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(54) **USE OF AN ANIONICALLY-MODIFIED CELLULOSIC POLYMER AS A DYE TRANSFER
INHIBITOR DURING A TEXTILE LAUNDERING PROCESS**

(57) The present invention relates to the use of an anionically-modified cellulosic polymer to prevent the redeposition of dyes in a textile laundering wash bath from coloured textiles onto white or differently-coloured textiles also present in the same wash bath.

EP 3 798 290 A1

Description

FIELD OF THE INVENTION

- 5 **[0001]** The present invention relates to the use of an anionically-modified cellulosic polymer to prevent the redeposition of dyes in a textile laundering wash bath from coloured textiles onto white or differently-coloured textiles also present in the same wash bath.
- [0002]** The present invention relates to the use of an anionically-modified cellulosic polymer as a dye transfer inhibitor during a textile laundering process.
- 10 **[0003]** The textile laundering process can be a hand-washing process or an automatic washing machine laundering process.

BACKGROUND OF THE INVENTION

- 15 **[0004]** During a textile laundering process, the function of dye transfer inhibitor (DTI) agents is to prevent the redeposition of dyes from coloured textiles onto white or differently coloured textiles also present in the same wash, thus protecting the latter from tainting or staining. The issue has historically been associated with direct and acid dyes, which form relatively weak associations with textile fibres compared to other dye classes such as reactive dyes. Many agents have been described as DTI agents against such dyes, especially polymers such as polyvinylpyrrolidone (e.g., Sokalan® HP 50 from BASF), vinylpyrrolidone-vinylimidazole copolymer (e.g., Sokalan® HP 56 from BASF), poly(4-vinylpyridine-N-oxide) (e.g., Reilline® 4035 and 350 from Vertellus) and poly(4-vinylpyridine N-carboxymethylbetaine) (e.g., Chromabond® S 400 from Ashland).
- 20 **[0005]** In recent years, many direct dyes have been replaced in washable clothing by reactive dyes which have much better wash-fastness, yet dye transfer remains an issue for today's consumers, especially when washing new items which may have been incompletely rinsed of free dye during manufacture. The inventors have observed that other classes of dyes such as vat and sulfur dyes are important causes of dye transfer.
- 25 **[0006]** It is known that anionically-modified cellulosic polymers, such as carboxymethyl cellulose (CMC), act as soil suspension polymers in laundry detergents. It is known that the soil suspension mechanism of these polymers is due to two mechanism. Firstly, the polymers adsorb at the interface of the suspended soil particle and the liquid of the laundering wash bath, which leads to a change in the electrical charge of the suspended soil particle. And secondly, the polymers adsorb onto the surface of the textile in the laundering wash bath, which leads to a change in the electrical and steric properties of the textile surface.
- 30 **[0007]** Due to the negative charge of the anionic moiety of these polymers, e.g. such as the COO-moiety of the CMC, the zeta potential is increased, and the barrier between the suspended soil particles and the textile surface becomes stronger and there is less redeposition. DTI agents such as polyvinylpyrrolidone, vinylpyrrolidone-vinylimidazole copolymer, poly(4-vinylpyridine-N-oxide) and poly(4-vinylpyridine N-carboxymethylbetaine) form complexes with dyes released from coloured fabrics thus preventing their redeposition on to other fabrics.
- 35 **[0008]** The inventors have surprisingly found that anionically-modified cellulosic polymers, such as carboxymethyl cellulose (CMC), common soil suspension additives in laundry detergents, can significantly reduce dye transfer and hence function as an effective DTI agent. Without wishing to be bound by theory, the inventors believe that the anionically-modified cellulosic polymer is reducing dye transfer through one or more of the following mechanisms:
- 40 (i) adsorption on to dyed (donor) fabrics reducing the release of dye into the wash solution;
 (ii) adsorption on to insoluble dye/textile particles that have been abraded from the dyed (donor) item, reducing their affinity for receiver fabric surfaces; and
 45 (iii) adsorption on to receiver fabrics (e.g. white items) acting as an electrostatic barrier to dye particles.

SUMMARY OF THE INVENTION

- 50 **[0009]** The present invention relates to the use of an anionically-modified cellulosic polymer to prevent the redeposition of dyes in a textile laundering wash bath from coloured textiles onto white or differently-coloured textiles also present in the same wash bath.
- [0010]** The present invention relates to the use of an anionically-modified cellulosic polymer as a dye transfer inhibitor during a textile laundering process.
- 55

DETAILED DESCRIPTION OF THE INVENTION

- [0011] Anionically-modified cellulosic polymer.** The anionically-modified cellulosic polymer is used to prevent the

red deposition of dyes in a textile laundering wash bath from coloured textiles onto white or differently-coloured textiles also present in the same wash bath.

[0012] The anionically-modified cellulosic polymer is used as a dye transfer inhibitor during a textile laundering process.

[0013] Any anionically-modified cellulosic polymer is suitable for use in the present invention. A preferred anionically-modified cellulosic polymer is carboxymethyl cellulose (CMC). A preferred carboxymethyl cellulose has a degree of substitution (DS) of at least 0.55, and has a degree of blockiness (DB) of at least 0.35, and has a DS+DB in the range of from 1.05 to 2.00.

[0014] Suitable CMCs may also be additionally modified, for example ether modified carboxymethyl cellulose, ether modified carboxyethyl cellulose, ether modified carboxymethylethyl cellulose, ester modified carboxymethyl cellulose, ester modified carboxy ethylcellulose, ester modified carboxymethylethyl cellulose, amido modified carboxymethyl cellulose, amido modified carboxyethyl cellulose, amido modified carboxymethylethyl cellulose, and mixtures thereof. Other suitable anionically-modified cellulosic polymer is sulfoethyl cellulose and derivatives thereof. Further anionically-modified celluloses are disclosed in US 6,790,822.

[0015] The anionically-modified cellulosic polymer may be comprised by any laundry detergent composition, such as a solid laundry detergent composition, a liquid laundry detergent composition, or a water-soluble unit dose laundry detergent composition (such as a detergent pouch). A highly suitable laundry detergent composition is a solid laundry detergent composition, such a laundry detergent powder.

[0016] The anionically-modified cellulosic polymer can be used towards any dye present in the laundering wash bath, but is particularly useful towards direct dyes, acid dyes, vat dyes and sulfur dyes.

[0017] Examples of suitable polymers are the carboxymethyl cellulose products sold under the tradenames Finfix® (CP Kelco), Detercel® (Amtext), USK® (USK Kimya), Carbocel® (Lamberti), Mikro-Technik® (Mikro-Technik), Dencell® (Denkim).

[0018] Solid laundry detergent composition: A suitable laundry detergent composition is a solid free-flowing particulate laundry detergent composition, such as a laundry detergent powder. The laundry detergent composition is typically a fully formulated laundry detergent composition, not a portion thereof such as a spray-dried, extruded or agglomerate particle that only forms part of the laundry detergent composition. Typically, the solid composition comprises a plurality of chemically different particles, such as spray-dried base detergent particles and/or agglomerated base detergent particles and/or extruded base detergent particles, in combination with one or more, typically two or more, or five or more, or even ten or more particles selected from: surfactant particles, including surfactant agglomerates, surfactant extrudates, surfactant needles, surfactant noodles, surfactant flakes; phosphate particles; zeolite particles; silicate salt particles, especially sodium silicate particles; carbonate salt particles, especially sodium carbonate particles; polymer particles such as carboxylate polymer particles, cellulosic polymer particles, starch particles, polyester particles, polyamine particles, terephthalate polymer particles, polyethylene glycol particles; aesthetic particles such as coloured noodles, needles, lamellae particles and ring particles; enzyme particles such as protease granulates, amylase granulates, lipase granulates, cellulase granulates, mannanase granulates, pectate lyase granulates, xyloglucanase granulates, bleaching enzyme granulates and co- granulates of any of these enzymes, preferably these enzyme granulates comprise sodium sulphate; bleach particles, such as percarbonate particles, especially coated percarbonate particles, such as percarbonate coated with carbonate salt, sulphate salt, silicate salt, borosilicate salt, or any combination thereof, perborate particles, bleach activator particles such as tetra acetyl ethylene diamine particles and/or alkyl oxybenzene sulphonate particles, bleach catalyst particles such as transition metal catalyst particles, and/or isoquinolinium bleach catalyst particles, pre-formed peracid particles, especially coated pre-formed peracid particles; filler particles such as sulphate salt particles and chloride particles; clay particles such as montmorillonite particles and particles of clay and silicone; flocculant particles such as polyethylene oxide particles; wax particles such as wax agglomerates; silicone particles, brightener particles; dye transfer inhibition particles; dye fixative particles; perfume particles such as perfume microcapsules and starch encapsulated perfume accord particles, or pro-perfume particles such as Schiff base reaction product particles; hueing dye particles; chelant particles such as chelant agglomerates; and any combination thereof.

[0019] Suitable laundry detergent compositions comprise a detergent ingredient selected from: deterative surfactant, such as anionic deterative surfactants, non-ionic deterative surfactants, cationic deterative surfactants, zwitterionic deterative surfactants and amphoteric deterative surfactants; polymers, such as carboxylate polymers, soil release polymer, anti-redeposition polymers, cellulosic polymers and care polymers; bleach, such as sources of hydrogen peroxide, bleach activators, bleach catalysts and pre-formed peracids; photobleach, such as such as zinc and/or aluminium sulphonated phthalocyanine; enzymes, such as proteases, amylases, cellulases, lipases; zeolite builder; phosphate builder; co-builders, such as citric acid and citrate; carbonate, such as sodium carbonate and sodium bicarbonate; sulphate salt, such as sodium sulphate; silicate salt such as sodium silicate; chloride salt, such as sodium chloride; brighteners; chelants; hueing agents; dye transfer inhibitors; dye fixative agents; perfume; silicone; fabric softening agents, such as clay; flocculants, such as polyethyleneoxide; suds suppressors; and any combination thereof.

[0020] Suitable laundry detergent compositions may have a low buffering capacity. Such laundry detergent compositions typically have a reserve alkalinity to pH 9.5 of less than 5.0gNaOH/100g. These low buffered laundry detergent

compositions typically comprise low levels of carbonate salt.

[0021] Deterative Surfactant: Suitable deterative surfactants include anionic deterative surfactants, non-ionic deterative surfactant, cationic deterative surfactants, zwitterionic deterative surfactants and amphoteric deterative surfactants. Suitable deterative surfactants may be linear or branched, substituted or un-substituted, and may be derived from petrochemical material or biomaterial.

[0022] Anionic deterative surfactant: Suitable anionic deterative surfactants include sulphonate and sulphate deterative surfactants.

[0023] Suitable sulphonate deterative surfactants include methyl ester sulphonates, alpha olefin sulphonates, alkyl benzene sulphonates, especially alkyl benzene sulphonates, preferably C₁₀₋₁₃ alkyl benzene sulphonate. Suitable alkyl benzene sulphonate (LAS) is obtainable, preferably obtained, by sulphonating commercially available linear alkyl benzene (LAB); suitable LAB includes low 2-phenyl LAB, other suitable LAB include high 2-phenyl LAB, such as those supplied by Sasol under the tradename Hyblene®.

[0024] Suitable sulphate deterative surfactants include alkyl sulphate, preferably C₈₋₁₈ alkyl sulphate, or predominantly C₁₂ alkyl sulphate.

[0025] A preferred sulphate deterative surfactant is alkyl alkoxyated sulphate, preferably alkyl ethoxyated sulphate, preferably a C₈₋₁₈ alkyl alkoxyated sulphate, preferably a C₈₋₁₈ alkyl ethoxyated sulphate, preferably the alkyl alkoxyated sulphate has an average degree of alkoxylation of from 0.5 to 20, preferably from 0.5 to 10, preferably the alkyl alkoxyated sulphate is a C₈₋₁₈ alkyl ethoxyated sulphate having an average degree of ethoxylation of from 0.5 to 10, preferably from 0.5 to 5, more preferably from 0.5 to 3 and most preferably from 0.5 to 1.5.

[0026] The alkyl sulphate, alkyl alkoxyated sulphate and alkyl benzene sulphonates may be linear or branched, substituted or un-substituted, and may be derived from petrochemical material or biomaterial.

[0027] Other suitable anionic deterative surfactants include alkyl ether carboxylates.

[0028] Suitable anionic deterative surfactants may be in salt form, suitable counter-ions include sodium, calcium, magnesium, amino alcohols, and any combination thereof. A preferred counterion is sodium.

[0029] Non-ionic deterative surfactant: Suitable non-ionic deterative surfactants are selected from the group consisting of: C₈-C₁₈ alkyl ethoxylates, such as, NEODOL® non-ionic surfactants from Shell; C₆-C₁₂ alkyl phenol alkoxyates wherein preferably the alkoxyate units are ethyleneoxy units, propyleneoxy units or a mixture thereof; C₁₂-C₁₈ alcohol and C₆-C₁₂ alkyl phenol condensates with ethylene oxide/propylene oxide block polymers such as Pluronic® from BASF; alkylpolysaccharides, preferably alkylpolyglycosides; methyl ester ethoxylates; polyhydroxy fatty acid amides; ether capped poly(oxyalkylated) alcohol surfactants; and mixtures thereof.

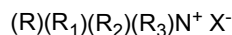
[0030] Suitable non-ionic deterative surfactants are alkylpolyglucoside and/or an alkyl alkoxyated alcohol.

[0031] Suitable non-ionic deterative surfactants include alkyl alkoxyated alcohols, preferably C₈₋₁₈ alkyl alkoxyated alcohol, preferably a C₈₋₁₈ alkyl ethoxyated alcohol, preferably the alkyl alkoxyated alcohol has an average degree of alkoxylation of from 1 to 50, preferably from 1 to 30, or from 1 to 20, or from 1 to 10, preferably the alkyl alkoxyated alcohol is a C₈₋₁₈ alkyl ethoxyated alcohol having an average degree of ethoxylation of from 1 to 10, preferably from 1 to 7, more preferably from 1 to 5 and most preferably from 3 to 7. The alkyl alkoxyated alcohol can be linear or branched, and substituted or un-substituted.

[0032] Suitable nonionic deterative surfactants include secondary alcohol-based deterative surfactants.

[0033] Cationic deterative surfactant: Suitable cationic deterative surfactants include alkyl pyridinium compounds, alkyl quaternary ammonium compounds, alkyl quaternary phosphonium compounds, alkyl ternary sulphonium compounds, and mixtures thereof.

[0034] Preferred cationic deterative surfactants are quaternary ammonium compounds having the general formula:



wherein, R is a linear or branched, substituted or unsubstituted C₆₋₁₈ alkyl or alkenyl moiety, R₁ and R₂ are independently selected from methyl or ethyl moieties, R₃ is a hydroxyl, hydroxymethyl or a hydroxyethyl moiety, X is an anion which provides charge neutrality, preferred anions include: halides, preferably chloride; sulphate; and sulphonate.

[0035] Zwitterionic deterative surfactant: Suitable zwitterionic deterative surfactants include amine oxides and/or betaines.

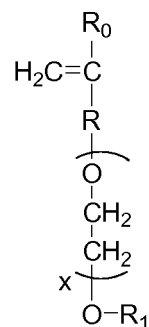
[0036] Polymer: Suitable polymers include carboxylate polymers, soil release polymers, anti-redeposition polymers, cellulosic polymers, care polymers and any combination thereof.

[0037] Carboxylate polymer: The composition may comprise a carboxylate polymer, such as a maleate/acrylate random copolymer or polyacrylate homopolymer. Suitable carboxylate polymers include: polyacrylate homopolymers having a molecular weight of from 4,000 Da to 9,000 Da; maleate/acrylate random copolymers having a molecular weight of from 50,000 Da to 100,000 Da, or from 60,000 Da to 80,000 Da.

[0038] Another suitable carboxylate polymer is a co-polymer that comprises: (i) from 50 to less than 98 wt% structural units derived from one or more monomers comprising carboxyl groups; (ii) from 1 to less than 49 wt% structural units

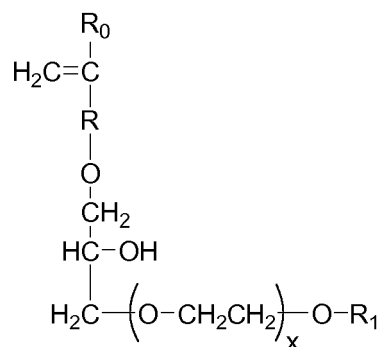
derived from one or more monomers comprising sulfonate moieties; and (iii) from 1 to 49 wt% structural units derived from one or more types of monomers selected from ether bond-containing monomers represented by formulas (I) and (II):

formula (I):



wherein in formula (I), R_0 represents a hydrogen atom or CH_3 group, R represents a CH_2 group, CH_2CH_2 group or single bond, X represents a number 0-5 provided X represents a number 1-5 when R is a single bond, and R_1 is a hydrogen atom or C_1 to C_{20} organic group;

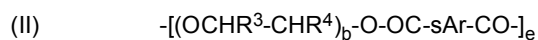
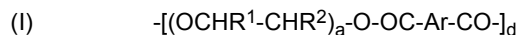
formula (II)



wherein in formula (II), R_0 represents a hydrogen atom or CH_3 group, R represents a CH_2 group, CH_2CH_2 group or single bond, X represents a number 0-5, and R_1 is a hydrogen atom or C_1 to C_{20} organic group.

It may be preferred that the polymer has a weight average molecular weight of at least 50kDa, or even at least 70kDa.

[0039] Soil release polymer: The composition may comprise a soil release polymer. A suitable soil release polymer has a structure as defined by one of the following structures (I), (II) or (III):



wherein:

a, b and c are from 1 to 200;

d, e and f are from 1 to 50;

Ar is a 1,4-substituted phenylene;

sAr is 1,3-substituted phenylene substituted in position 5 with SO_3Me ;

Me is Li, K, Mg/2, Ca/2, Al/3, ammonium, mono-, di-, tri-, or tetraalkylammonium wherein the alkyl groups are C_1 - C_{18} alkyl or C_2 - C_{10} hydroxyalkyl, or mixtures thereof;

R^1 , R^2 , R^3 , R^4 , R^5 and R^6 are independently selected from H or C_1 - $C_{18}n$ - or iso-alkyl; and

R⁷ is a linear or branched C₁-C₁₈ alkyl, or a linear or branched C₂-C₃₀ alkenyl, or a cycloalkyl group with 5 to 9 carbon atoms, or a C₈-C₃₀ aryl group, or a C₆-C₃₀ arylalkyl group.

Suitable soil release polymers are sold by Clariant under the TexCare® series of polymers, e.g. TexCare® SRN240 and TexCare® SRA300. Other suitable soil release polymers are sold by Solvay under the Repel-o-Tex® series of polymers, e.g. Repel-o-Tex® SF2 and Repel-o-Tex® Crystal.

[0040] Anti-redeposition polymer: Suitable anti-redeposition polymers include polyethylene glycol polymers and/or polyethyleneimine polymers.

[0041] Suitable polyethylene glycol polymers include random graft co-polymers comprising: (i) hydrophilic backbone comprising polyethylene glycol; and (ii) hydrophobic side chain(s) selected from the group consisting of: C₄-C₂₅ alkyl group, polypropylene, polybutylene, vinyl ester of a saturated C₁-C₆ mono-carboxylic acid, C₁-C₆ alkyl ester of acrylic or methacrylic acid, and mixtures thereof. Suitable polyethylene glycol polymers have a polyethylene glycol backbone with random grafted polyvinyl acetate side chains. The average molecular weight of the polyethylene glycol backbone can be in the range of from 2,000 Da to 20,000 Da, or from 4,000 Da to 8,000 Da. The molecular weight ratio of the polyethylene glycol backbone to the polyvinyl acetate side chains can be in the range of from 1:1 to 1:5, or from 1:1.2 to 1:2. The average number of graft sites per ethylene oxide unit can be less than 0.02, or less than 0.016, the average number of graft sites per ethylene oxide unit can be in the range of from 0.010 to 0.018, or the average number of graft sites per ethylene oxide unit can be less than 0.010, or in the range of from 0.004 to 0.008.

[0042] Suitable polyethylene glycol polymers are described in WO08/007320.

[0043] A suitable polyethylene glycol polymer is Sokalan HP22.

[0044] Cellulosic polymer: In addition to the anionically-modified cellulose, further cellulose polymers may be included in the composition such as alkyl cellulose, alkyl alkoxyalkyl cellulose, , methyl cellulose, methyl hydroxyethyl cellulose, and mixtures thereof.

[0045] Care polymers: Suitable care polymers include cellulosic polymers that are cationically modified or hydrophobically modified. Such modified cellulosic polymers can provide anti-abrasion benefits and dye lock benefits to fabric during the laundering cycle. Suitable cellulosic polymers include cationically modified hydroxyethyl cellulose.

[0046] Other suitable care polymers include dye lock polymers, for example the condensation oligomer produced by the condensation of imidazole and epichlorhydrin, preferably in ratio of 1:4:1. A suitable commercially available dye lock polymer is Polyquart® FDI (Cognis).

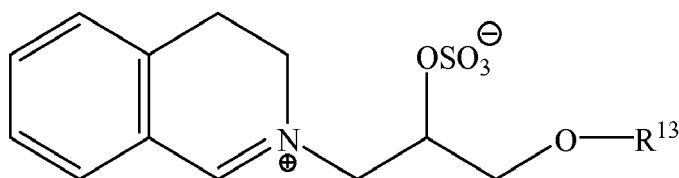
[0047] Other suitable care polymers include amino-silicone, which can provide fabric feel benefits and fabric shape retention benefits.

[0048] Bleach: Suitable bleach includes sources of hydrogen peroxide, bleach activators, bleach catalysts, pre-formed peracids and any combination thereof. A particularly suitable bleach includes a combination of a source of hydrogen peroxide with a bleach activator and/or a bleach catalyst.

[0049] Source of hydrogen peroxide: Suitable sources of hydrogen peroxide include sodium perborate and/or sodium percarbonate.

[0050] Bleach activator: Suitable bleach activators include tetra acetyl ethylene diamine and/or alkyl oxybenzene sulphonate.

[0051] Bleach catalyst: The composition may comprise a bleach catalyst. Suitable bleach catalysts include oxaziridinium bleach catalysts, transition metal bleach catalysts, especially manganese and iron bleach catalysts. A suitable bleach catalyst has a structure corresponding to general formula below:



wherein R¹³ is selected from the group consisting of 2-ethylhexyl, 2-propylheptyl, 2-butyloctyl, 2-pentylnonyl, 2-hexyldecyl, n-dodecyl, n-tetradecyl, n-hexadecyl, n-octadecyl, iso-nonyl, iso-decyl, iso-tridecyl and iso-pentadecyl.

[0052] Pre-formed peracid: Suitable pre-form peracids include phthalimido-peroxycaproic acid.

[0053] Enzymes: Suitable enzymes include lipases, proteases, cellulases, amylases and any combination thereof.

[0054] Protease: Suitable proteases include metalloproteases and/or serine proteases. Examples of suitable neutral or alkaline proteases include: subtilisins (EC 3.4.21.62); trypsin-type or chymotrypsin-type proteases; and metalloproteases. The suitable proteases include chemically or genetically modified mutants of the aforementioned suitable proteases.

[0055] Suitable commercially available protease enzymes include those sold under the trade names Alcalase®, Savi-

nase®, Primase®, Durazym®, Polarzyme®, Kannase®, Liquanase®, Liquanase Ultra®, Savinase Ultra®, Ovozyme®, Neutrase®, Everlase® and Esperase® by Novozymes A/S (Denmark), those sold under the tradename Maxatase®, Maxacal®, Maxapem®, Preferenz P® series of proteases including Preferenz® P280, Preferenz® P281, Preferenz® P2018-C, Preferenz® P2081-WE, Preferenz® P2082-EE and Preferenz® P2083-A/J, Properase®, Purafect®, Purafect Prime®, Purafect Ox®, FN3®, FN4®, Excellase® and Purafect OXP® by DuPont, those sold under the tradename Opticlean® and Optimase® by Solvay Enzymes, those available from Henkel/ Kemira, namely BLAP (sequence shown in Figure 29 of US 5,352,604 with the following mutations S99D + S101 R + S103A + V104I + G159S, hereinafter referred to as BLAP), BLAP R (BLAP with S3T + V4I + V199M + V205I + L217D), BLAP X (BLAP with S3T + V4I + V205I) and BLAP F49 (BLAP with S3T + V4I + A194P + V199M + V205I + L217D) - all from Henkel/Kemira; and KAP (Bacillus alkalophilus subtilisin with mutations A230V + S256G + S259N) from Kao.

[0056] A suitable protease is described in WO11/140316 and WO11/072117.

[0057] **Amylase:** Suitable amylases are derived from AA560 alpha amylase endogenous to Bacillus sp. DSM 12649, preferably having the following mutations: R118K, D183*, G184*, N195F, R320K, and/or R458K. Suitable commercially available amylases include Stainzyme®, Stainzyme® Plus, Natalase, Termamyl®, Termamyl® Ultra, Liquezyme® SZ, Duramyl®, Everest® (all Novozymes) and Spezyme® AA, Preferenz S® series of amylases, Purastar® and Purastar® Ox Am, Optisize® HT Plus (all Du Pont).

A suitable amylase is described in WO06/002643.

[0058] **Cellulase:** Suitable cellulases include those of bacterial or fungal origin. Chemically modified or protein engineered mutants are also suitable. Suitable cellulases include cellulases from the genera *Bacillus*, *Pseudomonas*, *Humicola*, *Fusarium*, *Thielavia*, *Acremonium*, e.g., the fungal cellulases produced from *Humicola insolens*, *Myceliophthora thermophila* and *Fusarium oxysporum*.

[0059] Commercially available cellulases include Celluzyme®, Carezyme®, and Carezyme® Premium, Celluclean® and Whitezyme® (Novozymes A/S), Revitalenz® series of enzymes (Du Pont), and Biotouch® series of enzymes (AB Enzymes). Suitable commercially available cellulases include Carezyme® Premium, Celluclean® Classic. Suitable cellulases are described in WO07/144857 and WO10/056652.

[0060] **Lipase:** Suitable lipases include those of bacterial, fungal or synthetic origin, and variants thereof. Chemically modified or protein engineered mutants are also suitable. Examples of suitable lipases include lipases from *Humicola* (synonym *Thermomyces*), e.g., from *H. lanuginosa* (*T. lanuginosus*).

[0061] The lipase may be a "first cycle lipase", e.g. such as those described in WO06/090335 and WO13/116261. In one aspect, the lipase is a first-wash lipase, preferably a variant of the wild-type lipase from *Thermomyces lanuginosus* comprising T231R and/or N233R mutations. Preferred lipases include those sold under the tradenames Lipex®, Lipolex® and Lipoclean® by Novozymes, Bagsvaerd, Denmark.

[0062] Other suitable lipases include: Lip1 139, e.g. as described in WO2013/171241; and TfuLip2, e.g. as described in WO2011/084412 and WO2013/033318.

[0063] **Other enzymes:** Other suitable enzymes are bleaching enzymes, such as peroxidases/oxidases, which include those of plant, bacterial or fungal origin and variants thereof. Commercially available peroxidases include Guardzyme® (Novozymes A/S). Other suitable enzymes include choline oxidases and perhydrolases such as those used in Gentle Power Bleach™.

[0064] Other suitable enzymes include pectate lyases sold under the tradenames X-Pect®, Pectaway® (from Novozymes A/S, Bagsvaerd, Denmark) and PrimaGreen® (DuPont) and mannanases sold under the tradenames Mannaway® (Novozymes A/S, Bagsvaerd, Denmark), and Mannastar® (Du Pont).

[0065] **Zeolite builder:** The composition may comprise zeolite builder. The composition may comprise from 0wt% to 5wt% zeolite builder, or 3wt% zeolite builder. The composition may even be substantially free of zeolite builder; substantially free means "no deliberately added". Typical zeolite builders include zeolite A, zeolite P and zeolite MAP.

[0066] **Phosphate builder:** The composition may comprise phosphate builder. The composition may comprise from 0wt% to 5wt% phosphate builder, or to 3wt%, phosphate builder. The composition may even be substantially free of phosphate builder; substantially free means "no deliberately added". A typical phosphate builder is sodium tri-polyphosphate.

[0067] **Carbonate salt:** The composition may comprise carbonate salt. The composition may comprise from 0wt% to 10wt% carbonate salt, or to 5wt% carbonate salt. The composition may even be substantially free of carbonate salt; substantially free means "no deliberately added". Suitable carbonate salts include sodium carbonate and sodium bicarbonate.

[0068] **Silicate salt:** The composition may comprise silicate salt. The composition may comprise from 0wt% to 10wt% silicate salt, or to 5wt% silicate salt. A preferred silicate salt is sodium silicate, especially preferred are sodium silicates having a Na₂O:SiO₂ ratio of from 1.0 to 2.8, preferably from 1.6 to 2.0.

[0069] **Sulphate salt:** A suitable sulphate salt is sodium sulphate.

[0070] **Brightener:** Suitable fluorescent brighteners include: di-styryl biphenyl compounds, e.g. Tinopal® CBS-X, di-amino stilbene di-sulfonic acid compounds, e.g. Tinopal® DMS pure Xtra and Blankophor® HRH, and Pyrazoline com-

pounds, e.g. Blankophor® SN, and coumarin compounds, e.g. Tinopal® SWN.

Preferred brighteners are: sodium 2 (4-styryl-3-sulfophenyl)-2H-naphthol[1,2-d]triazole, disodium 4,4'-bis{[(4-anilino-6-(N-methyl-N-2 hydroxyethyl)amino 1,3,5-triazin-2-yl)]amino}stilbene-2-2' disulfonate, disodium 4,4'-bis{[(4-anilino-6-morpholino-1,3,5-triazin-2-yl)]amino}stilbene-2-2' disulfonate, and disodium 4,4'-bis(2-sulfostyryl)biphenyl. A suitable fluorescent brightener is C.I. Fluorescent Brightener 260, which may be used in its beta or alpha crystalline forms, or a mixture of these forms.

[0071] Chelant: The composition may also comprise a chelant selected from: diethylene triamine pentaacetate, diethylene triamine penta(methyl phosphonic acid), ethylene diamine-N'N'-disuccinic acid, ethylene diamine tetraacetate, ethylene diamine tetra(methylene phosphonic acid) and hydroxyethane di(methylene phosphonic acid). A preferred chelant is ethylene diamine-N'N'-disuccinic acid (EDDS) and/or hydroxyethane diphosphonic acid (HEDP). The composition preferably comprises ethylene diamine-N'N'-disuccinic acid or salt thereof. Preferably the ethylene diamine-N'N'-disuccinic acid is in S,S enantiomeric form. Preferably the composition comprises 4,5-dihydroxy-m-benzenedisulfonic acid disodium salt. Preferred chelants may also function as calcium carbonate crystal growth inhibitors such as: 1-hydroxyethanediphosphonic acid (HEDP) and salt thereof; N,N-dicarboxymethyl-2-aminopentane-1,5-dioic acid and salt thereof; 2-phosphonobutane-1,2,4-tricarboxylic acid and salt thereof; and combination thereof.

[0072] Hueing agent: Suitable hueing agents include small molecule dyes, typically falling into the Colour Index (C.I.) classifications of Acid, Direct, Basic, Reactive (including hydrolysed forms thereof) or Solvent or Disperse dyes, for example classified as Blue, Violet, Red, Green or Black, and provide the desired shade either alone or in combination. Preferred such hueing agents include Acid Violet 50, Direct Violet 9, 66 and 99, Solvent Violet 13 and any combination thereof.

[0073] Many hueing agents are known and described in the art which may be suitable for the present invention, such as hueing agents described in WO2014/089386.

[0074] Suitable hueing agents include phthalocyanine and azo dye conjugates, such as described in WO2009/069077.

[0075] Suitable hueing agents may be alkoxyated. Such alkoxyated compounds may be produced by organic synthesis that may produce a mixture of molecules having different degrees of alkoxylation. Such mixtures may be used directly to provide the hueing agent, or may undergo a purification step to increase the proportion of the target molecule. Suitable hueing agents include alkoxyated bis-azo dyes, such as described in WO2012/054835, and/or alkoxyated thiophene azo dyes, such as described in WO2008/087497 and WO2012/166768.

[0076] The hueing agent may be incorporated into the detergent composition as part of a reaction mixture which is the result of the organic synthesis for a dye molecule, with optional purification step(s). Such reaction mixtures generally comprise the dye molecule itself and in addition may comprise un-reacted starting materials and/or by-products of the organic synthesis route. Suitable hueing agents can be incorporated into hueing dye particles, such as described in WO 2009/069077.

[0077] Dye transfer inhibitors: Suitable dye transfer inhibitors include polyamine N-oxide polymers, copolymers of N-vinylpyrrolidone and N-vinylimidazole, polyvinylpyrrolidone, polyvinylloxazolidone, polyvinylimidazole and mixtures thereof. Preferred are poly(vinyl pyrrolidone), poly(vinylpyridine betaine), poly(vinylpyridine N-oxide), poly(vinyl pyrrolidone-vinyl imidazole) and mixtures thereof. Suitable commercially available dye transfer inhibitors include PVP-K15 and K30 (Ashland), Sokalan® HP165, HP50, HP53, HP59, HP56K, HP56, HP66 (BASF), Chromabond® S-400, S403E and S-100 (Ashland).

[0078] Perfume: Suitable perfumes comprise perfume materials selected from the group: (a) perfume materials having a ClogP of less than 3.0 and a boiling point of less than 250°C (quadrant 1 perfume materials); (b) perfume materials having a ClogP of less than 3.0 and a boiling point of 250°C or greater (quadrant 2 perfume materials); (c) perfume materials having a ClogP of 3.0 or greater and a boiling point of less than 250°C (quadrant 3 perfume materials); (d) perfume materials having a ClogP of 3.0 or greater and a boiling point of 250°C or greater (quadrant 4 perfume materials); and (e) mixtures thereof.

[0079] It may be preferred for the perfume to be in the form of a perfume delivery technology. Such delivery technologies further stabilize and enhance the deposition and release of perfume materials from the laundered fabric. Such perfume delivery technologies can also be used to further increase the longevity of perfume release from the laundered fabric. Suitable perfume delivery technologies include: perfume microcapsules, pro-perfumes, polymer assisted deliveries, molecule assisted deliveries, fiber assisted deliveries, amine assisted deliveries, cyclodextrin, starch encapsulated accord, zeolite and other inorganic carriers, and any mixture thereof. A suitable perfume microcapsule is described in WO2009/101593.

[0080] Silicone: Suitable silicones include polydimethylsiloxane and amino-silicones. Suitable silicones are described in WO05075616.

[0081] Process for making the solid composition: Typically, the particles of the composition can be prepared by any suitable method. For example: spray-drying, agglomeration, extrusion and any combination thereof.

[0082] Typically, a suitable spray-drying process comprises the step of forming an aqueous slurry mixture, transferring it through at least one pump, preferably two pumps, to a pressure nozzle. Atomizing the aqueous slurry mixture into a

spray-drying tower and drying the aqueous slurry mixture to form spray-dried particles. Preferably, the spray-drying tower is a counter-current spray-drying tower, although a co-current spray-drying tower may also be suitable.

[0083] Typically, the spray-dried powder is subjected to cooling, for example an air lift. Typically, the spray-drying powder is subjected to particle size classification, for example a sieve, to obtain the desired particle size distribution. Preferably, the spray-dried powder has a particle size distribution such that weight average particle size is in the range of from 300 micrometers to 500 micrometers, and less than 10wt% of the spray-dried particles have a particle size greater than 2360 micrometers.

[0084] It may be preferred to heat the aqueous slurry mixture to elevated temperatures prior to atomization into the spray-drying tower, such as described in WO2009/158162.

[0085] It may be preferred for anionic surfactant, such as linear alkyl benzene sulphonate, to be introduced into the spray-drying process after the step of forming the aqueous slurry mixture: for example, introducing an acid precursor to the aqueous slurry mixture after the pump, such as described in WO 09/158449.

[0086] It may be preferred for a gas, such as air, to be introduced into the spray-drying process after the step of forming the aqueous slurry, such as described in WO2013/181205.

[0087] It may be preferred for any inorganic ingredients, such as sodium sulphate and sodium carbonate, if present in the aqueous slurry mixture, to be micronized to a small particle size such as described in WO2012/134969.

[0088] Typically, a suitable agglomeration process comprises the step of contacting a detergent ingredient, such as a detergent surfactant, e.g. linear alkyl benzene sulphonate (LAS) and/or alkyl alkoxylated sulphate, with an inorganic material, such as sodium carbonate and/or silica, in a mixer. The agglomeration process may also be an in-situ neutralization agglomeration process wherein an acid precursor of a detergent surfactant, such as LAS, is contacted with an alkaline material, such as carbonate and/or sodium hydroxide, in a mixer, and wherein the acid precursor of a detergent surfactant is neutralized by the alkaline material to form a detergent surfactant during the agglomeration process.

[0089] Other suitable detergent ingredients that may be agglomerated include polymers, chelants, bleach activators, silicones and any combination thereof.

[0090] The agglomeration process may be a high, medium or low shear agglomeration process, wherein a high shear, medium shear or low shear mixer is used accordingly. The agglomeration process may be a multi-step agglomeration process wherein two or more mixers are used, such as a high shear mixer in combination with a medium or low shear mixer. The agglomeration process can be a continuous process or a batch process.

[0091] It may be preferred for the agglomerates to be subjected to a drying step, for example to a fluid bed drying step. It may also be preferred for the agglomerates to be subjected to a cooling step, for example a fluid bed cooling step.

[0092] Typically, the agglomerates are subjected to particle size classification, for example a fluid bed elutriation and/or a sieve, to obtain the desired particle size distribution. Preferably, the agglomerates have a particle size distribution such that weight average particle size is in the range of from 300 micrometers to 800 micrometers, and less than 10wt% of the agglomerates have a particle size less than 150 micrometers and less than 10wt% of the agglomerates have a particle size greater than 1200 micrometers.

[0093] It may be preferred for fines and over-sized agglomerates to be recycled back into the agglomeration process. Typically, over-sized particles are subjected to a size reduction step, such as grinding, and recycled back into an appropriate place in the agglomeration process, such as the mixer. Typically, fines are recycled back into an appropriate place in the agglomeration process, such as the mixer.

[0094] It may be preferred for ingredients such as polymer and/or non-ionic detergent surfactant and/or perfume to be sprayed onto base detergent particles, such as spray-dried base detergent particles and/or agglomerated base detergent particles. Typically, this spray-on step is carried out in a tumbling drum mixer.

[0095] **Method of laundering fabric:** The method of laundering fabric comprises the step of contacting the solid composition to water to form a wash liquor, and laundering fabric in said wash liquor. Typically, the wash liquor has a temperature of above 0°C to 90°C, or to 60°C, or to 40°C, or to 30°C, or to 20°C. The fabric may be contacted to the water prior to, or after, or simultaneous with, contacting the solid composition with water. Typically, the wash liquor is formed by contacting the laundry detergent to water in such an amount so that the concentration of laundry detergent composition in the wash liquor is from 0.2g/l to 20g/l, or from 0.5g/l to 10g/l, or to 5.0g/l. The method of laundering fabric can be carried out in a front-loading automatic washing machine, top loading automatic washing machines, including high efficiency automatic washing machines, or suitable hand-wash vessels. Typically, the wash liquor comprises 90 litres or less, or 60 litres or less, or 15 litres or less, or 10 litres or less of water. Typically, 200g or less, or 150g or less, or 100g or less, or 50g or less of laundry detergent composition is contacted to water to form the wash liquor.

Solid free-flowing particulate laundry detergent composition examples:

[0096]

EP 3 798 290 A1

	Ingredient	Amount (in wt%)
5	Anionic deterative surfactant (such as alkyl benzene sulphonate, alkyl ethoxylated sulphate and mixtures thereof)	from 8wt% to 15wt%
	Non-ionic deterative surfactant (such as alkyl ethoxylated alcohol)	from 0.1wt% to 4wt%
10	Cationic deterative surfactant (such as quaternary ammonium compounds)	from 0wt% to 4wt%
	Other deterative surfactant (such as zwitterionic deterative surfactants, amphoteric surfactants and mixtures thereof)	from 0wt% to 4wt%
15	Carboxylate polymer (such as co-polymers of maleic acid and acrylic acid and/or carboxylate polymers comprising ether moieties and sulfonate moieties)	from 0.1wt% to 4wt%
	Polyethylene glycol polymer (such as a polyethylene glycol polymer comprising polyvinyl acetate side chains)	from 0wt% to 4wt%
20	Polyester soil release polymer (such as Repel-o-tex and/or Texcare polymers)	from 0wt% to 2wt%
	Anionically modified cellulosic polymer (such as carboxymethyl cellulose)	from 0.1wt% to 2wt%
25	Other polymer (such as care polymers)	from 0wt% to 4wt%
	Zeolite builder and phosphate builder (such as zeolite 4A and/or sodium tripolyphosphate)	from 0wt% to 4wt%
30	Other co-builder (such as sodium citrate and/or citric acid)	from 0wt% to 3wt%
	Carbonate salt (such as sodium carbonate and/or sodium bicarbonate)	from 0wt% to 20wt%
35	Silicate salt (such as sodium silicate)	from 0wt% to 10wt%
	Filler (such as sodium sulphate and/or bio-fillers)	from 10wt% to 70wt%
40	Source of hydrogen peroxide (such as sodium percarbonate)	from 0wt% to 20wt%
	Bleach activator (such as tetraacetylene diamine (TAED) and/or nonanoyloxybenzenesulphonate (NOBS))	from 0wt% to 8wt%
45	Bleach catalyst (such as oxaziridium-based bleach catalyst and/or transition metal bleach catalyst)	from 0wt% to 0.1wt%
	Other bleach (such as reducing bleach and/or pre-formed peracid)	from 0wt% to 10wt%
50	Photobleach (such as zinc and/or aluminium sulphonated phthalocyanine)	from 0wt% to 0.1wt%
	Chelant (such as ethylenediamine-N'-disuccinic acid (EDDS) and/or hydroxyethane diphosphonic acid (HEDP))	from 0.2wt% to 1wt%
55	Hueing agent (such as direct violet 9, 66, 99, acid red 50, solvent violet 13 and any combination thereof)	from 0wt% to 1wt%
	Brightener (C.I. fluorescent brightener 260 or C.I. fluorescent brightener 351)	from 0.1wt% to 0.4wt%

(continued)

Ingredient	Amount (in wt%)
Protease (such as Savinase, Savinase Ultra, Purafect, FN3, FN4 and any combination thereof)	from 0.1wt% to 0.4wt%
Amylase (such as Termamyl, Termamyl ultra, Natalase, Optisize, Stainzyme, Stainzyme Plus and any combination thereof)	from 0wt% to 0.2wt%
Cellulase (such as Carezyme and/or Celluclean)	from 0wt% to 0.2wt%
Lipase (such as Lipex, Lipolex, Lipoclean and any combination thereof)	from 0wt% to 1wt%
Other enzyme (such as xyloglucanase, cutinase, pectate lyase, mannanase, bleaching enzyme)	from 0wt% to 2wt%
Fabric softener (such as montmorillonite clay and/or polydimethylsiloxane (PDMS))	from 0wt% to 15wt%
Flocculant (such as polyethylene oxide)	from 0wt% to 1wt%
Suds suppressor (such as silicone and/or fatty acid)	from 0wt% to 4wt%
Perfume (such as perfume microcapsule, spray-on perfume, starch encapsulated perfume accords, perfume loaded zeolite, and any combination thereof)	from 0.1wt% to 1wt%
Aesthetics (such as coloured soap rings and/or coloured speckles/noodles)	from 0wt% to 1wt%
Miscellaneous	balance to 100wt%

EXAMPLE

[0097] The following experiment has been carried out.

I. Preparation of test compositions

[0098] A granular detergent with the following composition was used as a base detergent, this formulation is free from substituted cellulosic polymers. Components and levels in the formulation are as follows:

Formulation	%
Linear alkylbenzene sulfonate	12.00
Alcohol ethoxylate (7EO)	2.64
Zeolite	1.84
Sodium percarbonate	17.00
Tetraacetylenediamine (TAED)	3.80
Polycarboxylate	1.70
Sodium carbonate	19.32
Sodium silicate	8.26
Optical brightener & enzymes (protease/amylase/mannanase/lipase)	1.40
Sodium Sulphate	Balance

EP 3 798 290 A1

[0099] 10 separate wash solutions were prepared using water of 6.8 US grains per gallon hardness containing 5g/L of the above formulation for each wash cycle.

[0100] The following table shows the amounts of CMC that were added to each of the wash solutions (expressed as % active polymer in formulation) to create a dose response for two different CMC samples:

Finnfix BDA®, supplied by CP Kelco, Äänekoski, Finland.

Finnfix VT®, supplied by CP Kelco, Äänekoski, Finland.

Example	
A	Formulation as above (Nil CMC)
B	Formulation as above + 0.25% Finnfix BDA®
C	Formulation as above + 0.5% Finnfix BDA®
D	Formulation as above + 1% Finnfix BDA®
E	Formulation as above + 2% Finnfix BDA®
F	Formulation as above + 3% Finnfix BDA®
G	Formulation as above + 0.25% Finnfix VT®
H	Formulation as above + 0.5% Finnfix VT®
I	Formulation as above + 1% Finnfix VT®
J	Formulation as above + 1.5% Finnfix VT®

II. Test fabrics

Whiteness tracers (receiver fabrics)

[0101] 5x5cm swatches white knitted cotton fabric (supplied by Warwick Equest, Consett, United Kingdom).

[0102] 5x5cm swatches white terry towel fabric (supplied by Warwick Equest, Consett, United Kingdom) 5x5cm swatches brushed cotton fabric (supplied by Asda George, pillow and sheet set)

8 replicates of each fabric type were used for each test formulation.

Bleeder fabric (donor fabric)

[0103] 5x5cm swatches Black Denim Swisstatest Art #279 Farbic (supplied by Swisstatest Testmaterialien AG, Gallen, Switzerland)

12 swatches were used for each test formulation.

III. Test wash procedure

[0104] The method involves the use of a tergotometer to simulate the action of a washing machine.

[0105] Test formulations were used to wash white tracer fabrics and bleeder fabrics together with knitted cotton ballast, added to maintain a 21:1 water:cloth ratio.

[0106] Tergotometer pots containing the test solution (1.0L) plus test fabrics, at 40°C were agitated at 300rpm for 40 mins. After the wash, the test fabrics and ballast were then rinsed in fresh water (6.8 US gpg hardness at 15°C) for 5 minutes.

[0107] The wash process was repeated using the test fabrics from the first wash cycle for a further 3 wash cycles. After 4 wash cycles, the test fabrics were dried at ambient room temperature for >12 hours. The whiteness level of the test fabrics (receiver fabric) was measured by spectrophotometer and show the dye transfer inhibition performance of the two CMCs as a function of level in formulation.

IV. Comparison of the samples

[0108]

Table 1: Average CIE Whiteness of test fabrics.

Example	CIE Whiteness			
	Terry Towel	Knitted Cotton	Brushed Cotton	Average
A (nil CMC)	119.2	124.9	127.5	123.9
B (0.25% BDA)	118.7	126.3	128.8	124.6 (+0.7)
C (0.5% BDA)	120.4	128.6	129.0	126.0 (+2.1)
D (1% BDA)	124.8	132.3	131.5	129.6 (+5.7)
E (2% BDA)	122.7	132.6	130.3	128.5 (+4.6)
F (3% BDA)	123.0	130.6	130.1	127.9 (+4.0)
G (0.25% VT)	121.8	131.6	131.4	128.3 (+4.4)
H (0.5% VT)	124.9	132.0	131.1	129.3 (+5.4)
I (1% VT)	123.8	131.7	131.7	129.1 (+5.2)
J (1.5% VT)	124.4	132.4	131.2	129.4 (+5.5)

[0109] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".

Claims

1. Use of an anionically-modified cellulosic polymer to prevent the redeposition of dyes in a textile laundering wash bath from coloured textiles onto white or differently-coloured textiles also present in the same wash bath.
2. Use according to claim 1, wherein the anionically-modified cellulosic polymer is carboxymethyl cellulose.
3. Use according to claim 2, wherein the carboxymethyl cellulose has a degree of substitution (DS) of at least 0.55, and has a degree of blockiness (DB) of at least 0.35, and has a DS+DB in the range of from 1.05 to 2.00.
4. Use according to any preceding claim, wherein the anionically-modified cellulosic polymer is comprised in a solid laundry detergent composition.
5. Use according to any preceding claim, wherein the dye is a direct dye or an acid dye.
6. Use according to any of claims 1-5, wherein the dye is a vat dye or a sulfur dye.
7. Use of an anionically-modified cellulosic polymer as a dye transfer inhibitor during a textile laundering process.
8. Use according to claim 7, wherein the anionically-modified cellulosic polymer is carboxymethyl cellulose.
9. Use according to claim 8, wherein the carboxymethyl cellulose has a degree of substitution (DS) of at least 0.55, and has a degree of blockiness (DB) of at least 0.35, and has a DS+DB in the range of from 1.05 to 2.00.
10. Use according to any of claims 7-9, wherein the anionically-modified cellulosic polymer is comprised in a solid laundry detergent composition.
11. Use according to any of claims 7-10, wherein the dye is a direct dye or an acid dye.
12. Use according to any of claims 7-10, wherein the dye is a vat dye or a sulfur dye.



EUROPEAN SEARCH REPORT

Application Number
EP 19 20 0559

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 00/42144 A1 (PROCTER & GAMBLE [US]; BABA HAJIME [JP] ET AL.) 20 July 2000 (2000-07-20) * page 3, line 7 - line 34; claims 1-10 *	1-12	INV. C11D3/00 C11D3/22
A	EP 2 135 933 A1 (PROCTER & GAMBLE [US]) 23 December 2009 (2009-12-23) * claims 1-15 *	1-12	
A	WO 2014/012867 A1 (HENKEL AG & CO KGAA [DE]) 23 January 2014 (2014-01-23) * claims 1-10 *	1-12	
A	US 2011/034365 A1 (LANT NEIL JOSEPH [GB]) 10 February 2011 (2011-02-10) * claims 1-15 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			C11D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 April 2020	Examiner Richards, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 20 0559

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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30

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45

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55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0042144 A1	20-07-2000	AT 382079 T	15-01-2008
		AU 2310099 A	01-08-2000
		CA 2357045 A1	20-07-2000
		CN 1337993 A	27-02-2002
		DE 69937841 T2	11-12-2008
		EP 1141194 A1	10-10-2001
		JP 2002534592 A	15-10-2002
		US 6790822 B1	14-09-2004
		WO 0042144 A1	20-07-2000

EP 2135933 A1	23-12-2009	AR 072271 A1	18-08-2010
		BR PI0915413 A2	03-11-2015
		CA 2724892 A1	23-12-2009
		CN 102099456 A	15-06-2011
		EP 2135933 A1	23-12-2009
		JP 2011524457 A	01-09-2011
		US 2009318325 A1	24-12-2009
		WO 2009154934 A1	23-12-2009
		ZA 201008676 B	29-05-2013

WO 2014012867 A1	23-01-2014	DE 102012212727 A1	23-01-2014
		EP 2875108 A1	27-05-2015
		WO 2014012867 A1	23-01-2014

US 2011034365 A1	10-02-2011	BR 112012005245 A2	15-03-2016
		CN 102575198 A	11-07-2012
		EP 2302025 A1	30-03-2011
		US 2011034365 A1	10-02-2011
		WO 2011031599 A1	17-03-2011

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6790822 B [0014]
- WO 08007320 A [0042]
- US 5352604 A [0055]
- WO 11140316 A [0056]
- WO 11072117 A [0056]
- WO 06002643 A [0057]
- WO 07144857 A [0059]
- WO 10056652 A [0059]
- WO 06090335 A [0061]
- WO 13116261 A [0061]
- WO 2013171241 A [0062]
- WO 2011084412 A [0062]
- WO 2013033318 A [0062]
- WO 2014089386 A [0073]
- WO 2009069077 A [0074] [0076]
- WO 2012054835 A [0075]
- WO 2008087497 A [0075]
- WO 2012166768 A [0075]
- WO 2009101593 A [0079]
- WO 05075616 A [0080]
- WO 2009158162 A [0084]
- WO 09158449 A [0085]
- WO 2013181205 A [0086]
- WO 2012134969 A [0087]