opacifying agents, for example titanium dioxide.

[0032] According to the present invention the web may comprise a non-acrylate binder. The term "binder" as used herein describes any agent employed to interlock fibers. Such agents comprise wet strength resins and dry strength resins. It is often desirable particularly for cellulose based materials to add chemical substances known in the art as wet strength resins. A general dissertation on the types of wet strength resins utilised namely in the paper art can be found in TAPPI monograph series No. 29, Wet Strength in Paper and Paperboard, Technical Association of the Pulp and Paper Industry (New York, 1965). In addition to wet strength additives, it can also be desirable to include certain dry strength and lint control additives known in the art such as starch binders.

[0033] Preferred binders used to bond non-wovens are polymeric binders, preferably latex binders, more preferably waterborne latex binders. Suitable binders include butadiene-styrene emulsions, ethylene vinyl acetate emulsions, vinyl acetate, vinyl chloride and combinations thereof. Preferred latex binders are made from styrene, butadiene, acrylonitrile-butadiene emulsions or combination thereof.

[0034] The term non-acrylate binder, as used herein, encompasses all latex binders that do not comprise acrylic acid or acrylic acid ester or vinyl acetate monomers. Preferred binders according to the present invention include: Butadiene-styrene emulsions, carboxylated styrene-butadiene emulsion, Acrylonitrile-butadiene emulsions, polyacrylamide resins, Polyamide-epichlorohydrin resin, Acrylonitrile-Butadiene-Styrene emulsion, Styrene Acrylonitrile. The most preferred binder according the present invention is a butadiene-styrene emulsion, which can be commercially obtained from the Ameribol Svnpol Corp. as Rowene™ SB 5550.

[0035] The binder can be applied to the web by any method known in the art. Suitable methods include spraying, printing (e.g. flexographic printing), coating (e.g. gravure coating or flood coating), padding, foaming, impregnation, saturation and further extrusion whereby the composition is forced through tubes in contact with the substrate whilst the substrate passes across the tube or combinations of these application techniques. For example spraying the composition on a rotating surface such as calendar roll that then transfers the composition to the surface of the substrate. The most preferred method for the application of the binder is spraying onto the web. Most preferably the binder is sprayed onto one side of the web in one step of application and onto the other side of the web in a independent step of application.

[0036] Typically, the amount of the binder applied to the web, as measured in weight % of the dry weight of the fibres comprised by the web, is from 5% to 30%, more preferably from 10% to 25 %, most preferably from 14% to 22%. Of course the amount of binder to be applied largely depends on the kind of web to be treated.

[0037] According to a preferred embodiment of the present invention the substrate incorporates a cleaning composition as described herein. By "incorporates" it is meant herein that said substrate or wet wipe is coated or impregnated with a liquid cleaning composition as described herein.

[0038] In preparing wet wipes according to the present invention, the composition is applied to at least one surface of the substrate material. The composition can be applied at any time during the manufacture of the wet wipe. Preferably the composition can be applied to the substrate after the substrate has been dried. Any variety of application methods that evenly distribute lubricious materials having a molten or liquid consistency can be used. Suitable methods include spraying, printing, (e.g. flexographic printing), coating (e.g. gravure coating or flood coating) extrusion whereby the composition is forced through tubes in contact with the substrate whilst the substrate passes across the tube or combinations of these application techniques. For example spraying the composition on a rotating surface such as calendar roll that then transfers the composition to the surface of the substrate. The composition can be applied either to one surface of the substrate or both surfaces, preferably both surfaces. The preferred application method is extrusion coating.

[0039] The composition can also be applied uniformly or non uniformly to the surfaces of the substrate. By non

uniform it is meant that for example the amount, pattern of distribution of the composition can vary over the surface of the substrate. For example some of the surface of the substrate can have greater or lesser amounts of composition, including portions of the surface that do not have any composition on it. Preferably however the composition is uniformly applied to the surfaces of the wipes. The composition is typically applied in an amount of from about 0.5 g to 10 g per gram of substrate, preferably from 1.0 g to 5 g per gram of substrate, most preferably from 2 g to 4 g per gram of dry substrate.

[0040] Preferably, the composition can be applied to the substrate at any point after it has been dried. For example the composition can be applied to the substrate preferably after calendaring and prior to being wound up onto a parent roll. Typically, the application will be carried out on a substrate unwound from a roll having a width equal to a substantial number of wipes it is intended to produce. The substrate with the composition applied thereto is then subsequently perforated utilising standard techniques in order to produce the desired perforation line.

Composition

[0041] The composition of the present invention is preferably suitable for use as a cleaning and/or disinfecting composition. The compositions may be formulated in any suitable form for example as a solid, paste or liquid. In the case where the compositions according to the present invention are formulated as solids, they can be applied to the substrate as a solid or alternatively can be mixed with an appropriate solvent, typically water, before application to the substrate. Where the composition is in liquid form, the compositions are preferably but not necessarily formulated as aqueous compositions. Liquid compositions are preferred herein for convenience of use.

[0042] In a preferred embodiment the liquid compositions according to the present invention are aqueous compositions typically comprising from 50% to 99.9% by weight of the total composition of water, preferably from 70% to 99% and more preferably from 80% to 99%. These aqueous compositions preferably have a pH as is of not more than 13.0, more preferably from 1 to 11, and most preferably from 2 to 10. The pH of the compositions can be adjusted by using organic or inorganic acids, or alkalinising agents.

[0043] Suitable organic acids include citric acid, lactic acid and mixtures thereof. In a preferred embodiment of the present invention, the composition herein comprises an organic acid, preferably citric acid, lactic acid or a mixture thereof, and most preferably lactic acid.

[0044] Compositions suitable for use as a cleaning composition preferably have pH in the range of from 5 to 13, more preferably from 7 to 13 and most preferably from 8 to 10. Compositions for use as disinfecting compositions preferably have a pH in the range of from 0 to 7, more preferably from 1 to 5 and most preferably from 2 to 4.

[0045] In another preferred embodiment according to the present invention, the liquid compositions herein are substantially free, preferably free, of pH modifying agents. Preferably, the compositions being substantially free, preferably free, of pH modifying agents have a pH of from 6.5 to 7.5, more preferably of from 6.8 to 7.2.

[0046] By "substantially free" it is meant herein, that the liquid composition comprises less than 1%, preferably less than 0.5%, more preferably less than 0.1%, and even more preferably less than 0.05%, by weight of the total composition of a pH modifying agent.

[0047] By "pH modifying agents" it is meant herein, ingredients solely added for the purpose of modifying the pH of the compositions described as for example acids, sources of alkalinity, buffers and the like and mixtures thereof.

[0048] By acids it is meant herein any organic acid, as for example, citric acid, maleic acid, lactic acid, glycolic acid, succinic acid, glutaric acid and adipic acid, and mixtures thereof and/or any inorganic acid, as for example, sulphuric acid, chloridric acid, phosphoric acid, nitric acid, and mixtures thereof. By sources of alkalinity for use herein are the caustic alkalis such as sodium hydroxide, potassium hydroxide and/or lithium hydroxide, and/or the alkali metal oxides such as sodium and/or potassium oxide, and/or other suitable sources of alkalinity including ammonia, ammonium carbonate and hydrogen carbonate.

[0049] It has been observed that when a substrate incorporating a liquid composition as described herein is used to clean and/or disinfect an animate or inanimate surface, wherein said liquid composition is substantially free, preferably free, of pH modifying agents, streaking and/or spotting benefits can be observed. Indeed, the absence of pH modifying agents in the liquid compositions herein can contribute to reduce or even prevent the formation of streaks and/or spots on a surface cleaned and/or disinfected with a substrate incorporating a liquid composition as described herein being substantially free of pH modifying agents as compared to a similar surface cleaned and/or disinfected with a substrate incorporating a liquid composition not being substantially free of pH modifying agents. By reducing or even preventing the formation of streaks and/or spots on said cleaned and/or disinfected surface, shine benefits are provided to said surface.

Surfactant System

[0050] According to the present invention the substrate incorporates a composition comprising a surfactant system.

The surfactant system consists of a synergistic system comprising at least three surfactants, namely an anionic, a nonionic and an amphoteric and/or zwitterionic surfactant.

[0051] The compositions preferably comprises the surfactant system at a level by weight of the total composition of from 0.05-20%, more preferably from 0.1-5% and most preferably from 0.2-3%.

Anionic Surfactant:

[0052] Suitable anionic surfactants for use herein include alkyl sulphates. Suitable alkyl sulphates for use herein include water-soluble salts or acids of the formula ROSO_3M wherein R is a $\text{C}_6\text{-C}_{24}$ linear or branched, saturated or unsaturated alkyl group, preferably a $\text{C}_8\text{-C}_{20}$ alkyl group, more preferably a $\text{C}_8\text{-C}_{16}$ alkyl group and most preferably a $\text{C}_{10}\text{-C}_{14}$ alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium), or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0053] Suitable anionic surfactants for use herein further include alkyl aryl sulphates. Suitable alkyl aryl sulphates for use herein include water-soluble salts or acids of the formula ROSO_3M wherein R is an aryl, preferably a benzyl, substituted by a $\text{C}_6\text{-C}_{24}$ linear or branched saturated or unsaturated alkyl group, preferably a $\text{C}_8\text{-C}_{20}$ alkyl group and more preferably a $\text{C}_{10}\text{-C}_{16}$ alkyl group and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0054] Suitable anionic surfactants for use herein further include alkoxyated sulphate surfactants. Suitable alkoxyated sulphate surfactants for use herein are according to the formula $\text{RO(A)}_m\text{SO}_3\text{M}$ wherein R is an unsubstituted $\text{C}_6\text{-C}_{24}$ alkyl, hydroxyalkyl or alkyl aryl group, having a linear or branched $\text{C}_6\text{-C}_{24}$ alkyl component, preferably a $\text{C}_{12}\text{-C}_{20}$ alkyl or hydroxyalkyl, more preferably $\text{C}_{12}\text{-C}_{18}$ alkyl or hydroxyalkyl, A is an ethoxy or propoxy or butoxy unit or a mixture thereof, m is greater than zero, typically between 0.5 and 6, more preferably between 0.5 and 3, and M is H or a cation which can be, for example, a metal cation (e.g., sodium, potassium, lithium, calcium, magnesium, etc.), ammonium or substituted-ammonium cation. Alkyl ethoxyated sulphates, alkyl butoxyated sulphates as well as alkyl propoxyated sulphates are contemplated herein. Specific examples of substituted ammonium cations include methyl-, dimethyl-, trimethyl-ammonium and quaternary ammonium cations, such as tetramethyl-ammonium, dimethyl piperdinium and cations derived from alkanolamines such as ethylamine, diethylamine, triethylamine, mixtures thereof, and the like. Exemplary surfactants are $\text{C}_{12}\text{-C}_{18}$ alkyl polyethoxylate (1.0) sulphate ($\text{C}_{12}\text{-C}_{18}\text{E}(1.0)\text{SM}$), $\text{C}_{12}\text{-C}_{18}$ alkyl polyethoxylate (2.25) sulphate ($\text{C}_{12}\text{-C}_{18}\text{E}(2.25)\text{SM}$), $\text{C}_{12}\text{-C}_{18}$ alkyl polyethoxylate (3.0) sulphate ($\text{C}_{12}\text{-C}_{18}\text{E}(3.0)\text{SM}$), and $\text{C}_{12}\text{-C}_{18}$ alkyl polyethoxylate (4.0) sulphate ($\text{C}_{12}\text{-C}_{18}\text{E}(4.0)\text{SM}$), wherein M is conveniently selected from sodium and potassium.

[0055] Suitable anionic surfactants for use herein further include alkyl sulphonates. Suitable alkyl sulphonates for use herein include water-soluble salts or acids of the formula RSO_3M wherein R is a $\text{C}_6\text{-C}_{20}$ linear or branched, saturated or unsaturated alkyl group, preferably a $\text{C}_8\text{-C}_{18}$ alkyl group and more preferably a $\text{C}_{14}\text{-C}_{17}$ alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium), or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

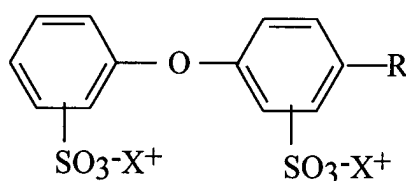
[0056] Suitable anionic surfactants for use herein further include alkyl aryl sulphonates. Suitable alkyl aryl sulphonates for use herein include water-soluble salts or acids of the formula RSO_3M wherein R is an aryl, preferably a benzyl, substituted by a $\text{C}_6\text{-C}_{20}$ linear or branched saturated or unsaturated alkyl group, preferably a $\text{C}_8\text{-C}_{18}$ alkyl group and more preferably a $\text{C}_9\text{-C}_{14}$ alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0057] Particularly suitable alkyl sulphonates include $\text{C}_{14}\text{-C}_{17}$ paraffin sulphonate like Hostapur® SAS commercially available from Hoechst. An example of commercially available alkyl aryl sulphonate is Lauryl aryl sulphonate from Su. Ma.. Particularly preferred alkyl aryl sulphonates are alkyl benzene sulphonates commercially available under trade name Nansa® available from Albright&Wilson.

[0058] Suitable anionic surfactants for use herein further include alkoxyated sulphonate surfactants. Suitable alkoxyated sulphonate surfactants for use herein are according to the formula $\text{R(A)}_m\text{SO}_3\text{M}$ wherein R is an unsubstituted $\text{C}_6\text{-C}_{20}$ alkyl, hydroxyalkyl or alkyl aryl group, having a linear or branched $\text{C}_6\text{-C}_{20}$ alkyl component, preferably a $\text{C}_{12}\text{-C}_{20}$

C₂₀ alkyl or hydroxyalkyl, more preferably C₁₂-C₁₈ alkyl or hydroxyalkyl, A is an ethoxy or propoxy or butoxy unit, m is greater than zero, typically between 0.5 and 6, more preferably between 0.5 and 3, and M is H or a cation which can be, for example, a metal cation (e.g., sodium, potassium, lithium, calcium, magnesium, etc.), ammonium or substituted-ammonium cation. Alkyl ethoxylated sulphonates, alkyl butoxylated sulphonates as well as alkyl propoxylated sulphonates are contemplated herein. Specific examples of substituted ammonium cations include methyl-, dimethyl-, trimethyl-ammonium and quaternary ammonium cations, such as tetramethyl-ammonium, dimethyl piperdinium and cations derived from alkanolamines such as ethylamine, diethylamine, triethylamine, mixtures thereof, and the like. Exemplary surfactants are C₁₂-C₁₈ alkyl polyethoxylate (1.0) sulphonate (C₁₂-C₁₈E(1.0)SM), C₁₂-C₁₈ alkyl polyethoxylate (2.25) sulphonate (C₁₂-C₁₈E(2.25)SM), C₁₂-C₁₈ alkyl polyethoxylate (3.0) sulphonate (C₁₂-C₁₈E(3.0)SM), and C₁₂-C₁₈ alkyl polyethoxylate (4.0) sulphonate (C₁₂-C₁₈E(4.0)SM), wherein M is conveniently selected from sodium and potassium. Particularly suitable alkoxyated sulphonates include alkyl aryl polyether sulphonates like Triton X-200® commercially available from Union Carbide.

[0059] Suitable anionic surfactants for use herein further include C₆-C₂₀ alkyl alkoxyated linear or branched diphenyl oxide disulphonate surfactants. Suitable C₆-C₂₀ alkyl alkoxyated linear or branched diphenyl oxide disulphonate surfactants for use herein are according to the following formula:



wherein R is a C₆-C₂₀ linear or branched, saturated or unsaturated alkyl group, preferably a C₆-C₁₈ alkyl group and more preferably a C₆-C₁₄ alkyl group, and X⁺ is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like). Particularly suitable C₆-C₂₀ alkyl alkoxyated linear or branched diphenyl oxide disulphonate surfactants to be used herein are the C₁₂ branched di phenyl oxide disulphonic acid and C₁₆ linear di phenyl oxide disulphonate sodium salt respectively commercially available by DOW under the trade name Dowfax 2A1® and Dowfax 8390®.

[0060] Other suitable anionic surfactants for use herein include alkyl-carboxylates. Other anionic surfactants can include salts (including, for example, sodium, potassium, ammonium, and substituted ammonium salts such as mono-, di- and triethanolamine salts) of soap, C₈-C₂₄ olefinsulfonates, sulfonated polycarboxylic acids prepared by sulfonation of the pyrolyzed product of alkaline earth metal citrates, e.g., as described in British patent specification No. 1,082,179; acyl glycerol sulfonates, fatty oleyl glycerol sulfates, alkyl phenol ethylene oxide ether sulfates, alkyl phosphates, isethionates such as the acyl isethionates, N-acyl taurates, alkyl succinamates and sulfosuccinates, monoesters of sulfosuccinate (especially saturated and unsaturated C₁₂-C₁₈ monoesters) diesters of sulfosuccinate (especially saturated and unsaturated C₆-C₁₄ diesters), acyl sarcosinates, sulfates of alkylpolysaccharides such as the sulfates of alkylpolyglucoside (the nonionic nonsulfated compounds being described below), branched primary alkyl sulfates, alkyl polyethoxy carboxylates such as those of the formula RO(CH₂CH₂O)_kCH₂COO-M⁺ wherein R is a C₈-C₂₂ alkyl, k is an integer from 0 to 10, and M is a soluble salt-forming cation. Resin acids and hydrogenated resin acids are also suitable, such as rosin, hydrogenated rosin, and resin acids and hydrogenated resin acids present in or derived from tall oil. Further examples are given in "Surface Active Agents and Detergents" (Vol. I and II by Schwartz, Perry and Berch). A variety of such surfactants are also generally disclosed in U.S. Patent 3,929,678, issued December 30, 1975 to Laughlin, et al. at Column 23, line 58 through Column 29, line 23.

[0061] In one preferred embodiment, preferred anionic surfactants for use herein are the C₈-C₁₆ alkyl sulfonates, C₈-C₁₆ alkyl sulfates, including branched alkyl sulphates, C₈-C₁₆ alkyl alkoxyated sulfates (e.g., C₈-C₁₆ alkyl ethoxylated sulfates), C₈-C₁₆ alkyl alkoxyated sulphonates and mixtures thereof. Such anionic surfactants are preferred herein as it has been found that they contribute to the disinfecting properties of a disinfecting composition herein. For example, C₈-C₁₆ alkyl sulfate acts by disorganizing the bacteria cell membrane, inhibiting enzymatic activities, interrupting the cellular transport and/or denaturing cellular proteins. Indeed, it is speculated that the improved disinfecting performance further associated with the addition of an anionic surfactant, especially a C₈-C₁₆ alkyl sulfonate, a C₈-C₁₆ alkyl sulfate and/or a C₈-C₁₆ alkyl alkoxyated sulfate, in a composition according to the present invention, is likely due to multiple mode of attack of said surfactant against the bacteria.

[0062] In a second preferred embodiment, the anionic surfactant is selected from the group consisting of: C₆₋₂₄ alkyl sulphates; C₆₋₂₄ alkyl aryl sulphates; C₆₋₂₄ alkyl alkoxyated sulphates; C₆₋₂₄ alkyl sulphonates, including paraffin sulphonates; C₆₋₂₄ alkyl aryl sulphonates; C₆₋₂₄ alkyl alkoxyated sulphonates; C₆₋₂₄ alkyl alkoxyated linear or branched diphenyl oxide disulphonates; naphthalene sulphonates; and mixtures thereof. More preferably the anionic surfactant

is selected from the group consisting of : C₆₋₂₄ alkyl sulphonates; C₆₋₂₄ alkyl sulphates; C₆₋₂₄ alkyl alkoxyated sulphates; C₆₋₂₄ alkyl aryl sulphonates; and mixtures thereof. Even more preferably the anionic surfactant for use herein is a paraffin sulphonate. Most preferably the anionic surfactant for use herein is a C₁₄-C₁₇ paraffin sulphonate.

[0063] In a third preferred embodiment the anionic surfactant is a branched alkyl sulphate surfactant. Branched alkyl sulphate is herein defined to mean a an alkyl sulfate comprising a sulfate group and a carbon chain of preferably from 2 to 20, more preferably from 2 to 16, most preferably from 2 to 8 carbon atoms. The carbon chain of the branched alkyl sulfate comprises at least one branching group attached to the carbon chain. The branching group is selected from the group consisting of an alkyl group having from 1 to 20, more preferably from 1 to 10 and most preferably from 1 to 4 carbon atoms. The branching group may be located at any position along the alkyl chain of the branched alkyl sulfate. More preferably the branching group is located at position from 1 to 4 along the alkyl chain. The sulfate group can be at any point along the length of the alkyl chain, most preferable at a terminus.

[0064] Suitable preferred branched alkyl sulfates include those available from Albright & Wilson under the tradename Empicol 0585/A.

Nonionic Surfactant:

[0065] Suitable nonionic surfactants for use herein are fatty alcohol ethoxylates and/or propoxylates which are commercially available with a variety of fatty alcohol chain lengths and a variety of ethoxylation degrees. Indeed, the HLB values of such alkoxyated nonionic surfactants depend essentially on the chain length of the fatty alcohol, the nature of the alkoxylation and the degree of alkoxylation. Surfactant catalogues are available which list a number of surfactants, including nonionics, together with their respective HLB values. Preferred nonionic surfactants for one embodiment are those having an average HLB from 8 to 20, more preferably from 10 to 18, most preferably from 11 to 16. These hydrophobic nonionic surfactants have been found to provide good grease cutting properties.

[0066] Preferred hydrophobic nonionic surfactants for use in the compositions according to the present invention are surfactants having an HLB below 16 and being according to the formula RO-(C₂H₄O)_n(C₃H₆O)_mH, wherein R is a C₆ to C₂₂ alkyl chain or a C₆ to C₂₈ alkyl benzene chain, and wherein n+m is from 0 to 20 and n is from 0 to 15 and m is from 0 to 20, preferably n+m is from 1 to 15 and, n and m are from 0.5 to 15, more preferably n+m is from 1 to 10 and, n and m are from 0 to 10. The preferred R chains for use herein are the C₈ to C₂₂ alkyl chains. Accordingly, suitable hydrophobic nonionic surfactants for use herein are Dobanol[®] 91-2.5 (HLB= 8.1; R is a mixture of C₉ and C₁₁ alkyl chains, n is 2.5 and m is 0), or Lutensol[®] TO3 (HLB=8; R is a C₁₃ alkyl chains, n is 3 and m is 0), or Lutensol[®] AO3 (HLB=8; R is a mixture of C₁₃ and C₁₅ alkyl chains, n is 3 and m is 0), or Tergitol[®] 25L3 (HLB= 7.7; R is in the range of C₁₂ to C₁₅ alkyl chain length, n is 3 and m is 0), or Dobanol[®] 23-3 (HLB=8.1; R is a mixture of C₁₂ and C₁₃ alkyl chains, n is 3 and m is 0), or Dobanol[®] 23-2 (HLB=6.2; R is a mixture of C₁₂ and C₁₃ alkyl chains, n is 2 and m is 0), or Dobanol[®] 45-7 (HLB=11.6; R is a mixture of C₁₄ and C₁₅ alkyl chains, n is 7 and m is 0) Dobanol[®] 23-6.5 (HLB=11.9; R is a mixture of C₁₂ and C₁₃ alkyl chains, n is 6.5 and m is 0), or Dobanol[®] 25-7 (HLB=12; R is a mixture of C₁₂ and C₁₅ alkyl chains, n is 7 and m is 0), or Dobanol[®] 91-5 (HLB=11.6; R is a mixture of C₉ and C₁₁ alkyl chains, n is 5 and m is 0), or Dobanol[®] 91-6 (HLB=12.5 ; R is a mixture of C₉ and C₁₁ alkyl chains, n is 6 and m is 0), or Dobanol[®] 91-8 (HLB=13.7 ; R is a mixture of C₉ and C₁₁ alkyl chains, n is 8 and m is 0), Dobanol[®] 91-10 (HLB=14.2 ; R is a mixture of C₉ to C₁₁ alkyl chains, n is 10 and m is 0), or mixtures thereof. Preferred herein are Dobanol[®] 91-2.5 , or Lutensol[®] TO3, or Lutensol[®] AO3, or Tergitol[®] 25L3, or Dobanol[®] 23-3, or Dobanol[®] 23-2, or mixtures thereof. These Dobanol[®] surfactants are commercially available from SHELL. These Lutensol[®] surfactants are commercially available from BASF and these Tergitol[®] surfactants are commercially available from UNION CARBIDE.

[0067] In a preferred embodiment the nonionic surfactant herein is an alkoxyated nonionic surfactant according to the formula RO-(A)_nH, wherein : R is a C₆ to C₂₂, preferably a C₈ to C₂₂, more preferably a C₉ to C₁₄ alkyl chain, or a C₆ to C₂₈ alkyl benzene chain; A is an ethoxy or propoxy or butoxy unit; and wherein n is from 0 to 20, preferably from 1 to 15 and, more preferably from 2 to 15 even more preferably from 2 to 12 and most preferably from 4 to 10. Preferred R chains for use herein are the C₈ to C₂₂ alkyl chains. Even more preferred R chains for use herein are the C₉ to C₁₂ alkyl chains. Ethoxy/butoxyated, ethoxy/propoxyated, butoxy/propoxyated and ethoxy/butoxy/propoxyated nonionic surfactants may also be used herein. Preferred alkoxyated nonionic surfactants are ethoxyated nonionic surfactants.

[0068] Suitable alkylpolysaccharides for use herein are disclosed in U.S. Pat. No. 4,565,647, Llenado, issued Jan. 21, 1986, having a hydrophobic group containing from about 6 to about 30 carbon atoms, preferably from about 10 to about 16 carbon atoms and a polysaccharide, e.g., a polyglycoside, hydrophilic group. For acidic or alkaline cleaning compositions/solutions suitable for use in no-rinse methods, the preferred alkyl polysaccharide preferably comprises a broad distribution of chain lengths, as these provide the best combination of wetting, cleaning, and low residue upon drying. This "broad distribution" is defined by at least about 50% of the chainlength mixture comprising from about 10 carbon atoms to about 16 carbon atoms. Preferably, the alkyl group of the alkyl polysaccharide consists of a mixtures of chainlength, preferably from about 6 to about 18 carbon atoms, more preferably from about 8 to about 16 carbon atoms, and hydrophilic group containing from about one to about 1.5 saccharide, preferably glucoside, groups per

molecule. This "broad chainlength distribution" is defined by at least about 50% of the chainlength mixture comprising from about 10 carbon atoms to about 16 carbon atoms. A broad mixture of chain lengths, particularly C₈-C₁₆, is highly desirable relative to narrower range chain length mixtures, and particularly versus lower (i.e., C₈-C₁₀ or C₈-C₁₂) chain-length alkyl polyglucoside mixtures. It is also found that the preferred C₈-C₁₆ alkyl polyglucoside provides much improved perfume solubility versus lower and narrower chainlength alkyl polyglucosides, as well as other preferred surfactants, including the C₈-C₁₄ alkyl ethoxylates. Any reducing saccharide containing 5 or 6 carbon atoms can be used, e.g., glucose, galactose and galactosyl moieties can be substituted for the glucosyl moieties. (optionally the hydrophobic group is attached at the 2-, 3-, 4-, etc. positions thus giving a glucose or galactose as opposed to a glucoside or galactoside.) The intersaccharide bonds can be, e.g., between the one position of the additional saccharide units and the 2-, 3-, 4-, and/or 6- positions on the preceding saccharide units. The glycosyl is preferably derived from glucose.

[0069] Optionally, and less desirably, there can be a polyalkyleneoxide chain joining the hydrophobic moiety and the polysaccharide moiety. The preferred alkyleneoxide is ethylene oxide. Typical hydrophobic groups include alkyl groups, either saturated or unsaturated, branched or unbranched containing from 8 to 18, preferably from 10 to 16, carbon atoms. Preferably, the alkyl group is a straight-chain saturated alkyl group. The alkyl group can contain up to about 3 hydroxyl groups and/or the polyalkyleneoxide chain can contain up to about 10, preferably less than 5, alkyleneoxide moieties. Suitable alkyl polysaccharides are octyl, nonyldecyl, undecyldodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, and octadecyl, di-, tri-, tetra-, penta-, and hexagluco- and/or galactosides. Suitable mixtures include coconut alkyl, di-, tri-, tetra-, and pentagluco- and tallow alkyl tetra-, penta- and hexagluco- and/or galactosides.

[0070] To prepare these compounds, the alcohol or alkylpolyethoxy alcohol is formed first and then reacted with glucose, or a source of glucose, to form the glucoside (attachment at the 1-position). The additional glycosyl units can then be attached between their 1-position and the preceding glycosyl units 2-, 3-, 4- and/or 6-position, preferably predominantly the 2-position.

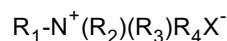
[0071] In the alkyl polyglycosides, the alkyl moieties can be derived from the usual sources like fats, oils or chemically produced alcohols while their sugar moieties are created from hydrolyzed polysaccharides. Alkyl polyglycosides are the condensation product of fatty alcohol and sugars like glucose with the number of glucose units defining the relative hydrophilicity. As discussed above, the sugar units can additionally be alkoxyated either before or after reaction with the fatty alcohols. Such alkyl polyglycosides are described in detail in WO 86/05199 for example. Technical alkyl polyglycosides are generally not molecularly uniform products, but represent mixtures of alkyl groups and mixtures of monosaccharides and different oligosaccharides. Alkyl polyglycosides (also sometimes referred to as "APG's") are preferred for the purposes of the invention since they provide additional improvement in surface appearance relative to other surfactants. The glycoside moieties are preferably glucose moieties. The alkyl substituent is preferably a saturated or unsaturated alkyl moiety containing from about 8 to about 18 carbon atoms, preferably from about 8 to about 10 carbon atoms or a mixture of such alkyl moieties. C₈-C₁₆ alkyl polyglucosides are commercially available (e.g., Simusol® surfactants from Seppic Corporation, 75 Quai d'Orsay, 75321 Paris, Cedex 7, France, and Glucocon® 425 available from Henkel). However, it has been found that purity of the alkyl polyglucoside can also impact performance, particularly end result for certain applications, including daily shower product technology. In the present invention, the preferred alkyl polyglucosides are those which have been purified enough for use in personal cleansing. Most preferred are "cosmetic grade" alkyl polyglucosides, particularly C₈ to C₁₆ alkyl polyglucosides, such as Plantaren 2000®, Plantaren 2000 N®, and Plantaren 2000 N UP®, available from Henkel Corporation (Postfach 101100, D 40191 Düsseldorf, Germany).

Amphoteric/Zwitterionic Surfactant:

[0072] Suitable amphoteric surfactants for use herein include amine oxides having the following formula R₁R₂R₃NO wherein each of R₁, R₂ and R₃ is independently a saturated substituted or unsubstituted, linear or branched hydrocarbon chains of from 1 to 30 carbon atoms. Preferred amine oxide surfactants to be used according to the present invention are amine oxides having the following formula R₁R₂R₃NO wherein R₁ is an hydrocarbon chain comprising from 1 to 30 carbon atoms, preferably from 6 to 20, more preferably from 8 to 16, most preferably from 8 to 12, and wherein R₂ and R₃ are independently substituted or unsubstituted, linear or branched hydrocarbon chains comprising from 1 to 4 carbon atoms, preferably from 1 to 3 carbon atoms, and more preferably are methyl groups. R₁ may be a saturated substituted or unsubstituted linear or branched hydrocarbon chain.

[0073] Suitable amine oxides for use herein are for instance natural blend C₈-C₁₀ amine oxides as well as C₁₂-C₁₆ amine oxides commercially available from Hoechst and Clariant.

[0074] Suitable zwitterionic surfactants for use herein contain both cationic and anionic hydrophilic groups on the same molecule at a relatively wide range of pH's. The typical cationic group is a quaternary ammonium group, although other positively charged groups like phosphonium, imidazolium and sulfonium groups can be used. The typical anionic hydrophilic groups are carboxylates and sulfonates, although other groups like sulfates, phosphonates, and the like can be used. A generic formula for some zwitterionic surfactants to be used herein is

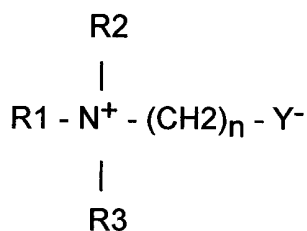


wherein R_1 is a hydrophobic group; R_2 and R_3 are each C_1 - C_4 alkyl, hydroxy alkyl or other substituted alkyl group which can also be joined to form ring structures with the N; R_4 is a moiety joining the cationic nitrogen atom to the hydrophilic group and is typically an alkylene, hydroxy alkylene, or polyalkoxy group containing from 1 to 10 carbon atoms; and X is the hydrophilic group which is preferably a carboxylate or sulfonate group. Preferred hydrophobic groups R_1 are alkyl groups containing from 1 to 24, preferably less than 18, more preferably less than 16 carbon atoms. The hydrophobic group can contain unsaturation and/or substituents and/or linking groups such as aryl groups, amido groups, ester groups and the like. In general, the simple alkyl groups are preferred for cost and stability reasons.

[0075] Highly preferred zwitterionic surfactants include betaine and sulphobetaine surfactants, functionalized betaines such as acyl betaines, alkyl imidazoline alanine betaines, glycine betaines, derivatives thereof and mixtures thereof. Said betaine or sulphobetaine surfactants are preferred herein as they help disinfection by increasing the permeability of the bacterial cell wall, thus allowing other active ingredients to enter the cell.

[0076] Furthermore, due to the mild action profile of said betaine or sulphobetaine surfactants, they are particularly suitable for the cleaning of delicate surfaces, e.g., delicate laundry or surfaces in contact with food and/or babies. Betaine and sulphobetaine surfactants are also extremely mild to the skin and/or surfaces to be treated.

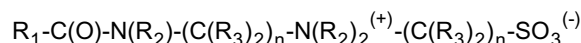
[0077] Suitable betaine and sulphobetaine surfactants for use herein are the betaine/sulphobetaine and betaine-like detergents wherein the molecule contains both basic and acidic groups which form an inner salt giving the molecule both cationic and anionic hydrophilic groups over a broad range of pH values. Some common examples of these detergents are described in U.S. Pat. Nos. 2,082,275, 2,702,279 and 2,255,082, incorporated herein by reference. Preferred betaine and sulphobetaine surfactants herein are according to the formula



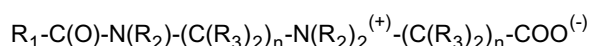
wherein R_1 is a hydrocarbon chain containing from 1 to 24 carbon atoms, preferably from 8 to 18, more preferably from 12 to 14, wherein R_2 and R_3 are hydrocarbon chains containing from 1 to 3 carbon atoms, preferably 1 carbon atom, wherein n is an integer from 1 to 10, preferably from 1 to 6, more preferably is 1, Y is selected from the group consisting of carboxyl and sulfonyl radicals and wherein the sum of R_1 , R_2 and R_3 hydrocarbon chains is from 14 to 24 carbon atoms, or mixtures thereof.

[0078] Examples of particularly suitable betaine surfactants include C_{12} - C_{18} alkyl dimethyl betaine such as coconutbetaine and C_{10} - C_{16} alkyl dimethyl betaine such as laurylbetaine. Coconutbetaine is commercially available from Seppic under the trade name of Amonyl 265®. Laurylbetaine is commercially available from Albright & Wilson under the trade name Empigen BB/L®.

[0079] Other specific zwitterionic surfactants have the generic formulas:



or



wherein each R_1 is a hydrocarbon, e.g. an alkyl group containing from 8 up to 20, preferably up to 18, more preferably up to 16 carbon atoms, each R_2 is either a hydrogen (when attached to the amido nitrogen), short chain alkyl or substituted alkyl containing from one to 4 carbon atoms, preferably groups selected from the group consisting of methyl, ethyl, propyl, hydroxy substituted ethyl or propyl and mixtures thereof, preferably methyl, each R_3 is selected from the group consisting of hydrogen and hydroxy groups and each n is a number from 1 to 4, preferably from 2 to 3, more

preferably 3, with no more than one hydroxy group in any $(C(R_3)_2)$ moiety. The R_1 groups can be branched and/or unsaturated. The R_2 groups can also be connected to form ring structures. A surfactant of this type is a C_{10} - C_{14} fatty acylamidopropylene(hydroxypropylene)sulfobetaine that is available from the Sherex Company under the trade name "Varion CAS sulfobetaine"®.

Optional Ingredients

[0080] The compositions herein may further comprise a variety of other optional ingredients such as peroxygen bleach, essential oils, organic acids, additional surfactants, chelants, solvents, builders, stabilisers, bleach activators, soil suspenders, dye transfer agents, brighteners, perfumes, anti dusting agents, enzymes, dispersant, dye transfer inhibitors, pigments, perfumes, radical scavengers, pH buffers, dyes or mixtures thereof.

Peroxygen Bleach

[0081] The compositions according to the present invention may comprise a peroxygen bleach as an optional feature.

[0082] A preferred peroxygen bleach is hydrogen peroxide, or a water soluble source thereof, or mixtures thereof. As used herein a hydrogen peroxide source refers to any compound which produces hydrogen peroxide when said compound is in contact with water. Suitable water-soluble sources of hydrogen peroxide for use herein include percarbonates, persilicates, persulphates such as monopersulfate, perborates and peroxyacids such as diperoxydodecanedioic acid (DPDA), magnesium perphthalic acid and mixtures thereof.

[0083] In addition, other classes of peroxides can be used as an alternative to hydrogen peroxide and sources thereof or in combination with hydrogen peroxide and sources thereof. Suitable classes include dialkylperoxides, diacylperoxides, preformed percarboxylic acids, organic and inorganic peroxides and/or hydroperoxides. The most preferred peroxygen bleach is hydrogen peroxide.

[0084] The presence of said peroxygen bleach especially hydrogen peroxide, persulfate and the like, in the compositions according to the present invention can contribute to disinfection properties of said compositions. Indeed, said peroxygen bleach may attack the vital function of the micro-organism cells, for example, it may inhibit the assembling of ribosomes units within the cytoplasm of the microorganisms cells. Also said peroxygen bleach like hydrogen peroxide, is an oxidiser that generates hydroxyl free radicals which attack proteins and nucleic acids. Furthermore, the presence of said peroxygen bleach, especially hydrogen peroxide, provides strong stain removal benefits which are particularly noticeable for example in laundry and hard surfaces applications.

[0085] Typically, peroxygen bleach or a mixture thereof is present in the compositions according to the present invention at a level of at least 0.01% by weight of the total composition, preferably from 0.1% to 15%, and more preferably from 1% to 10%.

Essential Oils

[0086] Another preferred component of the compositions of the present invention is an antimicrobial essential oil or an active thereof, or a mixture thereof.

[0087] Suitable antimicrobial essential oils to be used herein are those essential oils which exhibit antimicrobial activity. By "actives of essential oils", it is meant herein any ingredient of essential oils or natural extracts that exhibit antimicrobial activity. It is speculated that said antimicrobial essential oils and actives thereof act as proteins denaturing agents. Also said antimicrobial oils and actives thereof are compounds which contribute to the safety profile of a composition comprising them when it is used to disinfect any surface. A further advantage of said antimicrobial oils and actives thereof is that they impart pleasant odor to a composition comprising them without the need of adding a perfume.

[0088] Such antimicrobial essential oils include, but are not limited to, those obtained from thyme, lemongrass, citrus, lemons, oranges, anise, clove, aniseed, pine, cinnamon, geranium, roses, mint, lavender, citronella, eucalyptus, peppermint, camphor, ajowan, sandalwood, rosmarin, vervain, fleagrass, lemongrass, ratanhia, cedar, origanum, cypressus, propolis extracts and mixtures thereof. Preferred antimicrobial essential oils to be used herein are thyme oil, clove oil, cinnamon oil, geranium oil, eucalyptus oil, peppermint oil, citronella oil, ajowan oil, mint oil, origanum oil, propolis, cypressus oil cedar, garlic extract or mixtures thereof.

[0089] Actives of essential oils to be used herein include, but are not limited to, thymol (present for example in thyme, ajowan), eugenol (present for example in cinnamon and clove), menthol (present for example in mint), geraniol (present for example in geranium and rose, citronella), verbenone (present for example in vervain), eucalyptol and pinocarvone (present in eucalyptus), cedrol (present for example in cedar), anethol (present for example in anise), carvacrol, hinokitiol, berberine, ferulic acid, cinnamic acid, methyl salicylic acid, methyl salicylate, terpineol, limonene and mixtures thereof. Preferred actives of essential oils to be used herein are thymol, eugenol, verbenone, eucalyptol, terpineol, cinnamic acid, methyl salicylic acid, limonene, geraniol, ajolene or mixtures thereof.

[0090] Thymol may be commercially available for example from Aldrich, eugenol may be commercially available for example from Sigma, Systems - Bioindustries (SBI) - Manheimer Inc.

[0091] Typically, the antimicrobial essential oil or active thereof or mixture thereof is present in the composition at a level of at least 0.001% by weight of the total composition, preferably from 0.006% to 10%, more preferably from 0.01% to 8% and most preferably of from 0.03% to 3%.

[0092] It has now been found that combining said antimicrobial essential oil or an active thereof or a mixture thereof with a peroxygen bleach, in a composition, delivers not only excellent immediate disinfecting properties to the surfaces treated with said composition, but also long lasting disinfecting properties.

[0093] Indeed, it is speculated that peroxygen bleach and said essential oils/actives adsorb on a surface having been treated with said composition and thus reduce or even prevent the contamination of microorganisms over time, typically up to 48 hours after the surface has been treated with said composition, thereby delivering long lasting disinfection. In other words, it is speculated that a microfilm of said active ingredients is deposited on the surface treated with said compositions allowing protection against microorganisms recontamination overtime. Advantageously, this long lasting disinfection benefits is obtained with the compositions of the present invention comprising peroxygen bleach and antimicrobial essential oils/actives even when used under highly diluted conditions, i.e., up to dilution levels of from 1:100 (composition:water).

[0094] Excellent long lasting disinfection is obtained by treating a surface with a composition comprising a peroxygen bleach and an antimicrobial essential oil or active thereof as described herein, on a variety of microorganisms, e.g., the growth of Gram positive bacteria like *Staphylococcus aureus*, and Gram negative bacteria like *Pseudomonas aeruginosa* as well as of fungi like *Candida albicans* is reduced or even prevented on a surface having been treated with said composition.

[0095] Long lasting disinfection properties of the compositions herein may be measured by the bactericidal activity of said compositions. A test method suitable to evaluate the long lasting bactericidal activity of a composition may be as follow: First, the surfaces (e.g. glass) to be tested are respectively treated with either a composition according to the present invention or a reference composition, e.g., a negative control composed of pure water (for example by spraying the composition directly on the surface or first spraying the composition on a sponge used to clean the surface or when the composition herein is executed in the form of wipe by wiping the surface therewith). After a variable time frame (e.g. 24 hours) each surface is respectively inoculated with bacteria (10^{6-7} cfu/slide) cultured in for example TSB (Tryptone Soya Broth) and left typically from a few seconds to 2 hours before evaluating the remaining living bacteria. Then living bacteria (if any) are recovered from the surface (by touching TSA + neutraliser plates and by re-suspending the bacteria into the neutralisation broth and plating them on agar) and incubated at appropriate temperature, e.g. 37°C to let them grow typically over night. Finally, a visual grading of the living bacteria is made by comparing side by side the cultures and/or dilutions thereof (e.g. 10^{-2} or 10^{-1}) resulting from the surfaces treated with the compositions according to the present invention and the reference composition.

[0096] In a particular embodiment of the present invention, depending on the end use desired with said compositions they may further comprise, as optional ingredients, other antimicrobial compounds that further contribute to the antimicrobial/antibacterial activity of the compositions according to the present invention. Such antimicrobial ingredients include parabens like ethyl paraben, propyl paraben, methyl paraben, glutaraldehyde or mixtures thereof.

Additional Surfactants

[0097] The compositions of the present invention may comprise an additional surfactant. The additional surfactant may be selected from other nonionic, amphoteric, zwitterionic or anionic surfactants including but not limited to those described above. Alternatively the additional surfactant may include for example a cationic surfactant or a C6-C20 conventional soaps (alkali metal salt of a C6-C20 fatty acid, preferably sodium salts).

Chelating Agent

[0098] The compositions herein may further comprise a chelating agent as a preferred optional ingredient. Suitable chelating agents may be any of those known to those skilled in the art such as the ones selected from the group comprising phosphonate chelating agents, aminophosphonate chelating agents, substituted heteroaromatic chelating agents, amino carboxylate chelating agents, other carboxylate chelating agents, polyfunctionally-substituted aromatic chelating agents, biodegradable chelating agents like ethylene diamine N,N'- disuccinic acid, or mixtures thereof.

[0099] Suitable phosphonate chelating agents to be used herein include etidronic acid (1-hydroxyethylene-diphosphonic acid (HEDP)), and/or alkali metal ethane 1-hydroxydiphosphonates.

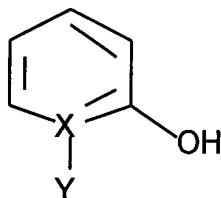
[0100] Suitable amino phosphonate chelating agents to be used herein include amino alkylene poly (alkylene phosphonates), nitrilotris(methylene)triphosphonates, ethylene diamine tetra methylene phosphonates, and/or diethylene triamine penta methylene phosphonates. Preferred aminophosphonate chelating agents to be used herein are dieth-

ylene triamine penta methylene phosphonates.

[0101] These phosphonate/amino phosphonate chelating agents may be present either in their acid form or as salts of different cations on some or all of their acid functionalities. Such phosphonate/amino phosphonate chelating agents are commercially available from Monsanto under the trade name DEQUEST®.

[0102] Substituted heteroaromatic chelating agents to be used herein include hydroxypyridine-N-oxide or a derivative thereof.

[0103] Suitable hydroxy pyridine N-oxides and derivatives thereof to be used according to the present invention are according to the following formula:



wherein X is nitrogen, Y is one of the following groups oxygen, -CHO, -OH, -(CH₂)_n-COOH, wherein n is an integer of from 0 to 20, preferably of from 0 to 10 and more preferably is 0, and wherein Y is preferably oxygen. Accordingly particularly preferred hydroxy pyridine N-oxides and derivatives thereof to be used herein is 2-hydroxy pyridine N-oxide. Hydroxy pyridine N-oxides and derivatives thereof may be commercially available from Sigma.

[0104] Polyfunctionally-substituted aromatic chelating agents may also be useful in the compositions herein. See U. S. patent 3,812,044, issued May 21, 1974, to Connor et al. Preferred compounds of this type in acid form are dihydroxydisulfobenzenes such as 1,2-dihydroxy -3,5-disulfobenzene.

[0105] A preferred biodegradable chelating agent for use herein is ethylene diamine N,N'- disuccinic acid, or alkali metal, or alkaline earth, ammonium or substitutes ammonium salts thereof or mixtures thereof. Ethylenediamine N,N'-disuccinic acids, especially the (S,S) isomer have been extensively described in US patent 4, 704, 233, November 3, 1987 to Hartman and Perkins. Ethylenediamine N,N'-disuccinic acid is, for instance, commercially available under the tradename ssEDDS® from Palmer Research Laboratories. Ethylene diamine N,N'-disuccinic acid is particularly suitable to be used in the compositions of the present invention.

[0106] Suitable amino carboxylate chelating agents useful herein include ethylene diamine tetra acetates, diethylene triamine pentaacetates, diethylene triamine pentaacetate (DTPA), N-hydroxyethylethylenediamine triacetates, nitrilo-triacetates, ethylenediamine tetrapropionates, triethylenetetraaminehexaacetates, ethanoldiglycines, propylene diamine tetracetic acid (PDTA) and methyl glycine di-acetic acid (MGDA), both in their acid form, or in their alkali metal, ammonium, and substituted ammonium salt forms. Particularly suitable to be used herein are diethylene triamine penta acetic acid (DTPA), propylene diamine tetracetic acid (PDTA) which is, for instance, commercially available from BASF under the trade name Trilon FS® and methyl glycine di-acetic acid (MGDA).

[0107] Further carboxylate chelating agents to be used herein includes malonic acid, salicylic acid, glycine, aspartic acid, glutamic acid, or mixtures thereof.

[0108] Typically, the compositions according to the present invention comprise up to 5% by weight of the total composition of a chelating agent, or mixtures thereof, preferably from 0.01% to 3% by weight and more preferably from 0.01% to 1.5%.

Radical Scavenger

[0109] The compositions herein may comprise a radical scavenger as another optional ingredient. Suitable radical scavengers for use herein include the well-known substituted mono and di hydroxy benzenes and derivatives thereof, alkyl- and aryl carboxylates and mixtures thereof. Preferred radical scavengers for use herein include di-tert-butyl hydroxy toluene (BHT), p-hydroxy-toluene, hydroquinone (HQ), di-tert-butyl hydroquinone (DTBHQ), mono-tert-butyl hydroquinone (MTBHQ), tert-butyl-hydroxy anysole (BHA), p-hydroxy-ansol, benzoic acid, 2,5-dihydroxy benzoic acid, 2,5-dihydroxyterephthalic acid, toluic acid, catechol, t-butyl catechol, 4-allyl-catechol, 4-acetyl catechol, 2-methoxy-phenol, 2-ethoxy-phenol, 2-methoxy-4-(2-propenyl)phenol, 3,4-dihydroxy benzaldehyde, 2,3-dihydroxy benzaldehyde, benzylamine, 1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl) butane, tert-butyl-hydroxy-anyline, p-hydroxy anyline as well as n-propyl-gallate. Highly preferred for use herein are di-tert-butyl hydroxy toluene, which is for example commercially available from SHELL under the trade name IONOL CP® and/or tert-butyl-hydroxy anysole. These radical scavengers further contribute to the stability of the peroxygen bleach-containing compositions herein.

[0110] Typically, the compositions according to the present invention comprise up to 5% by weight of the total com-

position of a radical scavenger, or mixtures thereof, preferably from 0.002% to 1.5% by weight and more preferably from 0.002% to 1%.

Solvent

[0111] The compositions herein may comprise as a preferred optional ingredient a solvent or mixtures thereof. When used, solvents will, advantageously, give an enhanced cleaning to the compositions herein. Suitable solvents for incorporation in the compositions according to the present invention include propylene glycol derivatives such as n-butoxypropanol or n-butoxypropoxypropanol, water-soluble CARBITOL® solvents or water-soluble CELLOSOLVE® solvents. Water-soluble CARBITOL® solvents are compounds of the 2-(2-alkoxyethoxy)ethanol class wherein the alkoxy group is derived from ethyl, propyl or butyl. A preferred water-soluble carbitol is 2-(2-butoxyethoxy)ethanol also known as butyl carbitol. Water-soluble CELLOSOLVE® solvents are compounds of the 2-alkoxyethoxyethanol class, with 2-butoxyethoxyethanol being preferred. Other suitable solvents are benzyl alcohol, methanol, ethanol, isopropyl alcohol and diols such as 2-ethyl-1,3-hexanediol and 2,2,4-trimethyl-1,3-pentanediol and mixture thereof. Preferred solvents for use herein are n-butoxypropoxypropanol, butyl carbitol®, benzyl alcohol, isopropanol, 1-propanol and mixtures thereof. Most preferred solvents for use herein are butyl carbitol®, benzyl alcohol, 1-propanol and/or isopropanol.

[0112] The solvents may typically be present within the compositions according to the invention at a level up to 15% by weight, preferably from 0.5% to 7% by weight of the composition.

pH buffer

[0113] In the embodiment of the present invention wherein the compositions are formulated in the alkaline pH range, typically from 7.5 to 12, the compositions according to the present invention may further comprise a pH buffer or a mixture thereof, i.e. a system composed of a compound or a combination of compounds, whose pH changes only slightly when a strong acid or base is added.

[0114] Suitable pH buffers for use herein include borate pH buffer, phosphonate, silicate and mixtures thereof. Suitable borate pH buffers for use herein include alkali metal salts of borates and alkyl borates and mixtures thereof. Suitable borate pH buffers to be used herein are alkali metal salts of borate, metaborate, tetraborate, octoborate, pentaborate, dodecaboron, borontrifluoride and/or alkyl borate containing from 1 to 12 carbon atoms, and preferably from 1 to 4. Suitable alkyl borate includes methyl borate, ethyl borate and propyl borate. Particularly preferred herein are the alkali metal salts of metaborate (e.g. sodium metaborate), tetraborate (e.g., sodium tetraborate decahydrate) or mixtures thereof.

[0115] Boron salts like sodium metaborate and sodium tetraborate are commercially available from Borax and Societa Chimica Larderello under the trade name sodium metaborate® and Borax®.

[0116] Further suitable pH buffers for use herein include carbonates and bicarbonates including alkali metal salts of carbonates and bicarbonates.

[0117] The pH of the composition can also be adjusted to an acidic pH and/or buffered at that pH using any suitable acidifying agent, for example organic acids.

[0118] Typically, the compositions according to the present invention may comprise up to 15% by weight of the total composition of a pH buffer, or mixtures thereof, preferably from 0.01% to 10%, more preferably from 0.01% to 5% and most preferably from 0.1% to 3%.

Packaging form of the wet wipes

[0119] In a preferred embodiment according to the present invention, the wet wipes are packaged in the container in any convenient configuration which allows easy removal of a single or multiple wet wipe from the container. Preferably the wipes are packaged in rolls, stacks or piles. More preferably the wipes are provided in a stacked configuration which may comprise any number of wipes.

[0120] Typically, the stack comprises from 2 to 150, more preferably from 5 to 100, most preferably from 10 to 60 wipes. Moreover the wipes may be provided folded or unfolded. Most preferably, the wipes are stacked in a folded configuration.

Process of treating a surface

[0121] In a preferred embodiment, the present invention encompasses a process of cleaning and/or disinfecting a surface, preferably a hard surface, comprising the step of contacting, preferably wiping, said surface with a substrate which incorporates a composition as described herein.

[0122] In a preferred embodiment of the present application, said process comprises the steps of contacting parts of said surface, more preferably soiled parts of said surface, with said substrate which incorporates a composition as described herein.

[0123] In another preferred embodiment said process, after contacting said surface with said substrate which incorporates a composition as described herein, further comprises the step of imparting mechanical action to said surface using said substrate which incorporates a composition as described herein. By "mechanical action" it is meant herein, agitation of the wet wipe on the surface, as for example rubbing the surface using the wet wipe.

[0124] By "surface", it is meant herein any surface including animate surface like human skin, mouth, teeth, and inanimate surfaces. Inanimate surfaces include, but are not limited to, hard-surfaces typically found in houses like kitchens, bathrooms, or in car interiors, e.g., tiles, walls, floors, chrome, glass, smooth vinyl, any plastic, plastified wood, table top, sinks, cooker tops, dishes, sanitary fittings such as sinks, showers, shower curtains, wash basins, WCs and the like, as well as fabrics including clothes, curtains, drapes, bed linens, bath linens, table cloths, sleeping bags, tents, upholstered furniture and the like, and carpets. Inanimate surfaces also include household appliances including, but not limited to, refrigerators, freezers, washing machines, automatic dryers, ovens, microwave ovens, dishwashers and so on.

Examples

[0125] The compositions of the present invention will be further illustrated by the following examples.

<u>Ingredients</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
	(% w/w)	(% w/w)	(% w/w)	(% w/w)	(% w/w)	(% w/w)
Water	to balance	to balance	to balance	to balance	to balance	to balance
Thymol	0.025	---	---	---	---	---
Geraniol	0.0375	---	0.3	---	---	---
Perfume	0.0375	0.1	0.1	0.1	0.1	0.15
Ethanol	9.4	9.4	5	9.4	8	8
Silicone Dow AF	---	0.003	-	0.003	0.003	0.003
C ₁₂₋₁₄ amine oxide	---	0.2	0.2	-	0.1	---
C ₁₀ amine oxide	---	-	-	0.2	---	0.02
C ₉₋₁₀ EO10	1.0	0.2	-	0.8	0.1	---
C ₉₋₁₁ EO5	---	---	---	---	---	0.1
C ₁₂₋₁₄ Betaine sodium salt	0.25	---	-	-	---	---
2 Ethyl Hexyl Sulphate	0.75	0.1	0.1	0.15	0.05	0.05
Citric acid	1.5	0.75	1.5	1.0	---	---
Lactic acid	---	---	---	---	0.44	---
Na ₂ CO ₃	---	0.1	-	-	0.06	---
NaOH	---	0.45	-	-	0.2	---
pH "as made lotion"	2.4	9.5	2.8	2.8	9.5	7.1
pH squeezed out	2.7	NA	3.2	3.2	NA	NA

[0126] In another

	A	B	C	D	E	F	G	H
<u>Alkoxylated nonionic surfactants</u>								
C 9-11 EOS	0.10	-	0.05	-	-	-	-	-
C12,14 EO5	-	-	-	-	-	-	-	-

(continued)

	A	B	C	D	E	F	G	H
<u>Alkoxylated nonionic surfactants</u>								
C11 EO5	-	0.10	-	0.03	0.10	0.10	0.10	0.05
C12,14EO21	0.10	-	0.05	2.0	-	-	-	-
C11EO21	-	0.10	-	0.03	0.10	0.10	0.10	0.05
<u>Anionic surfactants</u>								
NaPS	0.10	0.10	0.15	0.02	0.10	0.05	-	0.05
NaLAS	-	-	-	-	-	-	-	-
NaCS	-	-	-	-	-	-	-	-
Isalchem® AS	-	0.05	-	-	-	0.07	0.10	-
C12,14AmineOxide								
C12-14Betaine	0.13	0.15	0.20	0.04	-	0.08	0.15	-
	-	-	-	-	0.15	0.08	-	0.08
<u>Buffer</u>								
Na ₂ CO ₃	0.10	0.20	0.10	0.05	-	0.20	0.20	-
Citric	0.70	0.65	0.70	0.20	0.5	0.70	0.75	0.20
Caustic	0.50	0.45	0.48	0.15	0.10	0.5	0.5	0.05
<u>Suds control</u>								
Fatty Acid	-	-	-	-	0.05	-	-	-
<u>Branched fatty alcohol</u>	0.10	-	0.10		0.10	-	0.05	0.05
Isofol 12®	-	0.10	-	0.05	-	0.05	-	-
Isofol 16®	0.005	0.005	0.003	-	0.003	0.005	0.003	-
Silicone Dow AF								
<u>Solvents</u>								
EtOH	9.0	6.0	3.0	4.0	9.0	12	9.0	4.0
n-BP	2.0	1.0	2.0	4.0	2.0	0.55	2.0	4.0
BDGE	-	1.0	1.0	-	-	0.55	-	-
IPA	-	3.0	-	4.0	-	-	-	4.0
n-BPP	-	-	-	-	-	-	2.0	-
Minors and water	-----	-----	up	to	100%	-----		
<u>pH</u>	9.5	9.5	9.0	9.0	3.5	9.0	9.0	3.5

Claims

1. A sealable container containing a substrate which incorporates a composition comprising an anionic surfactant, an nonionic surfactant and an amphoteric and/or zwitterionic surfactant.
2. A container according to claim 1 wherein the seal of the container is substantially airtight.
3. A container according to any preceding claim wherein the container is made from plastic.
4. A container according to claim 3 wherein the plastic is made from compounds selected from the group consisting of polypropylene material polyethylene, polystyrene, acrylonitril butadiene styrene (ABS), polyester, polyvinyl chlo-

ride, polycarbonate, elastomer, and mixtures thereof.

5. A container according to any preceding claim wherein the substrate is airlaid, non-woven and comprising man-made fibers.
6. A container according to any preceding claim wherein the anionic surfactant is a branched alkyl sulfate surfactant.
7. A container according to claim 6 wherein the branched alkyl sulfate surfactant is 2-ethyl-hexyl sulphate.
8. A container according to claim 7 wherein the composition has a pH of from 1 to 14.
9. A container according to any of claims 1 to 5, wherein the anionic surfactant is selected from the group consisting of: C₆₋₂₀ alkyl sulphates; C₆₋₂₀ alkyl aryl sulphates; C₆₋₂₀ alkyl alkoxylated sulphates; C₆₋₂₀ alkyl sulphonates, including paraffin sulphonates; C₆₋₂₀ alkyl aryl sulphonates; C₆₋₂₀ alkyl alkoxylated sulphonates; C₆₋₂₀ alkyl alkoxylated linear or branched diphenyl oxide disulphonates; naphthalene sulphonates; and mixtures thereof.
10. A container according to any preceding claim wherein the nonionic surfactant herein is an alkoxylated nonionic surfactant according to the formula RO-(A)_nH, wherein : R is a C₆ to C₂₂, preferably a C₈ to C₂₂ or a C₆ to C₂₈ alkyl benzene chain; A is an ethoxy or propoxy or butoxy unit; and wherein n is from 0 to 20.
11. A container according to either of claim 9 or 10, wherein the composition has a pH of from 7 to 13, more preferably from 8 to 10.
12. A container according to any preceding claims wherein the amphoteric surfactant is selected from the group consisting of C₆ to C₂₀ amine oxide and mixtures thereof.
13. A container according to any preceding claims wherein the zwitterionic surfactant is selected from the group consisting of C₆ to C₂₀ betaine, sulfobetaines and mixtures thereof.
14. A container according to any preceding claim suitable for disinfecting additionally comprising a disinfecting agent.
15. A container according to claim 14 wherein the disinfecting agent is selected from the group consisting of bleaching agent, antimicrobial essential oil, antimicrobial active of an essential oil and mixtures thereof.
16. A container according to any preceding claim additionally comprising a solvent.
17. A container according to any of the preceding claims, wherein the composition further comprises lactic acid.
18. A container according to any of claims 1-10 and 12-16, wherein the composition is substantially free of pH modifying agents.
19. The use of a substrate contained in a sealable container incorporating a composition comprising an anionic surfactant, a nonionic surfactant and an amphoteric and/or zwitterionic surfactant and being substantially free of pH modifying agents to clean and/or disinfect a surface, wherein the formation of streaks and/or spots is reduced, preferably prevented.



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 00 87 0062

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