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(54) **PROCESS FOR IMPROVING THE SENSORY PROPERTIES OF FABRICS**

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(57) **ABSTRACT**

The invention describes a process for improving the sensory properties of fabrics. The fabrics are treated with a water-based preparation which contains alkyl oligoglycosides in combination with mixtures of mono- and diesters of saturated and unsaturated C_{16-22} fatty acids with diol and polyols, for example as a spray or in the form of a dryer sheet. The compositions may additionally contain auxiliaries and additives, preferably thickeners, such as in particular polymeric thickeners.

PROCESS FOR IMPROVING THE SENSORY PROPERTIES OF FABRICS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The application claims priority of European Patent Application No. 07005749.2 filed Mar. 21, 2007, the contents of which are incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] This invention relates to a process for improving the sensory properties of fabrics and to the use of certain water-based compositions for this purpose.

BACKGROUND OF THE INVENTION

[0003] The sensory properties of fabrics after typical washing and cleaning processes are an important evaluation criterion for the consumer. In this connection, it is desirable in particular that the fabrics have a pleasant feeling on the skin after washing. However, it is not just a question of softness; other criteria are also taken into account by the consumer, including smoothness, the presence of residues on the fibers, the feel and elasticity of the fabric, its flexibility and, for example, the noise the laundry makes on creasing or folding. A particular point is the moisture absorption of the fabric because, in the event of perspiration for example, relatively large quantities of water are released and have to be rapidly removed if the fabrics are to feel comfortable to wear.

[0004] In this connection, a large number of laundry after-treatment compositions and so-called softeners are described in the prior art, cf. WO 02/051972 which describes a fabric care composition containing, for example, organophilic clays in combination with a vegetable oil and, optionally, quaternary ammonium compounds. Fabric care compositions such as these generally have to be water-based so that they can be safely used by the consumer without any problems. However, the more closely the needs of the consumer are examined, the sooner it becomes clear that conventional softener formulations are no longer able to meet the demands of the modern consumer in relation to the wearing comfort of washed fabrics.

BRIEF SUMMARY OF THE INVENTION

[0005] Accordingly, the problem addressed by the present invention was to provide a process which would significantly improve the sensory properties of fabrics after washing. It has now been found that certain water-based compositions are capable of solving the stated problem.

[0006] In a first embodiment, therefore, the present invention relates to a process for improving the sensory properties of fabrics, which process comprises applying a water-based composition to a fabric, which composition comprises:

[0007] (a) an alkyloligoglycoside; and

[0008] (b) a mixture of mono- and diesters of a saturated and unsaturated C_{16-22} fatty acid with a diol or a polyol.

[0009] Additional auxiliaries and additives may also be included in the water-based composition for application to fabrics.

DETAILED DESCRIPTION OF THE INVENTION

[0010] In the process according to the invention, the water-based compositions described above are applied to fabrics. Suitable application processes include, in particular, spray application of the water-based compositions using suitable technical aids. However, the water-based compositions may also be otherwise applied to the fabrics, for example in the form of a laundry after-treatment preparation, optionally at elevated temperature, by contacting the items of laundry with the water-based compositions according to the invention for a suitable period of time. This can also be done, for example, by using a correspondingly finished so-called dryer sheet, which is preferably contacted with the laundry to be treated in a dryer and thus transfers its active components to the fabric. The finish imparted to the fabrics is preferably temporary and is thus different from the permanent finish which is used in the manufacture of the fabric. The compositions may also be applied to the fabrics in the form of encapsulated active components either during or after the washing process. In a preferred embodiment, however, the water-based compositions according to the present invention are applied to the items of laundry or fabrics by spraying.

[0011] Compositions of the type in question are generally marketed in the form of care sprays and are intended, for example, subsequently to provide a fabric with care additives. Such additives can include, for example, auxiliaries which make ironing easier and also fragrances which impart an impression of freshness. Sprays are preferably used for the process according to the invention. In a particularly preferred embodiment, the additive is in the form of an ironing aid which the consumer applies before or after ironing of the fabrics.

[0012] The compositions according to the invention are water-based and preferably contain between 50 and 99% by weight water, based on the preparation as a whole. It is especially suitable to use from 75 to 99% by weight water or, more particularly, 85 to 99% by weight water.

[0013] The water-based compositions for use in the process according to the invention comprise two components (a) and (b), as described hereinafter.

[0014] Component (a) is an alkyl (oligo)glycoside (APG) while component (b) is a mixture of esters based on diols or polyols with selected fatty acids. Without wishing to be bound to a particular theory, the function of the APG may be to keep the preferably water-insoluble component (b) dispersed in the formulation (in the form of fine particles) and to prevent the particles from sedimenting.

Component (a)

[0015] Alkyl and alkenyl oligoglycosides are known nonionic surfactants which correspond to formula (I):

$$R^1O\text{-}[G]_p \quad (I)$$

in which R^1 is an alkyl and/or alkenyl group containing 4 to 22 carbon atoms, G is a sugar unit containing 5 or 6 carbon atoms and p is a number of 1 to 10. They may be obtained by the relevant methods of preparative organic chemistry. The alkyl and/or alkenyl oligoglycosides may be derived from aldoses or ketoses containing 5 or 6 carbon atoms, preferably glucose. Accordingly, the preferred alkyl and/or alkenyl oligoglycosides are alkyl and/or alkenyl oligoglucosides. The index p in general formula (I) indicates the degree of oligomerization (DP), i.e. the distribution of mono- and oligoglycosides, and is a number of 1 to 10. Whereas p in a given compound is an integer and, above all, may assume a value of 1 to 6, the value p for a certain alkyl oligoglycoside is an analytically determined calculated quantity which is generally a fractional

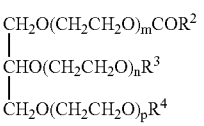
number. Alkyl and/or alkenyl oligoglycosides having an average degree of oligomerization p of 1.1 to 3.0 are preferably used. Alkyl and/or alkenyl oligo-glycosides, which have a degree of oligomerization of less than 1.7 and, more particularly, between 1.2 and 1.4, are preferred. The alkyl or alkenyl radical R^1 may be derived from primary alcohols containing 4 to 11 and preferably 8 to 10 carbon atoms. Typical examples are butanol, caproic alcohol, caprylic alcohol, capric alcohol and undecyl alcohol and the technical mixtures thereof obtained, for example, in the hydrogenation of technical fatty acid methyl esters or in the hydrogenation of aldehydes from Roelen's oxosynthesis. Alkyl oligoglucosides having a chain length of C_8 to C_{10} (DP=1 to 3), which are obtained as first runnings in the separation of technical C_{8-18} coconut oil fatty alcohol by distillation and which may contain less than 6% by weight of C_{1-2} alcohol as an impurity, and also alkyl oligoglucosides based on technical $C_{9/11}$ oxoalcohols (DP=1 to 3) are preferred. In addition, the alkyl or alkenyl radical R^1 may also be derived from primary alcohols containing 12 to 22 and preferably 12 to 14 carbon atoms. Typical examples are lauryl alcohol, myristyl alcohol, cetyl alcohol, palmitoleyl alcohol, stearyl alcohol, isostearyl alcohol, oleyl alcohol, elaidyl alcohol, petroselinyl alcohol, arachyl alcohol, gadoleyl alcohol, behenyl alcohol, erucyl alcohol, brassidyl alcohol and technical mixtures thereof which may be obtained as described above. Alkyl oligoglucosides based on hydro-genated $C_{12/14}$ coconut alcohol with a DP of 1 to 3 are preferred.

Component (b)

[0016] Component (b) may be selected from several different components, namely on the one hand esters of diols, preferably glycol or oligomers or polymers thereof, as well as esters of polyols, preferably esters of glycerol, these glycerol esters preferably used in the form of their partial esters, i.e. as mono- and/or diesters.

[0017] Diol esters suitable for the purposes of the present invention are, in particular, the esters of diols, preferably glycol or oligomers or polymers thereof. Suitable oligomers are polyethylene glycols while suitable polymers are the ethylene glycols with molecular weights of 100 or higher, preferably in the range from 100 to 1,000. They can be esterified with fatty acids by well-known methods in the art. The fatty acids used are C_{16-22} fatty acids, stearic acid being particularly preferred. A particularly preferred diester component is a glycol stearic acid diester.

[0018] Fatty acid partial glycerides, i.e. monoglycerides, diglycerides and technical mixtures thereof can still contain small quantities of di- and triglycerides from their production. Small quantities means that preferably only 1 to at most 10% by weight, more particularly at most 5% by weight, based on the total quantity of glycerides, are triglycerides. Glycerides (i.e. including mixtures of di- and monoglycerides) which are free from triglycerides are preferably used. The partial glycerides preferably correspond to formula (II):



(II)

where R^2CO is a linear or branched, saturated and/or unsaturated acyl group containing 6 to 22 and preferably 12 to 18 carbon atoms, R^3 and R^4 independently of one another have the same meaning as R^2CO or represent OH and the sum (m+n+p) is 0 or a number of 1 to 100 and preferably 5 to 25, with the proviso that at least one of the two substituents R^3 and R^4 is OH. Typical examples are mono- and/or diglycerides based on caproic acid, caprylic acid, 2-ethylhexanoic acid, capric acid, lauric acid, isotridecanoic acid, myristic acid, palmitic acid, palmitoleic acid, stearic acid, isostearic acid, oleic acid, elaidic acid, petroselic acid, linoleic acid, linolenic acid, elaeostearic acid, arachic acid, gadoleic acid, behenic acid and erucic acid and technical mixtures thereof. Technical lauric acid glycerides, palmitic acid glycerides, stearic acid glycerides, isostearic acid glycerides, oleic acid glycerides, behenic acid glycerides and/or erucic acid glycerides which have a percentage monoglyceride content of 50 to 95 by weight and preferably 60 to 90% by weight are preferably used. Relatively long-chain partial glycerides, for example based on oleic acid or stearic acid, more especially mixtures of glycerides based on saturated and unsaturated fatty acids, are particularly suitable.

[0019] The partial esters described above are preferably used in the form of a mixture of mono- and diesters of glycerol with saturated and unsaturated C_{16-22} fatty acids. A particularly suitable saturated fatty acid is stearic acid, whereas oleic acid in particular is preferred as the unsaturated fatty acid. Accordingly, preferred compositions contain glycerol partial esters based on stearic acid and oleic acid in the mixture of component b).

[0020] Components a) and b) of the compositions according to the invention are preferably present in a ratio by weight of 1:3 to 3:1, preferably 1:3 to 1:1 and more particularly 1:2 to 1:1. The weight of component b) is based on all the above-described components, i.e. both the diesters of the diols and the partial esters based on polyols, preferably glycerol. Another preferred embodiment is characterized by the use of compositions in which components a) and b) together are present in a quantity of 0.1 to 15% by weight, more particularly in quantities of 0.5 to 10% by weight and preferably in quantities of 0.1 to 5% by weight. The compounds described in relation to component b) are preferably insoluble in water, i.e. less than 10% by weight and, more particularly, less than 5% by weight can be dissolved in water.

Component c)

[0021] Besides water and components (a) and (b), the compositions according to the invention may optionally contain other auxiliaries and additives. Suitable auxiliaries and additives are, in particular, perfumes, dyes, other surfactants, non-aqueous solvents and thickeners.

[0022] A preferred additive is a thickener, i.e. a substance which increases the viscosity of the compositions. Polymeric thickeners are typically selected from the groups of polyvinyl alcohols, polyacrylic acid and polymethacrylic acids and salts thereof, polyacrylamides, polyvinyl pyrrolidones, polyethylene glycols, styrene/maleic anhydride copolymers and salts thereof. Polymers with thickening properties, preferably based on acrylates and methacrylates, are particularly preferred. Both homopolymers and copolymers or terpolymers may be used. In addition, thickeners based on cellulose or cellulose derivatives may be successfully used for the purposes of the present invention. Examples of such thickeners

are hydroxyethyl cellulose, carboxymethyl cellulose, hydroxypropyl methyl cellulose, hydroxypropyl cellulose or ethyl hydroxyethyl cellulose.

[0023] In another preferred embodiment, polyethylene glycols, preferably those having molecular weights of 100 or higher and, more particularly, in the range from 100 to 500 may be used either additionally or exclusively as component (c).

[0024] Component c), when present, is used in the compositions used in accordance with the invention preferably in quantities of 1 to 25% by weight, more preferably in quantities of 2 to 20% by weight and most preferably in quantities of 5 to 18% by weight. However, component c) is optional and, hence, may be absent altogether.

[0025] The process according to the invention preferably uses compositions which do not contain any additional cationic or other softening substances. In exceptional cases, such compounds may readily be used. In such cases, fabric softeners of the quaternary ammonium compound type, more particularly so-called esterquats, are particularly preferred. So far as the use of surfactants is concerned, any nonionic, anionic, amphoteric or cationic surfactants known to one of skill in the art may be used, particular importance attaching to the use of other nonionic surfactants known per se, such as for example fatty alcohol or fatty acid alkoxylates and/or derivatives thereof.

[0026] The process according to the invention improves the sensory properties of textiles. These properties are preferably determined by testing of the corresponding compositions on fabrics by volunteers who preferably evaluate smoothness, residues, feel, elasticity, flexibility, wearing comfort, softness, care, loudness of sound on creasing or folding. In such tests, pretreated fabrics are evaluated against comparison fabrics by the volunteers. Only those compositions are regarded as suitable which, on the basis of the individual criteria mentioned above, produce a significant overall improvement over the untreated comparison fabrics or the comparison fabrics treated solely with known compositions. Details of such selection processes can be found in the following Examples.

[0027] The present invention also relates to the use of the preparation described in the foregoing as an ironing aid—or independently thereof—generally as a means of improving the sensory properties of fabrics or as a care spray. Water-based compositions are preferably used for this purpose. According to the invention, however, the water-based compositions may also be applied to a carrier, which is a separate fabric or paper sheet, such as a dryer sheet, which is then contacted with the item of laundry to be treated, preferably at elevated temperature, for example in an automatic dryer.

[0028] The present invention also relates to the use of the preparation for improving the water absorption of fabrics, which effect can be achieved by the process according to the invention. This applies both to pure cotton or viscose and to pure wool and/or pure silk or to blends, for example with synthetic fibers.

[0029] Fabrics in the context of the invention are understood to be any sheet-form textiles which are normally processed to laundry/linen. However, fabrics containing cotton or consisting of cotton are particularly preferred.

EXAMPLES

[0030] The following emulsions were prepared in order to test the effect of the compositions (Table 1). C1 is a comparison preparation formulated without the components of the composition of the invention. Compositions E1 to E3 correspond to the invention.

TABLE 1

Ingredients in % by weight	C1	E1	E2	E3
PLANTATEX ® HCC	—	5	5	5
Glycerol	17	17	10	—
COSMEDIA ® HC 40	—	—	0.5	—
PEG 200	—	—	—	20
PHENONIP ®	0.4	0.4	0.4	0.4
Water, dem.	to 100	to 100	to 100	to 100
pH value	—	3.0	3.0	3.0

[0031] PLANTATEX® HCC contains (based on active substance) 21% by weight glycol distearate, 1% by weight glycerol monostearate, 1% by weight glycerol monooleate and 12.5% by weight alkyl (oligo)glycoside: balance to 100% by weight water. COSMEDIA® HC 40 (thickener from Cognis), PEG 200: polyethylene glycol with a molecular weight of 200.

[0032] Compositions C1 and E1 to E3 were each subjected to a sensory test. The test was conducted in a room with about 40% air humidity and a temperature of 22° C. 11 volunteers were available for the test. Each volunteer was given two new test fabrics for direct comparison. The established test criteria (for example slip, softness, etc.) were successively considered. To this end, the volunteers tested a treated fabric against an untreated comparison fabric. The criteria of sheen, smoothness, residues/film formation, feel, elasticity, flexibility, wearing comfort, softness, care, loudness of sound (on creasing of the swatches) and overall acceptance were evaluated. The assessments were made throughout the sensory examination, recorded in an online acquisition program and evaluated.

[0033] Standard cotton WFK 10 A (20×30 cm), Wfk GmbH, was used in the test fabrics. In order to remove any pretreatments applied, all swatches were washed three times with 0.075 kg Persil MEGAPERLS® (95° C. boil wash, mains water) and then twice in another 95° C. boil wash (Miele Softtronic W467, 1600 r.p.m.). Using an airbrush gun, compositions C1 and E1 to E3 were uniformly sprayed from a distance of 20 cm. A total of 4 g was applied per fabric. All test fabrics were treated in the same way with this device.

[0034] It was found that the treated swatches E1 to E3 were judged to be better than the untreated standard in all the test criteria. Particularly clear differences were observed in the criteria elasticity, flexibility, wearing comfort, care and softness.

Measurement of Water Absorption

[0035] In addition, the water absorption of cotton treated in accordance with the invention and untreated cotton was measured. To this end, cotton test fabrics were treated as described above with known water-based compositions and were compared with fabrics which had been treated by the process according to the invention. The water-based compositions each contained 2% by weight of a standard quaternary fabric softener (DEHYQUART® AU 46, Cognis) (C2) and, as an example of a preparation according to the invention, 5% by weight PLANTATEX® HCC (E4). All the compositions additionally contained 0.4% by weight PHENONIP® as a preservative.

[0036] The wetting time of the cotton with water was then measured. To this end, a test strip measuring 1.5×16 cm was cut out and placed on a measuring table. 12 μl distilled water was then applied to the test fabric from a dosing unit (distance ca. 0.5 cm). The behavior of the water droplet was recorded by a high-speed camera and the time to complete absorption was measured.

[0037] The untreated fabric absorbed the water droplet in less than 1 second. Preparation C2 had a wetting time of 23 seconds whereas the fabric E4 treated in accordance with the invention had a wetting time of only 8 seconds. Accordingly, the absorption of water by cotton was clearly improved by the process according to the invention.

[0038] The same measuring process was used to test the effect of the process according to the invention on wool and silk. Wool (Wfk 60A) and silk (Wfk 70A) were used as test fabrics.

[0039] Untreated wool produced an absorption time of more than 33 seconds. The absorption time for untreated silk was 22 seconds. By contrast, wool treated with a preparation according to the invention (similar in composition to E1, but with 3, 5 or 10% by weight PLANTATEX® HCC) produced absorption times of 6, 3 and 2 seconds.

[0040] Silk treated with a water-based preparation having the same composition as E1, but with 10% by weight PLANTATEX® HCC, produced an absorption time of 3 seconds.

What we claim is:

1. A process of treating a fabric for improving sensory properties which process comprises applying a water-based composition to a fabric, which composition comprises:

(a) an alkyloligoglycoside; and

(b) a mixture of mono- and diesters of a saturated and unsaturated C_{16-22} fatty acid with a diol or a polyol.

2. The process of claim **1** wherein the composition is applied to the fabric by spraying.

3. The process of claim **1** wherein the composition is applied to a carrier for application to the fabric.

4. The process of claim **3** wherein the carrier is a dryer sheet.

5. The process of claim **1** wherein the alkyloligoglycoside is of the formula: $R^1O\text{-}[G]_p$, in which R^1 is an alkyl and/or alkenyl group containing 4 to 22 carbon atoms, G is a sugar unit containing 5 or 6 carbon atoms and p is a number of 1 to 10.

6. The process of claim **1** wherein the diol is glycol.

7. The process of claim **1** wherein the polyol is glycerol.

8. The process of claim **6** wherein component (b) contains diesters of C_{16-22} saturated and unsaturated fatty acids of glycol.

9. The process of claim **7** wherein component (b) contains diesters of C_{16-22} saturated and unsaturated fatty acids of glycerol.

10. The process of claim **8** wherein the fatty acid is stearic acid and/or oleic acid.

11. The process of claim **9** wherein the fatty acid is stearic acid and/or oleic acid.

12. The process of claim **10** wherein the fatty acid is stearic acid.

13. The process of claim **10** wherein the fatty acid is oleic acid.

14. The process of claim **11** wherein the fatty acid is stearic acid.

15. The process of claim **11** wherein the fatty acid is oleic acid.

16. The process of claim **1** wherein the composition further comprises an additive.

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