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Description

Field of the invention

The present invention relates to a fabric softening composition and a method for its use.

Background art

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 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 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.

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.

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.

In US 4.110.498 a process is described for softening fabrics by sprinkling or spraying a fabric composition comprising a cationic softening agent and a lanolin alcohol derivative onto damp fabrics followed by drying at temperatures above the melting point of the softener composition.

In GB 2.007.734 a softener composition comprising oily/fatty compounds such as alkyl esters of long fatty acids and short chain alcohols or a long chain fatty alcohol are described.

In EP 13.780 the use of similar esters and long chain alcohols as viscosity control agents is described.

According to the invention, there is provided a method of treating fabrics comprising contacting the fabrics with an aqueous liquor, in which the weight ratio of the aqueous liquor to the fabrics is between 10:1 and 4:1, the aqueous liquor having a pH less than 7.5 and being formed by adding to water a liquid or granular solid fabric softening composition comprising a cationic fabric softening agent, characterised in that the composition also comprises lanolin or a lanolin-like material.

Attention is drawn to our copending applications published as EP 88520, EP 86105 and EP 86106 which relate to similar compositions but having less than 10% lanolin, comprising a viscosity control agent and having a viscosity of less than 150 cP, respectively.

The fabric softening composition used to form the aqueous liquid may be in the form of a granular solid, a paste, a dilute liquid (containing less than about 8% by weight total cationic fabric softening agent and lanolin or lanolin-like material) or a concentrated liquid (containing more than a total of about 8% of these materials). The preferred form of the composition is an aqueous based liquid, particularly a concentrated liquid.

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 cerebosterol and dihydrocholesterol (cholestanol). The terpene alcohols include lanesterol ($C_{30}H_{50}O$), dihydrolanesterol ($C_{30}H_{52}O$), angnosterol ($C_{30}H_{48}O$), dihydroagnosterol ($C_{30}H_{50}O$).

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 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 constituents are in the alcoholic, ester, alkoxylated, hydrogenated or other chemical form.

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

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 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 material" which terms as used herein includes any one of the constituents mentioned above.

The level of lanolin or lanolin-like material in the aqueous fabric softening compositions is preferably from about 0.25% to about 40% by weight, such as between about 1.5% and about 20% by weight of the 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.

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 ammoniumchloride, 2-heptadecyl-2-methylstearoyl amido ethyl imidazoline methosulphate, di-(coco)dimethyl ammoniumchloride, etc. These cationic fabric-softening agents are well-known in the art and further suitable examples can be found in Schwarts-Perry: "Surface-active Agents and Detergents" Vol. II. 1958.

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 preferably used in conjunction with other, more effective cationic 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 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-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 preferably from 0.5% to 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.

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 50 ppm and 500 ppm.

The pH of the liquor should be less than 7.5, and is preferably between 5.0 and 7.0.

The pH of the aqueous composition used for forming the liquor may be varied within a somewhat wider range, for example between 3 and 8, preferably from 4 to 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.

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 liquor to the fabrics being between 10:1 and 4:1.

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.

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

The amount of cationic softening agents 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 of agitation, the treatment time and the nature of the fabric. Generally, a level of less than 0.5%, such as between 0.01% and 0.4% by weight in total of these components will be deposited, based on the weight of the dry fabric.

The balance of the composition generally comprises the aqueous medium, optionally 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 composition.

The compositions of the invention may further comprise additional beneficial ingredients, commonly used or proposed for inclusion in fabric-softening compositions. Such ingredients, either alone or incorporated in sutiable carriers, include viscosity modifiers, germicides, fluorescers, perfumes including deodorising perfumes, organic or inorganic acids, antistatic agents such as water-soluble cationic surfactants, ethoxylated quaternary polyamine compounds (e.g. 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 may also be included.

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

In particular, when in liquid form, the compositions may include viscosity modifiers such as polymers as described below, C_{12}—C_{40} hydrocarbons, C_9—C_{24} fatty acids, fatty acid esters having a total of 10—40 carbon atoms, C_{10}—C_{18} fatty alcohols, electrolytes, and water-miscible solvents.

The polymer when included in the composition of the invention may be present therein in an amount of from 0.5 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 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 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 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 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 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.

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 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 of different type may also be used.

A prefered class of polymers comprises polyethyleneglycols with an average molecular weight of 1,000 to 6,000. These polymers, and especially those 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.

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} hydrocarbon 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 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 such as myristyl chloride and stearyl bromide are not excluded.

When the composition contains a C_9—C_{24} fatty acid, this is advantageous at a level of from 0.5 to 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.

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 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 sterate, ethylene glycol monostearate, ethyl stearate, methyl palmitate and other esters such as iso-butyl stearate, 2-ethylhexyllaurate, iso-octyl myristate.

When the composition contains a fatty alcohol having 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.

When the compositions contains as viscosity control agent a solvent, this may be a lower alcohol, 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 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 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 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 components in the composition. Typical levels are from 100 to 1000 parts per million, most preferably between 200 and 500 parts per million.

The fabric softening compositions optionally contain 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-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%.

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

By water-soluble, it is meant that the surfactant has 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 C_{12}—C_{24} alkyl chain, optionally substituted or interrupted by functional groups such as —O—, —COO—, —CONH—, —O— etc. Suitable water soluble nonionic surfactants are the ethoxylated sorbitan esters available as Tweens (Atlas Chemical).

It is particularly beneficial to include a water-soluble cationic or nonionic emulsifying agent in the 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 0.1% to 1%.

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

The viscosity of the fabric softening compositions when in liquid form 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.

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.

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

Examples 1 to 6

Liquid fabric conditioning compositions were made up according to the formulations given in the following Table I, by mixing the ingredients together in water at about 60°C and agitating.

Each composition was then added to town water at the concentrations mentioned in the table, and the pH was measured.

Each rinse liquor so obtained was capable of providing good fabric softening.

Table I also quotes the viscosity of each fabric softening composition measured in the Haake viscometer at 110 sec^{-1} at 25°C.

TABLE I

Example	1	2	3	4	5	6
Ingredients (%)						
Cationic fabric softener						
Arosurf TA 100 (100% active)	2.0					2.6
Varisoft 475 (75% active)		8.0	15.5	6.7		
Di(soft tallow) Imidazoline methosulphate					18.75	
Lanolin						
Pure lanolin BP (ex BDH)	8.0	4.0	9.5	9.0	6.25	22.4
Viscosity modifying agent						
Sodium chloride			0.015		0.32	
n-C_{14}—C_{17}paraffin oil (ex BP)				12.0		
Polyethylene glycol (MW 4K)					10.0	
Isopropanol					4.5	
Propylene glycol					1.0	
Water-soluble emulsifier						
Arquad 18 (50% active)				0.5		
Demineralised water	balance to 100					
pH at 100 ppm	6.42	6.67	6.72	7.05	7.22	6.62
pH at 250 ppm	6.27	6.37	6.45	6.95	6.67	6.47
Viscosity cP	24	92	125	183	71	181

Similar results can be obtained by replacing the lanolin used in these Examples with Coronet grade lanolin (ex Croda Chemicals) or Lanolin P95 (ex Westbrook Lanolin Company).

Similar results can also be obtained by using as the cationic fabric softener Arquad 2T of Arquad 2HT

(ex Armak Company). Still further simlilar results can be obtained by replacing the sodium chloride with calcium chloride, magnesium chloride or aluminium chlorhydrate.

Example 7

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

Example:	A	B	C
Ingredient (%)			
Arquad 2HT	8.0	8.0	8.0
Coronet lanolin	1.0	4.0	18.0
Water	—— balance to 100——		
Cationic/lanolin ratio	8:1	2:1	1:2.25

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 either of compositions A and C.

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

Claims

1. A method of treating fabrics comprising contacting the fabrics with an aqueous liquor in which the weight ratio of the aqueous liquor to the fabrics is between 10:1 and 4:1, the aqueous liquor having a pH less than 7.5 and being formed by adding to water a liquid or granular solid fabric softening composition comprising a cationic fabric softening agent, characterised in that the composition also comprises lanolin or lanolin-like material.

2. A method according to Claim 1, characterised in that the weight ratio of said lanolin or lanolin-like material to said fabric softening agent lies between 0.05:1 and 20:1.

3. A method according to Claim 2, characterised in that the weight ratio of said lanolin or lanolin-like material to said fabric softening agent lies between 0.01:1 and 10:1.

Patentansprüche

1. Verfahren zur Behandlung von Textilien, das das In-Kontakt-Bringen der Textilien mit einer wäßrigen Flüssigkeit in der das Gewichtsverhältnis der wäßrigen Flüssigkeit zu den Textilien zwischen 10:1 und 4:1 beträgt, umfaßt, wobei die wäßrige Flüssigkeit einen pH von weniger als 7,5 hat und durch Zugabe zu Wasser einer flüssigen oder granulierten festen Textilweichmacherzusammensetzung, die ein kationisches Textilweichmachermittel umfaßt, gebildet wird, dadurch gekennzeichnet, daß die Zusammensetzung auch Lanolin oder lanolinähnliches Material umfaßt.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Gewichtsverhältnis von diesem Lanolin oder lanolinähnlichen Material zu dem Textilweichmachermittel zwischen 0,05:1 und 20:1 liegt.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß das Gewichtsverhältnis von dem Lanolin oder lanolinähnlichen Material zu dem Textilweichmachermittel zwischen 0,01:1 und 10:1 liegt.

Revendications

1. Procédé de traitement de textiles consistant à mettre en contact les textiles avec une liqueur aqueuse dans laquelle le rapport pondéral de la liqueur aqueuse aux articles textiles est compris entre 10:1 et 4:1, la liqueur aqueuse ayant un pH inférieur à 7,5 et étant formée par addition à l'eau d'une composition liquide ou solide granulaire d'adoucissement de textiles comprenant un agent cationique d'adoucissement de textiles, caractérisé en ce que la composition contient également de la lanoline ou une matière similaire à la lanoline.

2. Procédé selon la revendication 1, caractérisé en ce que le rapport pondéral de ladite lanoline ou matière analogue à la lanoline audit agent d'adoucissement de textiles est compris entre 0,05:1 et 20:1.

3. Procédé selon la revendication 2, caractérisé en ce que le rapport pondéral de ladite lanoline ou matière analogue à la lanoline audit agent d'adoucissement des textiles, est compris entre 0,01:1 et 10:1.