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(54) Title: GERMICIDAL TOPICAL COMPOSITIONS

(57) Abstract: Topical germicidal compositions comprise (in preferred embodiments consist of or consist essentially of): about 50 %wt. - 90 %wt. of an alcohol constituent comprising one or more C₁-C₄ monohydric alcohols; a silicone emulsifier constituent; which preferably comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane; optionally, a volatile linear silicone constituent; optionally, an ion source; optionally but preferably, a thickener constituent based on one or more cellulose derivatives; optionally, one or more constituents for improving the aesthetic or other technical characteristics of the invention, optionally, water; characterized in that the are flowable and subsequent to being stored at elevated temperatures and/or extended time intervals are retained as a single phase composition and do not split or separate into two or more phases, and further, the compositions provide a topical germicidal benefit when applied to the skin or parts of the body. Also disclosed are methods for the production of the topical germicidal compositions, as well as methods for their use.



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GERMICIDAL TOPICAL COMPOSITIONS

The present invention relates to viscous germicidal topical compositions which have a high alcohol content, and which provide a germicidal benefit to dermal surfaces upon which the compositions are applied.

Topical compositions, per se, are well-known in the cosmetic, dermatological as well as in the pharmaceutical fields. Most topical compositions are intended to provide at least one but generally provide multiple or more specific benefits after being applied to the human skin. For example, personal care compositions which are primarily intended to be soaps for general cleaning of the human skin such as hand soaps or body wash soaps are well known in the fields of cosmetics and personal care products. While providing a primary cleaning benefit, such personal care compositions frequently also provide ancillary benefits such as moisturizing and nourishing the skin. Such personal care compositions which provide a good general cleaning benefit are usually based on one or more anionic soaps or anionic surfactants which are recognized to provide good cleaning and good foaming. However, such compositions typically provide only limited germicidal benefits.

Also known to the art are topical compositions which are primarily directed to provide an germicidal benefit to the epidermis or other body part when applied thereto. Such typically take the form of viscous gels and are often largely comprised of an alcohol, usually ethanol, with further constituents, e.g., thickeners. While often technically effective to provide a germicidal benefit, such compositions are also not without shortcomings, including in some cases, an unpleasant skin feel and in other cases, an undesired drying effect to the skin.

It is to these shortcomings as well as further shortcomings in the art to which the current invention is directed.

In a first aspect of the invention there are provided topical germicidal compositions for application to the epidermis, e.g., hands, arms, legs, face, scalp as well as other body areas.

According to a second aspect of the invention is provided a method for the manufacture or production of improved topical germicidal composition as set forth herein.

According to a still further aspect of the invention there is provided an improved method for the treatment of the skin (epidermis) as well as other body surface including the hair which method includes the application of a cleaning and/or germicidally effective amount of the topical composition described herein in order to provide an effective cleaning and/or germicidal benefit.

These and further aspects of the invention are provided as described within this specification.

Broadly stated, in a first aspect of the invention there are provided topical germicidal compositions for application to the epidermis, e.g., hands, arms, legs, face, scalp as well as other body areas. In certain preferred embodiments, the topical germicidal compositions are those which are flowable and exhibit an initial viscosity of at in the range of 10 – 100,000 cP at 25°C as measured using conventional quantitative methods. These topical germicidal compositions comprise (in preferred embodiments consist of, or consist essentially of):

about 50%wt. – 95%wt., preferably about 60%wt. – 90%wt. of an alcohol constituent comprising one or more C₁-C₄ monohydric alcohols;

a silicone emulsifier constituent, which preferably comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;

and optionally but preferably further includes

a volatile linear silicone constituent;

an ion source, such as a salt;

a thickener constituent based on one or more cellulose derivatives, such as hydroxypropylmethylcellulose;

optionally one or more further constituents for improving the aesthetic or other technical characteristics of the invention,

optionally but preferably up to 30%wt. of water, but preferably not more than about 15%wt. of water;

characterized in that they are flowable and preferably also exhibit an initial viscosity (“as mixed”) of at least about 10 cP measured at 25°C, and subsequent to being stored at elevated temperatures and/or extended time intervals are retained as a single phase composition and do not split or separate into two or more phases, and further, the compositions provide a topical germicidal benefit when applied to the skin or parts of the body.

In a second aspect of the invention there are provided topical germicidal compositions for application to the epidermis, e.g., hands, arms, legs, face, scalp as well as other body areas. In certain preferred embodiments, the topical germicidal compositions are those which are flowable and exhibit an initial viscosity of at in the range of 10 – 100,000 cP at 25°C as measured using conventional quantitative methods. These topical germicidal compositions comprise (in preferred embodiments consist of or consist essentially of):

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a silicone emulsifier constituent, which preferably comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;

a thickener constituent based on one or more cellulose derivatives, such as hydroxypropylmethylcellulose;

optionally, but preferably, a volatile linear silicone constituent;

optionally, but preferably, an ion source, such as a salt;

optionally one or more further constituents for improving the aesthetic or other technical characteristics of the invention,

optionally, but preferably, up to 30%wt. of water, but preferably not more than about 15%wt. of water;

characterized in that the are flowable and preferably also exhibit an initial viscosity (“as mixed”) of at least about 10 cP measured at 25°C, and subsequent to being stored at elevated temperatures and/or extended time intervals are retained as a single phase composition and do not split or separate into two or more phases, and further, the compositions provide a topical germicidal benefit when applied to the skin or parts of the body.

In a third aspect of the invention there are provided topical germicidal compositions for application to the epidermis, e.g., hands, arms, legs, face, scalp as well as other body areas. In certain preferred embodiments, the topical germicidal compositions are those which are flowable and exhibit an initial viscosity of at in the range of 10 – 100,000 cP at 25°C as measured using conventional quantitative methods. These topical germicidal compositions comprise (in preferred embodiments consist of or consist essentially of):

about 50%wt. – 95%wt. of an alcohol constituent comprising one or more C₁-C₄ monohydric alcohols;

a silicone emulsifier constituent, which preferably comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;

a volatile linear silicone constituent;

an ion source, such as a salt;

5 a thickener constituent based on one or more cellulose derivatives, such as hydroxypropylmethylcellulose;

optionally one or more further constituents for improving the aesthetic or other technical characteristics of the invention,

optionally, but preferably, up to 30%wt. of water, but preferably not more than about 10 15%wt. of water;

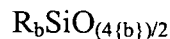
characterized in that they are flowable and preferably also exhibit an initial viscosity ("as mixed") of at least about 10 cP measured at 25°C, and subsequent to being stored at elevated temperatures and/or extended time intervals are retained as a single phase composition and do not split or separate into two or more phases, and further, the compositions provide a topical 15 germicidal benefit when applied to the skin or parts of the body.

In a fourth aspect, the present invention provides a topical germicidal composition according to the first, second or third aspects of the invention, characterized in that the said composition is effective against one or more, preferably at least two or more of the following microorganisms: *B. cepacia*, *E. coli*, *S. aureus*, *S. marcescens*, *S. pyogenes*, *S. epidermidis*, *E. faecalis*, 20 *K. pneumoniae*, *P. aeruginosa*, *E. hirae*, *S. pneumoniae*, *C. albicans*, *S. enterica*, and methicillin resistant *Staphylococcus aureus* ("MRSA").

The primary constituent of the topical germicidal compositions is an alcohol constituent, comprising one or more C₁-C₄ monohydric alcohols, e.g., one or more alcohols selected from methanol, ethanol, n-propanol, isopropanol, and all isomers of butanol. Isopropanol, although 25 often used on the skin, is less desirable for use in the present invention because of its severe defatting tendency. Its defatting tendency may, however, be compensated for by adding sufficient emollient ingredient if desired to offset this tendency. Preferred alcohols according to the present invention are however ethanol and n-propanol. In the present invention, when more than one alcohol is used, the alcohols are mixed at a concentration that is peak for their activity. 30 Ethanol is included for its reduced defatting activity and for activity against viruses, especially the lipophilic group; while the inclusion of n-propanol enhances the contribution of the alcohol

constituent to the overall germicidal efficacy of the topical germicidal compositions of which they form a part. In certain preferred embodiments the alcohol constituent comprises at least 50%wt., or (in order of increasing preference) at least 55%wt., 60%wt., 65%wt., 70%wt., 75%wt., 80%wt., 85%wt., 90%wt., 95%wt., and especially preferably comprises at least 100%wt. ethanol. The alcohol constituent itself comprises at least 50%wt., preferably comprises at least 55%wt., still more preferably comprises at least 60%wt. of the topical germicidal compositions of which it forms a part. Concurrently the alcohol constituent desirably comprises not more than 90%wt., preferably not more than 85%wt., yet more preferably not more than 80%wt., still more preferably not more than 75%wt., and especially preferably comprises not more than 70%wt. of the topical germicidal compositions.

A next essential constituent of the present invention is a silicone emulsifier constituent, which preferably comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane. The silicone emulsifier constituent may be a polydiorganosiloxanepolyoxyalkylene copolymer containing at least one polydiorganosiloxane segment and at least one polyoxyalkylene segment. The polyoxyalkylene segments may be bonded to the polydiorganosiloxane segments with silicon-oxygen-carbon bonds and/or with silicon-carbon bonds. The polydiorganosiloxane segments consist essentially of siloxane units which are interlinked by Si-O-Si linkages and which have the formula:



The value of b may range from 0 to 3 for said siloxane units with the provision that there is an average of approximately 2, i.e. from 1.9 to 2.1 R radicals for every silicon in the copolymer. Suitable siloxane units thus include $R_3SiO_{1/2}$, $R_2SiO_{2/2}$, $RSiO_{3/2}$, and $SiO_{4/2}$ siloxane units taken in such molar amounts so that b has an average value of approximately 2 in the copolymer. Said siloxane units may be arranged in linear, cyclic and/or branched fashion. The R radicals may be any radical selected from the group consisting of methyl, ethyl, vinyl, phenyl, and a divalent radical bonding a polyoxyalkylene segment to the polydiorganosiloxane segment. At least 95 percent of all R radicals are methyl radicals; preferably there is at least one methyl radical bonded to each silicon atom in (d). Divalent R radicals preferably contain no more than 6 carbon atoms. Examples of divalent R radicals include --O--, --C_mH_{2m}O--, --C_mH_{2m}-- and --C_mH_{2m}CO₂-- where m is an integer greater than zero.

Illustrative of the siloxane units that make up the polydiorganosiloxane segments are the following, where Me denotes methyl and Q denotes said divalent R radical and bonded polyoxyalkylene segment: $R_3SiO_{1/2}$ units such as $Me_3SiO_{1/2}$, $Me_2(CH_2=CH)SiO_{1/2}$, $Me_2(C_6H_5)SiO_{1/2}$, $Me(C_6H_5)(CH_2=CH)SiO_{1/2}$, $Me_2(CH_3CH_2)SiO_{1/2}$, $Me_2QSiO_{1/2}$, $MeQ_2SiO_{1/2}$, $Q_3SiO_{1/2}$, $Q_2(CH_3CH_2)SiO_{1/2}$, and $Me(C_6H_5)(Q)SiO_{1/2}$; $R_2SiO_{2/2}$ units such as $Me_2SiO_{2/2}$, $Me(C_6H_5)SiO_{2/2}$, $Me(CH_2=CH)SiO_{2/2}$, $(C_6H_5)_2SiO_{2/2}$, $MeQSiO_{2/2}$, and $Q(C_6H_5)SiO_{2/2}$; $RSiO_{3/2}$ units such as $MeSiO_{3/2}$, $C_6H_5SiO_{3/2}$, $CH_2=CHSiO_{3/2}$, $CH_3CH_2SiO_{3/2}$ and $QSiO_{3/2}$; and $SiO_{4/2}$ units.

It is to be understood that the polydiorganosiloxanepolyoxyalkylene copolymer may comprise one or more of said polydiorganosiloxane segments. The number of and average molecular weight of the polydiorganosiloxane segments in the copolymer is related to the desired weight ratio, hereinafter described, of said segments in the copolymer. Preferably the polydiorganosiloxanepolyoxyalkylene copolymer comprises one polydiorganosiloxane segment having bonded thereto one or more polyoxyalkylene segments.

The polyoxyalkylene segments of the polydiorganosiloxanepolyoxyalkylene copolymer consist essentially of oxyethylene units of the formula $--CH_2CH_2O--$, alone, or in combination with oxypropylene units of the formula $--CH_2CH(CH_3)O--$, wherein preferably, an average of at least half of the oxyalkylene units in the polyoxyalkylene segments being oxyethylene units. Suitable emulsions of this invention are not formed when the polyoxyalkylene segments contain more than 50 mol percent of the relatively hydrophobic oxypropylene unit. The polyoxyalkylene segments thus correspond to the formula $\{--CH_2CH_2O--\}_p \{--CH_2CH(CH_3)O--\}_q$ wherein the oxyalkylene units may be arranged in any suitable fashion such as random, alternating and block. The average values of p and q are such that p is greater than or equal to q and the sum of p+q is sufficient to provide an average molecular weight of at least 1,000 for the polyoxyalkylene segments. Preferably the average molecular weight of the polyoxyalkylene segments has a value of from 1,500 to 5,000.

The polyoxyalkylene segments of the polydiorganosiloxanepolyoxyalkylene copolymer are bonded to the polydiorganosiloxane segments of said copolymer by at least one terminal portion of said polyoxyalkylene segment, said bonding being by way of a divalent R radical, hereinbefore described. It is to be understood that said bonding may be by both terminal portions of said polyoxyalkylene segment in those copolymers comprising more than one polydiorganosiloxane segments. Any terminal portion of the polyoxyalkylene segment of the

polydiorganosiloxanepolyoxyalkylene copolymer that is not bonded to a polydiorganosiloxane segment is satisfied by a terminating radical. The type of said terminating radical is not critical and may be monovalent, thereby terminating one polyoxyalkylene segment, or polyvalent, thereby terminating more than one polyoxyalkylene segment. Said terminating radicals are made up of atoms selected from the group consisting of carbon, hydrogen, nitrogen, and oxygen. Illustrative of said terminating radical are hydrogen; hydroxyl; alkyl, such as methyl, ethyl, propyl, butyl; benzyl; aryl, such as phenyl; alkoxy such as methoxy, ethoxy, propoxy, butoxy; benzyloxy; aryloxy, such as phenoxy; alkenyloxy, such as vinyloxy and allyloxy; acyloxy, such as acetoxy, acryloxy and propionoxy and amino such as dimethylamino.

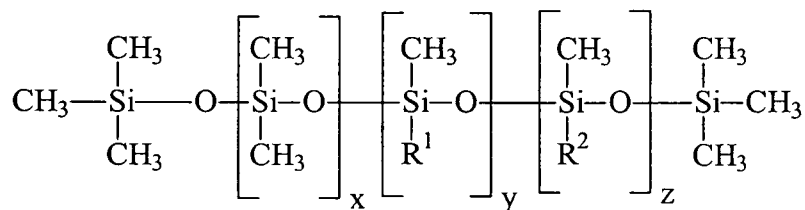
The number of and average molecular weights of the segments in the polydiorganosiloxanepolyoxyalkylene copolymer are such that the weight ratio of polydiorganosiloxane segments to polyoxyalkylene segments in the polydiorganosiloxanepolyoxyalkylene copolymer has a value of from 2 to 8, and preferably from 2.5 to 4.0. This weight ratio will insure that the copolymer (d) has a preferential solubility in the volatile liquid, a condition necessary for the formation of stable water-in-oil type emulsions of this invention.

The weight ratio of polydiorganosiloxane segments to polyoxyalkylene segments in polydiorganosiloxanepolyoxyalkylene copolymer is calculated on the basis of the total weight of polydiorganosiloxane and the total weight of polyoxyalkylene that is joined in the copolymerization process. For example, if 100 parts by weight of polydiorganosiloxane is joined completely by an addition process, which utilizes silicon-bonded hydrogen radicals, with 20 parts by weight of polyoxyalkylene, said weight ratio of the resulting copolymer has a value of 5. Of course, if said complete joining is accomplished by a displacement reaction, involving a silicon-bonded hydrolyzable radical and resulting in the formation of a by-product, the weight ratio of polydiorganosiloxane to polyoxyalkylene in the resulting copolymer may not be identical with the weight ratio of the corresponding reactants, due to the loss of the weight of the displaced groups. The error introduced into the calculation of said weight ratio by ignoring the loss of said displaced groups is usually insignificant. That is to say, the weight ratio of polydiorganosiloxane to polyoxyalkylene in copolymer (d) may be calculated from the weight of reactants that react to form the copolymer or said weight ratio may be determined by suitable analysis of the resulting copolymer itself. Suitable analytical techniques such as elemental analysis, nuclear magnetic

resonance spectroscopy, silicon substituent analysis and infra-red spectroscopy may be found in "Analysis of Silicones", A. Lee Smith, Ed., John Wiley and Sons, New York, 1974. It is to be understood that in the polydiorganosiloxanepolyoxyalkylene copolymer, the said copolymer may include a block arrangement of segments such as denoted by the formulae $(AB)_c$, $A(BA)_c$ and $B(AB)_c$ or a pendant arrangement of segments such as $(AB)_d$ or combinations thereof wherein A denotes a polydiorganosiloxane segment, B denotes a polyoxyalkylene segment and c and d respectively denote integers greater than zero and greater than one.

The polydiorganosiloxanepolyoxyalkylene copolymer may be prepared by modifications of the well-known methods described in the polydiorganosiloxane-polyoxyalkylene copolymer art. The following patents are hereby incorporated by reference to show the preparation of exemplarily polydiorganosiloxane-polyoxyalkylene copolymers: Haluska, U.S. Pat. No. 2,868,824; Haluska, U.S. Pat. No. Re 25,727; Bailey, U.S. Pat. No. 3,172,899; Pater, U.S. Pat. No. 3,234,252, Simmler, et al. U.S. Pat. No. 3,174,987; Bailey, et al., U.S. Pat. Nos. 3,562,786, 3,600,418 and 3,629,308; Holdstock, U.S. Pat. No. 3,629,165; and Gée et al., U.S. Pat. No. 4,122,029.

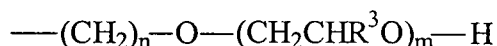
Also useful as silicone emulsifiers in the inventive compositions are one or more compounds which may be represented by the structure:



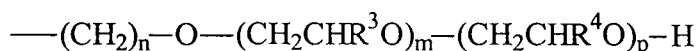
wherein

R^1 represents a C_1 - C_{30} straight chained, branched or cyclic alkyl group,

R^2 represents a moiety selected from:



and



in which n represents an integer from about 3 to about 10, R^3 and R^4 are selected from hydrogen and C_1 - C_6 straight chain, or branched chain alkyl groups with the proviso that R^3 and R^4 are not simultaneously the same, each of m, p, x and y are independently selected from

integers of zero or greater, such that the molecule has a molecular weight of between about 200 to about 20,000,000 and wherein both m and p are not both simultaneously zero, and z is selected from integers of 1 or greater.

Preferred examples of such silicone emulsifiers are silicone polyethers, viz., a polydiorganosiloxanepolyoxyalkylene copolymer containing at least one polydiorganosiloxane segment and at least one polyoxyalkylene segment, include PEG/PPG-18/18 dimethicone, available as a blend with cyclopentasiloxane as DC5225C or DC5185 from Dow Corning, Inc. , PEG/PPG-20/15 dimethicone, available as a blend with cyclopentasiloxane as SF1528 from Kobo, PEG-9 dimethicone, available as KF6017 or KF6028 from Shin-Etsu, cetyl dimethicone copolyol-polyglyceryl-4-isostearate-hexylaurate available as ABIL® WE 09 from Goldschmidt Chemical Corporation, Hopewell, VA, cetyl dimethicone copolyol (ABIL® EM 90), bis-PEG/PPG-14/14 dimethicone, cyclopentasiloxane (ABIL® EM 97), laurylmethicone copolyol (5200), Cyclomethicone (and) Dimethicone Copolyol available as DC 3225 C from Dow Corning, and Cyclopentasiloxane and Dimethicone Copolyol available as GE SF 1528 from GE Silicones.

The silicone emulsifiers comprise may be present in any amount of from at least about 0.01%wt. to at least about 45%wt., preferably are present in amounts of at least about 0.01 – 35%wt. based on the total weight of the topical germicidal composition of which it forms a part. Preferably the silicone emulsifier constituent is present in amount of from 1%wt. to 30%wt., more preferably from about 2%wt., to about 25%wt. Particularly preferred amounts of the silicone emulsifiers are described with reference to one or more of the examples.

As it is expected that the preferred PEG/PPG dimethicones may be provided in a liquid carrier, especially in a liquid silicone carrier, as a commercial preparation, including one or more of those identified above. In such a commercial preparation the PEG/PPG dimethicones typically comprise up to about 20%wt., more frequently up to about 10%wt. of the commercial preparation used as the silicone emulsifier constituent, with the balance being the liquid carrier, typically a liquid silicone and in some cases, a small amount of water or organic liquid.

The present inventors have surprisingly found that largely alcoholic compositions may be emulsified using the silicone emulsifier constituent, particularly wherein the silicone emulsifier constituent is based on comprises PEG/PPG dimethicone in a liquid silicone carrier, and wherein at least 50%wt., but preferably greater amounts of C₁-C₄ monohydric alcohols, especially C₁-C₄

linear monohydric alcohols and especially ethanol are present in the germicidal topical compositions.

The compositions of the invention may also include at least one volatile linear silicone, which may be present as a constituent separate from the silicone emulsifier constituent or which may form part of the silicone emulsifier constituent. The volatile linear silicone is advantageously a polydimethylsiloxane or dimethicone which has a relatively low average molecular weight, a relatively low viscosity and a significant vapor pressure at 25° C. (i.e. one gram of fluid placed on No. 1 filter paper leaves substantially no visible residue after thirty minutes at room temperature). It also typically has a boiling point under 250° C. The volatile linear silicone (or volatile dimethicone) is represented by the formula $(\text{CH}_3)_3\text{SiO}(\text{Si}(\text{CH}_3)_2\text{O})_n\text{Si}(\text{CH}_3)_3$ in which n is an integer of about 0 to about 6, preferably about 1 to about 4. One of the methyl groups of the foregoing formula may be replaced with an alkyl group (e.g. of 2 to 10 carbon atoms) to provide an alkylmethylsiloxane. Such material includes, for example, DC 2-1731 (Dow Corning), which is 3-hexylheptamethyltrisiloxane (viscosity=1.0 cst). While a pure silicone polymer may be utilized, generally the volatile linear silicone is a mixture of silicone polymers of the above formula. The volatile linear silicone preferably has a viscosity of less than about 5 cst (or less than about 5 cP), preferably between about 0.6 and 3.0 cst, more preferably between 1.0 and 2.0 cst. (For silicones with a specific gravity at 25° C. in the 0.75 to 0.92 range, the foregoing viscosity ranges convert to about 0.5 to 2.8 cP, preferably about 0.8 to 1.8 cP) By way of non-limiting example, suitable volatile linear silicones include DM Fluid 0.65 cs (hexamethyldisiloxane), DM Fluid 1.0 cs (octamethyltrisiloxane), DM Fluid 1.5 cs, DM Fluid 2.0 cs (dodecamethylpentasiloxane), DC 2-1184 and DC 2-1731, all of the foregoing being available from Dow Corning. A particularly preferred volatile linear silicone is a material commercially available as DC 2-1184, which has a viscosity of about 1.7 cst and an average molecular weight of about 320 (i.e. n is about 1 to 3 in the above formula).

The volatile linear silicone may be present in any amount of from 0%wt., but when present are desirably present in amounts of from 0.01%wt. to 40%wt., based on the total weight of the topical germicidal composition of which it forms a part. Preferably the volatile linear silicone is present in amount of from 0.1%wt. to 8%wt., more preferably from about 3%wt., to about 7%wt. Particularly preferred amounts of the volatile linear silicone are described with reference to one or more of the examples.

The compositions of the invention optionally but preferably also include an ion source. Such a source of ions are essential to ensure that thickening of the compositions results when combining the individual constituents. Such ions may be provided by the inclusion of or the addition of one or more inorganic materials, such as alkali metal salts, to the topical germicidal compositions. It has been observed by the inventor that the presence of available ions favorably improve the thickening of the compositions, but at the same time do not undesirably detract from the storage stability of the topical germicidal compositions. These ions may be added to the compositions separately, or they may form part of a different material which is used in the topical germicidal compositions and thereby become included in the same. Exemplary useful salts are water-soluble salts, including alkali metal salts, alkali hydroxides, alkali carbonates and alkali sulfates. Exemplary useful alkali metal salts include monovalent and divalent salts, such as one or more of: magnesium sulfate, calcium sulfate, potassium sulfate and sodium chloride. Particularly preferred as an ion source are the materials described in the following examples.

When present, the ion source, especially wherein the ion source is an alkali metal salt, may be present in the topical germicidal compositions in any effective amount, but advantageously are present in an amount of between 0.01%wt. and 5%wt., preferably is present in an amount of from 0.1%wt. to 2%wt., and still more preferably is present in an amount of between about 0.5%wt. and 2%wt., based on the total weight of the topical germicidal compositions of which they form a part.

The compositions of the invention optionally but advantageously also include a thickener constituent based on cellulose or one or more cellulose derivatives, and in certain preferred embodiments such a thickener constituent is necessarily present. Such are per se, known to the art and exemplary useful cellulose derivatives useful as a thickener constituent include methyl cellulose ethyl cellulose, hydroxymethyl cellulose hydroxy ethyl cellulose, hydroxy propyl cellulose, carboxy methyl cellulose, carboxy methyl hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxy propyl methyl cellulose, ethylhydroxymethyl cellulose and ethyl hydroxy ethyl cellulose. Of the foregoing hydroxypropyl methyl cellulose is particularly preferred for use in preferred compositions of the invention.

While the thickener constituent based on cellulose or one or more cellulose derivatives may be present in any amount which is found to provide a desired initial viscosity as well as viscosities to aged samples of the topical germicidal treatment compositions, advantageously the

thickener constituent based on cellulose or one or more cellulose derivatives is present in amounts of from about 0.01%wt. to about 5%wt., preferably is present in amounts of (in order of increasing preference) 0.1%wt., 0.15%wt., 0.2%wt., 0.25%wt. or greater amounts.

Concurrently the thickener constituent based on cellulose or one or more cellulose derivatives is present in amounts not in excess of 5%wt., and preferably is present in amount not greater than (in order of increasing preference) 0.45%wt., 4%wt., 3.5%wt., 3%wt., 2.5%wt., 2%wt., 1.5%wt., 1%wt., 0.8%wt., 0.7%wt., 0.6%wt., and 0.5%wt., based on the total weight of the compositions of which the thickener constituent based on cellulose or one or more cellulose derivatives constituent forms a part.

A further ancillary thickener constituent are one or more thickener constituents based on crosslinked polycarboxylate and/or polyacrylate polymer thickeners; including those typically exhibit a molecular weight from about 500,000 to about 4,000,000, and generally have degrees of crosslinking of from about 0.25% to about 15%.. Such crosslinked polycarboxylate and/or polyacrylate polymers may include in their structure other monomers besides acrylic acid such as ethylene and propylene which act as diluents, and maleic anhydride which acts as a source of additional carboxylic groups. Such thickener constituents based on crosslinked polycarboxylate and/or polyacrylate polymer thickeners are widely commercially available and include, e.g., polycarboxylate polymers and/or polyacrylate polymers sold under trade names Carbopol®, Acrysol® ICS-1 and Sokalan®.

A further ancillary thickener constituent are one or more clay thickeners. Exemplary clay thickeners comprise, for example, colloid-forming clays, for example, such as smectite and attapulgite types of clay thickeners. The clay materials can be described as expandable layered clays, i.e., aluminosilicates and magnesium silicates. The term "expandable" as used to describe the instant clays relates to the ability of the layered clay structure to be swollen, or expanded, on contact with water. The expandable clays used herein are those materials classified geologically as smectites (or montmorillonite) and attapulgites (or polygorskites).

A further ancillary thickener constituent are one or more thickeners based on naturally occurring polysaccharide polymers such as xanthan gum, guar gum, locust bean gum, tragacanth gum, or derivatives thereof.

Any of the ancillary thickeners, whether present singly or in combination with at least one further ancillary thickener constituent may be present in any amount which is found effective

in achieving a desired degree of thickening. When present, advantageously such one or more ancillary thickener constituents may be present in amounts of from about 0.001%wt. to about 7%wt., preferably from about 0.01%wt. to about 5%wt., based on the total weight of the topical germicidal composition of which it forms a part.

5 In certain embodiments of the invention one or more of the recited ancillary thickeners are expressly excluded from the topical germicidal compositions.

In further embodiments of the invention at least one or more of the recited ancillary thickeners are expressly present within from the topical germicidal compositions concurrently with a thickener constituent based on cellulose or one or more cellulose derivatives.

10 In still further embodiments of the invention, at least one or more of the recited ancillary thickeners are expressly present within from the topical germicidal compositions in the place of the thickener constituent based on cellulose or one or more cellulose derivatives, which latter thickener constituent is absent from the topical germicidal compositions.

As is noted previously, the compositions according to the invention may be provided in a variety of product forms, e.g., viscous flowable forms, such as gels, creams or pastes as well as readily flowable forms adapted to be poured from a bottle or flask, or more flowable forms suitable to be dispensed from such a bottle, flask or other reservoir via a nozzle or a pump, e.g., a manually operable pump or a manually operable trigger spray.

A minor amount of water may be present in the topical germicidal compositions, and if present, is added to order to provide to 100% by weight of the compositions of the invention. The water may be tap water, but is preferably distilled and is most preferably deionized water or "soft" water. If the water is tap water, it is preferably substantially free of any undesirable impurities such as organics or inorganics, especially minerals salts which are present in hard water which may thus undesirably interfere with the operation of the constituents present in the topical germicidal compositions according to the present invention. When present, water may be present in various amounts of up to about 25%wt. of the total weight of the composition of which it forms a part, although it is frequently present in reduced amounts, e.g., 24%, 23%, 22%, 21%, 20%, 19%, 18%, 17%, 16%, and 15%wt. based on the product form and further based on the total weight of the composition of which it forms a part. Advantageously water is included in the compositions in amounts of at least 3%wt, and preferably (and in order of increasing preference) at least 4%wt., 5%wt., 6%wt., 7%wt., 8%wt., 9%wt., 10%wt., base on the total weight of the

compositions of which water forms a part. Compositions of the invention in which no water is added to the constituents "as supplied" from their respective suppliers are also contemplated, as frequently one or more constituents may be supplied with an aqueous or aqueous/organic liquid carrier.

5 The topical germicidal compositions are preferably flowable, and depending upon the product form may be provided in variety of viscosity ranges suited for a particular product type. For example, the topical germicidal compositions may be provided as thin "cosmetic milk" product format, and may have a viscosity as little at about 500 cP typically to about 2500 cP, while in a "lotion" product format may have somewhat higher viscosities as well, typically in the
10 range of from about 2000 cP to about 10,000 cP, preferably in the range of about 2000 to about 8000 cP, while in a more viscous format such as a gel or thickened lotion may have a viscosity of about 9,000 cP or more, such as between about 10,000 cP and about 20,000 cP. Still more viscous forms of the topical germicidal compositions may be formed and are contemplated to be within the scope of the present invention, e.g., in the range of 10 – 100,000 cP at 25°C as
15 measured using conventional quantitative methods e.g., as measured at 20°C or 25°C by a Brookfield Type LVT or Type RVT viscometer using a standard spindle, (e.g., a #3 spindle) or alternately using a "T-bar" operating under a "helipath" rather than rotational mode of operation as would be practiced with a spindle. The aforesaid viscosities are ones which may be based on the "as mixed" topical germicidal compositions but preferably are evaluated after at
20 least 1 week, preferably at least 2 weeks of storage of a sample of the topical germicidal composition maintained at a temperature of at least 30°C preferably at least 40°C. Certain preferred viscosities and storage time and temperature conditions are disclosed with reference to one or more of the examples.

 The inventor has surprisingly observed that not only can stable largely alcoholic
25 compositions be emulsified with a silicone emulsifier constituent in the substantial absence of water, but further, according to preferred embodiments of the inventive compositions, following storage of the topical germicidal constituents at elevated and/or reduced temperatures and/or for extended periods of time the topical germicidal compositions retain a reasonable proportion of their 'as-mixed' viscosity of the compositions, without separation of the topical germicidal
30 compositions into two or more distinct phases, either into a solid and a liquid phase, or into two or more different liquid phases, following storage of the topical germicidal constituents at

elevated and/or reduced temperatures and/or for extended periods of time. Such is not believed to have been heretofore demonstrated in the art, particularly wherein such compositions also exhibit a significant antimicrobial and/or germicidal and/or disinfecting benefit to topical surfaces, e.g., skin or other body parts, upon which the topical germicidal compositions are applied. Furthermore, preferred embodiments of the topical germicidal compositions also provide a satisfactory to superior tactile feel of the topical germicidal compositions applied onto a dermal surface, particularly the hands. Such a satisfactory to superior tactile feel is to be understood that the topical germicidal compositions are not unduly or undesirably sticky when applied, and notwithstanding the high content of alcohol, the topically germicidal compositions do not significantly, preferably do not perceptually dry or dehydrate the dermal surfaces upon which they are applied.

The compositions of the invention may include one or more further optional constituents which may be used to improve one or more aesthetic and/or technical characteristics of the composition of which they form a part. Typically they are included in only small amounts, and usually the total amount of any such optional constituents does not exceed 50%wt. of the topical germicidal compositions of which they form a part.

The topical germicidal compositions may optionally but preferably contain a non-ionic emulsifier which function as a co-emulsifier constituent. By way of non-limiting examples useful co-emulsifiers are selected from ethoxylated fatty alcohols, polyethoxylated fatty alcohols, glycerol mono-fatty acid esters, fatty acid esters of polyethylene glycol, polyethoxylated sorbitan fatty acid esters, alkylglycosides, and alkylpolyol osides, although it is expected that any other anionic, nonionic, cationic, zwitterionic or amphoteric surfactant compound may also function as a useful co-emulsifier constituent.

A preferred co-emulsifier constituent is a ethylene oxide condensed with sorbitan fatty acid esters. Such materials are presently commercially available under the tradename TWEEN (ex. ICI) and/or CRILL (ex. Croda) which include polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monopalmitate, polyoxyethylene sorbitan monostearate, polyoxyethylene sorbitan tristearate, polyoxyethylene sorbitan monooleate, polyoxyethylene sorbitan trioleates which are available in a variety of grades, and with differing amounts of polyoxyethylene groups per molecule. Particularly preferred co-emulsifiers are described with reference to one or more of the examples. Such co-emulsifiers may be present in any effective

amount, and when included, advantageously are present in amounts of from about 0.01%wt. to about 5%wt., preferably from about 0.25%wt. to about 2%wt., based on the total weight of the topical germicidal compositions of which they form a part. In certain particularly preferred embodiments the compositions of the invention necessarily include a co-emulsifier constituent.

5 The topical compositions of the invention may optionally comprise one or more emollients which provide softness to the topical germicidal compositions.

 The inventive compositions may include skin conditioning agents. Such include cationic Polyquaternium-type polymers which are known to the art of topical compositions. Various grades of such cationic polymers may be used, inter alia: homopolymers of

10 diallyldimethylammonium chloride commercially available as Polyquaternium 5; dimethyldiallylammonium chloride homopolymer commercially available as Polyquaternium 6; copolymers of diallyldimethylammonium chloride with acrylamide commercially available as Polyquaternium 7; polymeric quaternary ammonium salt derived from the reaction of

15 hydroxyethyl cellulose with a trimethylammonium substituted epoxide commercially available as polymeric quaternary ammonium salts derived from the reaction of hydroxyethyl cellulose with a trimethylammonium substituted epoxide commercially available as Polyquaternium 10;

20 copolymers of 1-vinyl-2-pyrrolidine and dimethylaminoethyl methacrylate commercially available as Polyquaternium 11; Polyquaternium 15; copolymers of 1-vinyl-2-pyrrolidine and 1-vinyl-3-methyl-imidazolium salt

25 commercially available as Polyquaternium 16; copolymers of acrylic acid and dimethyldiallylammonium chloride commercially available as Polyquaternium 22; polymeric quaternary ammonium salts of hydroxyethyl cellulose reacted with lauryl dimethyl ammonium-substituted epoxide commercially available as Polyquaternium 24; Polyquaternium 28; polymeric quaternary ammonium salts of the terpolymer of acrylic

30 acid/diallyldimethylammonium chloride/acrylamide commercially available as Polyquaternium 39; Polyquaternium 44; Polyquaternium 46; and, terpolymers of acrylic acid with methacrylamidopropyl trimethylammonium chloride and methylacrylate commercially available as Polyquaternium 47. Other polyquaternium compounds although not specifically elucidated here may also be utilized in the present inventive compositions. When included in the inventive

compositions, the one or more cationic polyquaternium-type polymers or other known art skin conditioning agents may be present in amounts of from about 0.001 - 5 %wt., preferably in

amounts from 0.01 – 2.5%wt., but are most desirably present in reduced weight percentages from about 0.05 – 1%wt. based on the total weight of the topical germicidal composition of which they form a part.

Further optional constituents which may be included in the topical germicidal compositions include emollients such as one or more of esters, fatty acids and alcohols, polyols and hydrocarbons which may impart a softening effect when topically applied. Exemplary esters include mono- and di-esters which may be, inter alia, dibutyl adipate, diethyl sebacate, diisopropyl dimerate, dioctyl succinate, Exemplarily branched chain fatty esters include 2-ethyl-hexyl myristate, isopropyl stearate and isostearyl palmitate. Exemplary tribasic acid esters include triisopropyl trilinoleate and trilauryl citrate. Exemplarily straight chain fatty esters include lauryl palmitate, myristyl lactate, oleyl eurate and stearyl oleate. Further exemplary useful esters include coco-caprylate/caprate (a blend of coco-caprylate and coco-caprate), propylene glycol myristyl ether acetate, diisopropyl adipate and cetyl octanoate. Exemplary useful fatty alcohols and acids include, inter alia, those compounds having from 10 to 20 carbon atoms, preferentially cetyl, myristyl, palmitic and stearyl alcohols and acids.

The emollient constituent may be a single compound or a mixture of two or more compounds which provide a beneficial emollient effect. When present in the compositions of the invention, the total amount of the emollient constituent(s) present are sufficient to provide an improved softening effect to the compositions and are advantageously included in amounts of from 0.05 - 10%wt. based on the total weight of the topical germicidal compositions of which they form a part. When present, the emollient constituent(s) are preferably present in amounts from 0.05 - 5%wt., but are most desirably present in reduced weight percentages from about 0.1 - 3%wt. based on the total weight of the topical germicidal composition of which they form a part.

The topical germicidal compositions may also include one or more dimethicones or silicones as further skin treatment or skin protectant constituents, which, when present may be included in effective amounts. When present such one or more further skin treatment or skin protectant constituents are advantageously present in amounts from 0.01 - 5%wt., but are most desirably present in reduced weight percentages from about 0.1 - 3%wt. based on the total weight of the topical germicidal compositions of which they form a part.

The topical germicidal compositions may optionally comprise one or more humectants, including polyhydric alcohols including polyalkylene glycols as well as alkylene polyols and

their derivatives, inter alia, including propylene glycol, dipropylene glycol, polypropylene glycol, polyethylene glycol and derivatives thereof, sorbitol, hydroxypropyl sorbitol, erythritol, threitol, pentaerythritol, xylitol, glucitol, mannitol, hexylene glycol, butylene glycol (e.g., 1,3-butylene glycol), hexane triol (e.g., 1,2,6-hexanetriol), glycerine, ethoxylated glycerine and propoxylated glycerine. Further useful humectants include sodium 2-pyrrolidone-5-carboxylate, guanidine; glycolic acid and glycolate salts (e.g. ammonium and quaternary alkyl ammonium); lactic acid and lactate salts (e.g. ammonium and quaternary alkyl ammonium); aloe vera in any of its variety of forms (e.g., aloe vera gel); hyaluronic acid and derivatives thereof (e.g., salt derivatives such as sodium hyaluronate); lactamide monoethanolamine; acetamide monoethanolamine; urea; and, panthenol. Still further humectants include polyols e.g., linear and branched chain alkyl polyhydroxyl compounds such as, propylene glycol, polyethylene glycol, glycerine and sorbitol. Exemplary hydrocarbons which may also serve as humectants are those having hydrocarbon chains anywhere from 12 to 30 carbon atoms, particularly, mineral oil, petroleum jelly, squalene and isoparaffins.

The humectants may be used singly or two or more humectants may be included in topical germicidal compositions of the invention. When present, in accordance with certain of the preferred embodiments, one or more humectants may be included in effective amounts, advantageously from 0.01 – 25%wt., preferably from 5 – 15%wt. based on the total weight of the composition of which it forms a part. In particularly preferred embodiments, a humectant is necessarily present in an amount of from 5 – 12.5%wt., and a particularly preferred humectant is selected from polyhydroxy alcohols, such as glycerine, and/or alkoxlated polyhydroxy alcohols, such as ethoxylated glycerine and propoxylated glycerine. Of the foregoing, glycerine is a particularly preferred humectant.

The topical germicidal compositions may include one or more powders or pulvulent materials. These powders include mica, chalk, talc, Fullers earth, kaolin, starch, silica, silicates, hydrated aluminum silicate, fumed silica, aluminum starch octenyl succinate as well as comminuted or particulate polymers such as particles of polyamides (Nylons), polyalkyleneterephthalates (PET, PBT), polyolefins (PE) or fluoropolymers (polytetrafluoroethylene) as well as mixtures of two or more thereof. The inclusion of one or more powders in the inventive compositions may provide an improved tactile benefit and/or may act to absorb a part of one or more of the hydrophobic constituents present in the composition

and/or may provide an opacifying effect to the compositions. Preferred powders are those based on inorganic materials, e.g., silica, silicates and talc. Such are typically provided to the topical germicidal compositions as finely divided particles. While such powders may be included in any effective amount, when present they are advantageously included in amounts of between about 5 0.01%wt. to about 5%wt., preferably between about 0.25%wt. to about 2%wt., based on the total weight of the topical germicidal composition of which they form a part.

The topical germicidal compositions may include one or more preservatives. Exemplary useful preservatives include compositions which comprise parabens, including methyl parabens and ethyl parabens, glutaraldehyde, formaldehyde, 2-bromo-2-nitropropoane-1,3-diol, 5-chloro-10 2-methyl-4-isothiazolin-3-one, 2-methyl-4-isothiazoline-3-one, and mixtures thereof. Further suitable preservatives include those marketed as: KATHON CG/ICP, KATHON CG/ICP II (ex. Rohm and Haas Inc.), PROXEL (ex. Zeneca), SUTTOCID A (ex. Sutton Laboratories) and TEXTAMER 38AD (ex. Calgon Corp.) When present the preservative is included in any amount found to be effective in retarding or inhibiting the growth of undesired microorganisms in 15 the topical germicidal compositions, particularly during storage for several months at room temperature. The preservative composition is advantageously present in amounts of up to about 1.5%wt., preferably from about 0.00001%wt. to about 0.5%wt., most from about 0.0001%wt. to 0.25%wt. based on the total weight of the topical composition of which it forms a part. Usually however, in light of the high alcohol content such preservatives are not required and are 20 advantageously omitted.

The topical germicidal compositions may include a fragrance constituent, which may be based on natural and synthetic fragrances and most commonly are mixtures or blends of a plurality of such fragrances, optionally in conjunction with a carrier such as an organic solvent or a mixture of organic solvents in which the fragrances are dissolved, suspended or dispersed. 25 When present in a composition, the fragrance constituent may be present in any effective amount such that it can be discerned by a consumer of the topical germicidal composition, however is advantageously present in amounts of up to about 5%wt., preferably from about 0.00001%wt. to about 1.5%wt., most preferably from about 0.0001%wt. to 0.25%wt. based on the total weight of the topical composition of which it forms a part.

30 The inventive topical germicidal compositions may include one or more colorants, e.g., dyes or pigments which are known to the art to be useful in cosmetic or topical compositions which

may be used to impart a desired color or tint to the inventive compositions. Exemplary colorants include pigments, inter alia, inorganic red pigments, such as iron oxide, iron hydroxide and iron titanate; inorganic brown pigments, such as gamma-iron oxide; inorganic yellow pigments, such as iron oxide yellow and loess; inorganic black pigments, such as iron oxide black and carbon black; inorganic violet pigments, such as manganese violet and cobalt violet; inorganic green pigments, such as chromium hydroxide, chromium oxide, cobalt oxide and cobalt titanate; inorganic blue pigments, such as Prussian blue and ultramarine blue; lakes of tar pigments; lakes of natural dyes; and synthetic resin powder complexes of the inorganic pigments as recited above. Advantageously one or more colorants may be added in amounts of about 0.001%wt. to about 0.1% by weight, based on the total weight of the composition of which the colorant(s) forms a part.

The topical germicidal compositions of the invention may one or more essential oils which are selected to provide a so-called "aromatherapy benefit" or "holistic benefit" to the user. Essential oils are complex mixtures of different organic molecules, such as terpenes, alcohols, esters, aldehydes, ketones and phenols. Such essential oils are frequently extracted from naturally occurring botanical sources such as flowers, stems, leaves, roots and barks of aromatic plants. While essential oils may be used singly, it is also common to utilize blends of essential oils in order to provide a conjunctive aroma benefit, aromatherapy benefit, holistic benefit and possibly a therapeutic benefit as well.

Preferred essential oils providing an aromatherapy benefit for use in the topical germicidal compositions of the present invention include one or more selected from chamomile oil, lavandin oil, lavender oil, grapefruit oil, lemon oil, lime oil, mandarin orange oil, orange flower oil and orange oil. Chamomile oil may be used to promote both a fresh, clean and attractive scent and possibly provide a stress-relaxing benefit to the user of the topical composition. Lavender oil, and lavandin, may be used to promote both a fresh and attractive scent and possibly also provide a stress-relaxing benefit to the user of the topical composition. One or more of grapefruit oil, lemon oil, lime oil, mandarin orange oil, orange flower oil and orange oil provide a clean citrus scent and may possibly impart a perceived therapeutic benefit as well when used.

As used in the present invention, these one or more essential oils providing an aromatherapy benefit or holistic benefit are present in an amount about 0.00001 wt. % to about 1

wt. %, preferably from about 0.00005 wt. % to about 0.75 wt. %, and more preferably from about 0.0001 wt. % to about 0.5 wt. % of the total weight of the composition. It is to be understood that these one or more essential oils providing an aromatherapy benefit may be used with or without the optional fragranting constituent recited previously and may be used wholly or partially in place of said fragranting constituent.

The topical germicidal compositions may include one or more antioxidant constituents; certain of these antioxidant constituents may additionally provide an anti-wrinkling benefit to the skin or other topical treatment benefit. Examples of antioxidants include but are not limited to, water-soluble antioxidants such as sulfhydryl compounds and their derivatives (e.g., sodium metabisulfite and N-acetyl-cysteine), lipoic acid and dihydrolipoic acid, resveratrol, lactoferrin, glutathione, and ascorbic acid and ascorbic acid derivatives (e.g., ascorbyl palmitate and ascorbyl polypeptide), as well as oil-soluble antioxidants such as butylated hydroxytoluene, retinoids, tocopherols e.g., tocopherol acetate, tocotrienols, and ubiquinone, natural extracts containing antioxidants such as extracts containing flavonoids and isoflavonoids and their derivatives, extracts containing resveratrol and the like, as well as certain natural extracts e.g., grape seed, green tea, pine bark, propolis, and the like. When present the total amount of such antioxidants are usually not in excess of 5%wt, preferably from 0.0001 – 4%wt. based on the total weight of the topical germicidal compositions of which it forms a part. In certain preferred embodiments one or more antioxidant constituents are necessarily present.

Optionally the topical germicidal compositions may include one or more vitamins. Examples of vitamins which can be added include vitamin A, such as vitamin A oil, retinol, retinyl acetate and retinyl palmitate; vitamin B, including vitamin B₂ such as riboflavin, riboflavin butyrate and flavin adenine nucleotide, vitamin B₆ such as pyridoxine hydrochloride, pyridoxine dioctanoate and pyridoxine tripalmitate, vitamin B₁₂ and its derivatives, and vitamin B₁₅ and its derivatives; vitamin C, such as L-ascorbic acid, L-ascorbic acid dipalmitic ester, sodium (L-ascorbic acid)-2-sulfate and dipotassium L-ascorbic acid diphosphate; vitamin D, such as ergocalciferol and cholecalciferol; vitamin E, such as alpha-tocopherol, beta-tocopherol, gamma-tocopherol, dl-alpha-tocopheryl acetate, dl-alpha-tocopheryl nicotinate and dl-alpha-tocopheryl succinate. When present, in accordance with certain of the preferred embodiments, one or more vitamins may be included in effective amounts, advantageously from 0.0001 –

1%wt., preferably from 0.001 – 0.75%wt. based on the total weight of the topical germicidal compositions of which it forms a part.

The topical germicidal compositions may include one or more light stabilizers as well as UV absorbers or sunscreen constituents. Such materials are known to be useful in cosmetic or topical compositions and impart a degree of stability to the compositions which may comprise one or more components which may be deleteriously affected when exposed to certain sources of light, e.g., sunlight, fluorescent light sources. Other such materials are known to stabilize or improve the effect of colorants which may be present in the compositions. Any cosmetically acceptable material or compound which provides protection for one or more of the constituents in the inventive compositions from photolytic degradation or photo-oxidative degradation may be used. Examples include: triazines including s-triazine, triazine derivatives e.g. 2,4,6-trianilino-(p-carbo-2'-ethyl-1'-hexyloxy)-1,3,5-triazine, anisotriazine, ethylhexyltriazone, diethylhexylbutamidotriazone,; benzotriazoles and derivatives; esters of benzalmalonic acid; sulphonic acid derivatives of 3-benzylidencamphen; cinnamic acid and cinnamic acid amides, esters of cinnamonic acid; propane-1,3-diones; phenylbenzimidazoles and sulfonated benzimidazoles; salicylic acid derivatives including esters of salicylic acid, e.g., ethylhexyl salicylate, dipropylene glycol salicylate, TEA salicylate, salicylic acid 2-ethylhexylester, salicylic acid 4-isopropyl benzylester, salicylic acid homomenthylester; compounds or derivatives of compounds based on benzylidenecamphor, and the like. Any of the foregoing materials provided as acids may used in free acid form or as a salt thereof, e.g., an alkali, alkaline earth, ammonium, alkylammonium, alkanolammonium salt form thereof. When present, the one or more light stabilizers as well as UV absorbers may be included in any effective amount; advantageously such materials are present in amounts of from 0.0001 – 1%wt., preferably from 0.001 – 0.5%wt. based on the total weight of the topical germicidal composition of which it forms a part.

The inventive topical germicidal compositions may include one or more chelating agents. Exemplary useful chelating agents include those known to the art, including by way of non-limiting example; aminopolycarboxylic acids and salts thereof wherein the amino nitrogen has attached thereto two or more substituent groups. Preferred chelating agents include acids and salts, especially the sodium and potassium salts of ethylenediaminetetraacetic acid, diethylenetriaminepentaacetic acid, N-hydroxyethylethylenediaminetriacetic acid, and of which

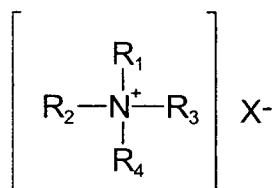
the sodium salts of ethylenediaminetetraacetic acid may be particularly advantageously used. Such chelating agents may be omitted, or they may be included in generally minor amounts such as from 0.001 - 0.5 %wt. based on the weight of the chelating agents and/or salt forms thereof. Desirably, when present, such chelating agents are included in the present inventive composition

5 in amounts from 0.01 - 0.5%wt., preferably from about 0.01 - 0.2%wt.

The inventive topical germicidal compositions may comprise further one or more further antimicrobial agents. Such further antimicrobial agent is/are one or more compounds which provide an appreciable germicidal benefit. Such further antimicrobial agent desirably provides an effective antimicrobial benefit to treated dermal surfaces, e.g., hands, arms, etc.

10 The further antimicrobial agent may include one or more cationic surfactant constituents, especially preferably one cationic surfactants which provide an appreciable germicidal benefit. Non-limiting examples of preferred cationic surfactant compositions which may be included in the treatment compositions are those which provide an appreciable germicidal benefit, and especially preferred are quaternary ammonium compounds and salts

15 thereof, which may be characterized by the general structural formula:



where at least one of R_1 , R_2 , R_3 and R_4 is a alkyl, aryl or alkylaryl substituent of from 6 to 26 carbon atoms, and the entire cation portion of the molecule has a molecular weight of at least 165. The alkyl substituents may be long-chain alkyl, long-chain alkoxyaryl, long-chain

20 alkylaryl, halogen-substituted long-chain alkylaryl, long-chain alkylphenoxyalkyl, arylalkyl, etc. The remaining substituents on the nitrogen atoms other than the abovementioned alkyl substituents are hydrocarbons usually containing no more than 12 carbon atoms. The substituents R_1 , R_2 , R_3 and R_4 may be straight-chained or may be branched, but are preferably straight-chained, and may include one or more amide, ether or ester linkages. The counterion X

25 may be any salt-forming anion which permits water solubility or water miscibility of the quaternary ammonium complex. Preferred quaternary ammonium compounds which act as germicides according to the foregoing formula are those in which R_2 and R_3 are the same or different C_8 - C_{12} alkyl, or R_2 is C_{12-16} alkyl, C_{8-18} alkylethoxy, C_{8-18} alkylphenoethoxy and R_3 is

benzyl, and X is a halide, for example chloride, bromide or iodide, or is a methosulfate anion. The alkyl groups recited in R₂ and R₃ may be straight-chained or branched, but are preferably substantially linear.

The further antimicrobial agent may include one or more of: pyrithiones such as zinc
 5 pyrithione, halohydantoins such as dimethyldimethylol hydantoin,
 methylchloroisothiazolinone/methylisothiazolinone sodium sulfite, sodium bisulfite,
 imidazolidinyl urea, diazolidinyl urea, benzyl alcohol, 2-bromo-2-nitropropane-1,3-diol,
 formalin (formaldehyde), iodopropenyl butylcarbamate, chloroacetamide, methanamine,
 methyldibromonitrile glutaronitrile, glutaraldehyde, 5-bromo-5-nitro-1,3-dioxane, phenethyl
 10 alcohol, o-phenylphenol/sodium o-phenylphenol, sodium hydroxymethylglycinate, polymethoxy
 bicyclic oxazolidine, dimethoxane, thimersal dichlorobenzyl alcohol, captan, chlorphenenesin,
 dichlorophene, chlorbutanol, glyceryl laurate, halogenated diphenyl ethers such as 2,4,4-
 trichloro-2-hydroxy-diphenyl ether (Triclosan®) and 2,2-dihydroxy-5,5-dibromo-diphenyl ether,
 phenolic antimicrobial compounds such as mono- and poly-alkyl and aromatic halophenols, such
 15 as p-chlorophenol, methyl p-chlorophenol, 4-chloro-3,5-dimethyl phenol, 2,4-dichloro-3,5-
 dimethylphenol, 3,4,5,6-terabromo-2-methylphenol, 5-methyl-2-pentylphenol, 4-isopropyl-3-
 methylphenol, para-chloro-meta-xilenol, dichloro meta xylenol, chlorothymol, and 5-chloro-2-
 hydroxydiphenylmethane, resorcinol and its derivatives, bisphenolic compounds such as 2,2-
 methylene bis (4-chlorophenol) and bis (2-hydroxy-5-chlorobenzyl)sulphide, benzoic esters
 20 (parabens), halogenated carbanilides such as 3-trifluoromethyl-4,4'-dichlorocarbanilide
 (Triclocarban), 3-trifluoromethyl-4,4-dichlorocarbanilide and 3,3,4-trichlorocarbanilide. The
 further antimicrobial agent may include one or more of: biguanides such as polyhexamethylene
 biguanide, p-chlorophenyl biguanide; 4-chlorobenzhydryl biguanide, 1,6-bis-(4-
 chlorobenzylbiguanido)-hexane (Fluorhexidine®), halogenated hexidine including, but not
 25 limited to, chlorhexidine (1,1'-hexamethylene-bis-5-(4-chlorophenyl biguanide)
 (Chlorohexidine®), as well as salts of any of the foregoing, e.g. polyhexamethylene biguanide
 hydrochloride.

Desirably, when present, such further antimicrobial agent may be included in the
 inventive compositions in any effective amount. Advantageously such amounts are from about
 30 0.0001 – 2%wt., but preferably are from about 0.01 – 1%wt. of the topical germicidal
 composition of which they form a part.

In certain particularly preferred embodiments, the inventive compositions expressly exclude such a further antimicrobial constituent.

The topical germicidal compositions of the invention may be advantageously produced by: forming a first aqueous-alcohol premixture which includes a thickener constituent, e.g., hydroxymethylcellulose and an ion source; forming a second silicone based premixture, and then under constant stirring adding the first aqueous-alcohol premixture to the second silicone based premixture at a measured volumetric or mass rate in a homogenizer, optionally at an increasing rotational speed during the addition of the the first aqueous-alcohol premixture to the second silicone based premixture in order form a resulting viscous emulsion.

Specific protocols for the production of preferred embodiments of the topical germicidal compositions are disclosed with reference to one or more of the examples and is described in more specific detail below. Thus, an aspect of the invention is a method for producing topical germicidal compositions according to one or more of the methods described herein.

In a further aspect, the present invention also contemplates a method for providing a cleaning and/or providing an germicidal benefit to skin or other topical surface which method contemplates the topical application of the aqueous topical germicidal compositions as described herein in a cleaning and/or germicidally effective amount. Preferably according to the foregoing method, a germicidal benefit is provided to the skin or other topical surface to which the composition has been applied. Preferred embodiments of the topical germicidal compositions exhibit good germicidal efficacy of undesired microorganisms, e.g., *S.aureus*, *E.coli*, *P.auruginosa*, as well as *E.hirae* on dermal (viz., skin. body) surfaces. Advantageously the topical germicidal compositions exhibit antimicrobial efficacy against one or more of certain gram positive pathogens, certain gram negative pathogens, certain viruses, certain fungi and/or certain mold.

While the topical germicidal compositions disclosed herein find a primary use in application to the skin to provide a cleaning and/or germicidal benefit thereto and is contemplated as being provided in a dispenser for use in such a treatment, it is to be understood that this is not to be understood as a limiting definition and that other forms and other uses of the present inventive composition, such as face lotion, milky lotion, cream, face cleansing cream, massage materials, liquid toilet soap, as well as in hair care products such as shampoo, rinse or other hair or scalp treatment are expressly contemplated as being within the scope of the present

invention. The topical germicidal compositions of the invention are beneficially formulated as a pourable lotion, a cosmetic milk, a liquid or a spray, but may also be formulated as a more viscous a cream or a gel, which may be transparent, translucent or opaque. In certain preferred embodiments the topical germicidal compositions is provided as a translucent composition.

5 The composition can be packaged in a suitable container to suit its viscosity and intended use by the consumer. For example, a lotion or cream can be packaged in a bottle, or can be packaged with a propellant in a propellant-driven aerosol device or alternately may be packaged in a container fitted with a manually operable pump. When the compositions of the invention have higher viscosities and is in the form of a paste, gel or cream it may conveniently be
10 provided in a resealable container with a relatively wide opening, e.g., a jar, tin, tub or bottle with a removable and replaceable cap or cover. Forms of the composition which have low viscosities may be provided in bottles or flasks from which they be dispensed by pouring, or by pumping such as via a manually pumpable trigger pump or manually operable trigger spray pump. The inventive composition can be provided and stored in a non-deformable bottle but
15 more preferably is provided in a squeezable container, such as a tube or deformable bottle which provides for easy dispensing of the composition by the consumer. Thus a further aspect of the invention provides a closed container containing the inventive composition as described herein.

 It is to be further expressly understood that topical application of the topical germicidal compositions disclosed herein may be applied to the skin on any part of the body, including the
20 skin on the face, neck, chest, back, arms, axilla, hands, legs, and scalp. The topical germicidal compositions disclosed herein may also be used on the hair. Preferably the topical germicidal compositions are not ingested or used on mucous tissues.

 It is contemplated that in use, the consumer dispenses a quantity of the topical germicidal composition described herein and applied it to the skin or any other part of the body where they
25 may be retained upon but are beneficially rubbed into the applied skin or other part of the body by the consumer to provide both a skin moisturization benefit concurrently with a germicidal benefit to the treated skin or other part of the body. Advantageously the thus applied topical germicidal composition is allowed to remain on the skin or other part of the body to which it has been applied, without any subsequent washing or rinsing. However, if desired by a consumer,
30 the topical germicidal treatment compositions may be rinsed by the consumer under a stream of

running water, e.g, in a shower or by immersion into water, e.g, a bath. Thus, a further aspect of the invention is directed to the use of the topical germicidal compositions as described herein.

The following examples below illustrate exemplary formulations as well as preferred embodiments of the invention. It is to be understood that these examples are provided by way of illustration only and that further useful formulations falling within the scope of the present invention and the claims may be readily produced by one skilled in the art without deviating from the scope and spirit of the invention.

Examples

A number of topical germicidal compositions were produced according to the process described below, are described on Table 1 below. With reference to the compositions described, compositions which fall within the scope of the invention are identified on Table 1 while compositions which are fall outside the scope of the invention and which are presented for comparative purposes are identified on Table 1C.

In the following compositions, the constituents were used “as supplied” from their respective suppliers and may constitute less than 100%wt. “actives”, or may have been supplied as constituting 100%wt. “active” of the named compound, as indicated in the following Tables 1, 1C and 2. The amounts indicated on the table refer to %wt. of the named constituent used in a composition, based on a total weight of 100%wt. for an identified composition.

Table 1							
	E1	E2	E3	E4	E5	E6	E7
silicone emulsifier #1	12	--	12	12	12	12	--
silicone emulsifier #2	--	10	--	--	--	--	12
volatile linear silicone	5	5	5	5	5	5	5
sorbitan isostearate	0.3	0.3	0.3	0.3	0.3	0.3	0.3
talc	--	--	--	--	--	--	--
silica #1	0.5	0.5	0.5	0.5	0.5	0.5	0.5
dimethicone	--	--	--	--	--	--	--
sodium chloride	1	1	1	1	1	1	1
glycerine	8	8	8	8	7	5	8
ethanol (100%)	61	61	61	61	61	61	61
hydroxypropylmethylcellulose	0.5	0.5	1	0.5	0.35	0.25	0.5
d.i. water	11.7	13.7	15.2	15.7	16.85	18.95	11.7

Table 1				
	E8	E9	E10	E11
silicone emulsifier #1	8	8	15	8
silicone emulsifier #2	--	--	--	--
volatile linear silicone	5	5	--	5
cyclopentasiloxane #1	--	--	8	2
sorbitan isostearate	--	0.4	--	--
talc	--	--	--	--
silica #1	0.5	--	--	1
dimethicone(1) 60000 ctS	--	--	--	--
dimethicone(2) 10 ctS	--	--	2	.5
sodium chloride	1	1	--	--
glycerine	10	10	10	10
ethanol (95%)	--	--	62	66
ethanol (100%)	61	61	--	--
hydroxypropylmethylcellulose	--	--	--	--
d.i. water	14.5	14.6	3	7.5

Table 1					
	E12	E13	E14	E15	E16
silicone emulsifier #1	15	8	8	8	8
silicone emulsifier #2	--	--	--	--	--
volatile linear silicone	4	4	5	5	5
cyclopentasiloxane #1	3	--	--	--	--
sorbitan isostearate	--	--	--	--	0.3
talc	--	--	--	--	--
silica #1	--	0.5	0.5	1.0	0.5
dimethicone(1) 60000 ctS	--	--	--	--	--
dimethicone(2) 10 ctS	1	--	--	--	--
dimethicone(3) 350 ctS	--	0.5	--	--	--
sodium chloride	--	--	--	--	1.0
glycerine	8.0	13.0	10.0	10.0	5.0
triethanolamine	--	--	0.25	--	--
ethanol (95%)	66	66	61	--	--
ethanol (100%)	--	--	--	61	61
hydroxypropylmethylcellulose	--	--	--	--	--
C ₁₀ -C ₃₀ acrylate copolymer	--	--	0.25	--	--
guar gum	--	--	--	--	0.35
d.i. water	3	8	15	15	18.85

Table 1C					
	C1	C2	C3	C4	C5
silicone emulsifier #1	12	12	12	12	12
volatile linear silicone	5	5	5	5	5
sorbitan isostearate	0.3	0.3	0.3	0.3	0.3
silica #1	0.5	0.5	0.5	0.5	0.5
sodium chloride	1	1	1	1	1
glycerine	8	8	8	8	8
ethanol (100%)	61	61	61	61	61
magnesium aluminum silicate	1	--	--	--	--
xanthan gum	--	1	--	--	--
triethanolamine	--	--	0.2	--	--
C ₁₀ -C ₃₀ acrylate copolymer	--	--	1.0	--	--
guar gum	--	--	--	0.35	--
Covacryl VIP*	--	--	--	--	1
d.i. water	11.2	11.2	11	14.85	11.2

* Covacryl VIP is an ammonium polyacrylate

The identity of the individual constituents used are described more fully on Table 2.

5

Table 2	
silicone emulsifier #1	supplied as SF1528, a blend comprising at least 80%wt. of decamethylcyclopentasiloxane, 5-10%wt. dimethyl, methyl, hydroxypropyl ethoxylated propoxylated siloxanes and silicones (PEG/PPG 20/15 dimethicone) and at least 2.67%wt. of mixed cyclosiloxanes (ex. Kobo, formerly GE Silicones)
silicone emulsifier #2	supplied as DC5225C, a blend comprising at least 60%wt. of decamethylcyclopentasiloxane, and 10-30%wt. dimethyl, methylhydroxypropyl, ethoxylated propoxylated siloxanes and silicones (PEG/PPG 18/18 dimethicone), remaining balance 5 – 10%wt. water (ex. Dow Corning)
volatile linear silicone	volatile linear silicone, supplied as DC 2-1184 (100%wt. actives; ex. Dow Corning)
silicone elastomer blend	blend composition comprising at least 60%wt. of decamethylcyclopentasiloxane, 10-30%wt. dimethyl, methylhydrogen siloxane, and 1-5%wt. dimethylsiloxanes, supplied as 9011 Silicone Elastomer Blend (100%wt. actives; ex. Dow Corning)

cyclopentasiloxane #1	supplied as DC245, volatile cyclopentadimethylsiloxane fluid, (100%wt. actives; ex. Dow Corning)
cyclopentasiloxane #2	supplied as Abil EM 97, bis-PEG/PPG-14/14 dimethicone, cyclopentasiloxane (100%wt. actives; ex. Evonik Goldschmidt GmbH, Essen, DE)
cyclopentasiloxane #3	supplied as Abil EM 90, cetyl PEG/PPG-10/1 dimethicone (100%wt. actives; ex. Evonik Goldschmidt GmbH, Essen, DE)
sorbitan isostearate	supplied as Crill 6 (99%wt. actives; ex. Croda Inc.)
PEG-30 dipolyhydroxystearate	supplied as Arlacel P135 (ex. Uniquema)
talc	anhydrous talc (100%wt. actives) laboratory grade
silica #1	supplied as Spheron L-1500, particulate silica having average particle size of from 2 – 15 microns (at least 96%wt. SiO ₂ ex. Catalysts & Chemical Ind. Co., Ltd., Kawaskai City, Japan)
silica #2	supplied as MSS-710, particulate silica having an average particle size of in the range of 6 -9 micron) (at least 96%wt. SiO ₂ ex. Kobo Products Inc., South Plainfield, NJ)
silica/silicone preblend	preblended composition comprising 5%wt. fumed silica particulate (SiO ₂), 28 – 57%wt. decamethyltetrasiloxane (CAS#141-62-8), 28 – 57%wt. octamethyltrisiloxane (CAS# 107-51-7), dodecamethylpentasiloxane (CAS#141-63-9)
dimethicone(1) 60000 ctS	supplied as DC200 Fluid, high viscosity polydimethylsiloxane polymer fluid exhibiting viscosity of 60,000 centistokes (cs) (100%wt. actives; ex. Dow Corning)
dimethicone(2) 10 ctS	supplied as DC200 Fluid, low viscosity polydimethylsiloxane polymer fluid exhibiting viscosity of 10 centistokes (cs) (100%wt. actives; ex. Dow Corning)
dimethicone(3) 350 ctS	supplied as DC200 Fluid, low to medium viscosity polydimethylsiloxane polymer fluid exhibiting viscosity of 350 centistokes (cs) (100%wt. actives; ex. Dow Corning)
sodium chloride	sodium chloride (100%wt. actives), laboratory grade
magnesium sulfate	magnesium sulfate (100%wt. actives), laboratory grade
glycerine	USP glycerine (100%wt. actives)

triethanolamine	triethanolamide, 100%wt. actives
ethanol (95%)	supplied as SD40 alcohol
ethanol (100%)	supplied as SD40 alcohol
hydroxypropylmethylcellulose	supplied as Methocel E4M (100%wt. actives)
C ₁₀ -C ₃₀ acrylate copolymer	supplied as Carbopol ULTREZ 20 (ex. Goodrich Co.)
guar gum	supplied as hydroxypropyl guar gum, as Mackamer 120S (ex. Mackam Inc.) (100%wt. actives)
d.i. water	deionized water

The topical germicidal compositions of the invention described on Tables 1 and 1C were produced according to the following general protocol, representative of a final batch size of 800 g:

5 I) Preparation of the hydro-alcoholic premixture:

To a preweighted 1500 ml laboratory beaker, was added the measured amount of deionized water at room temperature (approx. 20°C).

10 In a weighting dish, a measured amount of the sodium chloride was added to the water, then mixed with a laboratory mixer, for 5 minutes or longer if necessary, or until the sodium chloride was dissolved.

15 To a further 250 ml laboratory beaker was added the measured amount of glycerine and the hydroxypropylmethylcellulose, which was then manually mixed with a laboratory spatula to make slurry while ensuring that until all the hydroxypropylmethylcellulose was wetted and in order to form the slurry. Next this slurry was added to the 1500 ml laboratory beaker, and the contents were then mixed with a standard laboratory mixer (Heidolph RZR50), using a three blade propeller with a blade diameter of 51 mm. at 500 rpm for at least 30 minutes but longer if necessary until slurry is dissolved in the water and a uniform mixture was produced from the foregoing constituents. Subsequently a measured amount of ethanol, approx. 10-15%wt. of the total amount of the ethanol used to form the topical composition, was added under mixing conditions to the 1500 ml beaker which was allowed to mix for at least 15 minutes further in order to ensure that the resultant hydro-alcoholic premixture was uniformly mixed and had a homogenous appearance.

II) Preparation of the silicone premixture:

To a preweighed 2000 ml beaker was added the measured amount of the silicone emulsifier constituent, (when utilized, other essential or optional constituents, e.g., sorbitan isostearate, glycerine, silica, etc.). The contents were manually mixed with a laboratory spatula
5 to ensure good wetting of the constituents.

The homogenizer (Greeco Model II-07) was then utilized to mix the contents of this beaker at a low speed (approximately 1125 rpm) at room temperature; mixing continued until the contents of this beaker were uniform which typically took at least 5 minutes. Cover the beaker with plastic film.

III) Emulsification:

Under mixing conditions supplied by the homogenizer, the contents of the 1500 ml laboratory beaker containing the hydro-alcoholic phase were slowly transferred into the silicone phase at a relatively constant transfer rate of 15 g/min. which was achieved via the use of a
15 separation funnel whose valve was used to control the supply of the hydro-alcoholic premixture within the separation funnel into the 2000 ml beaker.

During the delivery of the hydro-alcoholic premixture, the speed of the homogenizer was slowly increased in order to ensure that there was a continuous flow of the emulsion through the homogenizer (e.g. when 400 g (for 800 g batch size) of the hydro-alcoholic phase was added, the
20 homogenizer speed was increased to about 1875 rpm.) However, during the mixing of the hydro-alcoholic premixture with the silicone premixture, the homogenizer was controlled to ensure that it did not exceed about 2250 rpm at any point during the process.

Following completion of the delivery of the hydro-alcoholic premixture to the silicone premixture, the homogenizer was allowed to operate at a speed of from about 2000 – 2250 rpm
25 for at least 15 additional minutes to ensure the formation of the resulting emulsion.

Thereafter, the homogenizer was removed, and the emulsion was subsequently mixed for at least 10 minute using a laboratory mixer (Heidolph RZR50 mixer), using a U-shaped paddle with a blade diameter of 114.3mm. at a rotational speed of about 50 rpm for at least 10 minutes.

Afterwards the batch of the formed topical germicidal composition was removed, and its
30 “as mixed” viscosity or “initial viscosity” was evaluated, and aliquots of the topical germicidal composition were evaluated for storage stability under elevated temperature conditions.

- The viscosity of the compositions according to the invention and identified on Table 1, as well as the viscosity of comparative compositions identified on Table 1C were evaluated over a span of several weeks and over a range of temperatures to demonstrate the change in viscosity over time, from the initial viscosity ("as mixed") of the composition to the ultimate viscosities subsequent to storage for different time intervals and at different temperatures. These are reported on the following Table 3. An entry of "--" indicates that the composition was not tested for the specific time and temperature condition.

Table 3						
		viscosity (cPs)				
sample composition		4°C	25°C	40°C	50°C	60°C
E1	1 week	25800	22080	17000	16800	16200
initial viscosity = 23200 cP (LVT #3 spindle, 3 rpm, 20°C)	2 weeks	--	21400	--	--	14800
	3 weeks	22200	20000	16800	16200	--
	6 weeks	19400	19200	--	16000	--
	12 weeks	--	--	--	--	--
		viscosity (cPs)				
		4°C	25°C	40°C	50°C	60°C
E2	1 week	9160	--	8340	8400	8100
initial viscosity = 18000 cP (LVT #3 spindle, 3 rpm, 20°C)	2 weeks	--	--	--	--	8000
	3 weeks	--	--	7000	8200	--
	6 weeks	11100	--	11100	10800	--
	12 weeks	--	--	--	--	--
		viscosity (cPs)				
		4°C	25°C	40°C	50°C	60°C
E3 (	1 week	19600	--	16200	15200	14600
initial viscosity = 35520 cP (LVT #3 spindle, 3 rpm, 20°C)	2 weeks	--	--	--	--	16000
	3 weeks	--	--	--	--	--
	6 weeks	18600	--	17000	7700	--
	12 weeks	6400	--	5000	--	--
		viscosity (cPs)				
		4°C	25°C	40°C	50°C	60°C
E7	1 week	34400	31800	23400	21000	18000
initial viscosity = 31120 cP (LVT #3 spindle, 6 rpm, 20°C)	2 weeks	--	--	--	--	18400

	3 weeks	25200	24600	20600	18600	--
	6 weeks	25800	26800	--	20800	--
	12 weeks	--	--	--	--	--
	viscosity (cPs)					
		4°C	25°C	40°C	50°C	60°C
E8	1 week	--	--	--	--	7400
initial viscosity = 17000 cP (LVT #3 spindle, 6 rpm, 20°C)	2 weeks	--	--	--	--	1400
	3 weeks	--	--	--	1400	--
	8 weeks	10200	--	6600	2600	--
	12 weeks	4200	--	2000	--	--
	viscosity (cPs)					
		4°C	25°C	40°C	50°C	60°C
E9	1 week	--	--	--	--	5800
initial viscosity = 10700 cP (LVT #3 spindle, 6 rpm, 20°C)	2 weeks	--	--	--	--	--
	3 weeks	--	--	--	1200	--
	6 weeks	--	--	3000	2000	--
	12 weeks	--	--	5100	--	--
	viscosity (cPs)					
		4°C	25°C	40°C	50°C	60°C
E10	1 week	3400	--	3000	2473	2133
initial viscosity = 2773 cP (LVT #3 spindle, 6 rpm, 20°C)	2 weeks	--	--	--	--	1920
	3 weeks	3100	--	2900	1840	--
	6 weeks	5000	--	3200	--	--
	12 weeks	4800	--	3200	--	--
	viscosity (cPs)					
		4°C	25°C	40°C	50°C	60°C
E11	1 week	2830	--	1700	1590	1500
initial viscosity = 1600 cP (LVT #3 spindle, 12 rpm, 20°C)	2 weeks	--	--	--	--	1350
	3 weeks	1960	--	1100	1150	--
	6 weeks	2150	--	1250	1100	--
	12 weeks	--	--	800	900	--

As is seen from the foregoing the compositions retained a significant proportion of their initial viscosity even subsequent to several weeks of storage at elevated temperatures.

Additionally none of the foregoing “as mixed” compositions of Table 1 or those tested under the conditions reported on Table 3 exhibited separation but remained homogenous even subsequent to the adverse testing conditions.

With regard to the compositions according to Table 1C, the following table lists observed technical shortcomings of the compositions.

Table 4	
sample composition:	remarks:
C1	composition split into two phases during production and could not be homogenized
C2	composition split into two phases during production and could not be homogenized
C3	acrylate copolymer thickening agent (Carbopol ULTREZ 20) precipitated in the hydro-alcohol premix and could not be homogenized
C4	composition split into two phases during production and could not be homogenized
C5	composition split into two phases during production and could not be homogenized

Evaluation of Germicidal Efficacy

A formulation according to the invention as described as E1 from Table 1 was also evaluated in order to evaluate its antimicrobial efficacy against *Staphylococcus aureus* (ATCC 6538), *Escherichia coli* (ATCC 10536), *Pseudomonas aeruginosa* (ATCC 15442) and *Enterococcus hirae* (ATCC 10541) in accordance with the protocols of British Standard EN 1276, a quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional environments – Test Method and requirements (phase 2, step 1) Ref. No. EN 1276: 1997E the contents of which are herein incorporated by reference. The protocols of this test were followed with the following variations from the published protocol: the tested E1 formulation was diluted in sterile deionized water at 80%v/v (E1 to water ratio) and were tested for a either a 1 minute or 5 contact time; a final concentration of 3g/l bovine albumin was used in testing for dirty conditions (Section 5.2.2.8.2, part b). As specified in the protocol of British Standard EN 1276 a reduction in viability was calculated for each test system, and at least two test systems were evaluated for

each of the microorganisms. The results of this test per the British Standard EN 1276 is reported on the following Table 5; a “pass” criteria is established when the test system exhibits at least 5 log₁₀ reduction of the test microorganism.

Table 5		
testing conditions	log10 reduction of formulation (E1) - replicate #1	log10 reduction of formulation (E1) - replicate #2
<i>S. aureus</i> (ATCC# 6583)		
1 minute, dirty	> 5.82	> 5.82
5 minute, dirty	> 5.82	> 5.82
<i>E. coli</i> (ATCC #10536)		
1 minute, dirty	> 5.76	> 5.76
5 minute, dirty	> 5.76	> 5.76
<i>P. aeruginosa</i> (ATCC# 15442)		
1 minute, dirty	> 5.15	> 5.15
5 minute, dirty	> 5.15	> 5.15
<i>E. hirae</i> (ATCC# 10541)		
1 minute, dirty	> 5.54	> 5.54
5 minute, dirty	> 5.54	> 5.54

5 The E1 composition was further evaluate its antimicrobial efficacy against further test microorganisms, identified on Table 5A, in accordance with the following generalized test protocol.

10 The test microorganism were sourced from a stock culture, which was next grown on a growth medium appropriate to the specific test organism. At 24 – 48 hours prior to the testing of the E1 composition, a quantity of the test organism was transferred onto agar plate, and on the day of testing of the E1 composition, the test organism was sourced from the agar plate and used to create a suspension of the test organism in a aqueous sodium chloride diluent to form a test suspension having a concentration of 1×10^8 colony forming units (“CFU”) per ml of the test suspension.

15 A reference plate of each test microorganism was prepared to a controlled dilution of the test microorganism in an aqueous sodium chloride diluent composition to form a desired concentration, e.g., 1×10^{-6} or 1×10^{-7} CFU/ml of the test microorganism then pour plated with agar growth media onto a sterile petri dish. After at least 48 hours the incidence of growth was visually evaluated. The reference plate was used as a reference from which to derive the degree
20 of reduction of the test organism which was tested against the E1 composition.

Prior to testing, the E1 composition was equilibrated in a temperature controlled water

bath, maintained at 25°C +/- 1°C. All further constituents were also equilibrated in the temperature controlled water bath as well. Thereafter, an aliquot of 9 ml of the E1 composition was mixed with 1 ml of the test suspension in a vessel, vortexed for 2-3 seconds, then the vessel was quickly transferred to the temperature controlled water bath. Thereafter, 1 ml of the mixture was withdrawn via a pipette and transferred into a neutralizer composition at the time of 1 minute +/- 5 seconds subsequent to the formation of the mixture and added to a neutralizing mixture comprising 8 ml of a neutralizer composition and 1 ml of water, which was vortexed for 2-3 seconds, and the resultant neutralized mixture was returned to the temperature controlled water bath for 5 minutes to maintain a temperature equilibrium. Thereafter quantities of the neutralized mixture was diluted in further quantities of sodium chloride diluent at ratios of 1×10^{-1} , 1×10^{-2} , 1×10^{-3} and 1×10^{-4} , then pour plated with a prepared agar medium onto a sterile test plate, and allowed to grow at an appropriate temperature for the organism for at least 36 hours. 2 replicates per organism/product, averaged values reported. Thereafter the plates were evaluated for visual growth, and the results reported.

Concurrently a "control plate" of each test microorganism was prepared to a controlled dilution of the test microorganism in the aqueous sodium chloride diluted to a desired concentration, e.g., 1×10^{-6} or 1×10^{-7} CFU/ml, then pour plated with agar growth media onto a sterile petri dish. After at least 48 hours the incidence of growth was visually evaluated and compared to tested petri plates to derive the $\log_{10}$ reduction.

Further composition control samples were produced as follows. A quantity of the E1 composition as well as all further materials used in other steps of the test were equilibrated in a temperature controlled water bath, maintained at 25°C +/- 1°C. A 9 ml aliquot of E1 was added to 1 ml of an aqueous sodium chloride diluent, which was vortexed for 2-3 second, and at 1 minute following mixing, a 1 ml aliquot was withdrawn and mixed with 8 ml of a neutralizer composition. This composition was returned to the temperature controlled water bath for 5 minutes, to which was added 1 ml of a test microorganism at a concentration of 1000-3000 CFU/ml. After addition, this mixture was vortexed for 2-3 seconds, then returned and retained in the temperature controlled water bath for 30 minutes to reach temperature equilibrium. Thereafter this mixture was pour plated with a prepared agar medium to produce a dilution of 1×10^{-2} , which was subsequently allowed to grow for 48 hours at appropriate temperature for test microorganism, then visually counted.

An aqueous control composition was produced according to the protocol given immediately above, but in place of the E1 composition was used 9 ml of hard water prepared as per European normal ("EN") standards, but otherwise, all other materials were used and the remaining protocol were followed. The plated aqueous control composition was allowed to grow for 48 hours at appropriate temperature for a test microorganism, then visually counted. Counts from the plated aqueous control compositions were compared to the plated composition control samples, which were within 0.5 log₁₀ of the neutralization control for the test to be considered valid. The production of an aqueous control composition, and a composition control sample was produced for the E1 composition to ensure the validity of the evaluation of efficacy against a test microorganism.

Table 5A		
	ME value	% reduction
<i>B. cepacia</i> (ATCC# 25416)	> 5.16	> 99.999
<i>E. coli</i> (ATCC# 11229)	> 5.31	> 99.999
<i>S. aureus</i> (ATCC# 6583)	> 4.97	> 99.999
<i>S. marcescens</i> (ATCC# 14756)	> 5.41	> 99.999
<i>S. pyogenes</i> (ATCC# 19615)	> 4.85	> 99.999
<i>S. epidermidis</i> (ATCC# 12228)	> 4.60	> 99.999
<i>E. faecalis</i> (ATCC# 51299)	> 5.38	> 99.999
<i>K. pneumoniae</i> (ATCC# 10031)	> 5.27	> 99.999
<i>P. aeruginosa</i> (ATCC# 9027)	> 5.20	> 99.999
MRSA (ATCC# 33592)	> 5.33	> 99.999
<i>S. pneumoniae</i> (ATCC# 6303)	> 4.71	> 99.999
<i>C. albicans</i> (ATCC# 10231)	> 4.43	> 99.999
<i>S. enterica</i> (ATCC# 10708)	> 5.67	> 99.999

As may be seen from the results indicated above, the E1 composition according to the invention provide excellent germicidal benefits, with the composition exceeding the at least 5 log₁₀ reduction of each of the four test microorganisms, as reported on Table 5. Further the E1 composition was also highly effective against the further microorganisms tested and reported on Table 5A, including MRSA.

Further topical germicidal compositions according to the invention disclosed on Table 6 were produced generally according to the protocol outlined above with reference to the compositions according to Table 1 and 1C. Again, in the following compositions, the constituents as identified on Table 2 were used “as supplied” from their respective suppliers and may constitute less than 100%wt. “actives”, or may have been supplied as constituting 100%wt. “active” of the named compound. The amounts indicated on the table refer to %wt. of the named constituent used in a composition, based on a total weight of 100%wt. for an identified composition.

Table 6	E17	E18	E19	E20	E21	E22	E23	E24
silicone emulsifier #1	12	--	--	--	--	--	--	--
silicone emulsifier #2	--	12	12	12	12	12	12	12
volatile linear silicone	5	5	5	5	5	4	4	3
cyclopentasiloxane #2	--	--	--	0.5	--	--	0.5	--
cyclopentasiloxane #3	--	--	0.3	--	0.5	0.3	--	0.3
sorbitan isostearate	0.3	--	--	--	--	--	--	--
PEG-30 dipolyhydroxystearate	--	0.3	--	--	--	--	--	--
silica #1	0.5	--	--	--	--	--	--	--
silica #2	--	0.5	0.5	0.5	0.5	0.5	0.5	0.5
silica/silicone preblend	--	--	--	--	--	1	1	2
sodium chloride	1	1	1	1	1	1	1	1
glycerine	8	8	8	8	8	8	8	8
ethanol (95%)	66	66	66	66	66	66	66	66
hydroxypropylmethylcellulose	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
d.i. water	6.7	6.7	6.7	6.5	6.5	6.7	6.5	6.7

Table 6	E25	E26	E27	E28	E29	E30	E31
silicone emulsifier #1	--	--	12	--	--	--	--
silicone emulsifier #2	12	12	--	12	12	12	--
silicone elastomer blend	--	--	--	--	--	--	10
volatile linear silicone	3	5	5	5	5	5	5
cyclopentasiloxane #2	0.5	--	--	--	--	--	--
cyclopentasiloxane #3	--	0.3	0.3	0.4	0.3	0.3	0.3
sorbitan isostearate	--	--	0.3	--	--	--	--

PEG-30 dipolyhydroxystearate	--	--	--	--	--	--	--
silica #1	--	--	0.5	--	--	--	--
silica #2	0.5	0.5	--	0.5	1.0	1.5	--
silica/silicone preblend	2	--	--	--	--	--	--
sodium chloride	1	--	--	1	1	1	1
magnesium sulfate	--	1	1	--	--	--	--
glycerine	8	8	8	8	8	8	8
ethanol (95%)	66	66	66	66	66	66	66
hydroxypropylmethylcellulose	0.5	0.5	0.5	0.5	0.5	0.5	0.5
d.i. water	6.5	6.7	6.7	6.37	6.2	5.7	8.2

The viscosity of the compositions of Table 6 were evaluated over a span of several weeks and over a range of temperatures to demonstrate the change in viscosity over time, from the initial viscosity (“as mixed”) of the composition to the ultimate viscosities subsequent to storage for different time intervals and at different temperatures. These are reported on the following Table 7. An entry of “--.” indicates that the composition was not tested for the specific time and temperature condition. The initial viscosity of the compositions were evaluated by first producing a composition, thereafter allowing it to rest undisturbed at room temperature (approx. 20°C) for 24-48 hours, and thereafter withdrawing an aliquot for the viscosity testing using a laboratory syringe in order to simulate a high shear condition, then ejecting the aliquot from the syringe into a laboratory beaker and thereafter evaluating the viscosity using a Brookfield LVT 3 viscometer equipped with spindle number 3 and operating at 6 rpm. The foregoing method of withdrawing an aliquot using a similar laboratory syringe and thereafter supplying it to a beaker was repeated for all later viscosity tests, in which the samples were first allowed to return to room temperature after being stored as specific temperature conditions and thereafter being sampled and their viscosity tested in the manner described for the initial viscosity testing. The viscosity results of the tests and the storage conditions and storage times are reported on Table 7. All viscosities are reported in “cPs”, as tested at room temperature.

Table 7									
	E17	E18	E19	E20	E21	E22	E23	E24	E25
Initial viscosity (cPs)	14200	14000	14200	18400	14600	14000	13000	11000	14400
after 1 week storage									
stored at -10°C	13200	9300	10400	9600	19000	9000	8800	9400	8000
stored at 25°C	10000	11400	13000	16400	13600	9000	1040	10600	14000
stored at 40°C, and 75% relative humidity	7200	5000	11200	9600	13200	9400	9400	9400	8800
after 2 weeks storage									
stored at 25°C	12400	11200	12200	16800	13200	10400	10200	8000	12400
stored at 40°C, and 75% relative humidity	6000	6400	10200	10600	13000	8400	8000	10600	6400
after 4 weeks storage									
stored at 25°C	9000	11000	12200	15400	11500	11000	10000	6600	12000
stored at 40°C, and 75% relative humidity	6400	9400	7800	10200	14400	8600	9000	9800	8200
after 5 weeks storage									
stored at 25°C	12100	10000	12200	14800	12000	9400	9000	6200	10400
stored at 40°C, and 75% relative humidity	7000	9400	10300	10400	12000	7600	8000	8800	5000

Table 7						
	E26	E27	E28	E29	E30	E31
Initial viscosity	13800	15000	13300	14600	13200	14500
after 1 week storage						
stored at -10°C	4200	4600	14000	9000	10000	4800
stored at 25°C	6000	6000	13000	9600	10600	4000
stored at 40°C, and 75% relative humidity	7000	7000	12000	11000	9000	4200
After 2 weeks storage						
stored at 25°C	5000	5400	--	10000	9800	--
stored at 40°C, and 75% relative humidity	5400	5400	--	11000	9000	--
After 4 weeks storage						
stored at 25°C	4000	8000	--	9000	9000	--
stored at 40°C, and 75% relative humidity	5000	6900	--	9000	8700	--
After 5 weeks storage						
stored at 25°C	3500	9600	--	9200	9200	--
stored at 40°C, and 75% relative humidity	5000	6800	--	10000	9000	--

As is evident from the results reported for the formulations of Table 6, the compositions exhibited good initial viscosities, as well as good viscosities subsequent to storage at various times and environmental conditions for several weeks. It is further
5 noted that none of the formulations of Table 6 separated into two (or more) phases during or following the testing.

While the invention is susceptible of various modifications and alternative forms, it is to be understood that specific embodiments thereof have been shown by way of example in the drawings which are not intended to limit the invention to the particular
10 forms disclosed; on the contrary the intention is to cover all modifications, equivalents and alternatives falling within the scope and spirit of the invention as expressed in the appended claims.

Claims:

1. A topical germicidal composition comprising:
50%wt. – 95%wt. of an alcohol constituent comprising one or more C₁-C₄
5 monohydric alcohols;
a silicone emulsifier constituent, which preferably comprises PEG/PPG
dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;
and optionally but preferably further includes
a volatile linear silicone constituent;
10 an ion source, such as a salt;
a thickener constituent based on one or more cellulose derivatives, such as
hydroxypropylmethylcellulose;
optionally one or more further constituents for improving the aesthetic or other
technical characteristics of the invention,
15 optionally but preferably up to 30%wt. of water, but preferably not more than
about 15%wt. of water;
characterized in that the are flowable and preferably also exhibit an initial
viscosity (“as mixed”) of at least about 10 cP measured at 25°C, and subsequent to being
stored at elevated temperatures and/or extended time intervals are retained as a single
20 phase composition and do not split or separate into two or more phases, and further, the
compositions provide a topical germicidal benefit when applied to the skin or parts of the
body.
2. A topical germicidal composition according to claim 1 comprising:
25 about 50%wt. – 95%wt. of an alcohol constituent comprising one or more C₁-C₄
monohydric alcohols;
a silicone emulsifier constituent, which preferably comprises PEG/PPG
dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;
a thickener constituent based on one or more cellulose derivatives, such as
30 hydroxypropylmethylcellulose;
optionally a volatile linear silicone constituent;

- optionally an ion source, such as a salt;
optionally one or more further constituents for improving the aesthetic or other technical characteristics of the invention,
optionally but preferably up to 30%wt. of water, but preferably not more than
5 about 15%wt. of water;
characterized in that the are flowable and preferably also exhibit an initial viscosity ("as mixed") of at least about 10 cP measured at 25°C, and subsequent to being stored at elevated temperatures and/or extended time intervals are retained as a single phase composition and do not split or separate into two or more phases, and further, the
10 compositions provide a topical germicidal benefit when applied to the skin or parts of the body.
3. A topical germicidal compositions according to claim 1 or 2 which comprises:
about 50%wt. – 95%wt. of an alcohol constituent comprising one or more C₁-C₄
15 monohydric alcohols;
a silicone emulsifier constituent, which preferably comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;
a volatile linear silicone constituent;
an ion source, such as a salt;
20 a thickener constituent based on one or more cellulose derivatives, such as hydroxypropylmethylcellulose;
optionally one or more further constituents for improving the aesthetic or other technical characteristics of the invention,
optionally but preferably up to 30%wt. of water, but preferably not more than
25 about 15%wt. of water;
characterized in that the are flowable and preferably also exhibit an initial viscosity ("as mixed") of at least about 10 cP measured at 25°C, and subsequent to being stored at elevated temperatures and/or extended time intervals are retained as a single phase composition and do not split or separate into two or more phases, and further, the
30 compositions provide a topical germicidal benefit when applied to the skin or parts of the body.

4. A topical germicidal composition according to any of claims 1 – 3 wherein the initial viscosity of the compositions is from 10 – 100,000 cP at 25°C.
- 5 5. A topical germicidal composition according to any preceding claim wherein the silicone emulsifier constituent comprises PEG/PPG dimethicone in a liquid silicone carrier and/or comprises a PEG/PPG cyclopentasiloxane;
6. A topical germicidal composition according to any preceding claim which
10 comprises ethanol.
7. A topical germicidal composition according to any preceding claim which exhibits antimicrobial efficacy against at least one of: *B. cepacia*, *E. coli*, *S. aureus*, *S. marcescens*, *S. pyogenes*, *S. epidermidis*, *E. faecalis*, *K. pneumoniae*, *P. aeruginosa*, *E.*
15 *hirae*, *S. pneumoniae*, *C. albicans*, *S. enterica*, and methicillin resistant *Staphylococcus aureus* (“MRSA”).
8. A method for the production of a topical germicidal composition according to any preceding claim which method includes the steps of:
- 20 forming a first aqueous-alcohol premixture which includes a thickener constituent, e.g., hydroxymethylcellulose and an ion source;
forming a second silicone based premixture,
and subsequently under constant stirring adding the first aqueous-alcohol premixture to the second silicone based premixture at a measured volumetric or mass rate
25 in a homogenizer, optionally at an increasing rotational speed during the addition of the first aqueous-alcohol premixture to the second silicone based premixture in order form a resulting viscous emulsion.
9. A method for the treatment of the skin (epidermis) as well as other body surface
30 including the hair which method includes the application of a cleaning and/or

germicidally effective amount of the topical composition according to any of claims 1 – 7 to provide an effective cleaning and/or germicidal benefit.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/002764

A. CLASSIFICATION OF SUBJECT MATTER		
INV. A61K8/34 A61K9/00	A61K8/25 A61K47/10	A61K8/72 A61K47/24
A61Q17/00 A61K47/30	A61K9/06	
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 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 practical, 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 03/034994 A2 (UNIV COLUMBIA [US]; MODAK SHANTA [US]; GAONKAR TRUPTI A [US]; CARAOS L) 1 May 2003 (2003-05-01) claims 1,20,41-47, 50,60; examples 10,13-15	1-9
X	US 6 294 186 B1 (BEERSE PETER WILLIAM [US] ET AL) 25 September 2001 (2001-09-25) claims 1,15,20,21	1-9
X	WO 2004/084973 A2 (BECTON DICKINSON CO [US]; HOANG MINH QUANG [US]; HUNT DONALD EDWARD [U] 7 October 2004 (2004-10-07) claims 1,2,3,17	1-9
A	US 6 136 771 A (TAYLOR TIMOTHY J [US] ET AL) 24 October 2000 (2000-10-24) claims 1,12,16,39	1-9
-/--		
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search 26 March 2010		Date of mailing of the international search report 13/04/2010
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Giese, Hans-Hermann

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/002764

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 288 486 A (WHITE JOHN H [US]) 22 February 1994 (1994-02-22) claim 1 -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2009/002764

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 03034994	A2	01-05-2003	AU 2002337953 A1 06-05-2003
		CA 2464468 A1 01-05-2003	
		MX PA04003211 A 27-07-2004	
		US 2003152644 A1 14-08-2003	
		US 2004247685 A1 09-12-2004	
		US 2004219227 A1 04-11-2004	
US 6294186	B1	25-09-2001	NONE
WO 2004084973	A2	07-10-2004	US 2009143470 A1 04-06-2009
			US 2006263323 A1 23-11-2006
US 6136771	A	24-10-2000	GT 200000106 A 21-12-2001
			US 6107261 A 22-08-2000
			US 6204230 B1 20-03-2001
			US 6451748 B1 17-09-2002
US 5288486	A	22-02-1994	NONE