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(54) Title: COMPOSITIONS COMPRISING A FATTY ACID SULFONATE AND HYDROGEN PEROXIDE

(57) Abstract: The present invention provides aqueous liquid compositions comprising a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

Compositions Comprising a Fatty Acid Sulfonate and Hydrogen Peroxide

The present invention relates to compositions comprising a C_{12} to C_{14} fatty acid sulfonate and hydrogen peroxide as well as the use of respective compositions in methods for cleaning or disinfecting surfaces.

A wide range of hygiene products for cleaning and disinfecting (solid) surfaces are commercially available. In general it is distinguished between products to be used in methods of cleaning a surface and products to be used in methods of disinfecting a surface.

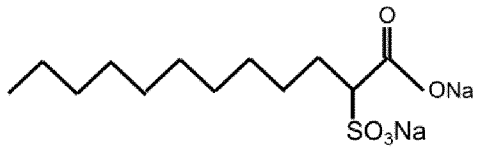
Exceptionally, US 6,479,454 discloses compositions comprising hydrogen peroxide and an amine oxide. US 6,444,230 discloses compositions comprising peroxy compounds, fatty alcohol ethoxylates and an amine oxide.

However, it is also well known that compositions comprising a surfactant for reduction of surface tension and a compound having anti-microbial activity have an unpredictable effects on anti-microbial activity. For example, while the well-known surfactants SDS and SLES, will significantly reduce surface tension, however, their effects on protein denaturation causes an inhibition of anti-microbial effects of a composition comprising SDS and/or SLES as well as a compound with anti-microbial activity.

Spore-forming pathogens, such as the bacterium *Clostridioides difficele* cause major problems for cleaning and disinfection in hospitals and public care facilities. The need to provide improved cleaning and disinfection compositions is further evidenced by the current COVID-19 pandemic. For modern hygiene management, it would therefore be desirable to have compositions for cleaning and disinfection, which combine high anti-microbial activity with environmental safety and cost-efficiency.

Summary of the Present Invention

The above problems are solved by the present invention, which provides aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition. The C_{12} to C_{14} fatty acid sulfonate is disodium 2-sulfolaurate can be characterized by the following formula:



A respective a C_{12} to C_{14} fatty acid sulfonate is commercially available from BASF under the trademark Texapon SFA.

The present inventor surprisingly found that a composition comprising a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in very low concentrations, such as a concentration of the C_{12} to C_{14} fatty acid sulfonate of 0.01 to 0.9 w/w% and a concentration of the hydrogen peroxide of 0.01 to 5.0 w/w%, provides a number of advantages in methods for cleaning and disinfecting surfaces, including:

(1) compositions comprising a C_{12} to C_{14} fatty acid sulfonate in extremely low concentration of 0.05 w/w% have a significantly higher anti-microbial activity as determined by the 4-field-test carried out according to EN 16615

(2) the compositions can be used at mild pH values, namely at pH values between 4 and 8;

(3) significant reduction of the surface tension of the composition in comparison to other compositions comprising a surfactant and an anti-microbial compound which is required for cleaning activity;

(4) significant cleaning and anti-microbial effects are obtained at very low concentrations;

(5) the C_{12} to C_{14} fatty acid sulfonate does not cause any skin irritation;

(6) the composition achieves a very significant reduction of the bacteria and even spores present on the surfaces treated.

In particular, it has been found that the aqueous liquid compositions of the present invention have a significantly higher anti-microbial activity as determined by the 4-field-test carried out according to EN 16615.

The aqueous liquid compositions of the present invention may further comprise additional components selected from surfactants, stabilizers, complexing agents, pH regulators, corrosion inhibitors and/or additives. Compositions comprising a combination of different surfactants, in particular a combination of the C_{12} to C_{14} fatty acid sulfonate and further non-ionic surfactants, anionic surfactants and/or cationic surfactants are preferred, for example a polymer-based non-ionic surfactants.

The aqueous liquid compositions of the present invention preferably have a dynamic surface tension of less than 26 mN/m after 30 seconds, preferably less than 24 mN/m after 30 seconds, more preferably less than 23 mN/m after 30 seconds. The dynamic surface tension can be determined using a pressure tensiometer for example by the BPT Mobilie of Krüss using the method as illustrated in Example 2.

In a further aspect, the aqueous liquid compositions of the present invention are characterized in achieving a reduction of *Clostridioides difficele* sporicidal activity of at least log 2 in a 4-field test after 5 minutes, preferably at least log 3 or at least log 4 in a 4-field test after 5 minutes. The a reduction of *Clostridioides difficele* sporicidal activity is determined using a 4-field-test for determining sporicidal activity on non-porous surfaces in accordance with EN 16615 as described in Example 3.

In the context of the present application, the concentrations of the components of the compositions are provided as w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

Accordingly, the aqueous liquid compositions of the invention may contain the C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.05 to 0.50 w/w% relative to the total weight of the aqueous liquid composition.

The aqueous liquid compositions of the invention preferably contain the hydrogen peroxide in a concentration of 0.05 to 3.5 w/w% relative to the total weight of the aqueous liquid composition.

The aqueous liquid compositions of the invention can further be characterized by a pH in the range of 2.0 and 8.0, preferably in the range of 4.0 to 6.0.

In a preferred embodiment, the aqueous liquid compositions of the present invention further comprise additional surfactants selected from amine oxide surfactants, for example the kryptoionic surfactant / cocamine oxide, amine, C12-14 Alkyldimethyl, N-Oxides, such as the product commercially available from Libra under the trademark LIBRANOX AO12/14.

In a related embodiment, the aqueous liquid compositions of the present invention further comprise additional surfactants selected from non-ionic surfactants, polymer-based surfactant made from hexan-1-ol and ethylene oxide (C6 and 5 moles etylene oxid), such as the products commercially available from BASF under the trademark Lutensol CS 6250, Lutensol XL40, Lutensol XL60, Lutensol XL80 or combinations thereof. Combinations of

surfactants comprising C6 to C8 alcohol ethoxylates and C10 to C16 alcohol ethoxylates are preferred, in particular in a relative concentration of the C6 to C8 alcohol ethoxylates to the C10 to C16 alcohol ethoxylates of 6:1 to 1:1, preferably in the range of 3:1 to 5:1, most preferred in the range of 4:1.

In a further related embodiment, the aqueous liquid compositions of the present invention further comprise surfactants selected from amine oxide and Lutensol in a relative concentration range of amine oxide : Lutensol of 4:1.

The aqueous liquid compositions of the present invention can contain SLES in a concentration of less than 0.15 w/w %. The aqueous liquid compositions of the present invention most preferably do not contain SLS or SLES.

The aqueous liquid compositions of the present invention may further contain surfactants selected from the group of (1) phosphoric acid-based ester surfactants (C-6 to C-14), such as decyl and/or octyl esters sold by ILCO Chemikalien GmbH under the trademark "ILCO-Phos 204" (CAS No.: 68186-45-8), (2) N-acylated peptide and/or N-acylated amino acid surfactants, such as the product commercially available as "Protelan ENS" from Zschimmer & Schwarz or "Perlastan" from Schill + Seilacher, such as "Perlastan SC 25 NKPF", (3) alkyl ether carboxylate surfactants, such as "Akypo LF6" or "Akypo LF2" from Kao Chemicals, (4) secondary alkyl sulfonate (SAS) surfactants, such as Mersolat H 95 from Lanxess, (5) glycolipid containing sophorolipids and/or rhamno-lipids surfactants, such as the product Rewoferm LS ONE from EVONIK and combinations thereof.

The aqueous liquid compositions of the present invention may further contain additional anti-microbial agents selected from the group of (1) chlorine dioxide and (2) peracetic acid or mixtures thereof.

The aqueous liquid compositions of the present invention may further contain secondary plant compounds selected from the group of (1) flavonoids, such as Tangeritin, (2) flavonoids, such as nobiletin, or mixtures thereof.

The aqueous liquid compositions of the present invention may further contain solvents selected from the group of (1) ethanol and (2) isopentyldiol or mixtures thereof.

Further additives that can be encompassed by the aqueous liquid compositions of the present invention include (1) (bio-) polymers, for temporary coating of surfaces and/or compensation of protein agressivity, such as "NOVOTEC CB800", GELITA, (2) poyalcoxyl

ethers, such as "GEOlube 75 W 270" from GEO SECIALYTY CHEMICALS, and (3) natural phospholipids, such as Natipide ECO from Lipoid Kosmetik AG and mixtures thereof.

In a related embodiment the present invention provides methods of cleaning or sterilizing a surface, comprising a step of treating the surface with an aqueous liquid composition according to the present invention as described above. Accordingly in one embodiment the method comprises treating a surface with a composition comprising a C12 to C14 fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition. The surface may comprises or made of a synthetic material, glass, stone, metal, wood or a plant material or a skin, a food surface, a meat or fish surface.

In the context of the present application, the term "sterilizing" is used to characterize a method which achieves a significant reduction of a bacterial or viral contamination. However, the term does not necessarily require that all microorganisms on the surfaces treated in the methods of the present invention are killed.

In a further embodiment, the present invention provides methods of cleaning or sterilizing a surface comprising the following steps:

(a) applying a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% to the surface; and subsequently

(b) applying hydrogen peroxide in a concentration of 0.01 to 5.0 w/w% to the surface.

The methods of the present invention preferably achieve a reduction of *Clostridium difficele* sporicidal activity of at least log 2 in a 4-field test, preferably at least log 3 in a 4-field test explained in more detail below.

In a further aspect the invention provides container comprising at least two chambers and a dispensing device, wherein one chamber comprises an aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate and the at least one other chamber comprises an aqueous liquid composition comprising hydrogen peroxide.

Overview over the surfactants:

Abbrev.	Trademark	Manufacturer	Chemical description	ID
TXP	Texapon SFA	BASF	Anionic Surfactant / Disodium 2-Sulfolaurate C12-14	
CS	Lutensol CS 6250	BASF	Nonionic Surfactant / Polymer-based Liquide made from Hexan-1-ol. and ethylene oxid. (C6 and 5 moles etylene oxid)	CAS number: 31726-34-8
XL	Lutensol XL 60	BASF	Nonionic Surfactant / Polymer-based Liquid made from Decanol (Guerbet Alcohol) and ethylene oxid. (C10 and 6 moles ethylene oxide): Oxiran, 2-methyl-, Polymer with Oxiran, mono(2-propylheptyl) ether	CAS number: 31726-34-8
SB	SurfBoost AD 15	Nouryon	Nonionic surfactant / C12-C14 alkyl amide ethoxylate	
AO	Amine oxide 12/14	LIBEANOX AO12/14	Kryptoionic Surfactant / Cocamine Oxid (Amines, C12-14 Alkyldimethyl, N-Oxides)	CAS number: 308062-28-4
SLES	IMPAPHAT SLES 28 NU		sodium lauryl ether sulfate (2 mol EO)	CAS number: 68891-38-3

Table 1

Example 1 (Influence of TXP on static interfacial tension in mN/m):

The Wilhelmy plate method using the ***Krüss Force Tensiometer - K100*** was employed to determine the static surface tension.

A platinum plate of known geometry with a roughened surface is brought into contact with the liquid. The wetting and contact line corresponds to the circumference of the plate. The force with which the liquid acts on the plate along the wetting line is measured. This force is directly proportional to the surface tension of the liquid. The platinum plate was cleaned with distilled water and 2-propanol before each measurement and then annealed.

All measurements were performed with the following parameters:

Immersion depth	2.0 mm
Immersion speed	100 mm/min
Measuring time	300 s

Surfactant (combination)	Interfacial tension (mN/m)	Mass of substance (g)	Temperature (°C)	pH
TXP (1.0 % w/w)	**23.844536** ± 0.222161	0.09774 ± 0.00091	26.39 ± 0.51	5,20
TXP (1.0 % w/w)	**23.661772** ± 0.121585	0.09700 ± 0.00050	24.66 ± 0.17	5,20
CS (1.0 % w/w)	**52.293885** ± 0,219487	0.21435 ± 0.00090	23.15 ± 0.03	5,20
CS (1.0 % w/w)	**52.881469** ± 0.109401	0.21677 ± 0.00045	22.92 ± 0,35	5,20
TXP (0.5 % w/w) **CS** (0.5 % w/w)	**24.358018** ± 0.300102	0.09985 ± 0.00123	24.59 ± 0.26	5,20
TXP (0.5 % w/w) **CS** (0.5 % w/w)	**23.901815** ± 0.171836	0.09798 ± 0.00070	23.76 ± 0.11	5,20

Table 2

Example 2: (Influence of TXP on dynamic surface tension in mN/m)

A Bubble Pressure Tensiometer - ***BPT Mobile*** from Krüss was used to determine the dynamic surface tension. The measurements were carried out at 20 °C with disposable capillary in 7 steps over a period of 10 - 30000 ms.

Time Measuring point (Mp) / Surfactant (combination)	Mp 1 approx. 10 ms	Mp 2 approx. 40 ms	Mp 3 approx. 150 ms	Mp 4 approx. 500 ms	Mp 5 approx. 1950 ms	Mp 6 approx. 7,500 ms	Mp 7 approx 30,000 ms	pH
0.40 % w/w CS **0.10 % w/w XL** **0.30 % w/w AO**	**41,71** 10 ms	**36,72** 39 ms	**34,20** 147 ms	**32,17** 521 ms	**30,33** 1970 ms	**29,25** 7429 ms	**28,67** 29568 ms	**5,20**
0.40 % w/w CS **0.10 % w/w XL** **0.30 % w/w AO** **+ 0.05 % w/w SLES**	**43,10** 9 ms	**36,93** 39 ms	**34,09** 150 ms	**31,37** 515 ms	**28,47** 1929 ms	**26,22** 7369 ms	**24,73** 30404 ms	**5,20**
0.40 % w/w CS **0.10 % w/w XL** **0.30 % w/w AO** **+ 0.05 % w/w TXP**	**49,36** 9 ms	**40,85** 39 ms	**37,07** 137 ms	**32,24** 518 ms	**27,77** 1942 ms	**25,33** 7336 ms	**23,61** 28867 ms	**5,20**

Table 3

Example 3 (influence of TXP on disinfection performance)

The anti-microbial activity of the compositions was determined using the quantitative test method for the evaluation of bactericidal and yeasticidal activity on non-porous surfaces with mechanical action employing wipes in the medical area (4-field-test; phase 2, Step 2) / based on prWI - sporicidal activity on non-porous surfaces 4-field-test (April 2019), EN 16615 (2015).

Test temperature:	20°C±1°C
Sample test concentrations of soaking liquid:	100% real test concentrations
Appearance of the product dilutions:	clear
Interfering substances ("clean conditions"):	0.3g/l bovine serum albumin
Test Organism:	*Clostridioides difficile* R027 NCTC 13366
Incubation temperature:	36°C ± 1 °C - 5d
Counting procedure:	Pour plate technique
Method of neutralisation:	Dilution neutralisation
Neutraliser:	3% polysorbate 80 + 0.3% lecithine + 0.1 % histidine + 0.5°/o sodium thiosulphate
Test surface	Forex
Stability and appearance of the mixture during the procedure:	No precipitation or flocculation
Test Requirement (EN16615):	**reduction ≥ 4 lg**

Formulation I.		**Reaction time**	**Reduction factor**	**pH**
H_2O_2	**2.00 % (w/w)**			
AO	**0.30 % (w/w)**			
CS	**0.20 % (w/w)**			
XL	**0.20 % (w/w)**			
SB	**0,40 % (w/w)**	**5 min**	**3.73 log**	**5,20**
Formulation II. (+ TXP)		**Reaction time**	**Reduction factor**	**pH**
H_2O_2	**2.00 % (w/w)**			
AO	**0.30 % (w/w)**			
CS	**0.20 % (w/w)**			
XL	**0.20 % (w/w)**			
SB	**0,40 % (w/w)**			
TXP	**0,05 % (w/w)**	**5 min**	**4.79 log**	**5,20**

Table 4

These results were compared to the anti-microbial activity of an aqueous composition comprising 2% hydrogen peroxide as the only component using the same quantitive assay conditions, i.e., the conditions of EN 16615 (2015).

The aqueous composition comprising 2% hydrogen peroxide as the only active component merely achieved a reduction factor of 2,77 log after 15 minutes and was thus significantly inferior to the compositions of the invention.

Example 4

The anti-microbial activity of the following further compositions was determined using the quantitative test method for the evaluation of bactericidal and yeasticidal activity on non-porous surfaces with mechanical action employing wipes in the medical area (4-field-test; phase 2, Step 2) / based on prWI - sporicidal activity on non-porous surfaces 4-field-test (April 2019), EN 16615 (2015).

Nr.\%	SLES	AO	TXP	APG	G-A	H2O2	pH	Exp	Test	log RF
1	1,60	0,12	0,25	0,60	0,20	2,00	4,05	3 min	4-Field test EN 16615	>4,01
2	1,60	-----	0,25	------	0,20	2,00	3,97	4 min	4-Field test EN 16615	3,04
3	0,80	-----	0,25	------	0,20	2,00	4,04	4 min	4-Field test EN 16615	2,95
4	1,60	-----	--------	------	0,20	2,00	4,01	4 min	4-Field test EN 16615	NZ
5	1,60	-----	--------	------	0,20	2,00	3,95	5 min	Suspension Test EN 13704	NZ

SAS	Secondary Alkyl Sulfonate (SAS) surfactants, such as Mersolat H 40 from Lanxess - CAS-No.: 68188-18-1
G-A	Glycolic acid - CAS-No.: 79-14-1
Exp	Exposure time
log RF	logarithmic reduction factor

Example5

Commercial TXP as described above can be further purified before use in the above methods.

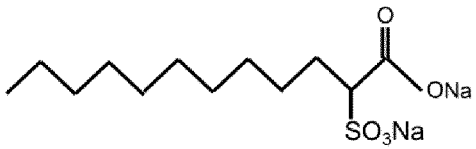
In one example, 8.333 g TXP (containing 30% TXP) was added to a centrifuge tube containing 50 ml of deionized water and 0.15 g of glycolic acid and mixed by shaking. The mixture was heated to 60 °C in a water bath, held at that temperature for one h, and the temperature was slowly lowered (over a period of 24 h) to 38 °C. The sample was held at this temperature for 48 h. The sample was stored for 5 weeks in a centrifuge tube at room temperature.

The sample separated into a sediment of about 12.5 ml and a transparent supernatant of about 37.5 ml at a pH of about 5.5.

Claims

1. Aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

2. Aqueous liquid composition according to claim 1, wherein the C_{12} to C_{14} fatty acid sulfonate is disodium 2-sulfolaurate characterized by the following formula:



3. Aqueous liquid composition according to claim 1 or 2, wherein the C_{12} to C_{14} fatty acid sulfonate is present in a concentration of 0.05 to 0.50 w/w% relative to the total weight of the aqueous liquid composition.

4. Aqueous liquid composition according to one of claims 1 to 3, wherein hydrogen peroxide is present in a concentration of 0.05 to 3.5 w/w% relative to the total weight of the aqueous liquid composition.

5. Aqueous liquid composition according to one of claims 1 to 4, wherein the composition has a pH in the range of 2.0 and 8.0, preferably in the range of 4.0 to 6.0.

6. Aqueous liquid composition according to one of claims 1 to 5, wherein the composition further comprises an amine oxide surfactant in a concentration of 0.01 to 1.2, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

7. Aqueous liquid composition according to one of claims 1 to 6, wherein the composition further comprises a lauryl sulfate surfactant in a concentration of 0.2 to 2.6, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

8. Aqueous liquid composition according to one of claims 1 to 7, wherein the composition further comprises components selected from surfactants, stabilizers,

complexing agents, pH regulators, corrosion inhibitors and/or further additives, wherein non-ionic surfactants are preferred, for example a polymer-based non-ionic surfactants.

9. Method of cleaning or sterilizing a surface, comprising a step of treating the surface with an aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

10. Method of cleaning or sterilizing a surface according to claim 7, wherein the surface comprises or is made of a synthetic material, glass, stone, metal, wood or plant material or skin, a food surface, a meat or fish surface.

11. Method of cleaning or sterilizing a surface according to claim 7 to 10, further comprising a step of producing the aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate and hydrogen peroxide within less than 3 hours prior to use by mixing an aqueous liquid comprising the C_{12} to C_{14} fatty acid sulfonate and an aqueous liquid comprising hydrogen peroxide such that a composition is obtained, wherein the concentration of the C_{12} to C_{14} fatty acid sulfonate is 0.01 to 0.9 w/w% and the concentration of the hydrogen peroxide is 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

12. Aqueous liquid composition according to one of claims 1 to 11, wherein the composition further comprises at least one surfactant selected from the group of sodium lauryl sulfates (SLES and/or SLS), in a concentration 0.10% to 6.00%, preferably 0.20% to 2.50%, particularly preferably 0.30% to 1.80%, most preferably 0.60% to 1.40%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

13. Aqueous liquid composition according to one of claims 1 to 12, wherein the composition further comprises at least one surfactant from the group alkylbenzenesulfonates (SAS u./o. SDBS), in a concentration 0.02 % to 1.20 %, preferably 0.10 % to 0.75 %, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

14. Aqueous liquid composition according to one of claims 1 to 13, wherein the composition further comprises at least one surfactant from the group of amine

oxides, in a concentration 0.02% to 1.20%, preferably 0.10% to 0.75 %, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

15. Aqueous liquid composition according to claim 14, wherein the the amine oxide has a chain length of C12-14.

16. Aqueous liquid composition according to one of claims 1 to 15, wherein the composition further comprises at least one surfactant from the group of alkyl polyglycosides, in a concentration 0.20% to 6.0%, preferably 0.30% to 2.60%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

17. Aqueous liquid composition according to one of claims 1 to 16, wherein the composition further comprises at least one alcohol in the concentration 0.1 % to 49 %, preferably ethanol and/or 2-propanol, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

18. Aqueous liquid composition according to one of claims 1 to 17, wherein the composition further comprises water and alcohols and at least one further solvent in a concentration of 0.1 % to 6 %, preferably a diol, more preferred isopentyldiol, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

19. Aqueous liquid composition according to one of claims 1 to 18, wherein the composition further comprises at least two acids selected from the group consisting of glycolic acid, succinic acid, formic acid, amidosulfonic acid, lactic acid, in a concentration of 0.01% to 1.50%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

20. Aqueous liquid composition according to one of claims 1 to 19, wherein the composition further comprises at least one surfactant from the group of N-acylated peptides and/or N-acylated amino acids, in the concentration, 0.03% to 2.60%, preferably 0.09% to 1.60%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

21. Aqueous liquid composition according to one of claims 1 to 20, wherein the sum of all anionic surfactants in the solution and the at least one amine oxide is present in a ratio of from 8:1 to 2:1, preferably from 6:1 to 2:1, more preferably from 6:1 to 3:1,

most preferably from 5:1 to 4:1, preferably the group of anionic surfactants being more concentrated than the group of amine oxide surfactants.

22. Aqueous liquid composition according to one of claims 1 to 21, wherein the composition further comprises alkyl benzene sulfonates in a ratio to the group of amine oxides 6:1 to 1:6, preferably in a ratio of 3:1 to 1:3, more preferred in a ratio of 1:1.

23. Method of producing an aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition, wherein the method comprises steps of:
    (a) mixing the C_{12} to C_{14} fatty acid sulfonate with an aqueous liquid;
    (b) optionally adding further components, such as anionic surfactants;
    (c) adding hydrogen peroxide.

24. Method of producing an aqueous liquid composition according to claim 23, further comprising an amine oxide surfactant but no a lauryl sulfate surfactant, wherein the amine oxide surfactant is dissolved in the solvent before the C_{12} to C_{14} fatty acid sulfonate is added.

25. Method of producing an aqueous liquid composition according to claim 23 or 24, further comprising a lauryl sulfate and an amine oxide surfactant, wherein the lauryl sulfate surfactant is dissolved in the solvent before the amine oxide surfactant is added.

26. Method of producing an aqueous liquid composition according to claim 23, further comprising a alkylpolyglycoside surfactant and wherein
    (a) the alkylpolyglycoside surfactant is acidified and mixed with the solvent comprising the other surfactants; or
    (b) the surfactants other than the alkylpolyglycoside surfactant are mixed, the mixture is acidified and the alkylpolyglycoside surfactant is added.

27. Container comprising at least two chambers and a dispensing device, wherein one chamber comprises an aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate and the at least one other chamber comprises an aqueous liquid composition comprising hydrogen peroxide.

28. Container according to claim 27, the dispensing device mixes the at least two components upon dispensing such that an aqueous liquid composition comprising a C_{12} to C_{14} fatty acid sulfonate and hydrogen peroxide is dispensed, wherein the liquid composition comprises the C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% and hydrogen peroxide in a concentration of 0.01 to 5.0 w/w%, wherein all concentrations are relative to the total weight of the aqueous liquid composition.

29. Method of cleaning or sterilizing a surface comprising the following steps:
    (a) applying a C_{12} to C_{14} fatty acid sulfonate in a concentration of 0.01 to 0.9 w/w% to the surface; and subsequently
    (b) applying hydrogen peroxide in a concentration of 0.01 to 5.0 w/w% to the surface.

30. Method of cleaning or sterilizing a surface according to claim 29, wherein the aqueous liquid composition has a pH in the range of 2.0 and 8.0, preferably in the range of 4.0 to 6.0.

31. Method of cleaning or sterilizing a surface according to one of claims 29 or 30, wherein the aqueous liquid composition further comprises one or more components selected from surfactants, stabilizers, complexing agents, pH regulators, corrosion inhibitors and/or further additives, wherein non-ionic surfactants are preferred, for example a polymer-based non-ionic surfactants.

32. Method of sterilizing a surface according to one of claims 7 to 12, wherein the treatment achieves a reduction of *Clostridioides difficile* sporicidal activity of at least log 2 in a 4-field test after 5 minutes, preferably at least log 3 or at least log 4 in a 4-field test after 5 minutes, more preferably at least 4 log levels after 4 min or after 2 min, and wherein the 4-field test is carried out according to EN 16615.

33. Dry powder composition comprising a C_{12} to C_{14} fatty acid sulfonate.

34. Method of producing a dry powder composition according to claim 33, wherein the C_{12} to C_{14} fatty acid sulfonate is dried to a powder.