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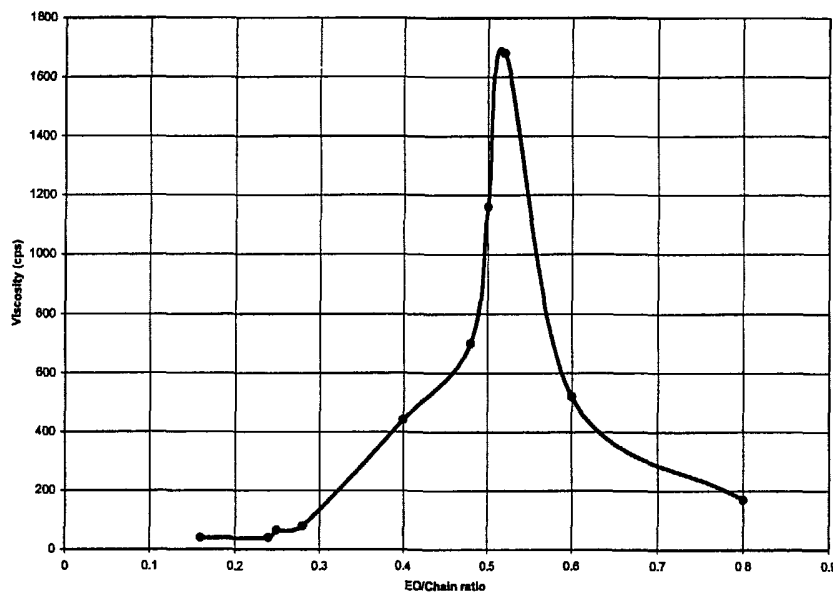
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(54) Title: AQUEOUS COMPOSITION COMPRISING OLIGOMERIC ESTERQUATS

Viscosity of Ultra composition containing as a function of EO/Chain ratio



(57) Abstract: The application relates to a low viscosity and to a stable fabric softening composition process for the preparation of a stable, and particularly to a viscosity stable, fabric softening composition having a low viscosity, said composition comprising from about 1 to 20 wt.% of an oligomeric esterquat, obtainable by reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid followed by partial quaternization (leading to a mixture of oligomeric esteramine and of esterquat). The process comprises melting said oligomeric esterquat, dispersing said melted material in hot water, and subsequently cooling. In a second aspect, the application relates to a process wherein a thickening agent or mixture of thickening agents

is added to the hot water containing the melted material or after the hot water has cooled. This thickening agent is selected from the group consisting of modified cellulosic polymer, non-ionic viscosity modifier, associative thickener and polyacrylate.

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## Aqueous Composition Comprising Oligomeric Esterquats

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### Technical Field

The present invention is in the field of aqueous compositions, especially liquid household products, such as liquid detergents and fabric softener compositions. Particularly, the invention relates to such compositions comprising a softening agent for natural and synthetic fibers, which softening agent is based on esters derived from alkanol amines, carboxylic acids and fatty alcohols or on cationic surfactants obtainable thereof. More in detail, the present invention relates to a process for preparing a stable aqueous composition containing such softening agents, to the preparation of such a thickened stable composition, as well as to the compositions obtainable by said processes.

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### Background of the Invention

Biodegradable softeners have attracted recent attention in the prior art. For instance, in German patent no. 197 43 687, in the name of Henkel KGaA, readily biodegradable detergents are described, which contain oligomeric esterquats obtained by quaternizing oligoesters of mono and di-carboxylic acids in combination with alkylene oxide adducts on fatty acid amines.

The international patent application WO-A-01/47489, in the name of Cognis Deutschland GmbH and Bigorra Llosas *et al.*, discloses fiber brightening and softening agents comprising esterquats obtained by reacting alkanol amines with mixtures of fatty acids and dicarboxylic acids, optionally alkoxyating the resulting esters, and quaternizing the products; and auxiliary materials selected from (non)quaternized fatty acid

amides, betaines, nonionic surfactants, polyols and/or their derivatives, alcohols and/or hydrotropes.

In the European patent application 1 136 471, in the name of KAO Corporation S.A., alkanol amine esters are described which are based  
5 on the esterification reaction of alkanolamines, carboxylic acids and fatty alcohols. The alkanolamines and fatty alcohols are optionally alkoxyated. In addition, the cationic surfactants and esterquats obtainable therefrom are disclosed.

The cationic surfactants and the esterquats disclosed in said  
10 European patent application have a high degree of biodegradability, but compared to the biodegradable esterquats of the prior art also exhibit a high degree of efficacy in softening and conditioning natural and synthetic fibers, such as hair, or fibers used in textiles and paper.

In a further aspect, said European patent application relates to  
15 aqueous fabric-softening compositions which contain the cationic surfactants or esterquats, optionally together with other active softening substances. Particularly, these fabric softening compositions contain, in an aqueous medium optionally containing constituents selected from those normally used in fabric softener composition: (a) cationic  
20 surfactants or esterquats obtainable from the alkanolamines described, (b) one or more cationic surfactants which are active as fabric softeners, and (c) one or more non-ionic fabric-conditioning surfactants, wherein the amount of (a)+(b)+(c) is 2-60 wt.% based on the total composition; the amount of (a), based on the total of (a)+(b)+(c), being 2-100 wt.%; the  
25 amount of (b), based on the total of (a)+(b)+(c), being 0-98 wt.%; and the amount of (c), based on the total of (a)+(b)+(c), being 0-40 wt.%.

### **Objectives of the Present Invention**

The first objective of the present invention is to provide a liquid  
30 fabric softener composition comprising an oligomeric esterquat of the type described in said EP-A-1 136 471 which fabric softener composition has a stable and reproducible viscosity.

The second objective of the present invention is to provide a liquid softener composition of said type, which has a medium viscosity. It is well known to persons skilled in the art that consumers prefer medium viscosity because it induces product richness perception. Preferably, the liquid fabric softener composition is a liquid rinse cycle composition.

It is a further objective of the present invention to provide clear fabric softener compositions.

Other objectives will become apparent from reading the following description.

10

### **Summary of the Invention**

The present inventors have investigated the behaviour of the oligomeric cationic surfactants and particularly the oligomeric esterquats of the type described in EP-1 136 471 in aqueous formulations. They have found that diluted and concentrated compositions comprising from about 1 wt.% to about 20 wt.% of the said oligomeric cationic surfactants or oligomeric esterquats can be formed by incorporating melted oligomeric esterquat in hot water using specific process parameters. This process leads to a stable, reproducible low viscosity. The term "low viscosity", as used refers to a composition having a viscosity in the range of about 20-50 mPa.s.

Viscosities of compositions described in the present description and claims are determined at room temperature (25°C) using a Brookfield RVT viscometer (spindle 2; 50 rpm). Any percentages indicated are percentages by weight drawn to the weight of the final composition, unless otherwise indicated.

A low viscosity for such liquid compositions provides advantages in the preparation stage for fabric softening compositions. However, the person skilled in the art also knows that consumers prefer fabric softening compositions having a medium viscosity over low viscosity compositions. Medium viscosities give an important aesthetic attribute that is perceived by consumers as being linked to the richness of a product. The term

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"medium viscosity" as used herein refers to viscosities in the range of about 80-700 mPa.s, and preferably from about 100-500 mPa.s.

According to the teachings of the aforementioned European patent application

5 1 136 471:

*"Products which improve viscosity control, for example, inorganic salts such as calcium chloride, magnesium chloride, calcium sulphate, sodium chloride, etc.: products which serve to reduce viscosity in concentrated compositions, such as glycols*  
10 *compounds, for example, ethylene glycol, dipropylene glycol, polyglycols, etc., and thickening agents for diluted compositions, for example, polymers derived from cellulose, guar gum, etc."*

are well known to persons skilled in the art as optional components to be  
15 added to the aqueous fabric softener compositions described therein. However, the present inventors found that it was not known how to prepare compositions containing from 1-20 wt.% oligomeric esterquat which have a stable and reproducible viscosity. In addition, the present inventors have discovered that only a few thickening agents are able to  
20 increase the viscosity of the oligomeric esterquats to the desired viscosity level.

Specifically, these thickening agents are selected from specific modified cellulosic polymers, specific non-ionic viscosity modifiers, specific associative thickeners and specific polyacrylate polymers.

25 Accordingly, the present invention provides a medium viscosity fabric softening composition, comprising (a) from about 1 to 20 wt.% of an oligomeric esterquat, derived from the reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid, followed by partial  
30 quaternization (leading to a mixture of oligomeric esteramine and of esterquat); and (b) an effective amount of a thickening agent or mixture of thickening agents, selected from the group consisting of (i) non-ionic water-soluble cellulosic polymer derived from the condensation of cellulose

and ethylene oxide and/or propylene oxide; (ii) ethoxylated and/or propoxylated C<sub>10-15</sub> fatty alcohol; (iii) ethoxylated and/or propoxylated fatty alcohol polyurethane associative thickener; and (iv) cationic polyacrylate copolymer.

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### **Detailed Description of the Invention**

In a first aspect, the present invention relates to a medium viscosity fabric softening composition, comprising 1-20 wt.%, preferably 1-18 wt.%, of an oligomeric esterquat, obtainable by reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid, followed by partial quaternization (leading to a mixture of oligomeric esteramine and of esterquat), and an effective amount of a thickening agent or mixture of thickening agents, selected from the group consisting of (i) non-ionic water-soluble cellulosic polymer derived from the condensation of cellulose and ethylene oxide and/or propylene oxide; (ii) ethoxylated and/or propoxylated C<sub>10-15</sub> fatty alcohol; (iii) ethoxylated and/or propoxylated fatty alcohol polyurethane associative thickener; and (iv) cationic polyacrylate copolymer.

20 In a preferred embodiment, the medium viscosity fabric softening composition of the present invention is a concentrate, comprising 8-20 wt.%, and preferably 10-18 wt.%, of said oligomeric esterquat. In a very preferred embodiment, this medium viscosity fabric softening composition is clear.

25 In a second aspect, the present invention relates to a process for the preparation of a stable, and particularly to a viscosity stable, fabric softening composition having a low viscosity, said composition comprising 1-20 wt.% of an oligomeric esterquat, obtainable by reaction of an alkanol amine with a polycarboxylic acid and with a fatty alcohol and optionally a  
30 fatty acid, followed by partial quaternization (leading to a mixture of oligomeric esteramine and of esterquat), said process comprising melting said oligomeric esterquat, dispersing said melted material in hot water, and subsequently cooling.

In a suitable embodiment, the hot water has a temperature in the range between the melting point of said oligomeric esterquat and a temperature that is about 30°C higher than said melting point. It is noted in this respect that the melting point of the esterquat is generally not a sharp point but a melting range. The melting point is in the present description, the lowest temperature where the esterquat is in flowing molten state.

In preferred embodiments, the hot water has a temperature in the range between 50 and 70°C, and more particular in the range between 55 and 65°C.

The addition of molten esterquat to the hot water is carried out while stirring. The cooling step can simply be carried out by storing the mixture at ambient temperature; preferably the cooling is carried out while stirring.

By the process of the present invention, fabric softening compositions comprising an oligomeric esterquat having a low viscosity are obtained, which have a stable and reproducible viscosity. These low viscosity compositions form the third aspect of the present invention.

As indicated above, the viscosity of such compositions may be increased by addition of thickening agents that are selected to be compatible with the oligomeric esterquat. The thickening agents are selected from specific thickeners of groups consisting of modified cellulosic polymer, non-ionic viscosity modifier, associative thickeners and cationic polyacrylate copolymer.

Accordingly, in a fourth aspect, the present invention relates to a process for the manufacture of a stable medium viscosity fabric softening composition, said composition comprising (a) from about 1 to 20 wt.% of an oligomeric esterquat, obtainable by reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid, followed by partial quaternization (leading to a mixture of oligomeric esteramine and of esterquat); and (b) an effective amount of a thickening agent; said process

comprising (a) melting said oligomeric esterquat; (b) dispersing the melted material of step (a) in hot water; and thereafter (c) cooling said hot water, and wherein said thickening agent is added to the hot water of step (b) or after the cooling step of (c), which thickening agent is selected from the group consisting of (i) non-ionic water-soluble cellulosic polymer derived from the condensation of cellulose and ethylene oxide and/or propylene oxide; (ii) ethoxylated and/or propoxylated C<sub>10-15</sub> fatty alcohol; (iii) ethoxylated and/or propoxylated fatty alcohol polyurethane associative thickener; and (iv) cationic polyacrylate copolymer.

The amount of thickening agent to be added to the thin solution prepared in the process forming the second aspect of the present invention is sufficient to bring the viscosity of the final composition in the range of 80-700 and preferably 100-500 mPa.s.

In the fabric softening composition to be prepared other generally used additives and ingredients may be present. Particularly, conventional preservatives, sequestering and anti-oxidant agents, dyes, perfumes and ingredients delivering additional consumer benefits such as colour protection, anti-wrinkle effect, anti-bacterial effect, and so on can be added.

The medium viscosity fabric softening composition forming the first aspect of the present invention may be described as a liquid aqueous fabric softening composition comprising (a) 1-20 wt.% of an oligomeric esterquat, obtainable by reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid, followed by partial quaternization (leading to a mixture of oligomeric esteramine and of esterquat); (b) the above-mentioned specific thickening agent or mixture of thickening agents in sufficient amounts to increase the viscosity of a thin dispersion of (i) to a medium viscosity; and (c) optionally preservative, sequestering or anti-oxidant agents, dye, perfume and any ingredients delivering additional consumer benefits such as colour protection agents, anti-wrinkle agents, anti-bacterial agents and so on. Conventional ingredients for fabric

softening and conditioning compositions, such as clays, silicones, fatty alcohols, fatty esters and so on, may also be present.

In the fabric softening compositions of the present invention, an essential ingredient is the oligomeric esterquat, obtainable by reaction of  
5 an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid, followed by partial quaternization (leading to a mixture of oligomeric esteramine and of esterquat). The preparation of this essential ingredient is described in all details in EP-A-1 136 471, which document is incorporated in the  
10 present description by reference for describing the said ingredient and its preparation.

Preferably, the alkanol amine is triethanol amine. In a further preferred embodiment, the carboxylic acid is a polycarboxylic acid, more preferably a dicarboxylic acid, and especially adipic acid. The most  
15 preferred esterquat is commercially available *ex* KAO and sold under the tradename Tetranyl CL-518.

It has been discovered that the selection of suitable thickening agents for the oligomeric esterquats required by the present invention is driven by the compatibility with the oligomeric esterquat and the micellar  
20 solution of this material in water. Only few thickening agents have been found to be compatible with the oligomeric esterquat dispersion.

These suitable thickening agents will be described in more detail herein-below:

The first group of suitable thickeners belong to the class of  
25 modified cellulosic polymers. Suitable cellulosic polymers are non-ionic water-soluble cellulose derivatives, and particularly cellulose ethers derived from the condensation of cellulose, and especially high purity cellulose, such as cellulose derived from cotton or wood, and ethylene oxide and/or propylene oxide, but preferably ethylene oxide. Suitable  
30 modified cellulosic thickeners are commercially available under the tradename Natrosol HHX, HHXR and HHBR (*ex* Hercules Inc, USA). In a preferred embodiment, the thickening agent comprises non-ionic water-soluble cellulose ether formed by reaction of cellulose and ethylene oxide.

As is illustrated in the working examples, it is possible with these cellulosic thickeners to prepare clear medium viscosity fabric softening compositions depending on the amount of thickening agent used.

The second group of suitable thickeners belong to the non-ionic viscosity modifiers. Preferably, the thickening agent comprises ethoxylated fatty alcohols having a fatty chain length varying from 10 to 15 (in average) carbon atoms, while the number of ethoxylation varies from 2 to 8 (in average). As will be elaborated in example 2, herein-below, the best thickening effect is observed with ethoxylated fatty alcohols, wherein the ethoxylation ratio to the chain length of the fatty alcohol is higher than or equal to 0.3. The highest viscosity when using equal weight percentages can be obtained with ethoxylated fatty alcohols wherein this ratio is about 0.5. In addition, the corresponding propoxylated and ethoxylated/propoxylated fatty alcohols are also suitable for use in the present invention.

The third group encompasses certain so-called associative thickeners. Particularly suitable associative thickeners are ethoxylated fatty alcohol polyurethane compounds. The thickening efficacy depends on the number of urethane ethoxylations and the fatty alcohol chain length. Suitable results are obtained when using Thickener 71496 (*ex* BASF; Germany) and Accusol 880 (*ex* Röhm & Haas; Germany). As is illustrated in the working examples, it is possible with Thickener 71496 to prepare clear medium viscosity fabric softening compositions.

The fourth group suitable to be used as thickener in the fabric softener compositions of the present invention are cationic polyacrylate copolymers. Good results are obtained with compositions wherein the thickening agent is a cationic polyacrylate polymer obtained by copolymerization of trimethyl amino ethyl methacrylate monomers, (meth)acrylate monomers and acrylamide monomers, which copolymers are optionally crosslinked. Suitable such polymers are described in WO 90/12862 (BP Chemicals Ltd.), which international patent application is incorporated by reference herein, and which international patent application discloses aqueous based fabric conditioning formulations

comprising a water dispersible cationic softener and as a thickener a cross-linked cationic polymer that is derivable from a water soluble cationic ethylenically unsaturated monomer or blend of monomers, which is cross-linked by 5 to 45 ppm of a cross-linking agent comprising polyethylenic functions. These thickeners give compositions having medium viscosity. Particularly suitable cationic polyacrylate polymers are obtained by polymerization of trimethyl amino ethyl methacrylate monomers, (meth)acrylate monomers and acrylamide monomers to obtain co-polymers that are optionally crosslinked. The co-polymers are quaternized. Medium cationicity, which means a cationicity derived from 65-85 mole.% trimethyl aminoethyl methacrylate is needed to achieve the viscosity aimed at. Any crosslinking, if present, should be limited to less than 100 ppm crosslinker present in the preparation process for this thickener. The thickening efficacy depends on the charge density, the crosslinking degree and to a lesser extent on the molecular weight. Suitable results are obtained with Polymer 7050 (*ex* BP Chemicals; United Kingdom), and C998 and C999 (*ex* Ciba; Switzerland).

In preferred embodiments, the thickening agent is selected from the group consisting of modified cellulosic polymer, cationic polyacrylate copolymer and mixtures thereof.

Typical formulations within the scope of the present invention are described in the following table:

Ingredients	Regular	Ultra
Water	→ 100 %	→ 100%
Oligomeric Esterquat	4-6%	12-18%
Perfume	0.36%	0.1%
Sequestering Agent	0.1%	0.06%
Preservative	0.06%	Q.S.
Thickening agent	Q.S.	

The term "regular" refers to a formulation that is ready to be added to a washing machine; the term "ultra" refers to a concentrated formulation that delivers similar softness benefit with reduced use

amount. Any percentages given in this table and in the present description in general refer to percentages by weight drawn to the total composition (unless otherwise indicated).

In a particularly preferred embodiment, the medium viscosity fabric softening composition of the invention is clear. This means that such a composition is free from visible turbidity and is transparent.

It is especially surprising that concentrated medium viscosity fabric softening compositions can be obtained which are stable without requiring viscosity controllers which are proposed in EP-A-1 136 471. More in detail, this means that medium viscosity fabric softening compositions can be obtained which do not contain any added organic solvents, which do not contain any added electrolyte, and which do not contain any added organic solvents in combination with any added electrolyte. Some organic solvent may be present in the active ingredients of the compositions of the invention. By the terms "do not contain any added organic solvents" it is meant that the total composition contains less than 3 wt.% organic solvent, preferably less than 2.0 wt.% solvent. Some electrolyte may be present in the active ingredients of the compositions of the invention. By the terms "do not contain any added electrolyte" it is meant that the total composition contains less than 0.1 wt.%, preferably less than 0.05 wt.%, and more preferably less than 0.01 wt.% electrolyte.

The invention will be described in more detail in the following examples, which do not limit the invention, but merely illustrate the invention. In the working examples, reference will be made to the drawings wherein

Figure 1 is a graph showing the viscosity (in cps (mPa.s)) as a result of the ratio ethylene oxide groups/fatty acid carbons in the chain; and

Figures 2 and 3 show graphs showing the viscosity (in cps (mPa.s)) as a result of the amount of cellulosic polymer.

**Example 1**

Dispersions of oligomeric esterquats, and particularly of Tetranyl CL518 (*ex* KAO), in water were prepared, according to the following process: water is heated to a temperature of 60°C ± 2°C; the oligomeric esterquat is melted at a temperature of 60°C; it is added in molten state in the hot water under stirring; the mixture is cooled down to 25°C. By this process products are obtained which have a viscosity of about 40 mPa.s.

In order to make formulations having higher viscosities, thickening agent is added in the water phase or after the cooling step depending of the chemical nature and the physical form.

**Example 2****Non-ionic viscosity modifier:**

Addition of ethoxylated fatty alcohol allows increasing the viscosity of thin concentrated composition containing 15% of oligomeric esterquat

Chain length (Mean)	EO Number	Ratio EO/Chain	Viscosity (cps)
12.5	2	0.16	40
12.5	3	0.24	40
12.5	5	0.4	440
12.5	6.5	0.52	1680
10	2.5	0.25	65
10	5	0.5	1160
10	6	0.6	520
10	8	0.8	170
14.5	4	0.28	80
14.5	7	0.48	700

The best thickening effect is observed when the ethoxylation ratio of EO number to chain length is greater than or equal to 0.3. The results are also shown in figure 1.

**Example 3****Associative Thickener:**

These polymers are ethoxylated polyurethanes.

As associative thickeners are used: Thickener 71496 (BASF), and Accusol 880 (Röhm & Haas).

The addition of 5% of associative thickener increases the viscosity up to gelification (about 10,000 cps) of the Ultra product.

- 5 The addition of associative thickener allows increasing the viscosity of regular compositions containing 4% of oligomeric esterquat, and the viscosity is a function of the associative thickener content.

Ethoxylated Polyurethane (%)	Supplier	Viscosity (cps)	Aspect
Regular 4% Dispersion			
2.5	BASF	60	Clear
3.0	BASF	150	Clear
3.5	BASF	530	Clear
1.5	Rohm & Haas	80	Turbid
2.0	Haas	240	Turbid
3.0	Rohm & Haas	880	Turbid
Ultra 12% Dispersion			
2.5	BASF	60	Clear
3.0	BASF	100	Clear
2.5	Rohm & Haas	120	Turbid

- 10 If the thickening effect is considered only, both samples are satisfactory and allow achieving medium viscosity at a minimal level of 3.0%

If additionally clarity is desired for the compositions to be prepared, the ethoxylated polyurethane obtained from BASF is most suitable.

15

**Example 4**  
**Polyacrylate Polymers:**

The following polyacrylate polymers were tested:

Supplier	Product	Level (%)	Formula	Viscosity	Aspect
BP Chemicals	Polymer 7050	0.2	Regular	140 cps	Turbid
Rhöm	Rohagit K720	0.2	Concentrate	30 cps	Clear
		0.4	Concentrate	40 cps	Clear

		0.2	Regular	40 cps	Clear
SNF	Flosoft	0.2	Concentrate	20 cps	Turbid
	DP/PSD200	0.2	Regular	20 cps	Turbid
Ciba	C998	1.0	Concentrate	300 cps	Turbid
		0.5	Concentrate	120 cps	Turbid
	C999	1.0	Concentrate	180 cps	Turbid

The addition of polyacrylate polymer allows increasing the viscosity of regular compositions containing 4% of oligomeric esterquat, and the viscosity is a function of the polyacrylate polymer content.

Two types of polyacrylate co-polymers allow increasing the viscosity. The products are turbid. These types are the copolymers obtained from BP and Ciba. Particularly, Polymer 7050 is a copolymer obtained by copolymerisation of methacrylate, acrylamide and about 80% trimethylaminoethyl methacrylate; it is crosslined with 5-45 ppm bismethacrylamide. Both Ciba polymers have the same cationicity as Polymer 7050 and have low to very low crosslinking.

The homopolymer (Rohagit K720; polymethacrylate) does not achieve medium viscosity, as well as the Flosoft co-polymer (Flosoft is a copolymer obtained by copolymerising methacrylate, acrylamide and 92 mole-% trimethyl aminoethyl methacrylate; it is crosslinked by using more than 150 ppm bismethylacrylamide).

So, medium viscosity is achievable with polyacrylate co-polymers in turbid products.

#### **Example 5** **Modified Cellulosic Polymers:**

In this example, it is shown that the addition of modified cellulosic polymer allows increasing the viscosity of regular compositions containing oligomeric esterquat, and that the viscosity is a function of the modified cellulosic polymer content.

The following modified cellulose polymers *ex* Hercules (under the trade name Natrosol) are tested:

Type I is Natrosol HHX: Very high molecular weight, extra fine powder;  
 Type II is Natrosol HHXR: same as HHX with delayed hydration;  
 Type III is Natrosol HHBR: same as HHXR with a better bio-stability.

5

Content	Type I	Type II	Type III
Regular composition: 4% oligomeric esterquat			
0.30	90	80	100
0.35	130	100	100
0.40		140	160
Ultra composition: 12% oligomeric esterquat			
0.25	110	110	80
0.30	160	140	150
0.50	740	520	640
1.00	6900	2700	6950

10 From the results it can be concluded that modified cellulosic polymers allow adjusting viscosity of regular and ultra compositions to medium and high viscosity values, at a low level of polymer.

All the thickened compositions are clear except the Natrosol type III at 1.0%.

## Claims

### What is claimed is:

1. A medium viscosity fabric softening composition, comprising (a)  
5 from about 1 to 20 wt.% of an oligomeric esterquat, derived from the  
reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty  
alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid,  
followed by partial quaternization (leading to a mixture of oligomeric  
esteramine and of esterquat); and (b) an effective amount of a thickening  
10 agent or mixture of thickening agents, selected from the group consisting  
of (i) non-ionic water-soluble cellulosic polymer derived from the  
condensation of cellulose and ethylene oxide and/or propylene oxide; (ii)  
ethoxylated and/or propoxylated C<sub>10-15</sub> fatty alcohol; (iii) ethoxylated  
and/or propoxylated fatty alcohol polyurethane associative thickener; and  
15 (iv) cationic polyacrylate copolymer.
2. The medium viscosity fabric softening composition of claim 1,  
comprising from about 8 to 20 wt.% of said oligomeric esterquat.
- 20 3. The medium viscosity fabric softening composition of claim 1,  
which is clear.
4. The medium viscosity fabric softening composition of claim 2,  
which is clear.  
25
5. The medium viscosity fabric softening composition of claim 2  
containing less than about 3 wt.% organic solvent.
6. The medium viscosity fabric softening composition of claim 2  
30 containing less than about 0.1 wt.% electrolyte.
7. The medium viscosity fabric softening composition of claim 5,  
containing less than about 0.1 wt.% electrolyte.

8. The medium viscosity fabric softening composition of claim 1, wherein the thickening agent is non-ionic water-soluble cellulosic polymer derived from the condensation of cellulose and ethylene oxide.
- 5 9. The medium viscosity fabric softening composition of claim 1, wherein the thickening agent is cationic polyacrylate polymer obtained by co-polymerization of trimethyl amino ethyl methacrylate monomers, (meth)acrylate monomers and acrylamide monomers, which co-polymers are optionally crosslinked.
- 10 10. The medium viscosity fabric softening composition of claim 1, wherein the thickening agent comprises ethoxylated fatty alcohols having a fatty chain length varying from 10 to 15 (in average) carbon atoms, and wherein the number of ethoxylation varies from 2 to 8 (in average).
- 15 11. The medium viscosity fabric softening composition of claim 10, wherein the ethoxylation ratio of the EO number to the carbon atoms in the chain length of the fatty alcohol is at least 0.3.
- 20 12. A process for the manufacture of a stable medium viscosity fabric softening composition, said composition comprising (a) from about 1 to 20 wt.% of an oligomeric esterquat, obtainable by reaction of an alkanol amine with (i) a polycarboxylic acid; and (ii) a fatty alcohol or a fatty acid; or (iii) a mixture of a fatty alcohol and a fatty acid, followed by partial  
25 quaternization (leading to a mixture of oligomeric esteramine and of esterquat); and (b) an effective amount of a thickening agent; said process comprising (a) melting said oligomeric esterquat; (b) dispersing the melted material of step (a) in hot water; and thereafter (c) cooling said hot water, and wherein said thickening agent is added to the hot water of step (b) or  
30 after the cooling step of (c), which thickening agent is selected from the group consisting of (i) non-ionic water-soluble cellulosic polymer derived from the condensation of cellulose and ethylene oxide and/or propylene oxide; (ii) ethoxylated and/or propoxylated C<sub>10-15</sub> fatty alcohol; (iii)

ethoxylated and/or propoxylated fatty alcohol polyurethane associative thickener; and (iv) cationic polyacrylate copolymer.

13. The process of claim 12, wherein the hot water has a temperature in the range between the melting point of said oligomeric esterquat and a temperature that is about 30°C higher than said melting point.

14. The process of claim 12, wherein the hot water has a temperature in the range between about 50 and 70°C.

15. The process of claim 12, wherein the hot water has a temperature in the range between about 55 and 65°C.

16. A low viscosity fabric softening composition, produced by the process of claim 12.

15

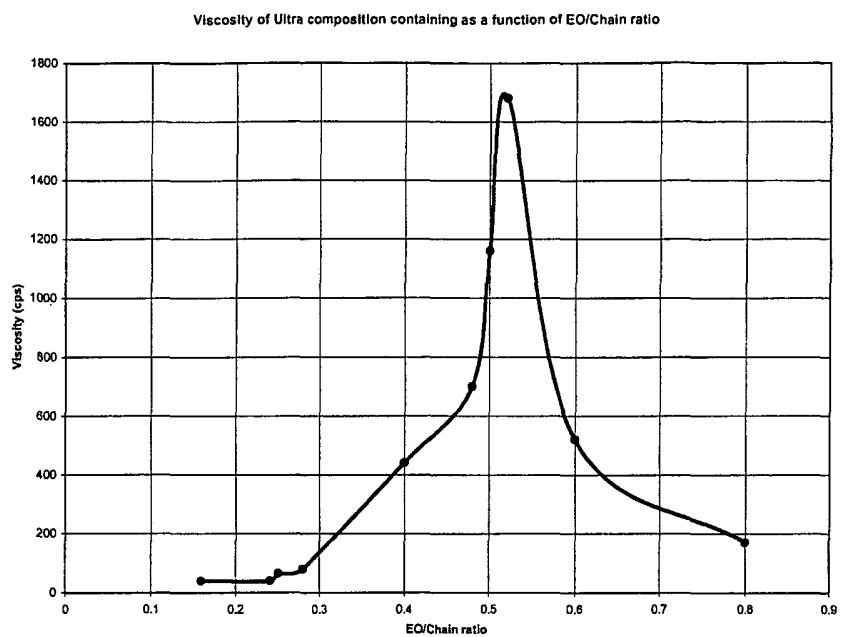


Fig 1

Cellulosic Polymer in Regular composition containing 4% Oligomeric esterquat

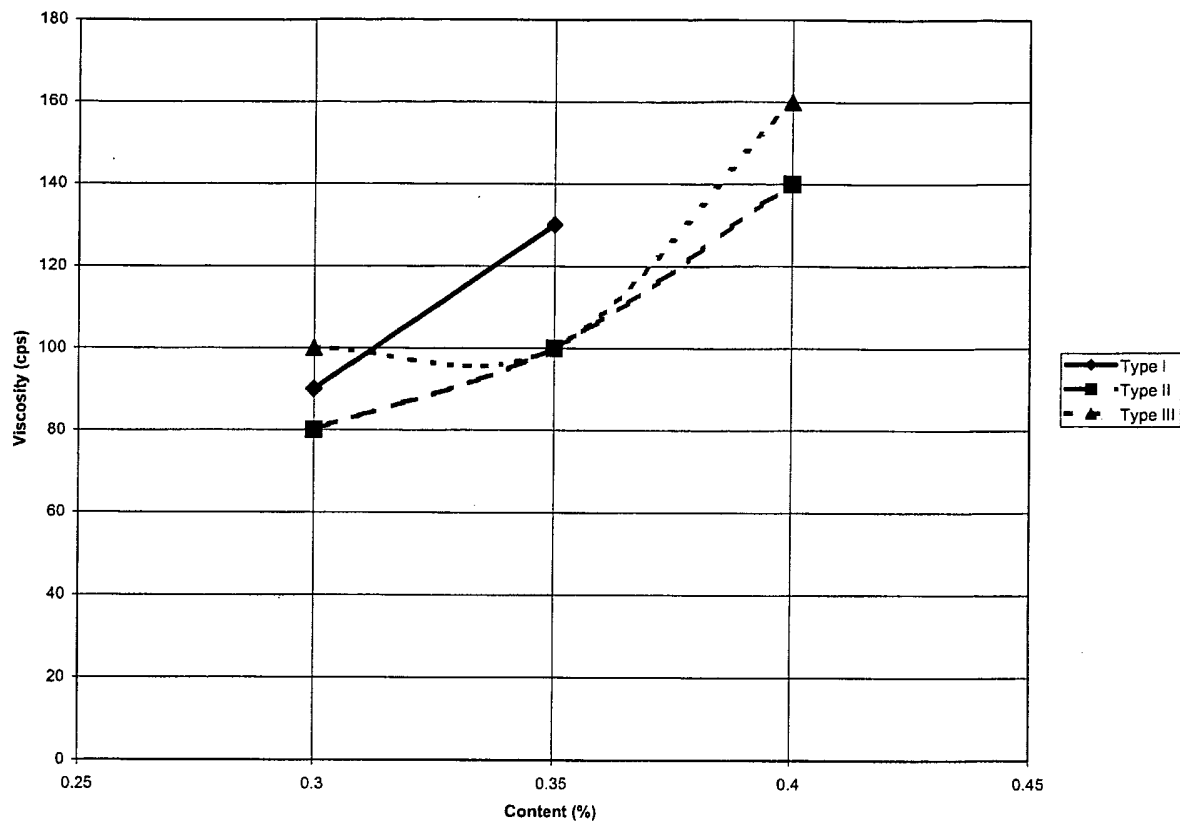


Fig 2

Cellulosic polymer in Ultra composition containing 12% Oligomeric Esterquat

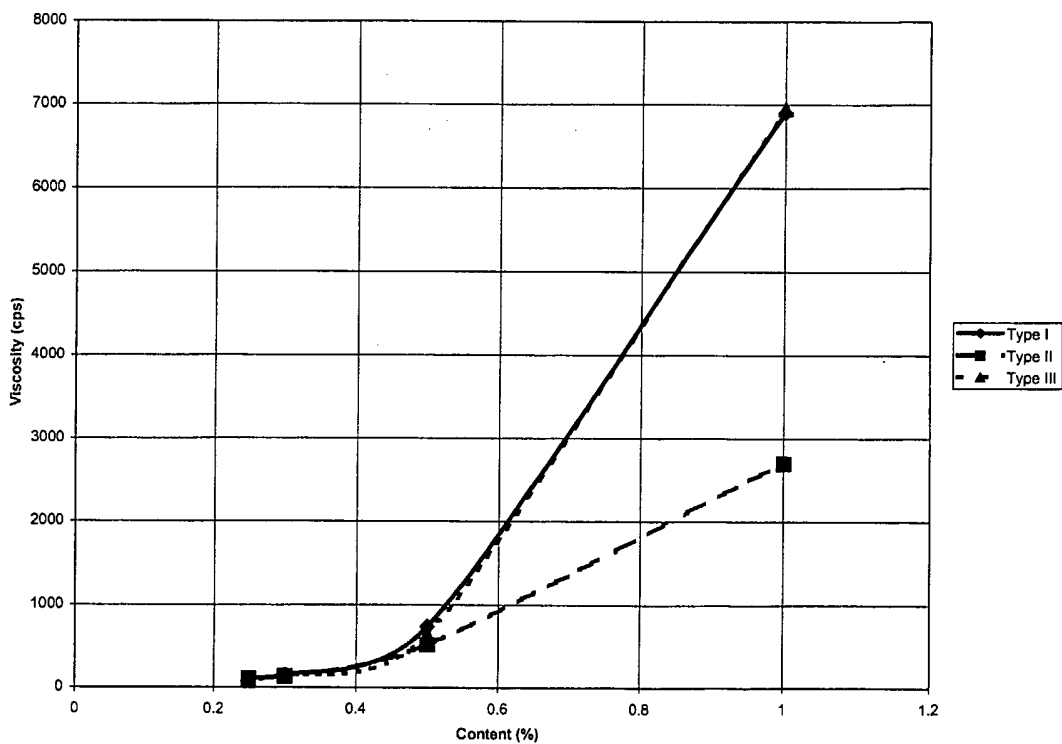


Fig 3

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 03/34596

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 C11D1/62 C11D3/20 C11D3/50 C11D3/22 C11D3/37				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) IPC 7 C11D				
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) EPO-Internal, WPI Data, PAJ				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X A	WO 99 33944 A (COLGATE PALMOLIVE CO) 8 July 1999 (1999-07-08) claims  examples page 15, line 26 -page 18, line 21 page 19, line 5 -page 20, line 12 page 20, line 29 -page 21, line 2 ---	1, 3, 9, 12-14 2, 4-8, 10, 11, 15		
X	US 4 606 916 A (QUACK JOCHEN M ET AL) 19 August 1986 (1986-08-19) claims examples 17A, 17J column 2, line 6 -column 4, line 40 --- -/--	1, 3		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
<input checked="" type="checkbox"/> Patent family members are listed in annex.				
° Special categories of cited documents:				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">                     *A* document defining the general state of the art which is not considered to be of particular relevance                      *E* earlier document but published on or after the international filing date                      *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      *O* document referring to an oral disclosure, use, exhibition or other means                      *P* document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                      *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.                      *&amp;* document member of the same patent family                 </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family			
Date of the actual completion of the international search  <p style="text-align: center;">17 March 2004</p>	Date of mailing of the international search report  <p style="text-align: center;">25/03/2004</p>			
Name and mailing address of the ISA 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	Authorized officer  <p style="text-align: center;">Neys, P</p>			

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/34596

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99 25797 A (HENKEL KGAA) 27 May 1999 (1999-05-27) claims examples page 10, paragraph 3 page 11, last paragraph ---	1-11
A	US 5 939 377 A (COLLARD CATHERINE ET AL) 17 August 1999 (1999-08-17) claims examples -----	1,12

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 16

No search for the subject-matter of claim 16 could be performed because a 'low' viscosity composition is claimed by way of referring to a process for producing 'medium' viscosity compositions. This contradiction renders claim 16 unclear in the light of Article 6 PCT.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/34596

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: 16  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/34596

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
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			US 5880084 A	09-03-1999
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			EP 1044250 A1	18-10-2000
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			EP 1098954 A1	16-05-2001
			WO 0004118 A1	27-01-2000
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