

FABRIC TREATMENT COMPOSITION CONTAINING THICKENED HYDROGEN PEROXID SOLUTION

5 The present invention relates to fabric treatment compositions and, in particular, to compositions which include a fabric whitening agent. The compositions of the invention are particularly, but not exclusively, suitable for the treatment of fine or delicate
10 fabrics.

 In the washing of fabrics, in particular of clothes, it is known to use a whitening composition either separately (for example as a pre-wash composition) or
15 as part of a detergent formulation. Most fabric whiteners have conventionally been provided in powder form and are generally based on percarbonates and/or perborates. A decomposition enhancer may also be included. Liquid formulations are also known which
20 are essentially bleaching preparations based on hypochlorite compositions. Such liquid formulations are not suitable for treatment of fine or delicate fabrics because of the aggressive nature of the hypochlorite with regard to the fabric and the colour.
25 In order to overcome the aggressive nature of the hypochlorite compositions, liquid compositions based on hydrogen peroxide have been suggested, since hydrogen peroxide has less aggressive properties and is less likely to damage fine or delicate fabrics or
30 to deleteriously affect fabric colour.

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However, a significant disadvantage of known fabric whiteners based on hydrogen peroxide occurs in that the compositions are not sufficiently stable.

Decomposition of the hydrogen peroxide readily occurs,
5 for example because of the presence of even very small amounts of heavy metals or other impurities such as reducing agents, or because of increases in ambient temperature.

10 Attempts have been made to prepare fabric whitening compositions based on hydrogen peroxide which are also thickened to a desired viscosity. Thickened compositions provide advantages in use as compared with unthickened compositions and consumer preference
15 for thickened products is well documented. For example, if the laundry composition is to be used as a pre-wash, a thickened composition is more easily applied directly onto difficult stains before the normal washing process without messy dripping. A
20 thickened composition will also remain longer on the garment to which it is applied than an unthickened composition. Thickening of the composition also helps the user to control dispensing of the composition. However, in addition to the premature decomposition of
25 the hydrogen peroxide, as mentioned above, thickened compositions based on hydrogen peroxide present problems in that the viscosity of the compositions is not stable with time. As a consequence, liquid compositions based on hydrogen peroxide which are
30 currently on the market are all believed to be simple

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unthickened hydrogen peroxide solutions containing a low concentration of surfactant, generally of not more than 2% surfactant.

- 5 Prior art hydrogen peroxide bleaching/cleaning products have frequently been thickened by using a combination of surfactants which, in the presence of an electrolyte, act to thicken the solution so that it becomes more viscous than water. For example,
- 10 GB 2286603 (Jeyes Group PLC) describes a thickened aqueous alkaline peroxide bleaching agent composition containing hydrogen peroxide, water, a stabiliser for the hydrogen peroxide, a water-soluble electrolyte and a surfactant/thickening component comprising:
- 15 i) an alkyl ether sulphate surfactant together with an amine oxide or betaine surfactant and, optionally, an alkane sulphonate surfactant; or ii) an amine oxide surfactant together with a sarcosinate surfactant and, optionally, an alkane sulphonate surfactant. However,
- 20 the presence of an electrolyte tends to accelerate decomposition of alkaline hydrogen peroxide solutions.

GB 2273721 (Jeyes Group PLC) also describes a thickened bleach composition comprising an alkaline

25 aqueous solution of hydrogen peroxide containing, as a thickening system, two different surfactants - a cationic and anionic surfactant - which interact to give the desired viscosity.

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It has now surprisingly been found that thickened fabric treatment compositions based on hydrogen peroxide, in particular fabric whitener compositions, having satisfactory stability with regard to hydrogen peroxide decomposition and viscosity can be provided by employing an associative thickening agent as the thickening medium. One advantage of the compositions of the present invention over the prior art surfactant-thickened compositions is that a smaller amount of active ingredients is needed to thicken the compositions to the desired viscosity.

The present invention provides a thickened liquid fabric treatment composition based on hydrogen peroxide which is sufficiently stable over time with respect to both viscosity and hydrogen peroxide decomposition.

In accordance with the present invention, there is provided a thickened liquid fabric treatment composition, in particular a fabric whitener composition, comprising hydrogen peroxide, one or more surfactants and an associative thickening agent.

By "thickened" compositions, we mean compositions of increased viscosity. Thickened compositions according to the invention are those which have a viscosity of from about 30 mPaS to 30 000 mPaS. For example, an appropriate viscosity for a pourable composition having the appearance of a thick liquid is a viscosity

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in the range of from about 30 to 600 mPas. More viscous liquids, for example with a viscosity of from 600 to 10 000 mPas or more are also within the scope of the invention. A preferred viscosity range in accordance with the present invention is 180 to 1500 mPas, and most preferably the viscosity of the compositions of the present invention is in the range 300 to 600 mPas. The viscosities of the compositions of the present invention are measured using a Brookfield Viscometer on a No.2 spindle at 25°C (ambient temperature) and at 10, 20 or 50 RPM. The appropriate RPM is chosen according to the viscosity of the composition being measured, as will be understood by those skilled in the art.

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Associative thickeners are water-soluble or water-swellaable polymers that have chemically attached hydrophobic groups that are capable of non-specific hydrophobic associations. Preferably, the associative thickening agents utilized in the present invention are non-ionic agents with hydrophobic and hydrophilic sequences which are effective over a wide pH range (pH 2-12). The hydrophobic parts of the thickener build up associations with the other hydrophobes present in the formulation. This allows the thickening agents to demonstrate a good synergistic thickening effect when used in conjunction with low water-soluble ingredients.

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The associative thickening agents employed in the present invention will typically have a general structure similar to that illustrated in Figure 1. As can be seen from Figure 1, the structure of the preferred associative thickening agents generally resembles in shape a so-called barbell (or dumb-bell) structure or a comb structure. Thus, the typical associative thickening agents in accordance with the invention will comprise a central hydrophilic portion and end portions which are hydrophobic. However, associative thickening agents having a central hydrophobic portion and end portions which are hydrophilic may be employed where appropriate. The associative thickening agents may alternatively be polymers having alternate hydrophilic and hydrophobic portions.

Particularly suitable associative thickening agents for use in accordance with the present invention are low to medium molecular weight dialkyl polyglycol ethers. By low to medium molecular weight, we mean compounds having a molecular weight ranging from a few hundred to tens of thousands. For example, particularly preferred associative thickening agents are dialkyl polyglycol ethers sold by Akzo under the tradenames DAPRAL T210 and DAPRAL T212, both of which have a molecular weight of about 8000. Dapral T210 is especially suitable because of its particular viscoelastic properties. Most preferably, a combination of both DAPRAL T210 and DAPRAL T212 is

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used, which results in a composition with particularly desirable rheological properties.

Also suitable for use in accordance with the present invention are hydrophobically modified ethoxylated urethane thickeners, such as those available under the tradename Acrysol 880 from Rohm and Haas company. These are non-ionic polymers supplied as a solution in a water/butyl carbitol mixture. Neutralization of the solution is not necessary and it is effective over a broad pH range (pH 2-12).

The amount of associative thickening agent in the composition will vary in accordance with the desired viscosity and generally in an approximately inverse relationship with respect to the amount of surfactant. The associative thickening agent is preferably present in an amount of 0.5% to 10% w/w active ingredient, more preferably 1% to 4% w/w and especially 1.7% w/w.

The composition also includes a non-ionic surfactant and/or an anionic surfactant. A soap may also be included. The non-ionic and anionic surfactants are desirably present, respectively, in amounts of 0.1% to 20% w/w active ingredient, preferably 4% to 16% w/w.

The non-ionic surfactant is particularly preferably present in an amount of 8% to 12% w/w active ingredient. Most preferably, the composition contains

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about 10% w/w active ingredient non-ionic surfactant.

The choice of non-ionic surfactant is not limited and any suitable non-ionic surfactant may be used.

Preferred non-ionic surfactants include alkoxyated
5 primary or secondary alcohols, alkylphenols, fatty acids and fatty acid amides, for example ethylene oxide and/or propylene oxide condensation products with fatty alcohols or alkylphenols. Other suitable non-ionic surfactants are alkyl polyglycosides and
10 alkanol amides. Two particularly preferred non-ionic surfactants are ethoxylated fatty alcohols sold under the tradenames Lutensol A07 (available from BASF) and Synperonic A7 (available from ICI).

15 The anionic surfactant is particularly preferably present in an amount of 2% w/w active material. The choice of anionic surfactant is also not limited and any suitable anionic surfactant may be used. Preferred anionic surfactants include alkyl (aryl)
20 sulphates and sulphonates, alkyl (aryl) ethoxylated sulphates, alkyl ether sulphonates, olefin sulphonates, ethoxylated ester phosphates, sulphosuccinate derivatives, secondary alkane sulphonates and sodium or potassium salts of long
25 chain fatty acids. A particularly preferred anionic surfactant is lauryl ether sulphate 3EO (having 3 moles of ethylene oxide) which is available under the tradename SIPON LES 328n from Sidobre Sinnova.

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The choice of surfactant in the composition can depend on the material for which the composition is intended and on the type of soil on the fabric. For example, for use on wool, a greater quantity of
5 non-ionic surfactant will give better detergency, whereas a lesser quantity of non-ionic surfactant and more anionic surfactant gives lower levels of detergency but greater fabric softness.

10 The concentration of hydrogen peroxide in the compositions of the invention, expressed as pure H_2O_2 , suitably lies in the range from 1% to 12% w/w, preferably 2% to 10% w/w and most preferably 3% to 8% w/w. In an especially preferred variation, the
15 hydrogen peroxide is present in amount of about 7% w/w. Whilst the above quantities are absolute values, the hydrogen peroxide will commonly be used in the form of a 35% aqueous solution.

20 In addition to the components discussed above, optional ingredients may also be added to the compositions of the invention, generally in minor amounts, depending upon the purpose of use. These may include stabilising agents, for example the sodium
25 salt of diethylene triamine penta acetic acid (0.5%) sold under the tradename Trilon C by BASF or phosphonates such as diethylene triamine penta(methylene phosphonic acid) sold under the tradename Dequest 2066 by Monsanto; pH adjusters such
30 as citric acid; opacifying agents, for example vinyl

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pyrrolidone styrene copolymers such as that supplied
by ISP under the tradename GAFTEX 430; optical
brighteners such as the distyryl biphenyl derivative
sold under the tradename Tinopal CB by CIBA GEIGY and
5 suitable fragrances. Other suitable optional
ingredients will be well known to those skilled in the
art.

The pH of the compositions of the invention is
10 preferably within the range pH 1 to pH 12,
particularly pH 2 to pH 7.5, especially pH 5.5. At
higher pH, in excess of pH 7.5, the detergency of the
composition can be improved. However, at such pH the
stability of the hydrogen peroxide is reduced and
15 decomposition may occur.

The compositions of the present invention may be
used as pre-wash formulations and applied directly
onto difficult stains before the normal washing
20 process. The compositions are particularly suitable
for such use as they possess sufficient thickness to
remain on the stained area before laundering the
garment. Alternatively, the composition of the
present invention may be used as a booster as part of
25 the detergent formulation in the main wash.

The compositions according to the invention may be
made by simply mixing together measured amounts of the
required constituents.

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In order that the invention may be more fully understood, the following examples are given by way of illustration only. In the examples all percentages are by weight unless otherwise stated. Also, the ingredients are all 100% by weight actives, unless otherwise stated.

Example 1

10 A thickened hydrogen peroxide solution was prepared from the following ingredients.

	Hydrogen peroxide	7.0%
	Dapral T210	1.7%
15	Trilon C	0.5%
	Lutensol A07	10.0%
	Sodium lauryl ether	7.2%
	sulphate (28% active ingredient solution)	
20	Perfume	7.2%
	Demineralised water	to 100%

The composition was measured for viscosity using a Brookfield Viscometer on a No. 2 spindle and had a viscosity of 195 mPaS at 25°C (room temperature) and 20 RPM. The pH of the composition was 5.1. After storage of the composition for 6 weeks at 40°C, the viscosity measurement was 205 mPaS at 25°C and 20 RPM. This indicated that the viscosity of the composition was stable with time. In addition, the composition

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was also found to retain 98% of its hydrogen peroxide after 6 weeks of storage at 40°C.

Example 2

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A thickened hydrogen peroxide solution was prepared from the following ingredients.

	Hydrogen peroxide	7.0%
10	Acusol 880	4.3%
	Dequest 2066	0.5%
	Synperonic A7	8.0%
	Sodium lauryl ether	2.0%
	sulphate (28% active	
15	ingredient solution)	
	Demineralised water	to 100%

This composition had a viscosity of 1500 mPaS as measured at room temperature and 20 RPM on a
20 Brookfield Viscometer on a No. 2 spindle. The composition had a pH of 5.3.

Example 3

25 A thickened hydrogen peroxide solution was prepared from the following ingredients.

	Hydrogen peroxide	7.0%
	Dapral T212	2.5%
30	Dequest 2066	0.5%

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	Lutensol A07	4.0%
	Sodium lauryl ether sulphate (28% active ingredient solution)	29.0%
5	Tinopal CB	0.4%
	Fragrance	0.2%
	Demineralised water	to 100%

This composition had a viscosity of 1500 mPaS as
10 measured at room temperature and 20 RPM on a
Brookfield Viscometer on a No.2 spindle. The
composition had a pH of 5.3.

Example 4

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A thickened hydrogen peroxide solution was prepared
from the following ingredients.

	Hydrogen peroxide	7.0%
20	Dapral T212	2.5%
	Dequest 2066	0.5%
	Lutensol A07	3.0%
	Sodium lauryl ether sulphate (28% active ingredient solution)	29.0%
25	Fragrance	0.2%
	Demineralised water	to 100%

This composition had a viscosity of 320 mPaS as
30 measured at room temperature and 20 RPM on a

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Brookfield Viscometer on a No.2 spindle. The composition had a pH of pH 5.3.

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CLAIMS

1. A thickened liquid fabric treatment composition comprising hydrogen peroxide, one or more
5 surfactants and an associative thickening agent.
2. A composition as claimed in claim 1, wherein the associative thickening agent is a low to medium molecular weight dialkyl polyglycol ether.
- 10 3. A composition as claimed in claim 1, wherein the associative thickening agent is a hydrophobically modified ethoxylated urethane.
- 15 4. A composition as claimed in claim 2, wherein the dialkyl polyglycol ether is present in an amount of 0.5% to 10% w/w.
5. A composition as claimed in claim 3, wherein the
20 hydrophobically modified ethoxylated urethane is present in an amount of 0.5% to 10% w/w.
6. A composition as claimed in any of claims 1 to 5, including an anionic surfactant.
- 25 7. A composition as claimed in any of claims 1 to 6, including a non-ionic surfactant.
8. A composition as claimed in any preceding claim,
30 which contains 0.1% to 20% w/w surfactant.



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9. A composition as claimed in any preceding claim,
wherein the hydrogen peroxide is present in an
amount of 1% to 12% w/w.

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