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(54) Title: IMPROVEMENTS RELATING TO LAUNDRY COMPOSITIONS

(57) Abstract: A fabric treatment composition for use in a laundry process, comprising (a) a fabric treatment active; (b) a capsule having a shell and core, wherein the core comprises a pest repellent in an amount of from 40 to 100 mol %, based on the total core; and (c) a further component, which is a perfume; wherein the perfume and the pest repellent are different.



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Improvements Relating to Laundry Compositions

Technical Field

- 5 The present invention relates to a fabric treatment composition, in particular a fabric softening composition, comprising an encapsulated pest repellent.

Background and Prior Art

- 10 Insects and other creatures within the arthropods, for example, mosquitoes, flies, horse flies, sand flies, ticks and others pose serious health and quality of life issues to millions of people in many countries. Mosquitoes, for example, pose a threat to 300 million people globally and 1.2 million die each year from malaria. In addition, bites are itchy and unsightly and represent a major unmet need for
15 consumers in many parts of the world.

There is clearly a need for new innovative and effective repellent products. The purpose of repellents is to prevent these pests from biting.

- 20 Repellents, including insect repellents, are commonly available in different forms including sprays, lotions, wipes and sticks. Encapsulation of insect repellents is known from GB2385789 (Celessence™ International Ltd). The use of insect repellents on textiles is known in industrial as well as domestic contexts. GB2385789 discloses the delivery of encapsulated insect repellent to skin or
25 clothing via use of a wipe, lotion or spray. The repellent is released when shear or friction forces break the capsules.

We have now found that repellent can be effectively and conveniently delivered, in encapsulated form, to fabric and textiles from laundry treatment products.

Delivery of microcapsules from, for example, a fabric conditioner ensures that

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even deposition of the repellent to the whole of an article is accomplished, ensuring maximum protection from the complete article. The active is released onto the fabric when the capsules are broken. Upon close contact with the skin, it is believed that repellent can also be transferred from the fabric onto the skin, thus conferring additional protection benefits to the wearer of treated fabric. A further surprising finding is that use of encapsulated repellent enables significantly more active to be delivered to a fabric article from a laundry treatment product, as well as longer lasting delivery of repellent benefits compared with non-encapsulated repellent.

We have further found that, when delivered from a laundry treatment product, the mode of delivery (shear release of repellent from capsules delivered to the fabric) enables bursts of fresh repellent to be released throughout the day thus prolonging the longevity of the protective effect of the repellent.

Statement of the Invention

In a first aspect of the invention there is provided a fabric treatment composition for use in a laundry process, comprising

- (a) a fabric treatment active;
 - (b) a capsule having a shell and core, wherein the core comprises a pest repellent in an amount of from 40 to 100 mol %, based on the total core; and
 - (c) a further component, which is a perfume;
- wherein the perfume and the pest repellent are different.

A second aspect provides a method for treating fabric comprising contacting the fabric with an aqueous dispersion comprising the composition of the first aspect. The second aspect usefully takes place during a laundry process.

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A third aspect of the invention provides a use of a composition of the first aspect to repel pests from fabric treated with the composition.

Detailed Description of the Invention

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The Capsule

The compositions of the invention comprise a capsule, having a shell and a core. The core comprises a pest repellent in an amount of from 40 to 100 mol %, preferably from 50 to 100 mol %, more preferably from 60 to 100 mol % and most preferably from 75 to 95 mol % based on the total core.

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The Pest Repellent

15 The compositions of the invention comprise one or more pest repellents. For the purposes of this patent, repellents (also referred to herein as pest repellents) means arthropod repellent materials, for example, materials that repel pests in the hexapoda (including insects), myriapoda and acarina sub-classes, preferably insect repellents. The pest repellent is present in the core of the capsule (herein also referred to as being in encapsulated form). Further non-encapsulated (non-confined) repellent may also be present. The encapsulated and non-encapsulated repellents may be the same or different, preferably different. The repellants described below are suitable for use in the present invention in both encapsulated and non-encapsulated forms.

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Repellents are products which deter insects and are applied to exposed areas of skin. Thus biting is prevented or, at least, reduced. Modern repellents typically contain an active ingredient, solvents and perfume. Once the product has been applied, the solvents evaporate, leaving the active ingredient on the skin. The active ingredient then evaporates slowly, forming a "scented" film on the skin, and

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the repellent acts for as long as it takes for the active ingredient to evaporate completely.

In chemical terms, most repellent actives belong to one of four groups: amides, alcohols, esters or ethers. Those suitable for use in the present invention are liquids or solids with a relatively low melting point and a boiling point above 150 °C, preferably liquids. They evaporate slowly at room temperature.

Many suitable repellents are related to perfume species (many fall into both classes). Commonly used repellents include: DEET (N,N-diethyl-m-toluamide), essential oil of the lemon eucalyptus (*Corymbia citriodora*) and its active compound p-menthane-3,8-diol (PMD), Icaridin, also known as Picaridin, D-Limonene, Bayrepel, and KBR 3023, Nepetalactone, also known as "catnip oil", Citronella oil, Permethrin, Neem oil and Bog Myrtle.

Known insect repellents derived from natural sources include: *Achillea alpina*, alpha-terpinene, Basil oil (*Ocimum basilicum*), *Callicarpa americana* (Beautyberry), Camphor, Carvacrol, Castor oil (*Ricinus communis*), Catnip oil (*Nepeta* species), Cedar oil (*Cedrus atlantica*), Celery extract (*Apium graveolens*), Cinnamon (*Cinnamomum Zeylanicum*, leaf oil), Citronella oil (*Cymbopogon fleusus*), Clove oil (*Eugenic caryophyllata*), Eucalyptus oil (70%+ eucalyptol, also known as cineol), Fennel oil (*Foeniculum vulgare*), Garlic Oil (*Allium sativum*), Geranium oil (also known as *Pelargonium graveolens*), Lavender oil (*Lavandula officinalis*), Lemon eucalyptus (*Corymbia citriodora*) essential oil and its active ingredient p-menthane-3,8-diol (PMD), Lemongrass oil (*Cymbopogon flexuosus*), Marigolds (*Tagetes* species), Marjoram (*Tetranychus urticae* and *Eutetranychus orientalis*), Neem oil (*Azadirachta indica*), Oleic acid, Peppermint (*Mentha x piperita*), Pennyroyal (*Mentha pulegium*), Pyrethrum (from *Chrysanthemum* species, particularly *C. cinerariifolium* and *C. coccineum*), Rosemary oil (*Rosmarinus officinalis*), Spanish Flag Lantana camara (*Helopeltis theivora*),

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Solanum villosum berry juice, Tea tree oil (*Melaleuca alternifolia*) and Thyme (*Thymus* species) and mixtures thereof.

5 The pest repellent is preferably a repellent of species selected from the classes Arachnida, Chilopoda, Diplopoda, Pauropoda, Symphyla, Insecta and Entognatha, preferably insecta.

Preferred repellents are effective against Diptera, preferably Nematocera, more preferably Culicomorpha, even more preferably Culicidae, especially Culicidae, more especially insects of the genera Anopheles and/or Aedes, and is most especially effective against an insect which is vector of malaria, yellow fever or dengue.

15 Preferred encapsulated repellents, Celessence Repel, containing the active ingredient Saltidin™ and Celessence Repel Natural, containing the active Citrepep™ 75, are available from Celessence, Rochester, England. Saltidin is a man made molecule developed originally by the Bayer Corporation. Citrepep is produced from eucalyptus oils and is high in p-menthane-3,8-diol (PMD).

20 The amount of encapsulated repellent present in the composition of the invention is preferably from 0.5 to 50 wt %, more preferably from 1 to 45 wt %, even more preferably from 2 to 35 wt % still more preferably from 5 to 25 wt % and most preferably from 10 to 20 wt %, for example, from 10 to 40 wt % by weight of the total composition.

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The encapsulated repellent may be in the form of a slurry.

The encapsulated repellent for use in the compositions of the present invention comprises a shell. Preferably, the shell is capable of being broken by application of shear force such as rubbing.

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The shell is comprised of materials including aminoplasts, proteins, polyurethanes, polysaccharides, gums, celluloses, and any other encapsulating material which may be used effectively in the present invention; an example being polymethylmethacrylate. Preferred encapsulating polymers include those formed from melamine formaldehyde or urea formaldehyde condensates, as well as similar types of aminoplasts. Most preferably the shell comprises melamine formaldehyde.

Additionally, microcapsules made via the simple or complex coacervation of gelatin are also preferred for use with the coating. Microcapsules having shell walls comprised of polyurethane, polyamide, polyolefin, polysaccharide, protein, silicone, lipid, modified cellulose, gums, polyacrylate, polystyrene, and polyesters or combinations of these materials are also possible.

A representative process used for aminoplast encapsulation is disclosed in U.S. Patent No. 3,516,941 though it is recognized that many variations with regard to materials and process steps are possible. A representative process used for gelatin encapsulation is disclosed in U.S. Patent No, 2,800,457 though it is recognized that many variations with regard to materials and process steps are possible.

Encapsulation can provide pore vacancies or interstitial openings depending on the encapsulation techniques employed.

Capsules suitable for use in the present invention comprise a wall or shell comprising a three-dimensional cross-linked network of an aminoplast resin, more specifically a substituted or un-substituted acrylic acid polymer or co-polymer cross-linked with a urea-formaldehyde pre-condensate or a melamine-formaldehyde pre-condensate.

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Microcapsule formation using mechanisms similar to the foregoing mechanism, using (i) melamine-formaldehyde or urea-formaldehyde pre-condensates and (ii) polymers containing substituted vinyl monomeric units having proton-donating functional group moieties (e.g. sulfonic acid groups or carboxylic acid anhydride groups) bonded thereto is disclosed in U.S. Patent 4,406,816 (2-acrylamido-2-methyl-propane sulfonic acid groups), UK published Patent Application GB 2,062,570 A (styrene sulfonic acid groups) and UK published Patent Application GB 2,006,709 A (carboxylic acid anhydride groups).

Particle size and average diameter of the capsules can vary from about 10 nanometers to about 1000 microns, preferably from about 50 nanometers to about 100 microns, more preferably from about 2 to about 40 microns, even more preferably from about 3 to 30 microns. A particularly preferred range is from about 5 to 10 microns, for example 6 to 7 microns. The capsule distribution can be narrow, broad or multimodal. Multimodal distributions may be composed of different types of capsule chemistries.

The Perfume

The compositions of the present invention further comprise a perfume. The perfume is in addition to the repellent. The perfume is different from the encapsulated repellent. The perfume is preferably present in an amount from 0.01 to 10 % by weight, more preferably from 0.05 to 5 % by weight, even more preferably from 0.1 to 4.0 %, most preferably from 0.15 to 4.0 % by weight, based on the total weight of the composition.

Useful components of the perfume include materials of both natural and synthetic origin. They include single compounds and mixtures. Specific examples of such components may be found in the current literature, e.g., in Fenaroli's Handbook of Flavor Ingredients, 1975, CRC Press; Synthetic Food Adjuncts, 1947 by M. B.

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Jacobs, edited by Van Nostrand; or Perfume and Flavor Chemicals by S. Arctander 1969, Montclair, N.J. (USA). These substances are well known to the person skilled in the art of perfuming, flavouring, and/or aromatizing consumer products, i.e., of imparting an odour and/or a flavour or taste to a consumer product traditionally perfumed or flavoured, or of modifying the odour and/or taste of said consumer product.

By perfume in this context is not only meant a fully formulated product fragrance, but also selected components of that fragrance, particularly those which are prone to loss, such as the so-called 'top notes'.

Top notes are defined by Poucher (Journal of the Society of Cosmetic Chemists 6(2):80 [1955]). Examples of well known top-notes include citrus oils, linalool, linalyl acetate, lavender, dihydromyrcenol, rose oxide and cis-3-hexanol. Top notes typically comprise 15-25%wt of a perfume composition and in those embodiments of the invention which contain an increased level of top-notes it is envisaged at that least 20%wt would be present within the encapsulate.

Preferably, the perfume is encapsulated. Perfume components which it is advantageous to encapsulate, include those with a relatively low boiling point, preferably those with a boiling point of less than 300, preferably 100-250 Celsius and pro-fragrances which can produce such components.

It is also advantageous to encapsulate perfume components which have a low Clog P (i.e. those which will be partitioned into water), preferably with a Clog P of less than 3.0. These materials, of relatively low boiling point and relatively low Clog P have been called the "delayed blooming" perfume ingredients and include the following materials:

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Allyl Caproate, Amyl Acetate, Amyl Propionate, Anisic Aldehyde, Anisole,
 Benzaldehyde, Benzyl Acetate, Benzyl Acetone, Benzyl Alcohol, Benzyl Formate,
 Benzyl Iso Valerate, Benzyl Propionate, Beta Gamma Hexenol, Camphor Gum,
 Laevo-Carvone, d-Carvone, Cinnamic Alcohol, Cinamyl Formate, Cis-Jasmone,
 5 cis-3-Hexenyl Acetate, Cuminic Alcohol, Cyclal C, Dimethyl Benzyl Carbinol,
 Dimethyl Benzyl Carbinol Acetate, Ethyl Acetate, Ethyl Aceto Acetate, Ethyl Amyl
 Ketone, Ethyl Benzoate, Ethyl Butyrate, Ethyl Hexyl Ketone, Ethyl Phenyl Acetate,
 Eucalyptol, Eugenol, Fenchyl Acetate, Flor Acetate (tricyclo Decenyl Acetate),
 Frutene (tricyclo Decenyl Propionate), Geraniol, Hexenol, Hexenyl Acetate,
 10 Hexyl Acetate, Hexyl Formate, Hydratropic Alcohol, Hydroxycitronellal, Indone,
 Isoamyl Alcohol, Iso Menthone, Isopulegyl Acetate, Isoquinolone, Ligustral,
 Linalool, Linalool Oxide, Linalyl Formate, Menthone, Menthyl Acetphenone,
 Methyl Amyl Ketone, Methyl Anthranilate, Methyl Benzoate, Methyl Benyl Acetate,
 Methyl Eugenol, Methyl Heptenone, Methyl Heptine Carbonate, Methyl Heptyl
 15 Ketone, Methyl Hexyl Ketone, Methyl Phenyl Carbiny Acetate, Methyl Salicylate,
 Methyl-N-Methyl Anthranilate, Nerol, Octalactone, Octyl Alcohol, p-Cresol, p-
 Cresol Methyl Ether, p-Methoxy Acetophenone, p-Methyl Acetophenone, Phenoxy
 Ethanol, Phenyl Acetaldehyde, Phenyl Ethyl Acetate, Phenyl Ethyl Alcohol, Phenyl
 Ethyl Dimethyl Carbinol, Prenyl Acetate, Propyl Bornate, Pulegone, Rose Oxide,
 20 Safrole, 4-Terpinenol, Alpha-Terpinenol, and/or Viridine.

Preferred non-encapsulated perfume ingredients are those hydrophobic perfume
 components with a ClogP above 3. As used herein, the term "ClogP" means the
 calculated logarithm to base 10 of the octanol/water partition coefficient (P). The
 25 octanol/water partition coefficient of a perfume raw material (PRM) is the ratio
 between its equilibrium concentrations in octanol and water. Given that this
 measure is a ratio of the equilibrium concentration of a PRM in a non-polar solvent
 (octanol) with its concentration in a polar solvent (water), ClogP is also a measure
 of the hydrophobicity of a material-the higher the ClogP value, the more
 30 hydrophobic the material. ClogP values can be readily calculated from a program

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called "CLOGP" which is available from Daylight Chemical Information Systems Inc., Irvine Calif., USA. Octanol/water partition coefficients are described in more detail in U.S. Pat. No. 5,578,563.

- 5 Perfume components with a ClogP above 3 comprise: Iso E super, citronellol, Ethyl cinnamate, Bangalol, 2,4,6-Trimethylbenzaldehyde, Hexyl cinnamic aldehyde, 2,6-Dimethyl-2-heptanol, Diisobutylcarbinol, Ethyl salicylate, Phenethyl isobutyrate, Ethyl hexyl ketone, Propyl amyl ketone, Dibutyl ketone, Heptyl methyl ketone, 4,5-Dihydrotoluene, Caprylic aldehyde, Citral, Geranial, Isopropyl
- 10 benzoate, Cyclohexanepropionic acid, Campholene aldehyde, Caprylic acid, Caprylic alcohol, Cuminaldehyde, 1-Ethyl-4-nitrobenzene, Heptyl formate, 4-Isopropylphenol, 2-Isopropylphenol, 3-Isopropylphenol, Allyl disulfide, 4-Methyl-1-phenyl-2-pentanone, 2-Propylfuran, Allyl caproate, Styrene, Isoeugenyl methyl ether, Indonaphthene, Diethyl suberate, L-Menthone, Menthone racemic, p-Cresyl
- 15 isobutyrate, Butyl butyrate, Ethyl hexanoate, Propyl valerate, n-Pentyl propanoate, Hexyl acetate, Methyl heptanoate, trans-3,3,5-Trimethylcyclohexanol, 3,3,5-Trimethylcyclohexanol, Ethyl p-anisate, 2-Ethyl-1-hexanol, Benzyl isobutyrate, 2,5-Dimethylthiophene, Isobutyl 2-butenate, Caprylnitrile, gamma-Nonalactone, Nerol, trans-Geraniol, 1-Vinylheptanol, Eucalyptol, 4-Terpinenol, Dihydrocarveol,
- 20 Ethyl 2-methoxybenzoate, Ethyl cyclohexanecarboxylate, 2-Ethylhexanal, Ethyl amyl carbinol, 2-Octanol, 2-Octanol, Ethyl methylphenylglycidate, Diisobutyl ketone, Coumarone, Propyl isovalerate, Isobutyl butanoate, Isopentyl propanoate, 2-Ethylbutyl acetate, 6-Methyl-tetrahydroquinoline, Eugenyl methyl ether, Ethyl dihydrocinnamate, 3,5-Dimethoxytoluene, Toluene, Ethyl benzoate, n-
- 25 Butyrophenone, alpha-Terpineol, Methyl 2-methylbenzoate, Methyl 4-methylbenzoate, Methyl 3-methylbenzoate, sec. Butyl n-butyrate, 1,4-Cineole, Fenchyl alcohol, Pinanol, cis-2-Pinanol, 2,4-Dimethylacetophenone, Isoeugenol, Safrole, Methyl 2-octynoate, o-Methylanisole, p-Cresyl methyl ether, Ethyl anthranilate, Linalool, Phenyl butyrate, Ethylene glycol dibutyrate, Diethyl
- 30 phthalate, Phenyl mercaptan, Cumic alcohol, m-Toluquinoline, 6-Methylquinoline,

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Lepidine, 2-Ethylbenzaldehyde, 4-Ethylbenzaldehyde, o-Ethylphenol, p-Ethylphenol, m-Ethylphenol, (+)-Pulegone, 2,4-Dimethylbenzaldehyde, Isoxylaldehyde, Ethyl sorbate, Benzyl propionate, 1,3-Dimethylbutyl acetate, Isobutyl isobutanoate, 2,6-Xylenol, 2,4-Xylenol, 2,5-Xylenol, 3,5-Xylenol, Methyl
5 cinnamate, Hexyl methyl ether, Benzyl ethyl ether, Methyl salicylate, Butyl propyl ketone, Ethyl amyl ketone, Hexyl methyl ketone, 2,3-Xylenol, 3,4, Xylenol, Cyclopentadenanolide and Phenyl ethyl 2 phenylacetate 2.

It is commonplace for a plurality of perfume components to be present in a
10 formulation. In the compositions for use in the present invention it is envisaged that there will be four or more, preferably five or more, more preferably six or more or even seven or more different perfume components from the list given of delayed blooming perfumes given above and/or the list of perfume components with a ClogP above 3 present in the perfume.

15 Another group of perfumes with which the present invention can be applied are the so-called 'aromatherapy' materials. These include many components also used in perfumery, including components of essential oils such as Clary Sage, Eucalyptus, Geranium, Lavender, Mace Extract, Neroli, Nutmeg, Spearmint,
20 Sweet Violet Leaf and Valerian. The aromatherapy material is in addition to the repellent and may be the same or different, preferably different, from the repellent.

The Composition

25 The composition of the invention is a laundry treatment composition, preferably for application by consumers in the home. The treatment may be applied via a laundry product, such as a detergent composition and a fabric conditioner composition. Where the composition is a fabric conditioner it is preferably a liquid and where the composition is a detergent composition, it is preferably a liquid or a
30 particulate composition, preferably a liquid.

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The laundry product will contain an active ingredient, which is preferably a surface active agent or a fabric conditioning agent. More than one active ingredient may be included. For some applications a mixture of active ingredients may be used.

- 5 Where the laundry product is a detergent composition, it will contain a surface-active compound (surfactant) which may be chosen from soap and non-soap anionic, cationic, non-ionic, amphoteric and zwitterionic surface-active compounds and mixtures thereof. Many suitable surface-active compounds are available and are fully described in the literature, for example, in "Surface-Active Agents and
10 Detergents", Volumes I and II, by Schwartz, Perry and Berch. The preferred detergent-active compounds that can be used are soaps and synthetic non-soap anionic and non-ionic compounds.

- The detergent compositions of the invention may contain linear alkylbenzene
15 sulphonate, particularly linear alkylbenzene sulphonates having an alkyl chain length of C₈-C₁₅. It is preferred if the level of linear alkylbenzene sulphonate is from 0 wt% to 30 wt%, more preferably 1 wt% to 25 wt%, most preferably from 2 wt% to 15 wt%.

- 20 The compositions of the invention may contain other anionic surfactants in amounts additional to the percentages quoted above. Suitable anionic surfactants are well-known to those skilled in the art. Examples include primary and secondary alkyl sulphates, particularly C₈-C₁₅ primary alkyl sulphates; alkyl ether sulphates; olefin sulphonates; alkyl xylene sulphonates; dialkyl sulphosuccinates;
25 and fatty acid ester sulphonates. Sodium salts are generally preferred.

- The compositions of the invention may also contain non-ionic surfactant. Nonionic surfactants that may be used include the primary and secondary alcohol ethoxylates, especially the C₈-C₂₀ aliphatic alcohols ethoxylated with an average of
30 from 1 to 20 moles of ethylene oxide per mole of alcohol, and more especially the

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c 10-c15 primary and secondary aliphatic alcohols ethoxylated with an average of from 1 to 10 moles of ethylene oxide per mole of alcohol. Non-ethoxylated nonionic surfactants include alkyl-polyglycosides, glycerol monoethers, and polyhydroxyamides (glucamide).

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It is preferred if the level of nonionic surfactant is from 0 wt% to 30 wt%, preferably from 1 wt% to 25 wt%, most preferably from 2 wt% to 15 wt%.

Fabric Softening Compound

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The laundry treatment composition is preferably a fabric conditioner. The fabric conditioner comprises a fabric softening active.

Suitable fabric softening compounds are described below.

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The fabric conditioning agents (also referred to herein as a fabric softening active or compound) may be cationic or non-ionic.

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Fabric conditioning compositions in accordance with the invention may be dilute or concentrated. Dilute products typically contain up to about 8 %, generally about 2 to 8 % by weight of softening active, whereas concentrated products may contain up to about 50 wt %, preferably from about 8 to about 50 %, more preferably from 8 to 25 % by weight active. Overall, the products of the invention may contain from 2 to 50 wt %, preferably from 3 to 25 wt % of softening active.

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The preferred softening active for use in rinse conditioner compositions of the invention is a quaternary ammonium compound (QAC). The preferred quaternary ammonium fabric conditioner for use in compositions of the present invention are the so called "ester quats".

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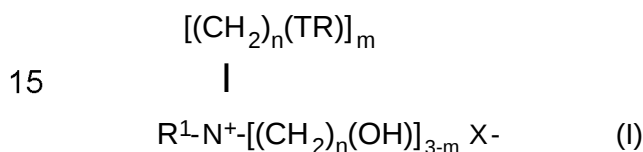
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Particularly preferred materials are the ester-linked triethanolamine (TEA) quaternary ammonium compounds comprising a mixture of mono-, di- and tri-ester linked components.

- 5 Typically, TEA-based fabric softening compounds comprise a mixture of mono, di- and tri-ester forms of the compound where the di-ester linked component comprises no more than 70 % by weight of the fabric softening compound, preferably no more than 60 wt % of the fabric softening compound and at least 10 % of the monoester linked component.

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A first group of quaternary ammonium compounds (QACs) suitable for use in the present invention is represented by formula (I):



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wherein each R is independently selected from a C₅₋₃₅ alkyl or alkenyl group; R¹ represents a C₁₋₄ alkyl, C₂₋₄ alkenyl or a C₁₋₄ hydroxyalkyl group; T is generally O-
 20 CO. (i.e. an ester group bound to R via its carbon atom), but may alternatively be CO-O (i.e. an ester group bound to R via its oxygen atom); n is a number selected from 1 to 4; m is a number selected from 1, 2, or 3; and X⁻ is an anionic counter-ion, such as a halide or alkyl sulphate, e.g. chloride or methylsulphate. Di-esters variants of formula I (i.e. m = 2) are preferred and typically have mono- and tri-
 25 ester analogues associated with them. Such materials are particularly suitable for use in the present invention.

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Especially preferred agents are preparations which are rich in the di-esters of triethanolammonium methylsulphate, otherwise referred to as "TEA ester quats".

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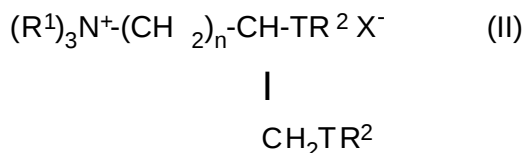
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Commercial examples include Stepantex™ UL85, ex Stepan, Prapagen™ TQL, ex Clariant, and Tetranyl™ AHT-1, ex Kao, (both di-[hardened tallow ester] of triethanolammonium methylsulphate), AT-1 (di-[tallow ester] of triethanolammonium methylsulphate), and L5/90 (di-[palm ester] of

5 triethanolammonium methylsulphate), both ex Kao, and Rewoquat™ WE15 (a di-ester of triethanolammonium methylsulphate having fatty acyl residues deriving from C10-C20 and ~~c 16-C18~~ unsaturated fatty acids), ex Witco Corporation.

Also, soft quaternary ammonium actives such as Stepantex VK90, Stepantex
10 VT90, SP88 (ex-Stepan), Prapagen TQ (ex-Clariant), Dehyquart AU-57 (ex-Cognis), Rewoquat WE18 (ex-Degussa) and Tetranyl L190 P, Tetranyl L190 SP and Tetranyl L190 S (all ex-Kao) are suitable.

A second group of QACs suitable for use in the invention is represented by
15 formula (II):



20

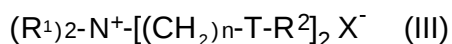
wherein each R¹ group is independently selected from C₁₋₄ alkyl, hydroxyalkyl or C₂₋₄ alkenyl groups; and wherein each R² group is independently selected from C₈₋₂₈ alkyl or alkenyl groups; and wherein n, T, and X⁻ are as defined above.

25 Preferred materials of this second group include 1,2 b/s[tallowoyloxy]-3-trimethylammonium propane chloride, 1,2 b/s[hardened tallowoyloxy]-3-trimethylammonium propane chloride, 1,2-Jb/s[oleoyloxy]-3-trimethylammonium propane chloride, and 1,2 b/s[stearoyloxy]-3-trimethylammonium propane chloride. Such materials are described in US 4,137,180 (Lever Brothers).

30 Preferably, these materials also comprise an amount of the corresponding mono-ester.

- 16 -

A third group of QACs suitable for use in the invention is represented by formula (III):



5

wherein each R^1 group is independently selected from C_{1-4} alkyl, or C_{2-4} alkenyl groups; and wherein each R^2 group is independently selected from C_{5-28} alkyl or alkenyl groups; and n , T , and X^- are as defined above. Preferred materials of this third group include bis(2-tallowoyloxyethyl)dimethyl ammonium chloride, partially

10

hardened and hardened versions thereof.

The iodine value of the quaternary ammonium fabric conditioning material is preferably from 0 to 80, more preferably from 0 to 60, and most preferably from 0 to 45. The iodine value may be chosen as appropriate. Essentially saturated

15

material having an iodine value of from 0 to 5, preferably from 0 to 1 may be used in the compositions of the invention. Such materials are known as "hardened" quaternary ammonium compounds.

A further preferred range of iodine values is from 20 to 60, preferably 25 to 50, more preferably from 30 to 45. A material of this type is a "soft" triethanolamine quaternary ammonium compound, preferably triethanolamine di-alkylester methylsulphate. Such ester-linked triethanolamine quaternary ammonium compound comprise unsaturated fatty chains.

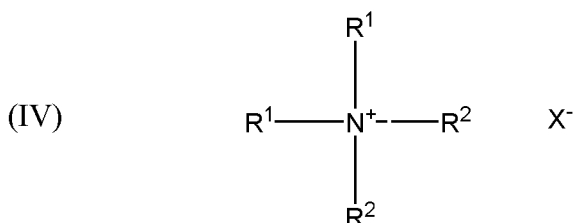
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Iodine value as used in the context of the present invention refers to the measurement of the degree of unsaturation present in a material by a method of nmr spectroscopy as described in Anal. Chem., 34, 1136 (1962) Johnson and Shoolery.

25

- 17 -

A further type of softening compound is a non-ester quaternary ammonium material represented by formula (IV):-



5

wherein each R^1 group is independently selected from C_{1-4} alkyl, hydroxyalkyl or C_{2-4} alkenyl groups; R^2 group is independently selected from C_{5-28} alkyl or alkenyl groups, and X^- is as defined above.

10 Oily sugar derivatives

The fabric softening compositions of the invention may contain a non-cationic softening material, which is preferably an oily sugar derivative. An oily sugar derivative is a liquid or soft solid derivative of a cyclic polyol (CPE) or of a reduced
15 saccharide (RSE), said derivative resulting from 35 to 100 % of the hydroxyl groups in said polyol or in said saccharide being esterified or etherified. The derivative has two or more ester or ether groups independently attached to a C_{5-22} alkyl or alkenyl chain.

20 Advantageously, the CPE or RSE does not have any substantial crystalline character at 20°C . Instead it is preferably in a liquid or soft solid state as herein defined at 20°C .

25 The liquid or soft solid (as hereinafter defined) CPEs or RSEs suitable for use in the present invention result from 35 to 100% of the hydroxyl groups of the starting cyclic polyol or reduced saccharide being esterified or etherified with groups such

- 18 -

that the CPEs or RSEs are in the required liquid or soft solid state. These groups typically contain unsaturation, branching or mixed chain lengths.

Typically the CPEs or RSEs have 3 or more ester or ether groups or mixtures thereof, for example 3 to 8, especially 3 to 5. It is preferred if two or more of the ester or ether groups of the CPE or RSE are independently of one another attached to a C₈ to C₂₂ alkyl or alkenyl chain. The C₈ to C₂₂ alkyl or alkenyl groups may be branched or linear carbon chains.

- 10 Preferably 35 to 85 % of the hydroxyl groups, most preferably 40-80 %, even more preferably 45-75 %, such as 45-70 % are esterified or etherified.

Preferably the CPE or RSE contains at least 35 % tri or higher esters, eg at least 40 %.

15

The CPE or RSE has at least one of the chains independently attached to the ester or ether groups having at least one unsaturated bond. This provides a cost effective way of making the CPE or RSE a liquid or a soft solid. It is preferred if predominantly unsaturated fatty chains, derived from, for example, rape oil, cotton seed oil, soybean oil, oleic, tallow, palmitoleic, linoleic, erucic or other sources of unsaturated vegetable fatty acids, are attached to the ester/ether groups.

20

These chains are referred to below as the ester or ether chains (of the CPE or RSE).

25

The ester or ether chains of the CPE or RSE are preferably predominantly unsaturated. Preferred CPEs or RSEs include sucrose tetratallowate, sucrose tetrarapeate, sucrose tetraoleate, sucrose tetraesters of soybean oil or cotton seed oil, cellobiose tetraoleate, sucrose trioleate, sucrose triapeate, sucrose pentaoleate, sucrose pentarapeate, sucrose hexaoleate, sucrose hexarapeate,

30

- 19 -

sucrose triesters, pentaesters and hexaesters of soybean oil or cotton seed oil, glucose tiroleate, glucose tetraoleate, xylose trioleate, or sucrose tetra-,tri-, penta- or hexa- esters with any mixture of predominantly unsaturated fatty acid chains.

The most preferred CPEs or RSEs are those with monounsaturated fatty acid

5 chains, i.e. where any polyunsaturation has been removed by partial hydrogenation. However some CPEs or RSEs based on polyunsaturated fatty acid chains, e.g. sucrose tetralinoleate, may be used provided most of the polyunsaturation has been removed by partial hydrogenation.

10 The most highly preferred liquid CPEs or RSEs are any of the above but where the polyunsaturation has been removed through partial hydrogenation.

Preferably 40 % or more of the fatty acid chains contain an unsaturated bond, more preferably 50 % or more, most preferably 60% or more. In most cases 65 % to 100 %, e.g. 65 % to 95 % contain an unsaturated bond.

15

CPEs are preferred for use with the present invention. Inositol is a preferred example of a cyclic polyol. Inositol derivatives are especially preferred.

In the context of the present invention, the term cyclic polyol encompasses all
20 forms of saccharides. Indeed saccharides are especially preferred for use with this invention. Examples of preferred saccharides for the CPEs or RSEs to be derived from are monosaccharides and disaccharides.

Examples of monosaccharides include xylose, arabinose, galactose, fructose,
25 sorbose and glucose. Glucose is especially preferred. Examples of disaccharides include maltose, lactose, cellobiose and sucrose. Sucrose is especially preferred. An example of a reduced saccharide is sorbitan.

The liquid or soft solid CPEs can be prepared by methods well known to those
30 skilled in the art. These include acylation of the cyclic polyol or reduced

- 20 -

saccharide with an acid chloride; trans-esterification of the cyclic polyol or reduced saccharide fatty acid esters using a variety of catalysts; acylation of the cyclic polyol or reduced saccharide with an acid anhydride and acylation of the cyclic polyol or reduced saccharide with a fatty acid. See for instance US 4 386 213 and
5 AU 14416/88 (both P&G).

It is preferred if the CPE or RSE has 3 or more, preferably 4 or more ester or ether groups. If the CPE is a disaccharide it is preferred if the disaccharide has 3 or more ester or ether groups. Particularly preferred CPEs are esters with a degree
10 of esterification of 3 to 5, for example, sucrose tri, tetra and penta esters.

Where the cyclic polyol is a reducing sugar it is advantageous if each ring of the CPE has one ether or ester group, preferably at the C_i position. Suitable examples of such compounds include methyl glucose derivatives.
15

Examples of suitable CPEs include esters of alkyl(poly)glucosides, in particular alkyl glucoside esters having a degree of polymerisation of 2.

The length of the unsaturated (and saturated if present) chains in the CPE or RSE
20 is C₈-C₂₂, preferably C₁₂-C₂₂. It is possible to include one or more chains of C_i-C_s, however these are less preferred.

The liquid or soft solid CPEs or RSEs which are suitable for use in the present invention are characterised as materials having a solid:liquid ratio of between
25 50:50 and 0:1 00 at 20°C as determined by T₂ relaxation time NMR, preferably between 43:57 and 0:1 00, most preferably between 40:60 and 0:1 00, such as, 20:80 and 0:1 00. The T₂ NMR relaxation time is commonly used for characterising solid:liquid ratios in soft solid products such as fats and margarines. For the purpose of the present invention, any component of the signal with a T₂ of

- 21 -

less than 100 μ s is considered to be a solid component and any component with $T_2 \geq 100 \mu$ s is considered to be a liquid component.

For the CPEs and RSEs, the prefixes (e.g. tetra and penta) only indicate the average degrees of esterification. The compounds exist as a mixture of materials ranging from the monoester to the fully esterified ester. It is the average degree of esterification which is used herein to define the CPEs and RSEs.

The HLB of the CPE or RSE is typically between 1 and 3.

Where present, the CPE or RSE is preferably present in the composition in an amount of 0.5-50% by weight, based upon the total weight of the composition, more preferably 1-30% by weight, such as 2-25%, eg 2-20%.

The CPEs and RSEs for use in the compositions of the invention include sucrose tetraoleate, sucrose pentaerucate, sucrose tetraerucate and sucrose pentaoleate.

Co-softeners and fatty complexing agents

Co-softeners may be used. When employed, they are typically present at from 0.1 to 20% and particularly at from 0.5 to 10%, based on the total weight of the composition. Preferred co-softeners include fatty esters, and fatty N-oxides. Fatty esters that may be employed include fatty monoesters, such as glycerol monostearate, fatty sugar esters, such as those disclosed WO 01/46361 (Unilever).

The compositions of the present invention may comprise a fatty complexing agent.

Especially suitable fatty complexing agents include fatty alcohols and fatty acids.

Of these, fatty alcohols are most preferred.

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Fatty complexing material may be used to improve the viscosity profile of the composition.

5 Preferred fatty acids include hardened tallow fatty acid (available under the tradename Pristerene™, ex Uniqema). Preferred fatty alcohols include hardened tallow alcohol (available under the tradenames Stenol™ and Hydrenol™, ex Cognis and Laurex™ CS, ex Albright and Wilson).

10 The fatty complexing agent is preferably present in an amount greater than 0.3 to 5% by weight based on the total weight of the composition. More preferably, the fatty component is present in an amount of from 0.4 to 4%. The weight ratio of the mono-ester component of the quaternary ammonium fabric softening material to the fatty complexing agent is preferably from 5:1 to 1:5, more preferably 4:1 to 1:4, most preferably 3:1 to 1:3, e.g. 2:1 to 1:2.

15

Non-ionic surfactant

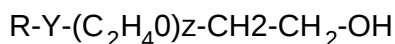
20 The compositions of the present invention may further comprise a nonionic surfactant. Typically these can be included for the purpose of stabilising the compositions. These are particularly suitable for compositions comprising hardened quaternary ammonium compounds.

25 Suitable nonionic surfactants include addition products of ethylene oxide and/or propylene oxide with fatty alcohols, fatty acids and fatty amines. Any of the alkoxylated materials of the particular type described hereinafter can be used as the nonionic surfactant.

Suitable surfactants are substantially water soluble surfactants of the general formula:

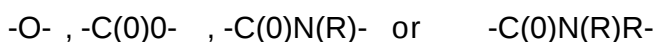
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where R is selected from the group consisting of primary, secondary and branched chain alkyl and/or acyl hydrocarbyl groups (when Y = -C(=O)O-, R ≠ an acyl hydrocarbyl group); primary, secondary and branched chain alkenyl hydrocarbyl groups; and primary, secondary and branched chain alkenyl-substituted phenolic hydrocarbyl groups; the hydrocarbyl groups having a chain length of from 8 to about 25, preferably 10 to 20, e.g. 14 to 18 carbon atoms.

In the general formula for the ethoxylated nonionic surfactant, Y is typically:



in which R has the meaning given above or can be hydrogen; and Z is at least about 8, preferably at least about 10 or 11.

Preferably the nonionic surfactant has an HLB of from about 7 to about 20, more preferably from 10 to 18, e.g. 12 to 16. Genapol™ C200 (Clariant) based on coco chain and 20 EO groups is an example of a suitable nonionic surfactant.

If present, the nonionic surfactant is present in an amount from 0.01 to 10%, more preferably 0.1 to 5 by weight, based on the total weight of the composition.

Shading Dyes

Optional shading dyes can be used. Preferred dyes are violet or blue. Suitable and preferred classes of dyes are discussed below. Moreover the unsaturated quaternary ammonium compounds are subject to some degree of UV light and/or transition metal ion catalysed radical auto-oxidation, with an attendant risk of yellowing of fabric. The presence of a shading dye also reduces the risk of yellowing from this source.

- 24 -

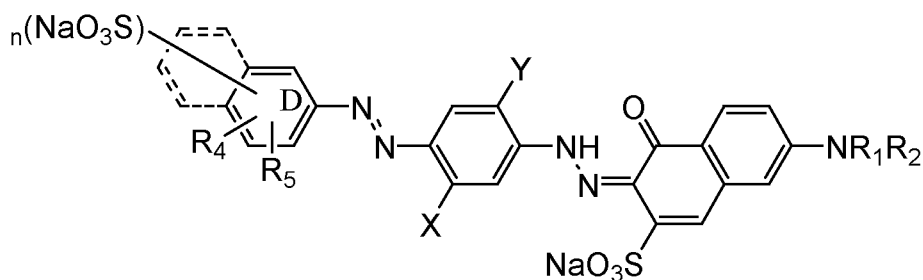
Different shading dyes give different levels of colouring. The level of shading dye present in the compositions of the present invention depend, therefore, on the type of shading dye. Preferred overall ranges, suitable for the present invention are from 0.00001 to 0.1 wt %, more preferably 0.0001 to 0.01 wt %, most preferably 0.0005 to 0.005 wt % by weight of the total composition.

Direct Dyes

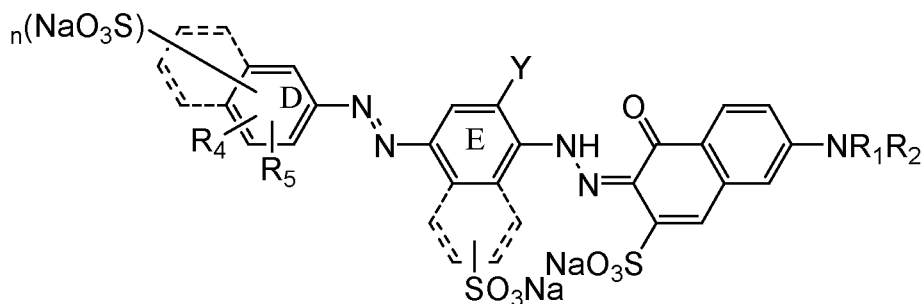
Direct dyes (otherwise known as substantive dyes) are the class of water soluble dyes which have an affinity for fibres and are taken up directly. Direct violet and direct blue dyes are preferred.

Preferably the dye are *bis-azo* or *tris-azo* dyes are used.

Most preferably, the direct dye is a direct violet of the following structures:



or



- 25 -

wherein:

ring D and E may be independently naphthyl or phenyl as shown;

R₁ is selected from: hydrogen and C1-C4-alkyl, preferably hydrogen;

R₂ is selected from: hydrogen, C1-C4-alkyl, substituted or unsubstituted phenyl

5 and substituted or unsubstituted naphthyl, preferably phenyl;

R₃ and R₄ are independently selected from: hydrogen and C1-C4-alkyl, preferably hydrogen or methyl;

X and Y are independently selected from: hydrogen, C1-C4-alkyl and C1-C4-alkoxy; preferably the dye has X= methyl; and, Y = methoxy and n is 0, 1 or 2,

10 preferably 1 or 2.

Preferred dyes are direct violet 7, direct violet 9, direct violet 11, direct violet 26, direct violet 31, direct violet 35, direct violet 40, direct violet 41, direct violet 51, and direct violet 99. Bis-azo copper containing dyes such as direct violet 66 may
15 be used.

The benzidine based dyes are less preferred.

Preferably the direct dye is present at 0.00001 wt% to 0.0010 wt% of the
20 formulation.

In another embodiment the direct dye may be covalently linked to the photo-bleach, for example as described in WO2006/024612.

25 **Acid dyes**

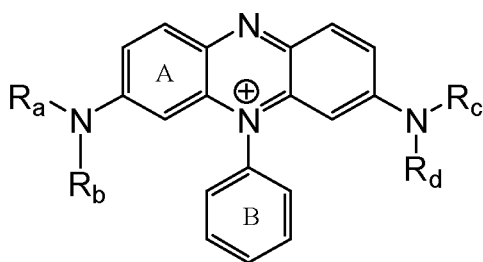
Cotton substantive acid dyes give benefits to cotton containing garments.

Preferred dyes and mixes of dyes are blue or violet. Preferred acid dyes are:

(i) azine dyes, wherein the dye is of the following core structure:

30

- 26 -



wherein R_a , R_b , R_c and R_d are selected from: H, a branched or linear C1 to C7-alkyl chain, benzyl, a phenyl, and a naphthyl;

- 5 the dye is substituted with at least one SO_3^- or $-\text{COO}^-$ group;
 the B ring does not carry a negatively charged group or salt thereof;
 and the A ring may further substituted to form a naphthyl;
 the dye is optionally substituted by groups selected from: amine, methyl, ethyl, hydroxyl, methoxy, ethoxy, phenoxy, Cl, Br, I, F, and NO_2 .

10

Preferred azine dyes are: acid blue 98, acid violet 50, and acid blue 59, more preferably acid violet 50 and acid blue 98.

Other preferred non-azine acid dyes are acid violet 17, acid black 1 and acid blue

15

Preferably the acid dye is present at 0.0005 wt% to 0.01 wt% of the formulation.

Hydrophobic dyes

20

The composition for use in the invention may comprise one or more hydrophobic dyes selected from benzodifuranes, methine, triphenylmethanes, naphthalimides, pyrazole, naphthoquinone, anthraquinone and mono-azo or di-azo dye chromophores. Hydrophobic dyes are dyes which do not contain any charged

25 water solubilising group. Hydrophobic dyes may be selected from the groups of

- 27 -

disperse and solvent dyes. Blue and violet anthraquinone and mono-azo dye are preferred.

Preferred dyes include solvent violet 13, disperse violet 27 disperse violet 26,
5 disperse violet 28, disperse violet 63 and disperse violet 77.

Preferably the hydrophobic dye is present at 0.0001 wt% to 0.005 wt% of the formulation.

10 **Basic dyes**

Basic dyes are organic dyes which carry a net positive charge. They deposit onto cotton. They are of particular utility for used in composition that contain predominantly cationic surfactants. Dyes may be selected from the basic violet
15 and basic blue dyes listed in the Colour Index International.

Preferred examples include triarylmethane basic dyes, methane basic dye, anthraquinone basic dyes, basic blue 16, basic blue 65, basic blue 66, basic blue 67, basic blue 71, basic blue 159, basic violet 19, basic violet 35, basic violet 38,
20 basic violet 48; basic blue 3, basic blue 75, basic blue 95, basic blue 122, basic blue 124, basic blue 141 .

Reactive dyes

25 Reactive dyes are dyes which contain an organic group capable of reacting with cellulose and linking the dye to cellulose with a covalent bond. They deposit onto cotton.

Preferably the reactive group is hydrolysed or reactive group of the dyes has been
30 reacted with an organic species such as a polymer, so as to the link the dye to this

- 28 -

species. Dyes may be selected from the reactive violet and reactive blue dyes listed in the Colour Index International.

Preferred examples include reactive blue 19, reactive blue 163, reactive blue 182
5 and reactive blue 96.

Dye conjugates

Dye conjugates are formed by binding direct, acid or basic dyes to polymers or
10 particles via physical forces.

Dependent on the choice of polymer or particle they deposit on cotton or synthetics. A description is given in WO2006/055787. They are not preferred.

15 Particularly preferred dyes are: direct violet 7, direct violet 9, direct violet 11, direct violet 26, direct violet 31, direct violet 35, direct violet 40, direct violet 41, direct violet 51, direct violet 99, acid blue 98, acid violet 50, acid blue 59, acid violet 17, acid black 1, acid blue 29, solvent violet 13, disperse violet 27 disperse violet 26, disperse violet 28, disperse violet 63, disperse violet 77 and mixtures thereof.

20

Further Optional Ingredients

The compositions of the invention may contain one or more other ingredients. Such ingredients include further preservatives (e.g. bactericides), pH buffering
25 agents, perfume carriers, hydrotropes, anti-redeposition agents, soil-release agents, polyelectrolytes, anti-shrinking agents, anti-wrinkle agents, anti-oxidants, sunscreens, anti-corrosion agents, drape imparting agents, anti-static agents, ironing aids, silicones, antifoams, colourants, pearlisers and/or opacifiers, natural oils/extracts, processing aids, e.g. electrolytes, hygiene agents, e.g. anti-bacterials
30 and antifungals, thickeners and skin benefit agents.

- 29 -

The fabric softening compositions may also comprise viscosity modifiers. Suitable viscosity modifiers are disclosed, for example, in WO 02/08161 1, US 2004/0214736, US 6827795, EP 0501 714, US 2003/01 04964, EP 0385749 and EP 331237.

5

Product Form and Use

The compositions of in the present invention are laundry treatment products, preferably a laundry detergent composition or a fabric softening composition, most preferably a fabric softening composition. The compositions are preferably for use in a laundry process, preferably a domestic laundry process, and most preferably in an automatic washing machine.

Fabric softening compositions have a pH ranging from about 2.5 to 6, preferably from about 2.5 to 4.5, most preferably about 2.5 to 2.8. The compositions of the invention may also contain pH modifiers such as hydrochloric acid or lactic acid.

A composition of the invention is preferably in liquid form. The composition may be a concentrate to be diluted in a solvent, including water, before use. The composition may also be a ready-to-use (in-use) composition. Preferably the composition is provided as a ready to use liquid comprising an aqueous phase. The aqueous phase may comprise water-soluble species, such as mineral salts or short chain (C₁₋₄) alcohols.

The composition is preferably for use in the rinse cycle of a home textile laundering operation, where, it may be added directly in an undiluted state to a washing machine, e.g. through a dispenser drawer or, for a top-loading washing machine, directly into the drum. The washing machine is preferably automatic. Alternatively, it can be diluted prior to use. The compositions may also be used in a domestic hand-washing laundry operation.

- 30 -

Preparation

Compositions used in the invention can be prepared by any method suitable for preparing dispersed, emulsified systems. One method involves the forming of a molten premixture of the active materials in water at an elevated temperature, adding additional water to obtain the desired active concentration, and then cooling to ambient temperature. When desired, some minor ingredients such as electrolytes, colouring agents, etc. may be post-dosed. A second method involves the forming of the product by phase inversion of a water in hydrocarbon emulsion, wherein the cationic material is either part of the hydrocarbon phase or added as a separate predispersion. This method is advantageous, because this provides very finely divided hydrocarbon particles in the final product. In an alternative method the encapsulated repellent may be post dosed, preferably in the form of an aqueous slurry.

Examples

Embodiments of the invention will now be illustrated by the following non-limiting examples. Further modifications will be apparent to the person skilled in the art.

Examples of the invention are represented by a number. Comparative examples are represented by a letter.

Unless otherwise stated, amounts of components are expressed as a percentage of the total weight of the composition.

Example 1:- Preparation of Composition 1 and Comparative Example A

Composition 1, in accordance with the invention, was a fabric conditioner composition comprising encapsulated mosquito repellent (Citrepel™ capsules,

- 31 -

supplied by Celessence). The capsules were included in the fabric conditioner at a level which was equivalent to 5% free mosquito repellent by weight.

Comparative Example A was a fabric conditioner composition comprising 5 wt % of unconfined mosquito repellent (Citriodiol TM supplied by Citrefine).

The fabric conditioners were prepared using the following method:-

- The softening active and fatty alcohol were melted together at about 60
10 - 65°C to form a co-melt.
- The water was heated to about 50°C with stirring.
- The add minor were then added to the water to form a water phase.
- The co-melt was then added to the heated water phase with stirring.
- The resulting product was then allowed to cool.
- 15 - The mosquito repellent (unconfined or encapsulated) and antifoam
 were then post dosed into the cooled product.

Citriodiol was received as a yellow oil containing some solid crystals. The Citriodiol was placed in a 50°C oven for 30 minutes to melt these crystals
20 prior to addition to the fabric conditioner with stirring at room temperature.

The resulting compositions are given in the following table:-

- 32 -

Table 1:- Compositions (wt %, as 100 % active) of Composition 1 and Comparative Example A

Ingredient	Tradename	1	A
Softener active	TEP-88L ¹	12.0	12.0
Fatty alcohol	Cetostearyl alcohol	0.4	0.4
Acid ⁶	HCl		
Antifoam ³	Wacker SRE	0.01	0.01
Mosquito repellent (unconfined) ⁴	Citriodiol	-	5.0
Encapsulated mosquito repellent ⁵	Citrepel	16.0	-
Perfume		0.5	0.5
Water and minors ²	-	To 100 %	To 100 %

¹Palm based soft TEA Quat, ex FXG

²Pearlescer, preservative, sequestrant, etc

5 ³Based on 100 % activity, ex Wacker

⁴Citriodiol supplied by Citrefine

⁵Citrepel encaps supplied by Celessence, equivalent to 5 wt % of free mosquito repellent.

⁶ To pH 2.0-2.5

10 Encapsulated perfume slurry "Blue Touch" (ex IFF)

Example 2:- Treatment of fabric using Composition 1 and Comparative**Example A**

5 Terry toweling fabric monitors were treated with Composition 1 and Comparative Example 1 as follows:-

10 Terry toweling fabric monitors (20 cm x 20 cm) were padded with the aqueous dispersions of Composition 1 or Comparative Example A. The compositions were dispersed in two litres of deionised water at an amount of 8.4 g per litre. Each fabric monitor was soaked for approximately five seconds in the liquor before being run through a mangle. In this way, the monitors absorbed approx. 200 % of the fabric weight in liquor. The treated monitors were then line dried overnight. The dried monitors were then sealed in Al foil.

15 **Example 3:- Release of pest repellent from fabric treated with Composition 1 and Comparative Example A**

20 The release of pest repellent (namely PMD) from the treated cloths was measured using Proton Transfer Mass Spectroscopy (PTr-MS) to analyse the static headspace of fabric monitors. Each fabric sample was placed in a flexible plastic bag and the bag then evacuated of air. The bag was then filled with clean zero-air, closed and left to equilibrate for 45 minutes. The air inside the bag was then analysed by PTR-MS. The largest mass ion peak was observed at 137.

25 Analysis was carried out at sequential time points over a three day period:-

- At 9 am on the morning of day 1 after drying, after approximately 16 hours exposure to air.
- At midday on day 1, after approximately 19 hours exposure to air.
- 30 · At 6pm on day 1 after drying, after approximately 25 hours exposure to air.
- In the morning 3 days after drying, after 64 hours exposure to air.

- 34 -

The tests were mainly carried out in triplicate.

The monitors assessed at 9 am of day 1 were also rubbed to see if this had an effect on the release of the repellent active. To do this, after the analysis

- 5 described above, the monitor was once more evacuated and refilled with fresh air. The fabric monitor was then rubbed five times through the flexible plastic bag and the PTr-MS analysis repeated.

The results of the analysis are shown in Table 3 below: -

10

Table 3: Intensity of the mass ion peak at 137 for monitors treated with Comparative Example A and Composition 1, at progressive time intervals and also with rubbing.

	Time interval				
	9am	12 pm	1 day	3 days	9 am + rubbing
Comparative A					
1)	3.5	-	-	-	2.4
2)	3.1	-	-	-	-
3)	2.0	-	-	-	-
Composition 1					
1)	79.5	75.8	73.5	38.7	147.8
2)	80.6	58.4	57.8	43.6	152.0
3)	78.5	49.0	47.8	36.6	161.4

- 15 It will be seen that the headspace concentrations were much higher for the encapsulated repellent than for the non-encapsulated repellent. The active ingredient was observed on the fabric up to three days after drying.

- 35 -

In addition, upon rubbing the fabric five times and resampling the headspace the concentration of p-methane-3,8-diol peaks approximately doubled.

CLAIMS

1. A fabric treatment composition for use in a laundry process, comprising
 - 5 (a) a fabric treatment active;
 - (b) a capsule having a shell and core, wherein the core comprises a pest repellent in an amount of from 40 to 100 mol %, based on the total core; and
 - (c) a further component, which is a perfume;
- 10 wherein the perfume and the pest repellent are different.
2. A composition as claimed in claim 1, wherein the perfume is encapsulated.
3. A composition as claimed in claim 1 or claim 2, which is a fabric conditioning
- 15 composition and the fabric treatment active is a fabric softening active.
4. A composition as claimed in claim 3, wherein the fabric softening active is an ester-linked quaternary ammonium active compound.
- 20 5. A composition as claimed in any preceding claim, wherein the pest repellent is a repellent of species selected from the classes Arachnida, Chilopoda, Diplopoda, Pauropoda, Symphyla, Insecta and Entognatha, preferably insecta.
- 25 6. As composition as claimed in claim 6 wherein the repellent is effective against Diptera, preferably Nematocera, more preferably Culicomorpha, even more preferably Culicidae, especially Culicidae, more especially insects of the genera Anopheles and/or Aedes, most especially an insect which is vector of malaria, yellow fever or dengue.

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7. A composition as claimed in claim 6, wherein the pest repellent is a mosquito repellent.
8. A composition as claimed in any preceding claim, wherein the pest repellent comprises p-menthane-3,8-diol.
9. A composition as claimed in any preceding claim, wherein the capsule is present in an amount of from 0.5 to 50 wt %, by weight of the total composition.
10. A composition as claimed in any preceding claim, which further comprises non-encapsulated pest repellent.
11. A composition as claimed in any preceding claim, wherein the shell comprises melamine formaldehyde.
12. A composition as claimed in any preceding claim, wherein the shell is capable of being broken by application of shear force such as rubbing.
13. A method for treating fabric comprising contacting the fabric with an aqueous dispersion comprising the composition defined in any one of claims 1 to 12, preferably during a laundry process.
14. A method as claimed in claim 13, which takes place in an automatic washing machine.
15. Use of a composition as claimed in any one of claims 1 to 12 to repel pests from fabric treated with the composition.