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(54) Title: HAIR TREATMENT COMPOSITIONS

(57) Abstract: The invention provides a hair treatment composition such as a shampoo or conditioner comprising a disaccharide and a diol.

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HAIR TREATMENT COMPOSITIONS

FIELD OF THE INVENTION

The invention relates to hair treatment compositions. More particularly the invention relates to hair treatment compositions comprising specific combinations of active materials. The compositions are particularly suitable for application to hair for repair and restoration of damaged hair.

BACKGROUND AND PRIOR ART

Hair can suffer damage from a number of sources such as; exposure to UV and chlorine; chemical influences such as bleaching, perming, overly frequent washing with harsh surfactant-based cleansing shampoo compositions; and mechanical influences such as prolonged use of heated styling appliances.

Damage to the hair typically manifests itself in cuticle and protein loss from the hair fibre, hair fibre brittleness and breakage and frayed or split ends.

In addition consumers require their hair to be manageable; that is that the hair when styled will retain that style for a long period of time and in a range of environmental detrimental conditions such as high humidity.

The use of sugars and plant extracts are disclosed in WO 01/68040 (L'Oreal) to protect keratinous tissue.

The present invention has now found that compositions comprising certain specific combinations of sugars and alcohols are effective for repairing and preventing the principal symptoms of damaged hair, these combinations also have the further advantage that they help to increase the manageability of the hair.

DESCRIPTION OF THE INVENTION

In a first aspect, the present invention provides a hair treatment composition comprising a disaccharide and a diol, wherein the diol is not propylene glycol or butylene glycol.

A further aspect of the invention is the use of the above composition for smoothing hair, aligning hair and preventing damage to the hair.

The invention also relates to a method of treating hair by applying the above composition to the hair.

Detailed Description

The disaccharide

The present invention comprises as an essential element of the invention a disaccharide, preferably the disaccharide

comprises of pentose or hexose sugars, more preferably the disaccharide comprises of two hexose units.

Disaccharides can be either reducing or non-reducing sugars. Non-reducing sugars are preferred.

The D(+) form of the sugars are preferred. Particularly preferred are trehalose and cellobiose or mixtures thereof. Trehalose is the most preferred disaccharide.

It is preferable if the disaccharide is not in the form of a salt and/or not sulphated.

The level of disaccharides present in the total formulation is preferably from 0.1wt% to 10wt%, more preferably from 0.2wt% to 5wt%, most preferably from 0.5wt% to 2wt%.

Diols

It is preferable if the diol has from 2 to 10 carbon atoms, preferably 3 to 6 carbon atoms, most preferably the diol has 4 carbon atoms.

I is advantageous if the diol has its hydroxyl groups positioned on C1 and C3 positions within the carbon backbone.

An especially preferred form of the diol is 3-methyl, 1,3,butanediol.

In addition diols are best used at a diol:disaccharide weight ratios of from 0.1:1 to 1:0.1, preferably from 0.1:1 and 2:1, most preferably from 2:1 to 1:2.

The level of diol present in the total formulation is preferably from 0.1wt% to 10wt%, more preferably from 0.2wt% to 5wt%, most preferably from 0.5wt% to 2wt%.

The pH of the formulations of the invention are in the range from pH 3 to pH 6, more preferably used at pH 3-5.

Product Form

The final product form of hair treatment compositions according to the invention may suitably be, for example, shampoos, conditioners, sprays, mousses, gels, waxes or lotions. Particularly preferred product forms are shampoos, post-wash conditioners (leave-in and rinse-off) and hair treatment products such as hair essences. Rinse-off compositions are particularly preferred.

Shampoo compositions preferably comprise one or more cleansing surfactants, which are cosmetically acceptable and suitable for topical application to the hair. Further surfactants may be present as emulsifiers.

Suitable cleansing surfactants, are selected from anionic, amphoteric and zwitterionic surfactants, and mixtures

thereof. The cleansing surfactant may be the same surfactant as the emulsifier, or may be different.

Anionic Cleansing Surfactant

Shampoo compositions according to the invention will typically comprise one or more anionic cleansing surfactants which are cosmetically acceptable and suitable for topical application to the hair.

Examples of suitable anionic cleansing surfactants are the alkyl sulphates, alkyl ether sulphates, alkaryl sulphonates, alkanoyl isethionates, alkyl succinates, alkyl sulphosuccinates, N-alkyl sarcosinates, alkyl phosphates, alkyl ether phosphates, alkyl ether carboxylates, and alpha-olefin sulphonates, especially their sodium, magnesium, ammonium and mono-, di- and triethanolamine salts. The alkyl and acyl groups generally contain from 8 to 18 carbon atoms and may be unsaturated. The alkyl ether sulphates, alkyl ether phosphates and alkyl ether carboxylates may contain from 1 to 10 ethylene oxide or propylene oxide units per molecule.

Typical anionic cleansing surfactants for use in shampoo compositions of the invention include sodium oleyl sulpho succinate, ammonium lauryl sulphosuccinate, ammonium lauryl sulphate, sodium cocoyl isethionate, sodium lauryl isethionate and sodium N-lauryl sarcosinate. The most preferred anionic surfactants are sodium lauryl sulphate, sodium lauryl ether sulphate(n)EO, (where n ranges from 1 to 3), ammonium lauryl sulphate and ammonium lauryl ether sulphate(n)EO, (where n ranges from 1 to 3).

The total amount of anionic cleansing surfactant in shampoo compositions of the invention is generally from 5 to 30, preferably from 6 to 20, more preferably from 8 to 16 wt%.

Co-surfactant

The shampoo composition can optionally include co-surfactants, preferably an amphoteric or zwitterionic surfactant, which can be included in an amount ranging from 0 to about 8, preferably from 1 to 4 wt%.

Examples of amphoteric and zwitterionic surfactants include, alkyl betaines, alkyl amidopropyl betaines, alkyl

sulphobetaines (sultaines), alkyl glycinates, alkyl carboxyglycinates, alkyl amphopropionates, alkylamphoglycinates, alkyl amidopropyl hydroxysultaines, acyl taurates and acyl glutamates, wherein the alkyl and acyl groups have from 8 to 19 carbon atoms. Typical amphoteric and zwitterionic surfactants for use in shampoos of the invention include lauryl amine oxide, cocodimethyl sulphopropyl betaine and preferably lauryl betaine, cocamidopropyl betaine and sodium cocamphopropionate.

Another preferred co-surfactant is a nonionic surfactant, which can be included in an amount ranging from 0 to 8, preferably from 2 to 5 wt%.

For example, representative nonionic surfactants that can be included in shampoo compositions of the invention include condensation products of aliphatic (C_8 - C_{18}) primary or secondary linear or branched chain alcohols or phenols with alkylene oxides, usually ethylene oxide and generally having from 6 to 30 ethylene oxide groups.

Further nonionic surfactants which can be included in shampoo compositions of the invention are the alkyl polyglycosides

(APGs). Typically, the APG is one which comprises an alkyl group connected (optionally via a bridging group) to a block of one or more glycosyl groups. Preferred APGs are defined by the following formula:

$$RO - (G)_n$$

wherein R is a branched or straight chain C_5 to C_{20} alkyl or alkenyl group, G is a saccharide group and n is from 1 to 10.

Other sugar-derived nonionic surfactants which can be included in shampoo compositions of the invention include the C_{10}-C_{18} N-alkyl (C_1-C_6) polyhydroxy fatty acid amides, such as the C_{12}-C_{18} N-methyl glucamides, as described for example in WO 92 06154 and US 5 194 639, and the N-alkoxy polyhydroxy fatty acid amides, such as C_{10}-C_{18} N-(3-methoxypropyl) glucamide.

The shampoo composition can also optionally include one or more cationic co-surfactants included in an amount ranging from 0.01 to 10, more preferably from 0.05 to 5, most preferably from 0.05 to 2 wt%. Useful cationic surfactants are described hereinbelow in relation to conditioner compositions.

The total amount of surfactant (including any co-surfactant, and/or any emulsifier) in shampoo compositions of the invention is generally from 5 to 50, preferably from 5 to 30, more preferably from 10 to 25 wt%.

Cationic Polymer

A cationic polymer may be present. The cationic polymer may be a homopolymer or be formed from two or more types of monomers. The molecular weight of the polymer will generally be between 5 000 and 10 000 000, typically at least 10 000 and preferably in the range 100 000 to about 2 000 000. The polymers will have cationic nitrogen containing groups such as quaternary ammonium or protonated amino groups, or a mixture thereof.

Suitable cationic nitrogen polymers are described in the CTFA Cosmetic Ingredient Directory, 3rd edition

The cationic conditioning polymers can comprise mixtures of monomer units derived from amine- and/or quaternary ammonium-substituted monomer and/or compatible spacer monomers.

Suitable cationic conditioning polymers include, copolymers of 1-vinyl-2-pyrrolidine and 1-vinyl-3-methyl-imidazolium salt (CTFA name Polyquaternium-16); copolymers of 1-vinyl-2-pyrrolidine and dimethylaminoethyl methacrylate, (CTFA name Polyquaternium-11); cationic diallyl quaternary ammonium-containing polymers in patricular(CTFA Polyquaternium 6 and Polyquaternium 7, mineral acid salts of amino-alkyl esters of homo-and co-polymers of unsaturated carboxylic acids as described in U.S. Patent 4,009,256; cationic polyacrylamides(as described in WO95/22311).

Cationic polysaccharide polymers suitable for use in compositions of the invention include those with an anhydroglucose residual group, such as a starch or cellulose. Cationic cellulose is available from Amerchol Corp. (Edison, NJ, USA) in their Polymer JR (trade mark) and LR (trade mark) series of polymers, as salts of hydroxyethyl cellulose reacted with trimethyl ammonium substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 10. Another type of cationic cellulose includes the polymeric quaternary ammonium salts of hydroxyethyl cellulose reacted with lauryl dimethyl

ammonium-substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 24. These materials are available from Amerchol Corp. (Edison, NJ, USA) under the tradename Polymer LM-200.

Other suitable cationic polysaccharide polymers include quaternary nitrogen-containing cellulose ethers (e.g. as described in U.S. Patent 3,962,418), and copolymers of etherified cellulose and starch (e.g. as described in U.S. Patent 3,958,581).

A particularly suitable type of cationic polysaccharide polymer that can be used is a cationic guar gum derivative, such as guar hydroxypropyltrimonium chloride (commercially available from Rhone-Poulenc in their JAGUAR trademark series). Particularly preferred cationic polymers are JAGUAR C13S, JAGUAR C14, JAGUAR C15, JAGUAR C17 and JAGUAR C16 Jaguar CHT and JAGUAR C162.

The cationic conditioning polymer will generally be present in compositions of the invention at levels of from 0.01 to 5, preferably from 0.05 to 1, more preferably from 0.08 to 0.5 wt%.

Conditioning Surfactant

Conditioner compositions usually comprise one or more conditioning surfactants, which are cosmetically acceptable and suitable for topical application to the hair.

Suitable conditioning surfactants are selected from cationic surfactants, used singly or in admixture.

Cationic surfactants useful in compositions of the invention contain amino or quaternary ammonium hydrophilic moieties which are positively charged when dissolved in the aqueous composition of the present invention.

Examples of suitable cationic surfactants are those corresponding to the general formula:

$[N(R_1)(R_2)(R_3)(R_4)]^+ (X)^-$

in which R_1, R_2, R_3, and R_4 are independently selected from (a) an aliphatic group of from 1 to 22 carbon atoms, or (b) an aromatic, alkoxy, polyoxyalkylene, alkylamido, hydroxyalkyl, aryl or alkylaryl group having up to 22 carbon atoms; and X

is a salt-forming anion such as those selected from halogen, (e.g. chloride, bromide), acetate, citrate, lactate, glycolate, phosphate nitrate, sulphate, and alkylsulphate radicals.

The aliphatic groups can contain, in addition to carbon and hydrogen atoms, ether linkages, and other groups such as amino groups. The longer chain aliphatic groups, e.g., those of about 12 carbons, or higher, can be saturated or unsaturated.

The most preferred cationic surfactants for conditioner compositions of the present invention are monoalkyl quaternary ammonium compounds in which the alkyl chain length is C16 to C22.

Examples of suitable cationic surfactants include quaternary ammonium compounds, particularly trimethyl quaternary compounds.

Preferred quaternary ammonium compounds include cetyltrimethylammonium chloride, behenyltrimethylammonium chloride (BTAC), cetylpyridinium chloride,

tetramethylammonium chloride, tetraethylammonium chloride, octyltrimethylammonium chloride, dodecyltrimethylammonium chloride, hexadecyltrimethylammonium chloride, octyldimethylbenzylammonium chloride, decyldimethylbenzylammonium chloride, stearyldimethylbenzylammonium chloride, didodecyldimethylammonium chloride, dioctadecyldimethylammonium chloride, tallowtrimethylammonium chloride, cocotrimethylammonium chloride, PEG-2 oleylammonium chloride and salts of these where the chloride is replaced by halogen, (e.g. , bromide), acetate, citrate, lactate, glycolate, phosphate nitrate, sulphate, or alkylsulphate. Further suitable cationic surfactants include those materials having the CTFA designations Quaternium-5, Quaternium-31 and Quaternium-18. Mixtures of any of the foregoing materials may also be suitable. A particularly useful cationic surfactant for use in hair conditioners of the invention is cetyltrimethylammonium chloride, available commercially, for example as GENAMIN CTAC, ex Hoechst Celanese.

Salts of primary, secondary, and tertiary fatty amines are also suitable cationic surfactants. The alkyl groups of such

amines preferably have from 12 to 22 carbon atoms, and can be substituted or unsubstituted.

Particularly useful are amido substituted tertiary fatty amines, in particular tertiary amines having one C_{12} to C_{22} alkyl or lakenyl chain. Such amines, useful herein, include stearamidopropyIdimethylamine, stearamidopropyidiethylamine, stearamidoethyldiethylamine, stearamidoethyldimethylamine, palmitamidopropyld imethylamine, palmitamidopropyldiethylamine, palmitamidoethyldiethylamine, palmitamidoethyldimethylamine, behenamidopropyldimethylamine, behenamidopropyldiethylamine, behenamidoethyldiethylamine, behenamidoethyldimethylamine, arachidamidopropyldimethylamine, arachid amidopropyldiethylamine, arachidamidoethyldiethylamine, arachidamidoethyldimethylamine, diethylaminoethylstearamide. Also useful are dimethylstearamine, dimethylsoyamine, soyamine, myristylamine, tridecylamine, ethylstearylamine, N-tallowpropane diamine, ethoxylated (with 5 moles of ethylene oxide) stearylamine, dihydroxyethylstearylamine, and arachidyl behenylamine.

These amines are typically used in combination with an acid to provide the cationic species. The preferred acid useful herein includes L- glutamic acid, lactic acid, hydrochloric acid, malic acid, succinic acid, acetic acid, fumaric acid, tartaric acid, citric acid, L-glutamic hydrochloride, and mixtures thereof; more preferably L-glutamic acid, lactic acid, citric acid. Cationic amine surfactants included among those useful in the present invention are disclosed in U.S. Patent 4,275,055 to Nachtigal, et al., issued June 23, 1981.

The molar ratio of protonatable amines to H^+ from the acid is preferably from about 1:0.3 to 1:1.2, and more preferably from about 1:0.5 to about 1:1.1.

In the conditioners of the invention, the level of cationic surfactant is preferably from 0.01 to 10, more preferably 0.05 to 5, most preferably 0.1 to 2 wt% of the total composition.

The cationic surfactants detailed in this section are also suitable for use in the aspect of the invention wherein a cationic surfactant is intimately mixed with the thermotropic mesogenic material and with oily conditioning

material prior to the incorporation of the conditioning material into the final hair conditioning composition

Fatty Materials

Conditioner compositions of the invention preferably additionally comprise fatty materials. The combined use of fatty materials and cationic surfactants in conditioning compositions is believed to be especially advantageous, because this leads to the formation of a structured phase, in which the cationic surfactant is dispersed.

By "fatty material" is meant a fatty alcohol, an alkoxylated fatty alcohol, a fatty acid or a mixture thereof.

Preferably, the alkyl chain of the fatty material is fully saturated.

Representative fatty materials comprise from 8 to 22 carbon atoms, more preferably 16 to 22. Examples of suitable fatty alcohols include cetyl alcohol, stearyl alcohol and mixtures thereof. The use of these materials is also advantageous in

that they contribute to the overall conditioning properties of compositions of the invention.

Alkoxylated, (e.g. ethoxylated or propoxylated) fatty alcohols having from about 12 to about 18 carbon atoms in the alkyl chain can be used in place of, or in addition to, the fatty alcohols themselves. Suitable examples include ethylene glycol cetyl ether, polyoxyethylene (2) stearyl ether, polyoxyethylene (4) cetyl ether, and mixtures thereof.

The level of fatty alcohol material in conditioners of the invention is suitably from 0.01 to 15, preferably from 0.1 to 10, and more preferably from 0.1 to 5 wt%. The weight ratio of cationic surfactant to fatty alcohol is suitably from 10:1 to 1:10, preferably from 4:1 to 1:8, optimally from 1:1 to 1:7, for example 1:3.

Suspending Agents

In a preferred embodiment, the hair treatment composition, especially if it is a shampoo composition, further comprises from 0.1 to 5-wt% of a suspending agent. Suitable suspending

agents are selected from polyacrylic acids, cross-linked polymers of acrylic acid, copolymers of acrylic acid with a hydrophobic monomer, copolymers of carboxylic acid-containing monomers and acrylic esters, cross-linked copolymers of acrylic acid and acrylate esters, heteropolysaccharide gums and crystalline long chain acyl derivatives. The long chain acyl derivative is desirably selected from ethylene glycol stearate, alkanolamides of fatty acids having from 16 to 22 carbon atoms and mixtures thereof. Ethylene glycol distearate and polyethylene glycol 3 distearate are preferred long chain acyl derivatives. Polyacrylic acid is available commercially as Carbopol 420, Carbopol 488 or Carbopol 493. Polymers of acrylic acid cross-linked with a polyfunctional agent may also be used; they are available commercially as Carbopol 910, Carbopol 934, Carbopol 941 and Carbopol 980. An example of a suitable copolymer of a carboxylic acid containing monomer and acrylic acid esters is Carbopol 1342. All Carbopol (trademark) materials are available from Goodrich.

Suitable cross-linked polymers of acrylic acid and acrylate esters are Pemulen TR1 or Pemulen TR2. A suitable heteropolysaccharide gum is xanthan gum, for example that available as Kelzan mu.

Conditioning Agents

Silicone Conditioning Agents

The compositions of the invention can contain emulsified droplets of a silicone conditioning agent, for enhancing conditioning performance.

Suitable silicones include polydiorganosiloxanes, in particular polydimethylsiloxanes that have the CTFA designation dimethicone. Also suitable for use compositions of the invention (particularly shampoos and conditioners) are polydimethyl siloxanes having hydroxyl end groups, which have the CTFA designation dimethiconol. Also suitable for use in compositions of the invention are silicone gums having a slight degree of cross-linking, as are described for example in WO 96/31188.

The viscosity of the emulsified silicone itself (not the emulsion or the final hair conditioning composition) is typically at least 10,000 cst at 25 °C the viscosity of the silicone itself is preferably at least 60,000 cst, most preferably at least 500,000 cst, ideally at least 1,000,000

cst. Preferably the viscosity does not exceed 10^9 cst for ease of formulation.

Emulsified silicones for use in the shampoo compositions of the invention will typically have an average silicone droplet size in the composition of less than 30, preferably less than 20, more preferably less than 10 μm, ideally from 0.01 to 1 μm. Silicone emulsions having an average silicone droplet size of ≤ 0.15 μm are generally termed microemulsions.

Examples of suitable pre-formed emulsions include emulsions DC2-1766, DC2-1784, DC-1785 DC-1786 and microemulsions DC2-1865 and DC2-1870, all available from Dow Corning. These are all emulsions/microemulsions of dimethiconol. Cross-linked silicone gums are also available in a pre-emulsified form, which is advantageous for ease of formulation. A preferred example is the material available from Dow Corning as DC X2-1787, which is an emulsion of cross-linked dimethiconol gum. A further preferred example is the material available from Dow Corning as DC X2-1391, which is a microemulsion of cross-linked dimethiconol gum.

A further preferred class of silicones for inclusion in shampoos and conditioners of the invention are amino functional silicones. By "amino functional silicone" is meant a silicone containing at least one primary, secondary or tertiary amine group, or a quaternary ammonium group. Examples of suitable amino functional silicones include: polysiloxanes having the CTFA designation "amodimethicone", Specific examples of amino functional silicones suitable for use in the invention are the aminosilicone oils DC2-8220, DC2-8166, DC2-8466, and DC2-8950-114 (all ex Dow Corning), and GE 1149-75, (ex General Electric Silicones). Suitable quaternary silicone polymers are described in EP-A-0 530 974. A preferred quaternary silicone polymer is K3474, ex Goldschmidt.

Also suitable are emulsions of amino functional silicone oils with non-ionic and/or cationic surfactant. Pre-formed emulsions of amino functional silicone are also available from suppliers of silicone oils such as Dow Corning and General Electric. Specific examples include DC929 Cationic Emulsion, DC939 Cationic Emulsion, and the non-ionic emulsions DC2-7224, DC2-8467, DC2-8177 and DC2-8154 (all ex Dow Corning).

With some shampoos it is particularly preferred to use a combination of amino and non amino functional silicones

The total amount of silicone is preferably from 0.01 to 10 %wt of the total composition more preferably from 0.3 to 5; most preferably 0.5 to 3-wt% is a suitable level.

(ii) Non-silicone Oily Conditioning Components

Compositions according to the present invention may also comprise a dispersed, non-volatile, water-insoluble oily conditioning agent.

By "insoluble" is meant that the material is not soluble in water (distilled or equivalent) at a concentration of 0.1% (w/w), at 25°C.

Suitable oily or fatty materials are selected from hydrocarbon oils, fatty esters and mixtures thereof. Straight chain hydrocarbon oils will preferably contain from about 12 to about 30 carbon atoms. Also suitable are polymeric hydrocarbons of alkenyl monomers, such as C_2-C_6 alkenyl monomers.

Specific examples of suitable hydrocarbon oils include paraffin oil, mineral oil, saturated and unsaturated dodecane, saturated and unsaturated tridecane, saturated and unsaturated tetradecane, saturated and unsaturated pentadecane, saturated and unsaturated hexadecane, and mixtures thereof. Branched-chain isomers of these compounds, as well as of higher chain length hydrocarbons, can also be used.

Suitable fatty esters are characterised by having at least 10 carbon atoms, and include esters with hydrocarbyl chains derived from fatty acids or alcohols, Monocarboxylic acid esters include esters of alcohols and/or acids of the formula R'COOR in which R' and R independently denote alkyl or alkenyl radicals and the sum of carbon atoms in R' and R is at least 10, preferably at least 20. Di- and trialkyl and alkenyl esters of carboxylic acids can also be used.

Particularly preferred fatty esters are mono-, di- and triglycerides, more specifically the mono-, di-, and tri-esters of glycerol and long chain carboxylic acids such as C_1-C_{22} carboxylic acids. Preferred materials include cocoa

butter, palm stearin, sunflower oil, soyabean oil and coconut oil.

The oily or fatty material is suitably present at a level of from 0.05 to 10, preferably from 0.2 to 5, more preferably from about 0.5 to 3-wt%.

In hair treatment compositions containing a conditioning agent, it is preferred that a cationic polymer also be present.

Styling polymers

If the product is a styling product it is preferred if a styling polymer is present

The hair styling polymer if present is preferably present in the compositions of the invention in an amount of from 0.001% to 10% by weight, more preferably from 0.1% to 10% by weight, such as from 1% to 8% by weight.

Hair styling polymers are well known. Suitable hair styling polymers include commercially available polymers that contain moieties that render the polymers cationic, anionic, amphoteric or nonionic in nature. Suitable hair styling polymers include, for example, block and graft copolymers. The polymers may be synthetic or naturally derived.

Adjuvants

The compositions of the present invention may also contain adjuvants suitable for hair care. Generally such ingredients are included individually at a level of up to 2, preferably up to 1 wt% of the total composition.

Suitable hair care adjuvants, include amino acids and ceramides.

The invention will now be further illustrated by the following, non-limiting Examples.

A number illustrates examples of the invention; a letter illustrates Comparative Examples.

All percentages quoted are by weight based on total weight unless otherwise stated.

EXAMPLES

The following Examples were prepared:

Table 1

Shampoo

	Wt %	
Ingredients	Example A	Example 1
Sodium laurylether sulphate(2EO)	12	12
Cocoyl amidopropyldimethyl glycine	2	2
Silicone emulsion	2	2
Guar hydroxypropyl trimethylammonium chloride	0.30	0.30
Preservative	0.35	0.35
Perfume	0.42	0.42
Citric acid	0.17	0.17
Trimethyl glycine	1.20	-
Trehalose	-	0.70
3-methyl 1,3-butanediol		0.70
Water and minors	to 100 wt%	

Results were obtained from a panel of sixty consumers. Each product was tested sequentially for a period of four days, with three days in-between, using a product without any

actives. The results show consumer assessed scores of the Examples relative to the Comparative Example.

The results are shown in figure 1 . It is clearly shown that Example 1 has significant advantages over the comparative Example (Example A)

CLAIMS

1. A hair treatment composition comprising a disaccharide and a diol, wherein the diol is not propylene glycol or butylene glycol.

2. A hair treatment composition according to claim 1 in which the disaccharide has two hexose rings.

3. A hair treatment composition according to any preceding in which the disaccharide is selected from trehalose, cellobiose or mixtures thereof.

4. A hair treatment composition according to any preceding claim in which the disaccharide is trehalose.

5. A hair treatment composition according to any preceding claim in which the diol has from 2 to 10 carbon atoms.

5. A hair treatment composition according to any preceding claim in which the diol has its hydroxyl groups positioned on C1 and C3.

6. A hair treatment composition according to any preceding claim in which the diol has 4 carbon atoms.

7. A hair treatment composition according to claim 6 in which the diol is 3-methyl, 1,3,butanediol.

8. A hair treatment composition according to any proceeding claim further comprising a surfactant.

9. A hair treatment composition according to any preceding claim comprising an aqueous base.

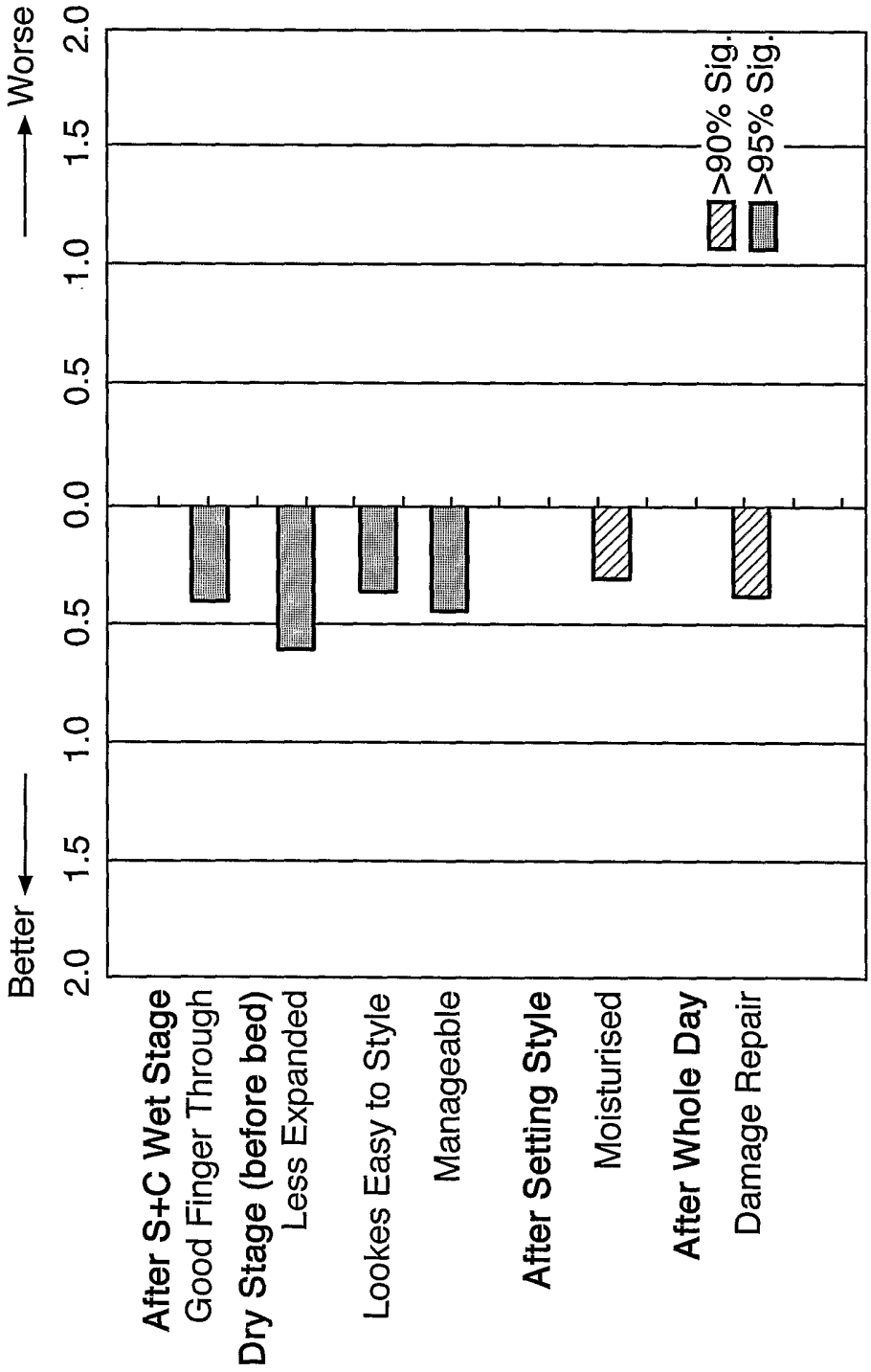
10. Use of a composition according to any preceding claim for smoothing hair.

11. Use of a composition according to any one of claims 1 to 9 for aligning hair.

12. Use of a composition according to any one of claims 1 to 9 for preventing damage to the hair.

13. A method of treating hair by applying a composition according to any one of claims 1 to 9 to the hair.

Fig.1.


Better
Worse
2.0
1.5
1.0
0.5
0.0
0.5
1.0
1.5
2.0
>90% Sig.
>95% Sig.
After S+C Wet Stage
Good Finger Through
Dry Stage (before bed)
Less Expanded
Lookes Easy to Style
Manageable
After Setting Style
Moisturised
After Whole Day
Damage Repair

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/13700

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61K7/06 A61K7/50

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)
IPC 7 A61K

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)
PAJ, EPO-Internal, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 06, 4 June 2002 (2002-06-04) & JP 2002 047168 A (POLA CHEM IND INC), 12 February 2002 (2002-02-12) abstract	1-13
X	US 4 690 818 A (PUCHALSKI JR EUGENE ET AL) 1 September 1987 (1987-09-01) column 5, line 31 - line 35; claim 1; example 1	1,5,8-13
A	EP 0 691 407 A (HAYASHIBARA BIOCHEM LAB) 10 January 1996 (1996-01-10) page 35; examples B-17	1-13

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 April 2004	29/04/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Voyiazoglou, D

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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 4 839 164 A (SMITH WALTER P) 13 June 1989 (1989-06-13) claims 1,4; example 1	1-13
A	WO 00/47167 A (COLOR ACCESS INC) 17 August 2000 (2000-08-17) page 8, line 22; examples II,III	1-13
A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 10, 31 October 1996 (1996-10-31) & JP 08 157339 A (LION CORP), 18 June 1996 (1996-06-18) abstract	1,5-13
A	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 10, 30 November 1995 (1995-11-30) & JP 07 173488 A (AJINOMOTO CO INC), 11 July 1995 (1995-07-11) abstract	1-13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 03/13700

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
JP 2002047168	A	12-02-2002	NONE		
US 4690818	A	01-09-1987	NONE		
EP 0691407	A	10-01-1996	JP	8073504 A	19-03-1996
			CA	2152563 A1	28-12-1995
			DE	69528019 D1	10-10-2002
			DE	69528019 T2	22-05-2003
			EP	0691407 A1	10-01-1996
			ES	2182869 T3	16-03-2003
			TW	426736 B	21-03-2001
			US	5919668 A	06-07-1999
US 4839164	A	13-06-1989	CA	1322532 C	28-09-1993
WO 0047167	A	17-08-2000	AU	2416400 A	29-08-2000
			WO	0047167 A1	17-08-2000
JP 08157339 8	A		NONE		
JP 07173488 8	A		NONE		