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⑦ Applicant: **UNILEVER NV, Burgemeester s'Jacobplein 1 P.O. Box 760, NL-3000 DK Rotterdam (NL)**

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⑦② Inventor: **Parslow, Michael William, 34 Heath Road, Upton by Chester (GB)**
Inventor: **Willis, Edwin, 15 Aldford Close, Bromborough Wirral Merseyside (GB)**

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⑦④ Representative: **Gambell, Derek et al, UNILEVER PLC Patents Division P.O. Box 68 Unilever House, London EC4P 4BQ (GB)**

⑤④ **Fabric softening composition.**

⑤⑦ A fabric softening composition comprises an aqueous base, a cationic fabric softener and up to about 10% lanolin. The cationic softener and lanolin are preferably in the ratio of 20:1 to 1:20 and the level of cationic softener in the composition may be from 0.5% to 30%. Other conventional fabric softening composition ingredients may be present. The lanolin may be replaced by a lanolinlike material such as derivatives thereof or one or more of the active constituents of lanolin either extracted therefrom or derived from other sources. The presence of lanolin in the composition improves the viscosity and performance thereof.

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FABRIC SOFTENING COMPOSITION

FIELD OF THE INVENTION

The present invention relates to a fabric softening composition. In particular, but not exclusively, it
5 relates to an aqueous based concentrated fabric softening composition.

BACKGROUND ART

10 It is known to treat fabrics, particularly after washing, with fabric softening agents in order to improve the feel of the fabrics and, in the case of clothes, to improve the comfort in wear. Traditionally, fabric softening agents are applied from an aqueous liquor which
15 is made up by adding a relatively small volume of a fabric softening composition to a large volume of water, for example during the rinse cycle in an automatic washing machine. The fabric softening composition is usually an aqueous liquid product containing less than about 8% of a
20 cationic fabric softening agent. For a number of reasons, including for example the cost of packaging, it would be preferred if the product were to contain more than 8% of the active ingredient but due to difficulties in

manufacture, storage and ease of use of the products, it has only been possible to do this in the past with some difficulty.

5 Further, there may be a desire to partially replace the cationic fabric softening agent with a material which is less costly, easier to handle or less prone to causing skin reaction while at the same time maintaining or substantially maintaining the performance of the product.

10

As set out in more detail below, the present invention seeks to overcome one or more of the objectives referred to above by the combined use of a cationic fabric softening agent and lanolin or a lanolin-like material.

15

SUMMARY OF THE INVENTION

According to the invention there is provided a fabric softening composition comprising an aqueous base and at least 0.5% by weight of a cationic fabric softening agent, characterised in that it further comprises from 0.25% up to 10% by weight of lanolin or a lanolin-like material.

20 An essential component of the present invention is lanolin or a lanolin-like material. Lanolin is wool wax which has been purified by various purification steps including washing, neutralisation, filtration, bleaching and deodorisation. Lanolin is composed primarily of esters which constitute the active constituents in the present invention and which yield on hydrolysis a mixture of complex alcohols and fatty acids. The alcohols which form about half of the ester component by weight, include sterols and terpene alcohols. The sterols amount to about 30% and include cholesterol, 7-dehydrocholesterol and 35 cerebosterol and dihydrocholesterol (cholestanol). The terpene alcohols include lanesterol ($C_{30}H_{50}O$),

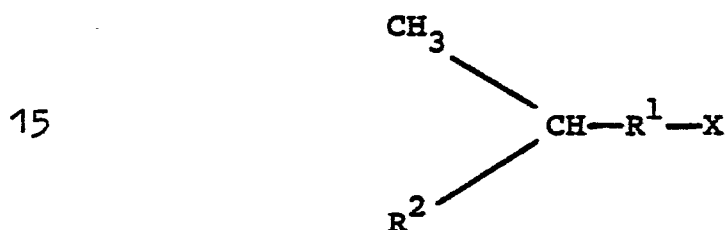
dihydrolanesterol ($C_{30}H_{52}O$), agnosterol ($C_{30}H_{48}O$),
dihydroagnosterol ($C_{30}H_{50}O$).

5 Lanolin is available commercially in a number of
forms. Lanolin as such contains the active constituents
primarily in their ester form. It is also available in
two hydrolysed forms where the active constituents are
primarily in their alcoholic or carboxylic acid form.
Further, lanolin may be hydrogenated to form a product
10 where the active constituents are present primarily only in
their alcoholic form. Lanolin is also commercially
available in propoxylated and acetylated forms. As used
herein the term "lanolin" is intended to refer to any such
material derived from wool wax whether the active
15 constituents are in the alcoholic, ester, alkoxylated,
hydrogenated or other chemical form.

 Suitable commercial forms of lanolin include Corona
(lanolin BP), Hartolan, Polychol and Coronet (Trade Marks
20 of Croda Chemicals Ltd), Solulan, Acetulan and Modulan
(Trade Marks of American Cholesterol Products Inc) and
Lanocerina (Trade Mark - Esperis SpA Milan). Commercial
lanolin is also available from Westbrook Lanolin Co.,
Bradford, England.

25 Many of the active constituents of lanolin can be
prepared synthetically, from sources other than wool wax
or can be extracted from wool wax and other naturally
occurring materials. While for cost reasons the
30 commercially available forms of lanolin are preferred for
the present invention, it is also possible to use any one
or more of the active constituents referred to above
however derived, and also materials of similar structure.
Thus, in place of lanolin one may use a "lanolin-like
35 material" which term as used herein includes

- (a) any one or more of the active lanolin constituents referred to above, and the carboxylic acid or alcohol, derivatives thereof;
- 5 (b) the corresponding carboxylic acids or alcohols and ester derivatives of the materials listed in (a), in particular the esters thereof with fatty acids or alcohols containing at least 12 carbon atoms.
- 10 (c) iso- and anteiso- alcohols and acids and derivatives thereof having the general formula



- 20 where R^1 is a divalent straight or branched chain, saturated or unsaturated, substituted or unsubstituted hydrocarbyl group having at least 7, preferably at least 15 carbon atoms, R^2 is a methyl or ethyl group and X is $-\text{OH}$, $-\text{COOH}$, $-\text{O}-\underset{\text{O}}{\overset{\parallel}{\text{C}}}-\text{R}^3$ or
- 25 $-\text{COOR}^3$ where R^3 is a hydrocarbyl group, in particular a fatty acid alkyl group containing of at least 12 carbon atoms. Examples of materials in this group include 16-methyl heptadecanol, 24-methyl hexacosanol, 8-methyl nonanoic acid; and 2-hydroxy-
- 30 16-methyl heptadecanoic acid.

The level of lanolin or lanolin-like material in the fabric softening compositions is from 0.25% up to 10% by weight, such as between 0.5% and 5% by weight of the

35 composition.

Any well-known cationic fabric softening agent can be used in the present invention, as well as mixtures of two or more of such agents.

5 Suitable examples of cationic fabric-softening agents are quaternary ammonium compounds containing two long alkyl or alkenyl chains with 12-22 carbon atoms such as di(hardened or unhardened tallow) dimethyl ammonium-chloride, 2-heptadecyl-2methylstearoyl amido ethyl
10 imidazoline methosulphate, di-(coco)dimethyl ammonium-chloride, etc. These cationic fabric-softening agents are well-known in the art and further suitable examples can be found in Schwartz-Perry: "Surface-active Agents and Detergents" Vol II, 1958.

15 Relatively water-soluble cationic softening agents, such as the monoalkyl quaternary ammonium compounds such as stearyltrimethylammoniumchloride, may also be used, but, as they are often less effective softeners, they are
20 preferably used in conjunction with other, more effective cationic fabric softening agents or with non-cationic softening agents such as fatty acid esters of polyols such as sorbitantristearate, glycerolmonostearate, and so on, or with anionic detergents with which they are capable of
25 forming softening complexes, such as fatty acid soaps. They may also be made more hydrophobic by treatment with suitable hydrophobising agents such as long chain alcohols and fatty acids. The present invention is however of particular benefit if the more effective, less water-
30 soluble cationic softening agents having two long alkyl chains are used.

 The level of cationic fabric softening agent in the aqueous fabric softening compositions is at least 0.5% but
35 preferably no more than 30% by weight, such as between 1.0% and 15% by weight of the composition.

The ratio by weight of the cationic fabric softening agent to the lanolin or lanolin-like material may lie between 0.05:1 and 20:1, more preferably between 0.1:1 and 10:1, especially between 1:1 and 4:1.

5

In use, the fabric softening composition of the invention is added to a large volume of water to form a liquor with which the fabrics to be treated are contacted. Generally, the total concentration of the cationic fabric softening agent and the lanolin or lanolin-like materials in this liquor will be between about 50 ppm and about 500 ppm.

10 The pH of the aqueous composition used for forming the liquor may be varied within a range, for example between about 3 and about 8, preferably from about 4 to about 6. To achieve the desired pH in the composition and in the treatment liquor, the composition may contain buffering agents as required such as benzoic acid, citric acid and phosphoric acids and/or their alkali metal salts.

20 In use, the fabrics to be treated are contacted with an aqueous liquor to which the fabric softening composition is added, the ratio by weight of the fabrics to the liquor being preferably less than about 25:1, most preferably between about 10:1 and about 4:1.

25 The aqueous liquor in contact with the fabrics may be at any convenient temperature. Successful results can be obtained when the liquor has a temperature between about 0°C and about 60°C, preferably between about 10°C and about 40°C.

30 The liquor and fabrics in contact therewith are preferably agitated during treatment.

35

The amount of cationic softening agent and lanolin or lanolin-like material deposited on the fabric depends on, inter alia, the concentration of these components in the treatment liquor, the treatment temperature, the degree
5 of agitation, the treatment time and the nature of the fabric. Generally, a level of less than about 0.5%, such as between about 0.01% and about 0.4% by weight in total of these components will be deposited, based on the weight of the dry fabric.

10

The balance of the composition comprises the aqueous medium, as the case may be with the other ingredients as set out below. The aqueous medium comprises at least 25%, preferably at least 30%, and especially at least 40% of the
15 composition.

15

The compositions of the invention may further comprise additional beneficial ingredients, commonly used or proposed for inclusion in liquid fabric-softening
20 compositions. Such ingredients, either alone or incorporated in suitable carriers, include additional viscosity modifiers, germicides, fluorescers, perfumes including deodorising perfumes, organic or inorganic acids, antistatic agents such as water-soluble cationic
25 surfactants, ethoxylated quaternary polyamine compounds (eg Ethoduameen T 13) and aluminium salts, soil-release agents, colourants, antioxidants, bleaches, bleach precursors, anti-yellowing agents, ironing aids etc, all in the conventional minor amounts. Enzymes such as cellulases
30 may also be included.

30

The compositions may also contain, in addition to the cationic fabric-softening agents, other non-cationic fabric-softening agents such as nonionic fabric-softening
35 agents.

35

In particular, the fabric softening compositions may include a viscosity modifier selected from polymers as described below, C₁₂-C₄₀ hydrocarbons, C₉-C₂₄ fatty acids, fatty acid esters having a total of 10-40 carbon
5 atoms, C₁₀-C₁₈ fatty alcohols, water-miscible solvents, and electrolytes.

The polymer when included in the composition of the invention may be present therein in an amount of from 0.5
10 to 40%, preferably from 1 to 30%, and particularly preferably 4-25%. The polymer, suitable for inclusion, is defined in the following way:

The polymer should be water-soluble under user's
15 conditions, and a 20% aqueous solution of the polymer should have a viscosity (η) of < 50 , preferably < 30 and especially preferably < 15 cP, as measured at 25°C and 110 sec⁻¹ in a Haake Viscometer. Said 20% aqueous solution should also show a vapour pressure equal to or lower than
20 the vapour pressure of a 2% aqueous solution of polyethyleneglycol with a molecular weight of 6,000, preferably equal to or lower than that of a 10% aqueous solution of said polyethyleneglycol, and particularly preferably equal to or lower than that of an 18% aqueous solution of said
25 polyethyleneglycol. The said aqueous polymer solution can be of water and polymer only, or can include solvent-containing media normally derived from the raw materials or additives, or include additives specifically designed to improve the vapour pressure lowering capacity of the
30 polymer, or, in the case of ionic polymers, include adjustments to pH in order to optimise ionisation. Such vapour pressure measurements can be obtained using an Hewlett Packard vapour pressure osmometer, using an operating temperature of 34.5°C or using any other suitable
35 vapour measuring device.

The polymer should furthermore have a molecular weight of at least 400, preferably at least 4,000 and particularly preferably at least 6,000.

- 5 It is desirable, furthermore, that the polymer does not negatively interact with any of the other ingredients of the composition.

Suitable examples of the polymer can be thus obtained
10 from the polyalkyleneglycols, the polyalkylene imines, dextran, gelatin and other natural or synthetic (co)polymers, as long as they meet the above criteria.

Mixtures of two or more polymers of the same type or
15 of different type may also be used.

A preferred class of polymers comprises polyethylene-glycols with an average molecular weight of about 1,000 to about 6,000. These polymers, and especially those
20 with an average molecular weight of 4,000 or 6,000, are particularly suitable for compositions of the invention with a high level of relatively water-insoluble cationic fabric-softening agent.

- 25 Other typical examples of suitable polymers are dextran with a molecular weight of 10,000 and polyethylene imine with a molecular weight of 45-750.

When the composition contains a C_{12} - C_{40} hydro-
30 carbon as a viscosity control agent, this is advantageously at a level of from 0.25% to 50% by weight, preferably from 0.5% to 25%. Preferred materials have from 12 to 24 carbon atoms and especially preferred are liquid mixtures of paraffins having from 14 to 18 carbon atoms.

Normally, suitable hydrocarbons are found in the paraffin and olefin series, but other materials, such as alkynes and cyclic hydrocarbons are not excluded. Materials known generally as paraffin oil, and petroleum
5 are suitable. Examples of specific materials are hexadecane, octadecane, eicosane tetradecane and octadecane. Preferred commercially-available paraffin mixtures include spindle oil and light oil and technical grade mixtures of C_{14} - C_{18} n-paraffins. Haloparaffins
10 such as myristyl chloride and stearyl bromide are not excluded.

When the composition contains a C_9 - C_{24} fatty acid, this is advantageously at a level of from 0.5 to 15%.
15

Highly preferred materials of this class are the C_{10} - C_{20} saturated fatty acids, especially lauric acid, myristic acid, palmitic acid and stearic acid.

20 When the composition contains a fatty acid ester having a total of 10 to 40 carbon atoms this is at a preferred level of from 0.25 to 15% by weight, advantageously 0.5 to 4%. The ester is preferably empirically derived from a fatty acid having 8 to 23 carbon
25 atoms and an alkanol or hydroxy alkanol having 1-8, especially 1-4 carbon atoms. Specific examples include esters derived from C_1 - C_3 alcohols and lauric, myristic, palmitic or stearic acid, such as methyl laurate, ethyl myristate, iso-propyl stearate, ethylene glycol
30 monostearate, ethyl stearate, methyl palmitate, and other esters such as iso-butyl stearate and 2-ethylhexyllaurate, iso-octyl myristate.

When the composition contains a fatty alcohol having
35 from 10 to 18 carbon atoms, this is preferably at a level of from 0.25 to 15% by weight.

Specific examples of this class are decanol, dodecanol, tetradecanol, pentadecanol, hexadecanol and octadecanol. The most preferred materials are lauryl and palmityl alcohols.

5

When the composition contains as viscosity control agent a solvent this may be a lower alkanol, a glycol, a glycolether and the like. The solvent may be present at a level of up to 20% by weight, such as from 5% to 10 15% by weight. When the cationic fabric-softening agent is supplied in the form of an aqueous-alcoholic solution, that alcohol content is included in the above amounts, and if necessary only a small amount of extra alcohol is to be added. A suitable solvent is 15 isopropanol.

The viscosity of the fabric softening composition may be controlled by the presence of an electrolyte. Preferably the electrolyte is a water-soluble non-surface 20 active salt such as sodium chloride, sodium methosulphate, sodium benzoate, calcium chloride, magnesium chloride or aluminium chlorhydrate. The level of electrolyte will determine or be determined by the desired viscosity of the composition and the nature and concentration of other 25 components in the composition. Typical levels are from about 100 to about 1000 parts per million, most preferably between about 200 and about 500 parts per million.

The fabric softening compositions optionally contain 30 one or more nonionic emulsifying agents, such as the polymerised monoglycerides of long chain fatty acids having from 14 to 24 carbon atoms in the straight or branched saturated or unsaturated carbon chain, such as poly-monolauryl glyceride, poly-monostearyl glyceride, poly-35 monopalmityl glyceride or poly-monooleyl glyceride.

Another suitable nonionic emulsifying agent is sorbitan monostearate.

These nonionic emulsifying agents are available commercially by the Trade Marks WITCONOL (Witco Chemicals Ltd) and SPAN (Atlas Chemical). The nonionic emulsifying agent may be present at a level from 0.5% to 9.5% by weight, such as from 2.4% to 6%.

10 In addition to the above-discussed components, compositions according to the invention can also include a water-soluble cationic or non-ionic surfactant.

By water-soluble, it is meant that the surfactant has 15 a solubility in water of pH 2.5 and 20°C of greater than 10 g/l. Normally such materials are alkyl substituted ammonium salts having one C₁₂-C₂₄ alkyl chain, optionally substituted or interrupted by functional groups such as —O—, —COO—, —CONH—, —O— etc. Suitable 20 water-soluble nonionic surfactants are the ethoxylates, sorbitan esters available as TWEENS (Atlas Chemical).

It is particularly beneficial to include a water-soluble cationic or nonionic emulsifying agent in the 25 composition if it contains as a viscosity modifier a hydrocarbon, fatty acid, fatty alcohol or fatty acid ester of the types referred to above. The level of the water-soluble surfactant is preferably 0.01% to 1%.

30 Preferably, the compositions contain substantially no anionic material such as anionic surfactants. However some anionic material may be tolerated in practice. In preferred compositions the weight ratio of any anionic material to the cationic fabric softening agent is less 35 than 0.4:1, most preferably less than 0.2:1.

The viscosity of the fabric softening compositions is preferably less than about 150 cP, most preferably less than about 120 cP. This viscosity is measured at 25°C and 110 sec⁻¹ in a Haake Viscometer.

5

The compositions of the invention can normally be prepared by mixing the ingredients together in water, heating to a temperature of about 60°C and agitating for 5-30 minutes.

10

The invention will now be illustrated by the following non-limiting examples.

EXAMPLES 1 TO 13

15

Fabric conditioning compositions were made up according to the formulations given in the following Tables I and II by mixing the ingredients together in water at about 60°C and agitating.

20

The cationic fabric softening agents used were:

CFS 1 - Arosurf TA 100 (approx 100% active)

CFS 2 - Arquad 2HT (82.35% active)

25

CFS 3 - Varisoft 475 (75% active)

CFS 4 - Di(soft tallow) imidazoline methosulphate

The lanolin used in each case was pure lanolin BP (ex BDM).

The viscosity modifying agents used were:

- VMA 1 - n C₁₄-C₁₇ paraffin (ex BP)
- VMA 2 - sodium chloride
- 5 VMA 3 - polyethylene glycol (MW 1.5K)
- VMA 4 - polyethylene glycol (MW 4K)
- VMA 5 - isopropanol
- VMA 6 - propylene glycol

- 10 The water-soluble emulsifying agent used was Arquad 18 (50% active).

- 15 Each Table also gives the viscosity of the composition as measure in a Haake viscometer at 110 sec⁻¹ and at 25°C.

TABLE I

<u>EXAMPLE NO</u>	1	2	3	4	5	6
20 <u>INGREDIENTS (%)</u>						
CFS 1	2.0	4.0				2.5
CFS2			7.3	7.3	12.7	
Lanolin	8.0	6.0	4.0	9.5	9.5	9.5
25 Arquad 18						0.7
VMA 1						13.0
VMA 2					0.045	
Water	-----balance to 100-----					
Viscosity cP	24	29	187	118	63	68

TABLE II

<u>EXAMPLE NO</u>	7	8	9	10	11	12	13
<u>INGREDIENTS (%)</u>							
5							
CFS 3	8.0	8.0	15.5	6.7			
CFS 4					35.0	18.75	18.75
Lanolin	4.0	9.0	9.5	9.0	5.0	6.25	6.25
Arquad 18				0.5			
10 VMA 1				12.0			
VMA 2			0.015		0.1	0.32	0.25
VMA 3					12.0		
VMA 4						10.0	12.0
VMA 5					8.4	4.5	4.5
15 VMA 6						1.0	1.0
Perfume					1.5		
Water	-----balance to 100-----						
Viscosity cP	92	115	125	183	180	71	151

20 Similar results can be achieved when Arquad 2T (ex Armak) is used as the cationic fabric softener. Similar results can also be achieved when lanolin BP is replaced with Coronet grade lanolin (ex Croda) or Lanolin P95 (ex Westbrook Lanolin Co). Still further similar results can

25 be achieved by using calcium chloride, magnesium chloride or aluminium chlorhydrate.

EXAMPLES 14 AND 15

30 Fabric conditioning compositions were made up according to the formulations given in the following Table III by mixing the ingredients together in water at about 60°C and agitating. Product viscosities were measured as in Examples 1 to 13.

TABLE III

<u>EXAMPLE NO:</u>	<u>14</u>	<u>15</u>
<u>INGREDIENTS %</u>		
Arosurf TA 100 (100% active)	10.5	-
Varisoft 475 (75% active)	-	15.5
Lanolin	9.5	9.5
Aluminium chlorhydrate (as a 50% solution)	1.0	0.3
Water	balance to 100	
Viscosity cP	196	82

EXAMPLES 16 TO 18

The following dilute fabric softening compositions were prepared:

<u>EXAMPLE NO:</u>			
<u>INGREDIENTS (%)</u>	<u>16</u>	<u>17</u>	<u>18</u>
Arquad 2HT	4.0	8.0	8.0
Coronet grade lanolin (ex Croda)	1.0	-	-
Lanolin P95 (ex Westbrook)	-	1.0	2.0
Calcium chloride	0.4	0.1	0.1
Water, perfume, dye	--balance to 100--		
Viscosity (110 sec ⁻¹)	3	23	24

EXAMPLES 19 AND 20

The following fabric softening compositions were prepared using lanolin-like materials in place of lanolin per se:

<u>EXAMPLE NO:</u>	<u>19</u>	<u>20</u>
<u>INGREDIENTS (%)</u>		
Arquad 2HT	8.0	12.25
Super Hartolan ¹	3.0	-
Iso-stearic acid ²	-	2.75
Calcium chloride	0.1	0.2
Water	--balance to 100--	
Viscosity at 110 sec ⁻¹ (Cp)	13	126

Notes: 1 - Distilled lanolin alcohols (ex Croda Chemicals)

2 - Iso-stearic acid (ex Emery)

EXAMPLE 21

Two fabric softening compositions were prepared according to the following Table.

EXAMPLE 21

<u>EXAMPLE:</u>	<u>A</u>	<u>B</u>
<u>INGREDIENT (%)</u>		
Arquad 2HT	8.0	8.0
Coronet lanolin	1.0	4.0
Water	balance to 100	
Cationic/lanolin ratio	8:1	2:1

Pieces of cotton terry cloth were treated with
liquors made up from these compositions. The treated
cloths were assessed by a panel of people who found
that composition B gave more preferred results than
5 composition A.

Except as indicated otherwise, all percentages
referred to herein are by weight, based on the weight of
the composition.

C L A I M S

1. A fabric softening composition comprising an aqueous base and at least 0.5% by weight of a cationic fabric
5 softening agent, characterised in that it further comprises from 0.25% to 10% by weight of lanolin or a lanolin-like material.
2. A fabric softening composition according to Claim 1,
10 characterised in that the weight ratio of said lanolin or lanolin-like material to said cationic fabric softening agent lies between 0.05:1 and 20:1.
3. A fabric softening composition according to Claim 1,
15 characterised in that the weight ratio of said lanolin or lanolin-like material to said cationic fabric softening agent lies between 0.1:1 and 10:1.
4. A fabric softening composition according to Claim 1,
20 characterised in that it contains from 0.5% to 30% by weight of said cationic fabric softening agent, and from 0.5% to 5% by weight of said lanolin or lanolin-like material.
- 25 5. A fabric softening composition according to Claim 4, characterised in that it contains from 1.0% to 15% by weight of said fabric softening agent.
6. A fabric softening composition substantially as
20 hereinbefore described.
