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(54) Titre : UTILISATION DE MELANGES TENSIOACTIFS
(54) Title: USE OF SURFACTANT MIXTURES

(57) Abrégé/Abstract:
The invention relates to the use of surfactant mixtures, comprising (a) anionic and/or non-ionic surfactants and (b) water-soluble &bgr;-(1,3) glucans which are substantially free of &bgr;-(1,6) links. Said mixtures are used to produce oral hygiene and dental hygiene products, in particular, toothpastes. The preparations are characterised in that the mucous membranes in the mouth have a particularly high degree of tolerability with regard thereto, by exhibiting exceptional foaming properties and a stable distribution of the abrasive substances.

## Abstract

The invention relates to the use of surfactant mixtures, comprising (a) anionic and/or non-ionic surfactants and (b) water-soluble &bgr;-(1,3) glucans which are substantially free of &bgr;-(1,6) links. Said mixtures are used to produce oral hygiene and dental hygiene products, in particular, toothpastes. The preparations are characterised in that the mucous membranes in the mouth have a particularly high degree of tolerability with regard thereto, by exhibiting exceptional foaming properties and a stable distribution of the abrasive substances.

# USE OF SURFACTANT MIXTURES

## Field of the invention

The invention resides in the area of mouth and teeth hygiene and concerns the use of preparations containing anionic and/or nonionic surfactants and selected glucans for producing oral hygiene and dental hygiene products as well as toothpastes with a defined composition.

## Prior art

The term oral hygiene and dental hygiene products is of one skilled in the art understood to be a liquid preparation, which as mouthwash desinfects the area of the mouth and throut, secondly are therewith understood paste or since a time back also tooth cleaning agents in the form of gels. These preparations are according to the requirements of the users especially mucosa compatible, in order to - especially by small injuries in mouth and throut areas - not to lead to irritations. In the case of tooth care products the additional requirements are that the preparations must have a strong foam, a neutral taste and active cleaning abilities.

In this connection reference is for example made to the German patent application DE-A1 4406748 (Henkel), from which oral hygiene and dental hygiene products are known where the surfactant component mainly is made up of anionic surfactants of the type of monoglyceride sulphate and nonionic surfactants of the type of alkylglucosides. However, a drawback connected with these agents of the known art is that the compatibility with the oral mucosa, foam stability and cleaning efficiency is not completely satisfactory. Moreover, a special problem is to disperse abrasive ingredients in toothpastes and especially tooth gels, so that there will be no agglomeration or separation even at temperature storage.

In this connection reference is made to the international patent application WO 96/34608 (Colgate) hingewiesen, where the use of ß-glucans against xerostomia is known. The object of US 3,931,398 (Colgate) is the subkutane administration of glucans i the vicinity of the oral cavity to combat caries. In the German patent application DE-A1 3621303 (FMC) gels based on ß-1,3-glucans are suggested, which for example are made from agrobakterium and can be used

in toothpastes. Finally, US 4,340,673 (Merck) describes that special glucans with molecular weights above 500 000 can be used for combatting plaque.

Accordingly, the subject of the invention has consisted in alleviating the above mentioned disadvantages of the known art, by providing especially mouth- and tooth care products, especially toothpastes, which at the same time are caracterised by an optimal compatibility with the oral mucosa, foam stability and cleaning efficiency, immune stimulating and antimicrobial properties as well as especially a stable distribution of the abrasive bodies.

## Description of the invention

The object of the invention is the use of surfactant mixtures, containing

(a) anionic and/or nonionic surfactants and

(b) water soluble ß-(1,3) glucans, which are substantially free of ß-(1,6) linkages,

for the manufacture of oral hygiene and dental hygiene products, especially toothpastes

Surprisingly it was found that addition of only small amounts of water soluble ß-(1,3) glucans, which are substantielly free of unwanted (1,6) linkages, to known mouth og tooth care agents with a content of common anionic and/or nonionic surfactants not only improve their compatibility with the oral mucosa, but also supports the plaque removal, stabilize the foam and especially give a homogeneous and storage stable distribution of abrasive substances. The invention comprises the perception that the preparations further have antimicrobial effect and stimulate the immune system. By "agents" is in connection with the invention therefore only ment toothpastes and toothgels, but also aqueous alcohol based mouthwash as well as chewing gums.

According to one aspect of the invention, there is provided use of a surface active mixture comprising (a) one or more surfactants selected from anionic and nonionic surfactants and (b) one or more water soluble β-(1,3) glucans wherein the one or more water soluble glucans are substantially free of β-(1,6) linkages, in preparation of a product for one or both of oral hygiene and dental hygiene.

According to another aspect of the invention, there is provided a tooth paste comprising: (a) 1 to 10% by weight of one or more surfactants selected from anionic and nonionic surfactants, (b) 0.1 to 2% by weight of one or more water soluble β-(1,3) glucans, wherein the one or more water soluble glucans are substantially free from β-(1,6)-linkages, (c) 0 to 2% by weight of one or more substances selected from chitosan and chitosan derivatives, (d) 1 to 25% by weight of one or more substances selected from grinding and polishing agents, (e) 0 to 65% by weight of one or more moisturizing agents, (f) 0 to 3% by weight of one or more aroma substances, and (g) 0 to 5% by weight of one or more auxiliaries, wherein the amounts of components (a) to (g) and water total 100% by weight.

Anionic and/or nonionic surfactants

Typical examples of anionic surfactants are soaps, alkylbenzene sulphonates, alkane sulphonates, olefine sulphonates, alkylether sulphonates, glycerolether sulphonates, α-methylester sulphonates, sulphofatty acids, alkyl sulphates, fatty alcohol ether sulphates, glycerol ether sulphates, mixed hydroxy ether sulphates, monoglyceride (ether) sulphates, fatty acid amide (ether)

sulphates, mono- and dialkyl sulphosuccinates, mono- and dialkyl sulfosuccinamates, sulpho triglycerides, amido soaps, ether carboxylic acids and their salts, fatty acid isethionates, fatty acid sarcosinates, fatty acid taurides, N-acylamino acids such as for example acyl lactylate, acyl tartrate, acyl glutamate and acyl aspartate, alkyl oligoglucoside sulphate, protein fatty acid condensate (especially plant products based on wheat) and alkyl (ether) phosphate. If the anionic surfactants contain polyglycol ether chains, these could show a conventional, but preferably a narrow homologue distribution. Typical examples of **nonionic surfactants** are fatty alcohol polyglycol ethers, alkylphenol polyglycol ethers, fatty acid polyglycol esters, fatty acid amide polyglycol ethers, fatty amino polyglycol ethers, alkoxylated triglycerides, mixed ethers, respectively mixed formals, possibly partially oxididized alk(en)yl oligoglycosides, respectively glucoronic acid derivatives, fatty acid -N-alkylglucamides, protein hydrolysates (especially plant products based on wheat), polyol fatty acid esters, sugar esters, sorbitan esters, polysorbates and amine oxides. Provided that the nonionic surfactants contain polyglycolether chains, these can show a conventional, but preferably a narrow distribution of homologues. Based on application technology reasons - especially compatibility with the oral mucosa and foaming ability - the use of alkyl sulphates, alkyl ether sulphates, monoglyceride (ether) sulphates, olefine sulphonates and alkyl and/or alkenyl oligoglycosides as well as their mixtures is preferable, and they can be used as water containing pastes, preferably, however, as water free powders or granulates, which can be obtained for example by the Flash-Dryer™ or by the SKET procedure.

Alkyl sulphates and alkyl ether sulphates

Alkyl sulphates and alkyl ether sulphates, which are of interest as components (a), are known anionic surfactants, which in industrial scale are produced by sulphation of primary alcohols - preferably fatty alcohols or oxo alcohols - or their ethylene oxide addition products, and thereafter neutralisation of the resulting sulphuric acid half ester with bases. Preferably they have the following formula (I),

$$R^1O(CH_2CH_2O)_nSO_3X \qquad (I)$$

where $R^1$ represents a linear or branched alkyl residue with 6 to 22 carbon atoms, n represents 0 or a number from 1 to 10 and X represents an alkali or alkaline

earth metal, ammonium, alkyl ammonium, alkanol ammonium or glucammonium. Typical examples are the suphation products of caprone alcohol, capryl alcohol, 2-ethylhexyl alcohol, caprin alcohol, lauryl alcohol, isotridecyl alcohol, myristyl alcohol, cetyl alcohol, palmoleyl alcohol, stearyl alcohol, isostearyl alcohol, oleyl alcohol, elaidyl alcohol, petroselinyl alcohol, linolyl alcohol, linolenyl alcohol, elaeostearyl alcohol, arachyl alcohol, gadoleyl alcohol, behenyl alcohol, erucyl alcohol and brassidyl alcohol as well as their technal mixtures, which e.g. are obtained by the high pressure hydrogenation of methyl esters of technical quality based on fats and oils or aldehydes of Roelen's oxo synthesis and as fraction of monomers by the dimerization of unsaturated fatty alcohols, in the form of their sodium salts. Additional examples are the sulphation products of the adducts of 1 to 10 moles ethylene oxide on the mentioned alcohols, also in the form of their sodium salts. Especially preferable is the use of sodium lauryl sulphate.

Monoglyceride (ether) sulphates

Monoglyceride sulphates and monoglyceride ether sulphates, which also are of interest as component (a), are likewise known anionic surfactants, which can be obtained according to the usual methods of the preparative organic chemistry. Normally triglycerides are used for their preparation, which where appropriate after ethoxylation are transesterified to the monoglycerides and thereafter sulphated and neutralized. It is also possible to react the partial glycerides with suitable sulphating agents, preferably gaseous sulphur trioxide or chlorosulfonic acid [see EP-B1 0561825, EP-B1 0561999 (Henkel)]. The monoglyceride (ether) sulphates which can be used according to the invention preferably have the formula (II),

(II)

where $R^2CO$ represents a linear or branched acyl residue with 6 to 22 carbon atoms, x, y and z represent in total 0 or the numbers 1 to 30, preferably 2 to 10, and Y represents an alkali or alkaline earth metal. Typical examples of suitable monoglyceride (ether) sulphates according to the invantion are the reaction

products of lauric acid monoglyceride, coco fatty acid monoglyceride, palmitic acid monoglyceride, stearic acid monoglyceride, oleic acid monoglyceride and tallow fatty acid monoglyceride, as well as their ethylene oxide adducts with sulphur trioxide or chlorosulfonic acid in the form of their sodium salts. Preferably the monoglyceride sulphates of the formula (II) are used, where $R^1CO$ represents a linear acyl residue with 8 to 18 carbon atoms.

Alkyl and/or alkenyl oligoglycosides

Alkyl- and alkenyl oligoglycosides, which also can be used as components (a) are known nonionic surfactants, with the formula (III),

$$R^3O\text{-}[G]_p \qquad (III)$$

wherein $R^3$ represents an alkyl and/or alkenyl residue with 4 to 22 carbon atoms, G represents a sugar residue with 5 or 6 carbon atoms and p represent numbers from 1 to 10. They can be obtained according to the usual methods of the preparative organic chemistry. Instead of the extensive literature, reference is made to the survey of Biermann et al. in *Starch/Stärke 45, 281(1993)*, B.Salka in *Cosm.Toil. 108, 89 (1993)* as well as J.Kahre et al. in *SÖFW-Journal, issue 8, 598 (1995)*. The alkyl and/or alkenyl oligoglycosides can be derived from aldoses or ketoses with 5 or 6 carbon atoms, preferably glucose. Die preferred alkyl and/or alkenyl oligoglycosides are therefore alkyl and/or alkenyl oligoglucosides. The index number p i the general formula (II) states the degree of oligomerization (DP), that is the distribution of mono- and oligoglykosides and represents a number between 1 and 10. Whilst p in a given compound always has to be an integer and here first of all can take the values p = 1 to 6, the value p for a specific alkyl oligoglycoside is an analytically determined calculated value, whih usually is a fractional number. Preferably used are alkyl and/or alkenyl oligoglykosides with an average degre  of oligomerization p from 1,1 to 3,0. From the standpoint of application technology such alkyl and/or alkenyl oligoglycosides are preferrred, which degree of oligomerization is less than 1,7 and especially between 1,2 and 1,4. The alkyl, respectively the alkenyl, residue $R^3$ can be derived from primary alcohols with 4 to 11, preferably 8 to 10 carbon atoms. Typical examples are butanol, capron alcohol, capryl alcohol, caprin alcohol and undecyl alcohol as well as their technical mixtures, such as obtained for example by the hydrogenation of

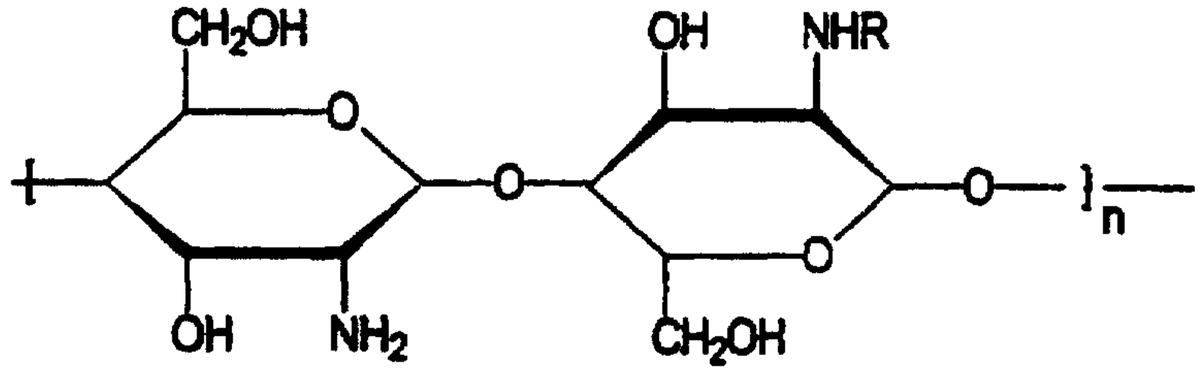
fatty acid methyl esters of technical quality or during the hydrogenation of aldehyds from Roeten's oxo synthesis. Preferred are alkyl oligoglucosides having chain lengths of $C_8$-$C_{10}$ (DP = 1 to 3), which are accumulated by the destillative separation of technical $C_8$-$C_{18}$ coco fatty alcohol and which can be contaminated with less than 6 % by weight of $C_{12}$ alcohol as well as alkyl oligoglucosides based on technical $C_{9/11}$ oxo alcohols (DP = 1 to 3). The alkyl, respectively alkenyl, residue $R^3$ can further be obtained from primary alcohols with 12 to 22, preferably 12 to 14 carbon atoms. Typical examples are lauryl alcohol, myristyl alcohol, cetyl alcohol, palmoleyl alkohof, stearyl alcohol, isostearyl alcohol, oleyl alcohol, elaidyl alcohol, petroselinyl alcohol, arachyl alcohol, gadoleyl alcohol, behenyl alcohol, erucyl alcohol, brassidyl alcohol as well as their technical mixtures, which can be obtained as desctibed above. Alkyl oligoglucosides based on hardened $C_{12/14}$ coco alcohol with a DP of 1 to 3 are preferred.

Water soluble ß-(1,3) glucans

The term glucans is intended to mean homopolysaccharides based on glucose. Depending on sterical linking there is a difference between ß-(1,3), ß-(1,4) and ß-(1,6) glucans. ß-(1,3) Glucans normally show a helical structure, whereas glucans with a (1,4) linkage generally have a linear structure. The ß-glucans of the invention have a (1,3) structure, i.e. they are substantillay free from undesired (1,6) linkages. Preferably such ß-(1,3) glucans are used where the side chains exclusively show (1,3) linkages. Especially the agents contain glucans which are obtained on the basis of yeast from the family *Sacchaomyces*, especially *Saccharomyces cerevisiae*. Glucans of this type are available in technical amounts according to known methods. The international patent application WO 95/30022 (Biotec-Mackzymal) describes e.g. a method for producing such substances, wherein glucans with ß-(1,3) and ß-(1,6) linkages are brought in contact with ß-(1,6) glucanases in such a way, that practically all ß-(1,6) linkages are loosened. Preferably used for the manufacture of these glucans are glucanases based on *Trichodermia harzianum*. As to the manufacture and availability of the glucans contained in these agents, reference is made to the above cited publication. Preferably the weight ratio of surfactants and glucans in the mixtures lies in the range of 100 : 1 to 10 : 1 and preferably 90 :1 to 50 :1.

Chitosan and Chitosan derivatives

In a preferable embodiment of the invention the surfactants and glucans can be used together with chitosans and/or chitosan derivatives (component c). Chitosans are biopolymers and belong to the group of hydrocolloids. From a chemical point of view they are partial deacetylated chitins with different molecular weights, and contain the following - idealized - monomer module:




In contrast to most of the hydrocolloids, which are negatively charged in the range of biological pH-values, chitosans are under these conditions cationic biopolymers. The positively charged chitosans can interact with opposite charged surfaces and are therefore used in cosmetic hair and body care agents as well as in pharmaceutical preparations (see *Ullmann's Encyclopedia of Industrial Chemistry, 5th Ed., vol. A6,* Weinheim, Verlag Chemie, 1986, p. 231-332). A summary of these subjects are also published in for example B. Gesslein et al., *HAPPI 27,* 57 (1990), O. Skaugrud in *Drug Cosm. Ind. 148,* 24 (1991) and E. Onsoyen et al. in *Seifen-Öle-Fette-Wachse 117,* 633 (1991). By the production of chitosan chitin is used as starting material, preferably the shell residues of crust animals, which are available in large amounts as cheap raw materials. The chitin is thereby, using a method which first was described by Hackmann et al., usually first deprotonated by addition of bases, demineralized by addition of mineral acids and at last deacetylated by addition of strong bases, whereby the molecular weights can be distributed over a broad spectrum. Corresponding methods are for example known from *Makromol. Chem. 177,* 3589 (1976) or the French patent application FR-A1 2701266. Preferably use is made of such types which are described in the German patent applications DE-A1 4442987 and DE-A1 19537001 (Henkel), and which have an average molecular weight of 10 000 to 2 500 000, preferably 800 000 to 1 200 000 Daltons, a viscosity according to Brookfield (1 % by weight in glycolic acid) below 5 000 mPas, a degree of

deacetylation in the range of 80 to 88 % and a content of ashes of less than 0,3 % by weight. In addition to the chitosanes as typical cationic biopolymers come according to the invention also in question anionic, respectively nonionic derivatized chitosans, such as e.g. carboxylation, succinilation or alkoxylation products, as they are described for example in the German patent DE-C2 3713099 (L'Oreal) as well as in the German patent application DE-A1 19604180 (Henkel). These are characterised through an especially good compatibility with other surfactants.

Auxiliary and Additive substances

The preparations which can be obtained through the use according to the invention of the surface active mixtures can as **grinding and polishing agents contain** chalk, dicalcium phosphate, insoluble sodium metaphosphate, aluminium silicate, layered silicates, hydrotalcite, calcium pyrophosphate, finely divided synthetic resins, silicic acids, aluminium oxide, aluminium oxide trihydrate, talcum, zeolites, magnesium aluminium silicate (Veegum®), calcium sulphate, magnesium carbonate and/or magnesium oxide. In addition as further auxiliary and additive substances finally aroma components can be used, for example peppermint oil, crisped mint oil, anise oil, star-anise oil, caraway oil, eucalyptus oil, fennel, cinnamon oil, carnation oil, geranium oil, sage oil, pimento oil, thyme oil, majoram oil, basil oil, citrus oil, gaultheria oil or one or more therefrom isolated or synthetically made components of these oils, such as e.g. menthol, carvon, anethol, cineol, eugenol, cinnamon aldehyde, cargophyllen, geraniol, citronellol, linalool, salvoes, thymol, terpinan, terpinol, methyl chavicol and methyl salicylate. Additional suitable aromas are e.g. methyl acetate, vanillin, ionone, linalyl acetate, rhodinol and piperiton. Suitable sweetening agents are either natural sugars as sucrose, maltose, lactose and fructose or synthetic sweetening agents as e.g. saccharin sodium salt, sodium cyclamate or aspartam. Furthwe suitable for the use especially in toothpastes as auxiliary and additional substances are moisturizing agents such as e.g. sorbitol or glycerol, substances which give consistency, deodorizing active agents, agents active against mouth and tooth deseases, water soluble fluorine compounds such as e.g. sodium fluoride or sodium monofluoro phosphate. The amount of the auxiliary and additional

substances is not critical and depends on the type of the finished agent. Usually the amount will be 5 to 98 and preferably 80 to 90 % by weight, based on the agents. Typical tooth pastes, which constitute an additional object of the invention, usually exihibit the following composition:

(a) 1 to 10, preferably 2 to 8 % by weight of anionic and/or nonionic surfactants,

(b) 0,1 to 2, preferably 0,5 to 1 % by weight of water soluble β-(1,3) glucans, which are substantially free from ß-(1,6) linkages,

(c) 0 to 2, preferably 0,1 to 1 % by weight of chitosan, respectively chitosan derivatives,

(d) 1 to 25, preferably 10 to 20 % by weight of grinding and polishing agents,

(e) 0 to 65, preferably 10 to 30 % by weight of moisturizing agents,

(f) 0 to 3, preferably 1 to 2 % by weight of aroma substances, and

(g) 0 to 5, preferably 1 to 3 % by weight of additional auxiliaries,

provided that the used amounts with water summarize to 100 % by weight.

**Examples**

The surfactant mixtures were worked into a standard tooth paste formulation. The foaming properties were determined according to the rub foam method (Reibschaummethode) in a EHMEDA rub foam apparatus *[Fette, Seifen, Anstrichmitt. 66,* 955 (1964)]. For this purpose 20 grams of tooth paste were dispersed in 180 grams of water and heated in the foam cylinder to 45°C. Therein foam was made through 60 seconds rubbing with a vertical rotating perlon brush at 2600 rev. per min. on a metal wire grid having cylindrical form. In Table 1 the foam volume after 0,5 min. and 5 min. after the end of the foam formation as well as that after 5 min. from the foam separated drainage water is specified. The assessment of the stability took place in a subjective manner after storage for 4 weeks at 40°C; (+) means stable, homogeneous distribution of the abrasive materials; (-) agglomeration and (- -) sedimentation. The estimation of taste followed after brushing of teeth by 5 independent test persons according to the following criteria: (++) = aroma predominant, no aftertaste; (+) = slight aftertaste; (-) = intensive aftertaste. The examples 1 to 4 in Table 1 are according to the invention, the examples V1 to V3 are for comparison.

**Table 1**

**Evaluation of tooth pastes (amounts as % by weight)**

| Composition / performance | 1 | 2 | 3 | 4 | V1 | V2 | V3 |
|---|---|---|---|---|---|---|---|
| Sodium lauryl sulphate | 2,0 | - | 2,0 | - | 2,0 | - | 2,0 |
| Sodium glyceryl cocoate sulphate | - | 2,0 | - | 2,0 | - | 2,0 | - |
| Coco glucosides | - | - | 0,5 | 1,0 | - | - | - |
| Betaglucans* | 0,1 | 0,1 | 0,1 | 0,1 | - | - | - |
| Chitosan** | - | - | 0,1 | 0,1 | - | - | 0,1 |
| Silica gel | 22,0 | 22,0 | 22,0 | 22,0 | 22,0 | 22,0 | 22,0 |
| Sodium carboxymethyl cellulose | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 | 1,2 |
| Saccharin, sodium salt | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| Sodium benzoate | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| Sodium fluoride | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 |
| Sorbitol (70 % by weight) | 15,0 | 15,0 | 15,0 | 15,0 | 15,0 | 15,0 | 15,0 |
| Glycerol (86 % by weight) | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 | 25,0 |
| Flavour | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 | 3,0 |
| Water | ad 100 | | | | | | |
| Rub foam [ml] | | | | | | | |
| - after 0,5 min. | 780 | 810 | 820 | 830 | 740 | 760 | 780 |
| - after 5 min. | 600 | 610 | 610 | 640 | 530 | 530 | 520 |
| - Drainage water | 60 | 55 | 55 | 60 | 70 | 65 | 75 |
| Stability | + | + | + | + | - - | - | - |
| Taste evaluation | + | + | + | ++ | - | + | + |

*) Highcareen® GS, **) Hydagen® CMF (both Henkel KGaA, Düsseldorf/FRG)

61200-52



CLAIMS:

1. Use of a surface active mixture comprising

(a) one or more surfactants selected from anionic and nonionic surfactants and

(b) one or more water soluble β-(1,3) glucans wherein the one or more water soluble glucans are substantially free of β-(1,6) linkages,

in preparation of a product for one or both of oral hygiene and dental hygiene.

2. Use according to claim 1, wherein the anionic surfactants are selected from the group consisting of alkyl sulphates, alkyl ether sulphates, monoglyceride (ether) sulphates and olefine sulphonates.

3. Use according to claim 1 or 2, wherein the nonionic surfactants are selected from the group consisting of alkyl and alkenyl oligoglycosides.

4. Use according to any one of claims 1 to 3, wherein the one or more water soluble β-(1,3) glucans are obtained from a yeast from the family *Saccharomyces*.

5. Use according to claim 4, wherein the one or more glucans are obtained by contacting one or more glucans with β-(1,3) and β-(1,6) linkages with one or more β-(1,6) glucanases in such a way that substantially all β-(1,6) linkages are loosened.

6. Use according to claim 5, wherein the one or more glucan contacted with the one or more glucanases are based on *Trichodermia harzianum*.

7. Use according to any one of claims 1 to 6, wherein the one or more surfactants and the one or more glucans are in a weight ratio of 100:1 to 10:1.

8. Use according to any one of claims 1 to 7, wherein the surface active mixture further comprises (c) one or more substances selected from chitosans and derivatives of chitosan.

9. Use according to any one of claims 1 to 8, wherein the product is selected from the group consisting of toothpastes, tooth gels, mouthwash and chewing gums.

10. A tooth paste comprising:

(a) 1 to 10% by weight of one or more surfactants selected from anionic and nonionic surfactants,

(b) 0.1 to 2% by weight of one or more water soluble β-(1,3) glucans, wherein the one or more water soluble glucans are substantially free from β-(1,6)-linkages,

(c) 0 to 2% by weight of one or more substances selected from chitosan and chitosan derivatives,

(d) 1 to 25% by weight of one or more substances selected from grinding and polishing agents,

(e) 0 to 65% by weight of one or more moisturizing agents,

(f) 0 to 3% by weight of one or more aroma substances, and

(g) 0 to 5% by weight of one or more auxiliaries,

wherein the amounts of components (a) to (g) and water total 100% by weight.