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(57) Abstract: The present invention relates to compositions suitable for cleansing and disinfecting, and in particular there is provided a composition which comprises a) At least 70 wt% to at most 90 wt% ethanol, b) 0.01wt% to less than 1 wt. % of polyalkylene glycol-modified polysiloxane, wherein the polyalkyleneglycol-modified polysiloxane comprises at least two different polyalkylene glycol groups and wherein the polyalkylene glycol groups are present in an amount corresponding to at least 40 moles of alkylene glycol per mole of polysiloxane, c) Optionally up to 0.5wt% of a foam stabiliser, d) Optionally up to 5wt% of a peroxide, and e) At least 5wt% water.

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COMPOSITION

The present invention relates to compositions suitable for cleansing and disinfecting, and in particular to compositions based on ethanol.

Ethanol compositions are widely used for their cleansing and disinfectant properties. Typical applications/formulations include compositions for "Hands and Small surface", "Screens", "Large surface/foaming" and "Surface MED". Depending on the application a range of different components/additives may be present in the composition.

For example, when ethanol is contacted with the skin, and in particular the epiderma, these compounds extract free fatty acid molecules. This impairs the skin moisture barrier function that prevents water loss and can lead to a disagreeable perception of dryness of the skin.

For the above reasons ethanol compositions for use on skin often include other components, such as emollients, designed to leave the skin with a smooth feel. Depending on the application, ethanol compositions can also include further components, including for example those designed to leave a pleasant smell.

More generally, compositions with ethanol concentrations of 60% to 95% (v/v) are deemed safe and effective for disinfection by the United States Food and Drug Administration (US FDA), the US Centers for Disease Control and Prevention (CDC) and the World Health Organisation (WHO) including for use against SARS-CoV-2. Higher ethanol concentrations in this range can reduce the contact time or increase the effectiveness of the compositions, but this is often at the expense of the risk of dryness, noted above, or other epidermal irritation. Thus, for these reasons, many commercially available ethanol compositions and many compositions described in the art limit the ethanol content to the lower end of the effective range. For example, many compositions have an ethanol composition of 60-65wt%, or have lower ethanol concentrations used in conjunction with propanol. Other compositions may use higher ethanol concentration, but add glycerol. The World Health Organisation recommended Handrub formulation using ethanol (hereinafter "WHO formulation"), for example, comprises (v/v) ethanol 80%, glycerol 1.45% and hydrogen peroxide 0.125%.

Nevertheless, it would be desirable to provide an improved composition which has high ethanol content. It would also be desirable to find a composition which can either be used for different applications without modification, or with only relatively minor changes

of the composition e.g. by using the same or a limited number of common components with only minor additions or concentration changes for different applications. This would enable a manufacturing plant producing such compositions to be easily and also efficiently switched to products for different applications depending on demand.

It is known that polyether-modified polysiloxanes can be used as components of light alcohol (C1-C4) antimicrobial compositions.

EP 3 058 821 B1, for example, describes foaming product compositions comprising 50 to 90 wt. of a C2-C4 alcohol and comprising PEG-8 to PEG-12 linear dimethicone surfactant. (PEG is polyethylene glycol)

EP 1 858 323 B1, for example, claims utilization of bis-PEG- [10-20] dimethicone as foamable alcohol composition for use as an alcoholic foam for personal hygiene. The compositions comprise: a) ethanol, a mixture of n-propanol an ethanol, a mixture of isopropanol and ethanol, or n-propanol present in an amount in the range of 60% v/v to 90 % v/v of the total composition, or isopropanol in an amount in the range of 70% v/v to 90 % v/v of the total composition.

We have found that certain polyalkylene glycol-modified polysiloxanes having at least two different polyalkylene glycol groups, can provide efficient foaming at very low levels even in high concentrations of ethanol, and also provide improved results in terms of skin feel.

Such compounds are also known in the art. For example, as described in EP 1830636 B1 describes a composition comprising 52 to ≦99 wt %, relative to the total quantity of the foam composition, of an alcohol or mixture of alcohols, a surfactant or a surfactant mixture, and at least one polyalkylene glycol, wherein the surface tension of the surfactant or surfactant mixture lies in the range of ±15 dyn/cm of the surface tension of alcohol or alcohol mixture. A preferred composition comprises bis-PEG/PPG-20/20 dimethicone, and in particular 55 to 96 wt % of ethanol, 1 to 10 wt % of bis-PEG/PPG-20/20 dimethicone.

Whilst the compositions such as those described in EP 1830636 B1 are effective, especially if higher ethanol concentrations are selected, when used for cleansing on solid surfaces such compositions have been found to leave unacceptable levels of greasy films, and when used as antiseptics, they have been found to give an oily sensorial feel.

A further example of the use of polyalkylene glycol-modified polysiloxanes having at least two different polyalkylene glycol groups can be found in EP 2654420 B1. In this document compositions are exemplified comprising a surfactant comprising a mixture of bis-PEG,PPG-20/5 PEG,PPG-20/5-dimethicone, methoxy-PEG/PPG-25/4-dimethicone and capryl-/caprin-triglyceride. Such compositions have high alcohol contents, but also include a large number of additional components.

Thus, it is an object of the present invention to provide an improved composition which provides effective cleansing and disinfecting, which upon use by a person leaves a smooth and pleasant skin feeling, and which upon use on screens and surfaces do not leave unacceptable levels of greasy film.

Thus, in a first aspect there is provided a composition which comprises

a) At least 70 wt% to at most 90 wt% ethanol,
b) 0.01wt% to less than 1 wt. % of polyalkylene glycol-modified polysiloxane, wherein the polyalkyleneglycol-modified polysiloxane comprises at least two different polyalkylene glycol groups and wherein the polyalkylene glycol groups are present in an amount corresponding to at least 40 moles of alkylene glycol per mole of polysiloxane,
c) Optionally up to 0.5wt% of a foam stabiliser,
d) Optionally up to 5wt% of a peroxide, and
e) At least 5wt% water.

Component (a) is ethanol, and ethanol is present in an amount of at least 70wt% to at most 90wt% of the composition. Preferably, the ethanol is present in an amount of 85wt% or less, and more preferably of 80wt% or less. The minimum concentration is preferably at least 71wt%, such as at least 72wt%.

The ethanol used to prepare the composition according to the present invention may be any suitable grade. It may be noted that the "ethanol" as used to produce the composition may comprise quantities of water e.g. as an impurity. This does not cause any issues since water is also a component of the composition. For avoidance of doubt, however, as used herein reference to the amount of ethanol in the composition refers to the quantity of the compound ethanol i.e. C_2H_5OH in the composition. Thus, any water (or other compound which may be present, such as a denaturant) in the ethanol used to prepare the composition is discounted in relation to the amount of ethanol in the composition of the

present invention. (In contrast, however, any water will contribute to the total amount of water in the composition. Thus, the amount of water in step (e) should include any water introduced with the ethanol or other components and any water separately added to the composition.)

Component (b) is a polyalkylene glycol ("PAG")-modified polysiloxane. It is present in an amount of 0.01wt% to less than 1wt% of the composition. Component (b) is preferably present in an amount of less than 0.99 wt%, such as 0.95wt% or less or 0.90wt% or less. More preferably the component (b) is present in an amount of 0.80wt% or less, and most preferably 0.50wt% or less of the composition. It has in particular been found that concentrations below 0.50wt%, and even below 0.30wt%, are still highly effective. A preferred minimum is 0.02wt%, such as 0.03wt%. A particularly preferred range is 0.03wt% to 0.30wt%, such as 0.05wt% to 0.25wt%.

The polyalkylene glycol-modified polysiloxane may be any suitable polyalkylene glycol-modified polysiloxane which comprises at least two different polyalkylene glycol groups. Typically, and preferably, at least one is polyethylene glycol or polypropylene glycol. The second and any further polyalkylene glycol groups may then be selected from polyalkylene glycols where the alkylene has 4 to 8 carbons. Preferably, however, both polyethylene glycol and polypropylene glycol are present in the polyalkylene glycol-modified polysiloxane.

The polyalkylene glycol-modified polysiloxane is also characterised in that the polyalkylene glycol groups are present in an amount corresponding to at least 40 moles of alkylene glycol per mole of polysiloxane. The number of alkylene glycol groups is typically described in the name of the component. PEG/PPG-18/18 dimethicone, for example, has an average of 18 ethylene glycol groups (in the PEG chain) and 18 propylene glycol groups (in the PPG chain) as a single end group on the polysiloxane. Hence this compound has an average of 36 alkylene glycol groups per molecule, corresponding to 36 moles of alkylene glycol per mole of polysiloxane. (For avoidance of doubt, whilst we refer to alkylene glycol groups it can also be considered that this corresponds also to the same number of alkylene oxide groups. PEG/PPG-18/18 dimethicone may, for example, also be referred to as having an average of 18 ethylene oxide groups and 18 propylene oxide groups per molecule or as having 18 moles of ethylene oxide and 18 moles of propylene oxide per mole of polysiloxane. As used herein these are all synonymous.)

Typically, and preferably, the requirement for a minimum of 40 moles of alkylene glycol per mole of polysiloxane is achieved by the presence of two or more polyalkylene glycol modifications on the polysiloxane chain. This can include modifications on the side of the chain, but in a most preferred embodiment is obtained by providing groups on both ends i.e. the polyalkylene glycol-modified polysiloxane is preferably a bis-polyalkylene glycol-modified polysiloxane. Such compounds have polyalkylene glycol chains on both ends of the polysiloxane chain, thereby doubling the number of polyalkylene groups present. Bis-PEG/PPG-20/20 dimethicone, for example, has 80 alkylene glycol groups per molecule (40 EG and 40 PG) corresponding to 80 moles of alkylene glycol per mole of polysiloxane.

Preferably, the polyalkylene glycol-modified polysiloxane is characterised in that the polyalkylene glycol groups are present in an amount corresponding to at least 42 moles, more preferably at least 44 moles of alkylene glycol per mole of polysiloxane. Most preferred compounds have at least 50 moles, such as at least 60 moles, and most preferably at least 70 moles of alkylene glycol per mole of polysiloxane. Typically, the polyalkylene glycol groups are present in an amount corresponding to up to 100 moles of alkylene glycol per mole of polysiloxane, more preferably up to 90, and most preferably up to 84 moles of alkylene glycol per mole of polysiloxane.

As already noted, in embodiments it is preferred that the polyalkylene glycol-modified polysiloxane comprises polypropylene glycol as one of at least two different polyalkylene glycol groups. In such embodiments, it is preferred that the polypropylene glycol groups are present in an amount corresponding to at least 20 moles of propylene glycol per mole of polysiloxane, such as at least 25 moles, and more preferably at least 30 moles of propylene glycol per mole of polysiloxane. Typically, in these embodiments the polypropylene glycol groups correspond to at least 30%, such as at least 40% of the total number of polyalkylene glycol groups present.

In a particularly preferred embodiment the polyalkylene glycol-modified polysiloxane has (exactly) two different polyalkylene glycol groups, and most preferably is a bis-PAG1/PAG2-modified polysiloxane, where PAG1 and PAG2 represent the two different polyalkylene glycol groups. Preferably also in this embodiment at least one of the polyalkylene glycol groups is polyethylene glycol or polypropylene glycol. Preferably the two groups are polyethylene glycol and polypropylene glycol. Where this is not the case,

the second group is preferably selected from polyalkylene glycols where the alkylene has 4 to 8 carbons.

The preferred polysiloxanes are polydimethylsiloxanes, also known as "dimethicones".

Correspondingly, the most preferred polyalkylene glycol-modified polysiloxanes are bis-PEG/PPG-X/Y-dimethicones, where "X" and "Y" represent the chain length of the PEG and PPG polymer chains respectively. (For the claimed bis-dimethicones this represents dimethicone which is blocked at both ends with an average of X moles of ethylene glycol and an average of Y moles of propylene glycol. It will be appreciated that "X + Y" will be at least 20 for the requirement that polyalkylene glycol groups are present in an amount corresponding to at least 40 moles of alkylene glycol per mole of polysiloxane to be met, and higher for the preferred embodiments. Correspondingly, the alkylene groups present in such molecules correspond to an amount of 2*(X+Y)" moles of alkylene glycol per mole of polysiloxane.)

Preferably X and Y are each from 5-26, more preferably 16-24, and most preferably 18-22. Preferably X and Y are such that $1/5 \leq X/Y \leq 5$ and more preferably $1/2 \leq X/Y \leq 2$. Preferably X and Y are equal. Most preferably they are both 20 i.e. the polyalkylene glycol-modified polysiloxane is bis-PEG/PPG-20/20 dimethicone.

Examples of suitable commercial products which can be used are the those available under the trade name ABIL® B 8832 from Evonik (which is a bis-PEG/PPG-20/20 dimethicone), XIAMETER™ OFX-0190 Fluid (bis-PEG/PPG -18/18 dimethicone) from Dow or BELSIL® OW 1500 (bis-PEG/PPG-20/20 dimethicone) from Wacker.

In particular, and surprisingly, it has been discovered that, compositions as claimed with ethanol concentrations of at least 70 wt.%, but low levels (less than 1wt%) of polyalkylene glycol-modified polysiloxane (and in particular bis-PEG/PPG-20/20 dimethicone) can deliver desired properties for cleansing and disinfection applications while delivering pleasant skin feel.

The compositions are highly foamable. This is surprising because, for compositions with water and a low alcohol concentration replacing PEG by PPG (or other longer chain) units on the polyalkylene chains of modified polysiloxane would be expected to reduce their foaming capability due to the reduction in polarity of the chain. For instance, SILWET® L-7220 by Momentive Performance Materials having chain made from 20%

ethylene oxide and 80% propylene oxide is described as a foam controller (EP1173267B1). We surprisingly found that for high (> 70 wt. %) ethanol content compositions of the types claimed herein the addition of PPG gives higher foaming. Without being bound by theory, we consider that, at these concentrations of ethanol, ethanol is migrating at the surfactant interface between the solution and air and that better compatibilization between ethanol and the modified polysiloxanes is achieved for the less polar PPG chains.

The composition of the present invention allows the production of commercially suitable formulations with very low levels of additives which is not only valuable in terms of raw material costs and processing but also limits the risks of having biocide activity reduction due to some of the additives. Further, the composition can be used for different applications without modification, or with only relatively minor changes of the composition.

Typical applications include:

- "Hands and small surface". Formulations suitable for these applications are typically those used for human hygiene, but can be applied on small surface areas. The formulations may typically be provided in the form of impregnated wipes or in relatively small volume bottles. Gelling agents may be added, for example, to form gels e.g. handgels. Containers are typically low volume e.g. <100ml.
- "Screens". Formulations suitable for screens, such as computer screens. Typically provided in the form of wipes or sprays in small bottles (e.g. up to 1L in volume).
- "Large surface". Formulations are usually to be applied to a much larger area, usually with the disinfecting properties being more important than the cleansing properties per se. Increased foaming is advantageous for improved efficiency of disinfection, so additives may be added for this purpose. Typically the formulations may be sprayed from a relatively large volume container (several litres and up).
- "Surface MED". Formulations for use where high levels of disinfection are required, such as surfaces used in medical facilities. The formulations may have added biocides, typically peroxides, for this purpose.

More particularly, for use for "Hands and Small surface" applications and for "Screens", no additional additives are required in the composition of the present invention. The preferred formulation therefore comprises none of components (c) and (d). In

preferred compositions the "balance" (remainder of the composition other than components (a) and (b)) is the water.

In contrast, for use for a "Large surface" applications, the same "base composition" comprising (a), (b) and water may be used, but preferably component (c) is also present i.e. up to 0.5wt% of a foam stabiliser. Examples of suitable foam stabilisers are fatty alcohols, and particularly straight chain C6 to C20 primary alcohols, and more preferably straight chain C8 to C16 primary alcohols. A particularly preferred foam stabiliser is 1-Tetradecanol, commonly referred to as myristyl alcohol.

Component (c), when present, is present in a maximum amount of 0.5wt%, preferably less than 0.2wt%, and most preferably less than 0.1wt%. A preferred range is 0.05 to 0.1wt%.

A further application to which the composition of the present invention can be applied, and again with only minor modifications to the formulation is "Surface MED". In preferred compositions for this application the composition comprising all of components (a)-(e). Components (a)-(c), including both the preferred components and their concentrations in the composition, are preferably as already set out for the other applications above. Thus, a most preferred composition for this application can comprise essentially the same composition used for "Large surface" applications to which component (d) is added.

As already noted, this ability to maintain components and concentrations between different applications and still provide desirable properties is a key advantage of the present composition.

Component (d), when present, is a peroxide. Any suitable peroxide may be used, either organic or inorganic, but hydrogen peroxide is preferred. Such components are added in situations where addition biocidal properties may be desired.

When present typically the amount of peroxide/component (d) is less than 4wt%, for example in the range 1 to 3wt%.

Component (e) is water. It is present in an amount of at least 5wt%. Due to the requirements on other components it must be present at less than 30wt% in total. Generally the water forms the balance of the composition i.e. such that all components present sum to 100%. Water is typically present in an amount of at least 10wt%, such as at least 15wt%, and usually at least 20wt%. Preferred ranges are 15 to 28wt% and 20 to 25wt%. As noted

already, water may be introduced with other components of the composition, such as the ethanol and/or may be introduced separately.

For avoidance of doubt, the present invention does not, unless otherwise stated, exclude that other additives could be added for any particular application. In particular, in some embodiments a thickening agent may be added to increase the viscosity of the composition and make it easier to dispense or apply, or simply to improve the feel of the product. For example, the composition of the present invention can be thickened by addition of an acrylate copolymer, such as Aqua SF1 from Lubrizol. Such additives can, if required, be neutralized with an organic base such as AMP® Ultra PC2000 from Dow.

Any thickening agent, where used is preferably used in an amount of less than 3wt% of the total composition, preferably of less than 2wt%, such as 0.2 to 1 wt%.

(For avoidance of doubt, in relation to the addition of a thickening agent specifically, but also more generally where references are made to an amount of a component in wt%, the amounts relate to the amount of specific component added. For example, thickening agent may be added in an aqueous or ethanolic solution comprising the active component e.g. acrylate copolymer, and it is the amount of acrylate copolymer which is preferably less than 3wt% of the total composition independently of the amount of solution added. (The water or ethanol content of which is counted towards the amount of this component in the final composition.)

However, in general, addition of further components, reduces some of the advantages of the invention by requiring additional modifications to the composition for different applications.

Thus, in preferred embodiments less than 5wt% (in total) of any components other than components (a)-(e) are added to the composition, particularly less than 3wt%, more preferably less than 1wt% of any components.

In one preferred embodiment other additives are not deliberately added to the formulation. By “deliberately added” is meant, components and additives which are added intentionally to the composition to obtain a specific effect. This definition excludes components which may be impurities in the components or in the solutions by which the components are combined, which as used herein are not considered to be intentionally added. In this embodiment the composition is considered to consist essentially of components (a), (b), (c) (where present), (d) (where present), and (e).

In an alternative preferred embodiment, other additives are not deliberately added to the formulation other than a thickening agent i.e. the composition may be considered to consist essentially of components (a), (b), (c) (where present), (d) (where present), (e) and a thickening agent.

It is also preferred, even where other components are present, that the composition comprises less than 1wt% of glycerol, and preferably no glycerol is present. In particular, and without wishing to be bound by theory, it is desirable to provide compositions which exclude or minimise glycerol in the formulation to try and improve biocidal properties. In any case, the use of polyalkylene glycol-modified polysiloxane allows glycerol to be excluded whilst providing improved compositions compared to compositions comprising glycerol, such as the WHO formulation discussed previously. In addition, the present invention also does not, unless otherwise stated, exclude that minor changes in the concentrations of the common components may be made depending on the application. In particular, compositions comprising 75wt% ethanol and 0.15wt% PEG/PPG-20/20 dimethicone are described in the Examples for "Hand and Small Surface applications". This formulation is suitable, without modification, also for "Screens" but the latter application can also be addressed using compositions with lower content of PEG/PPG-20/20 dimethicone, this also being shown in the Examples. A change of the composition of this type is relatively trivial for a manufacturer and may be preferred even if it adds some additional process control steps or plant scheduling requirements.

The compositions of the present invention are generally of an approximately neutral pH although they may also be slightly alkaline, as is typical for many soaps.

For example, compositions comprising solely the components (a), (b) and (e) (i.e. ethanol, the polyalkyleneglycol-modified polysiloxane and water) will usually have a pH in the range 6.5 to 8.5.

The pH of the composition more generally i.e. even when other components are present, is also preferably from about 6.5 to about 8.5, although values outside this range, including up to about 10, are acceptable.

More generally, the compositions according to the present invention may be used/provided for use in any suitable form. The compositions may be provided in bottles of any suitable volume depending on the application, optionally with a pump head if required for larger bottles, or they can also be delivered by means of a spraying device or via wipes.

The viscosity may vary widely, particularly depending on the desired application. Typically the viscosity is between 1 and 10,000 mPa.s (1 cP), with the higher values being applicable in particular where a thickening agent is added to form a gel as already noted. More particularly, when including a thickening agent the viscosity of the compositions is typically at least 500 mPa.s, such at least 800 mPa.s, and most preferably in the range 1000 to 8000 mPa.s. (Viscosity may generally be measured by any suitable device, but in the present invention is measured on a Brookfield DV2T RV model, on a 500ml sample, using a spindle # 3 and at a speed of 20 rpm for 1 minute.)

The present invention allows producing foamable formulations with concentrations < 1 wt. % of polyalkyleneglycol-modified polysiloxane that upon contact with human bodies leave smooth and pleasant skin feel. The compositions are however also suitable for other applications as noted.

Examples

Example 1

Preparation

In a first step, ABIL® B 8832 from Evonik (which is a bis-PEG/PPG-20/20 dimethicone) is dissolved in pure ethanol to form a solution with a concentration of 10wt% bis-PEG/PPG-20/20 dimethicone. The dissolution is achieved by slow stirring over about 5 minutes to minimise foaming.

In a second step, the required amount of this solution is then further diluted with stirring in a blender with pure ethanol to provide a solution comprising 0.2wt% bis-PEG/PPG-20/20 dimethicone.

In a third step, this solution is mixed with water (approx. three parts of this solution with one part of water) in the blender to give a final composition which comprises 75wt% ethanol, 0.15wt% of bis-PEG/PPG-20/20 dimethicone and a balance of water.

Example 2

Preparation

The preparation of Example 1 was repeated except that in the second step the solution was diluted with stirring in a blender with pure ethanol to provide a solution comprising 0.067wt% bis-PEG/PPG-20/20 dimethicone. In the third step this solution is

mixed with in the blender to give a final composition which comprises 75wt% ethanol, 0.05wt% of bis-PEG/PPG-20/20 dimethicone and a balance of water.

Example 3

Preparation

The preparation of Example 3 is similar to Example 1. However, in the first step a second solution was prepared by dissolving Lanette 14 from BASF (myristyl alcohol) in pure ethanol to form a solution with a concentration of 10wt% myristyl alcohol. The dissolution is achieved by slow stirring over about 10 minutes.

In the second step the required amounts of both solutions from the first step were mixed and then diluted with stirring in a blender with pure ethanol to provide a solution comprising bis-PEG/PPG-20/20 dimethicone and myristyl alcohol.

In the third step this solution is mixed with water in the blender to give a final composition which in this Example comprises 75wt% ethanol, 0.25wt% of bis-PEG/PPG-20/20 dimethicone, 0.8wt% myristyl alcohol and a balance of water.

Example 4

Preparation

The preparation of Example 3 is repeated except that when mixed with water hydrogen peroxide is added, to give a final composition comprising 75wt% ethanol, 0.25wt% of bis-PEG/PPG-20/20 dimethicone, 0.8wt% myristyl alcohol. 2.5wt% hydrogen peroxide and a balance of water.

Comparative Example 1

Preparation

The composition used for Comparative Example 1 is the WHO recommended Handrub formulation using ethanol comprising (v/v) ethanol 80%, glycerol 1.45%, hydrogen peroxide 0.125% and a balance of water.

Comparative Example 2

Preparation

Comparative Example 2 is denatured ethanol.

Comparative Example 3

Preparation

Comparative Example 3 is prepared in the same way as Example 3, except that the final composition comprises 2wt% bis-PEG/PPG-20/20 dimethicone is used.

Results

Examples 1 and 2 and Comparative Examples 1 and 2 were all tested as hand sanitisers. Although all compositions are effective at disinfecting the hands, the compositions according to the present invention were found to provide a better feel on the skin of the user. This was both compared to Comparative Example 2 (denature ethanol), which left a significant feeling of dryness on the skin, and also compared to Comparative Example 1 (WHO formulation). Thus, the use of low levels of bis-PEG/PPG-20/20 dimethicone provides an improved composition for use as a hand sanitiser.

Example 2 was also tested as a cleanser for computer screens. It was found to be very effective in cleansing and disinfecting without leaving any undesired traces on the screen.

Example 3 and Comparative Example 3 were tested in a large surface application. Comparative Example 3 provided excellent cleansing performance, but an oily/greasy residue was left on the surface. Example 3 also provided excellent cleansing performance, but without leaving any noticeable residue. This shows that excellent cleansing and disinfecting can be achieved without leaving residue by using low levels of bis-PEG/PPG-20/20 dimethicone.

Example 4 was also tested in a large surface application. The Example also provided excellent cleansing performance, without leaving any noticeable residue. The hydrogen peroxide improved the biocidal effectiveness, making this suitable also for applications in a medical environment.

CLAIMS

1. A composition which comprises:
   a) Ethanol, present in an amount of at least 70wt% to at most 90wt% of the composition,
   b) A polyalkylene glycol-modified polysiloxane, present in an amount of 0.01wt% to less than 1wt% of the composition, wherein the polyalkylene glycol-modified polysiloxane comprises at least two different polyalkylene glycol groups and wherein the polyalkylene glycol groups are present in an amount corresponding to at least 40 moles of alkylene glycol per mole of polysiloxane,
   c) Optionally up to 0.5wt% of a foam stabiliser,
   d) Optionally up to 5wt% of a peroxide, and
   e) At least 5wt% water.

2. A composition according to claim 1 wherein ethanol is present in an amount of 85wt% or less, and more preferably of between 70 and 80wt%.

3. A composition according to claim 1 or claim 2 wherein ethanol is present in an amount of at least 71wt%, such as at least 72wt%.

4. A composition according to any one of the preceding claims wherein component (b) is present in an amount of less than 0.95 wt%, preferably 0.80wt% or less, and most preferably 0.50wt% or less of the composition.

5. A composition according to any one of the preceding claims wherein the polyalkyleneglycol-modified polysiloxane is a bis-PEG/PPG-X/Y-dimethicone, where “X” and “Y” represent the chain length of the PEG and PPG polymer chains respectively, and wherein X and Y are each from 5-26 and “X + Y” is at least 20.

6. A composition according to any one of the preceding claims wherein the polyalkyleneglycol-modified polysiloxane is bis-PEG/PPG-20/20 dimethicone.

7. A composition according to any one of the preceding claims wherein component (c) is present and is a fatty alcohol, and particularly a straight chain C6 to C20 primary alcohol.

8. A composition according to any one of the preceding claims wherein component (c) is present, and is present in a maximum amount of less than 0.2wt%, and most preferably less than 0.1wt%, and most preferably in the range 0.05 to 0.1wt%.

9. A composition according to any one of the preceding claims wherein component (d) is present, and preferably is hydrogen peroxide and/or is present in an amount of less than 4wt%, such as in the range 1 to 3wt%.

10. A composition according to any one of the preceding claims wherein less than 5wt% (in total) of any components other than components (a)-(e) are present in the composition, particularly less than 3wt%, more preferably less than 1wt% of any components.

11. A composition according to any one of the preceding claims wherein the composition consists essentially of components (a), (b), (c) (where present), (d) (where present), and (e).

12. A composition according to any one of the preceding claims for use in disinfecting hands, and preferably wherein the composition includes components (a), (b) and (e), but not (c) and (d), and wherein component (b) is present in an amount of 0.05wt% to 0.25wt% of the composition.

13. Use of a composition according to any one of the preceding claims for disinfecting hands, screens and surfaces, including large surfaces and surfaces used in medical environments.

14. Use according to claim 13 wherein the use is for hands or screens and wherein the composition includes components (a), (b) and (e), but not (c) and (d), and wherein component (b) is present in an amount of 0.05wt% to 0.25wt% of the composition.

15. Use according to claim 13 where the use is for large surfaces and wherein the composition includes components (a), (b), (c) and (e), but not (d), and wherein component (b) is present in an amount of 0.20wt% to 0.40wt% of the composition.

16. Use according to claim 13 where the use is for surfaces used in medical environments and wherein the composition includes components (a), (b), (c), (d) and (e), and wherein component (b) is present in an amount of 0.05 wt% to 0.40wt% of the composition.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2021/067402

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/22 A61K8/34 A61K8/894 A61K31/045 A61K31/327
A61P31/02 A61Q19/10
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61K A61P A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, BIOSIS, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/066888 A2 (STOCKHAUSEN CHEM FAB GMBH [DE]; VEEGER MARCEL [DE] ET AL.) 29 June 2006 (2006-06-29) cited in the application	1-3,5,6, 8,10-13
Y	page 9, lines 14-18 claim 12 page 6; examples 2,3	1-15
Y	US 2019/343116 A1 (FUOCO DOMENICO [CA]) 14 November 2019 (2019-11-14) composition #1; claim 13; table 1	1-16
Y	WO 2011/013009 A2 (FOAMIX LTD [IL]; TAMARKIN DOV [IL] ET AL.) 3 February 2011 (2011-02-03) paragraphs [0017], [0040] composition 10B7; table 6a	1-16

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 September 2021	23/09/2021

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2021/067402

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006066888 A2	29-06-2006	AU 2005318384 A1	29-06-2006
		BR PI0519142 A2	30-12-2008
		CA 2589502 A1	29-06-2006
		CN 101083908 A	05-12-2007
		DE 102004062775 A1	29-06-2006
		EP 1830636 A2	12-09-2007
		JP 2008524295 A	10-07-2008
		PL 1830636 T3	31-07-2018
		US 2006182690 A1	17-08-2006
		US 2010069505 A1	18-03-2010
		US 2012136069 A1	31-05-2012
		US 2014221502 A1	07-08-2014
		WO 2006066888 A2	29-06-2006
		ZA 200704396 B	29-10-2008
US 2019343116 A1	14-11-2019	CA 3099887 A1	14-11-2019
		EP 3790528 A1	17-03-2021
		US 2019343116 A1	14-11-2019
		WO 2019215679 A1	14-11-2019
WO 2011013009 A2	03-02-2011	CA 2769625 A1	03-02-2011
		IL 217783 A	31-08-2016
		US 2012213709 A1	23-08-2012
		US 2016101051 A1	14-04-2016
		US 2017216334 A1	03-08-2017
		US 2019054106 A1	21-02-2019
		WO 2011013009 A2	03-02-2011