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(54) LAUNDRY DETERGENT FOR USE IN WASHING OF WHITE AND COLOURED FABRICS TOGETHER

(57) The present invention relates to the field of cleaning compositions, especially to cleaning compositions used in cleaning and/or washing of fabrics, textiles and clothes. In particular, the present invention relates to powder laundry detergent compositions suitable for washing and/or cleaning of coloured and white and/or light coloured textiles together in the same wash cycle at ≤40°C, wherein the said laundry detergent compositions are capable of improved dye transfer inhibition, colour care of coloured textiles, successful bleaching of white cotton fabrics and mechanical strength protection of cotton fabrics. The present inventive laundry detergent composition comprises anionic surfactant, nonionic surfactant, builder system, specific type and amount of clay, specifically selected dye transfer inhibitor, specific amounts of bleaching agent and activator to provide the aforementioned capabilities. The detergent compositions may further comprise phosphonates, cellulosic polymers, fillers, optical brighteners, enzymes, foam suppressors, coloured speckles and perfumes.

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Description

FIELD OF THE INVENTION:

[0001] The present invention relates to cleaning compositions. Particularly, the present invention relates to cleaning compositions used for cleaning and/or washing of fabrics, textiles, garments and clothes. More particularly, the present invention relates to powder form laundry detergent compositions appropriate for washing and/or cleaning of coloured and white and/or light coloured textiles together in the same wash cycle at ≤40°C. The present laundry detergent compositions are capable of improved dye transfer inhibition from coloured cotton textiles to white and/light coloured cotton textiles, improved colour care of coloured textiles, successful bleaching of white cotton fabrics and improved mechanical strength protection of cotton fabrics.

BACKGROUND OF THE INVENTION:

[0002] One persistent problem in washing or cleaning of textiles, fabrics and clothes in washing machine is the dyes detached from the coloured articles and/or garments. This causes not only the unwanted dye transfer to white and/or light-coloured articles which is known as discolouration but also the fading of coloured articles where fading remarks the change in the colour of the coloured articles into the colours lighter than the original condition. Thus, typically, laundry is sorted into coloured and white and/or light-coloured groups before washing. This method of grouping the articles before washing inarguably provides satisfactory results, however, is inconvenient, time-consuming and prone to over-sights with high possibility. A whole wash load of white and/or light-coloured articles and/or garments may be ruined if the consumer makes a single oversight.

[0003] The laundry detergents are generally produced as colour detergents for washing coloured textiles, and white detergents for washing white and/or light-coloured textiles. One of the most important ingredients of the white detergents is bleaching agent which is capable of providing whiteness by eliminating the bleach sensitive soils and/or stains. However, bleaching agents have the undesirable effect of fading or colour change on the coloured textiles since the bleaching agents not only bleach the soils and/or stains but also bleaches the dyes still attached to the coloured articles and/or the garments. Thus, the white detergents are not used for cleaning of coloured articles mind at peace. On the other hand, the colour detergents are not preferred for the cleaning of white and/or light-coloured textiles since they are not effectively capable of whitening the white textiles as they do not comprise or limitedly comprise bleaching agents. This leads the consumers to buy two different kinds of laundry detergents, and to run two different washing processes for cleaning their white and coloured textiles separately, which is inconvenient, time-consuming and costly.

[0004] Another problem caused by the presence of bleaching agents is that they cause a decrease in mechanical strength of textiles, especially cotton textiles, when the textiles are sequentially cleaned with the detergent compositions comprising bleaching agents. This is mainly caused by the irreversible corrosion of fibres constituting the textiles. As a result, the lifetime of textiles decreases and this is not welcomed by the consumers.

[0005] Many efforts have been made to overcome the problems stated above.

[0006] US2009186798 (A1) stated a colour care detergent composition comprising from 0.1% to 30% by weight of the composition of a dye transfer inhibitor, from 1% to about 30% by weight of the composition of a silicone, and from 0.3% to 30% by weight of the composition of clay. However, the stated detergent composition is bleach free, and thus, these types of compositions have the disadvantage of possessing insufficient bleaching power which lowers the cleaning performance in washing of white textiles and makes them appropriate mostly for the cleaning of coloured textiles.

[0007] In order to reduce dye transfer and to improve dye stability during laundering of mixed colored and white fabric laundry items, EP0582478 B1 claimed a heavy duty laundry detergent composition comprising 10 to 20% of nonionic detergent as the major detergent in the composition, 15 to 30% of clay, 25 to 70% of builder for the nonionic detergent, 0 to 3% of polyvinyl pyrrolidone, and with any balance of the composition being selected from the group consisting of other builders for the nonionic detergent, fillers, functional components, adjuvants, water and mixtures thereof, wherein the said detergent composition is essentially free of per-compound and essentially free of optical brightener. Once again, these types of compositions, unfortunately, have insufficient bleaching and whitening power since they essentially do not include per-compound and optical brightener. Thus, the cleaning performance in washing of white textiles is relatively poor, and makes them appropriate mostly for the cleaning of coloured textiles.

[0008] US5474576 (A) is another example that claims a composition for inhibiting dye transfer between fabrics during washing. The claimed composition is free of conventional bleaching agents, and comprises a metallo bleach catalyst, an amine base catalyst stabilizer and an enzymatic system capable of generating hydrogen peroxide. The bleaching power of the compositions come from enzymatic system, and unfortunately, costs much higher than the conventional bleaching systems in case an equal amount of peroxide is to be provided in washing medium.

[0009] There is still a great need for a laundry detergent composition which can be used in cleaning and/or washing of white and/or light-coloured textiles together with the coloured articles in the same washing cycle wherein the said

laundry detergent composition is capable of:

(i) improved dye transfer inhibition from coloured cotton textiles to light coloured and/or white coloured cotton textiles,

(ii) improved colour care of coloured textiles, in other words, preventing the discolouration of coloured textiles,

(iii) bleaching of white cotton textiles succesfully, and

(iv) protecting the mechanical strength of cotton textiles.

BRIEF DESCRIPTION OF DRAWINGS:

[0010]

FIGURE 1 - Effect of bentonite type on dye transfer inhibiting performance (The figure shows the compared dye transfer performances at the presence of sodium type bentonite and calcium type bentonite. For details of the dye transfer performance test please see the TESTS section. 1=EMPA 130; 2=EMPA 132; 3=EMPA 133; 4=EMPA 134; a=sodium type bentonite; b=calcium type bentonite)

FIGURE 2 - Effect of bentonite type on colour care performance (The figure shows the compared colour care performances at the presence of sodium type bentonite and calcium type bentonite. For details of the colour care performance test please see the TESTS section. I.C.=initial colour; a=sodium type bentonite; b=calcium type bentonite)

SUMMARY OF THE INVENTION:

[0011] Accordingly, the subject of present invention is to provide a laundry detergent composition for use in washing and/or cleaning of coloured textiles and white coloured and/or light coloured textiles together in the same washing cycle where the washing temperature is below or equal to 40°C.

[0012] Main object of the present invention is to provide laundry detergent compositions, that have an improved capability of preventing the transfer of the dyes detached from coloured cotton textiles to white coloured and/or light coloured textiles, especially the transfer of detached dyes to most troublesome textiles, namely cottons.

[0013] Secondary object of the present invention is to provide laundry detergent compositions which have an improved colour care capability of coloured textiles, in other words, improved capability of preventing the discolouration of coloured textiles.

[0014] Further object of the present invention is to provide laundry detergent compositions which have the capability of successfully bleaching the white cotton textiles.

[0015] Still further object of the present invention is to provide laundry detergent compositions which have the capability of protecting the mechanical strength of cotton textiles.

[0016] The inventors of the present invention surprisingly found that a laundry detergent composition comprising anionic surfactant, nonionic surfactant, builder system, specific type and amount of clay, specifically selected dye transfer inhibitor, specific amounts of bleaching agent and activator was capable of providing the aforementioned objects. The detergent compositions of the present invention may further comprise phosphonates, cellulosic polymers, fillers, optical brighteners, enzymes, foam suppressors, coloured speckles and perfumes.

DESCRIPTION OF DISCLOSURE:

[0017] The inventors of the present invention surprisingly revealed that a laundry detergent composition which can be used in cleaning and/or washing of white and/or light-coloured textiles together with the coloured articles in the same washing cycle, wherein the said laundry detergent composition is capable of: (i) improved dye transfer inhibition from coloured cotton textiles to light coloured and/or white coloured cotton textiles (ii) improved colour care of coloured textiles, in other words, preventing the discolouration of coloured textiles, (iii) bleaching the white cotton textiles succesfully, and (iv) protecting the mechanical strength of cotton textiles, can be provided if the said detergent composition comprises:

- anionic surfactant,
- nonionic surfactant,

- builder system,
- specific type and amount of clay,
- specifically selected dye transfer inhibitor,
- specific amounts of bleaching agent and activator.

[0018] The capabilities of: (i) improved dye transfer inhibition from coloured cotton textiles to light coloured and/or white coloured cotton textiles, and (ii) improved colour care of coloured textiles, together can also be called as *maintaining the initial colours of cotton fabrics* within the text.

[0019] The terms fabric(s), textile(s), article(s) and garment(s) are used interchangeably within the text.

[0020] The present inventive detergent compositions are in powder form. Detergent compositions include a base portion and a post-addition portion. The base portion is prepared by spray-drying a slurry which comprises heat-insensitive ingredients. On the other hand, in post-addition part, the heat-sensitive ingredients are added to the base portion either by mixing in a mixer or by spraying depending on the phase of the ingredient.

DYE TRANSFER INHIBITOR

[0021] One of the essential types of detergent ingredient added to present inventive detergent compositions is dye transfer inhibitor. Dye transfer inhibitors are polymers which have the ability to complex or adsorb the detached dyes washed out from the coloured fabrics before the detached dyes have the opportunity to attach on to other articles in the wash.

[0022] Appropriate dye transfer inhibitors may be selected from the group of:

- polyvinylpyrrolidone polymers,
- polyvinyloxazolidones,
- polyvinylimidazoles,
- polyamine N-oxide polymers, and
- copolymers of N-vinylpyrrolidone and N-vinylimidazole,

[0023] The preferred dye transfer inhibitor for use in detergent compositions according to the present invention is a polymer selected from N-vinylpyrrolidone and N-vinylimidazole copolymers wherein said polymer has an average molecular weight range from 50000 to 100000, preferably from 60000 to 80000, most preferably from 65000 to 75000. The average molecular weight ranges can be determined by light scattering or GPC.

[0024] The N-vinylpyrrolidone and N-vinylimidazole,copolymers characterized by having said average molecular weight range provide excellent dye transfer inhibiting properties while not adversely affecting the cleaning performance of detergent compositions formulated therewith. N-vinylpyrrolidone and N-vinylimidazole copolymer types as dye transfer inhibitors are found not to be, adversely affected by the presence of anionic surfactants since the studies of present invention resulted in effective and improved dye transfer inhibition at the presence of up to 10% anionic surfactants by weight of the total composition.

[0025] N-vinylpyrrolidone and N-vinylimidazole copolymers can be added either in granule form or liquid form. Both granule form and liquid form are added in post-addition (i.e. after the spray-drying process, not into the slurry) to the detergent composition. The granules are uniformly mixed into the detergent composition in a mixer while the liquid form is sprayed onto the detergent composition. Copolymer of N-vinylimidazole with N-vinyl-2-pyrrolidone (1-vinylimidazole, 1-vinyl-2-pyrrolidone) is an example for the N-vinylpyrrolidone and N-vinylimidazole copolymers that are preferably used in the detergent compositions according to the present invention. The non-limiting commercial examples that can be found in the market are Sokalan® HP 56 and Sokalan® HP 56 K from BASF.

[0026] The detergent compositions of the present invention can comprise 0.1% to 3%, preferably 0.2% to 2%, more preferably 0.2% to 0.5% dye transfer inhibitor by weight of the total composition.

BLEACHING AGENT and BLEACH ACTIVATOR

[0027] Another essential type of detergent ingredient added to present inventive detergent compositions is bleaching

agent. Bleaching agents have two important roles in washing process of coloured and white and/or light-coloured fabrics together: (i) whitening of white coloured fabrics by removing especially the bleach sensitive soils and/or stains (ii) bleaching at least some of the dyes detached from coloured articles and, thus, preventing them to attach on white and/or light-coloured articles.

[0028] The preferred bleaching agents appropriate for the present invention are hydrogen peroxide sources. Hydrogen peroxide is a powerful oxidizer among the known oxidizers. It is specifically preferred bleaching agent for the detergent compositions of present invention since it causes less textile fibre damage compared to many other peroxygen sources and it tends to be less aggressive on fabric dyes, enzymes and optical brighteners.

[0029] Suitable hydrogen peroxide sources can be selected from peroxides and/or persalts. Preferred hydrogen peroxide source is persalts. Suitable persalts that can be added to present inventive detergent compositions can be selected from the group of: perborates (e.g. perborate monohydrate, perborate tetrahydrate), percarbonates, peroxyhydrates, persilicates and persulphates. Percarbonates are particularly preferred since (i) their dissolution rate is relatively high, and (ii) they have the advantage of concurrently generating hydrogen peroxide and carbonate. The generated carbonate maintains a higher pH favoring the perhydrolysis.

[0030] Sodium percarbonate is the preferred percarbonate in present inventive detergent compositions. Sodium percarbonate particles are preferably coated for improved stability.

[0031] The detergent compositions of the present invention comprise at least 10% sodium percarbonate by weight of the total composition. The preferred sodium percarbonate amount is 10%-20%, more preferably 10%-15% by weight of the total composition. The lesser amounts of sodium percarbonate (<10%) are found to be insufficient for bleaching of white fabrics whereas the higher amounts (>20%) are prone to be promotive for fading of coloured fabrics. The bleaching agent amount of the present detergent compositions is specifically higher than 10% by weight of the total composition, and thus bleaching efficiency of present detergent compositions are particularly better than the prior art compositions since prior art compositions typically have bleaching agents from about 1% to about 10% by weight of the total composition at the presence of dye transfer inhibitors.

[0032] Although hydrogen peroxide is a good bleach, it is not particularly effective below about 40 °C. Thus, bleach activators are also essential type of detergent ingredient that should be available in the present inventive detergent compositions as the targeted washing temperatures are 40°C or below.

[0033] Bleach activators are the chemicals that help the bleaching agents work. They speed up the bleaching process so that bleaching can effectively take place at lower temperatures than without them. However, they are not catalysts as they are consumed during the oxidation process. The bleach activators are perhydrolyzed to form a peracid as active bleaching species.

[0034] Suitable bleach activators can be selected from the group of: tetraacetyl ethylene diamine (TAED), nonanoyloxybenzene sulphonate (NOBS), sodium 4-(isononanoyloxy)benzenesulphonate (iso-NOBS).

[0035] The preferred bleach activator for the present invention is tetraacetyl ethylene diamine (TAED). TAED reacts with hydrogen peroxide released by sodium percarbonate to produce peroxyacetic acid which is better bleach than hydrogen peroxide, and a molecule of DAED (diacetyl ethylene diamine) which is no longer reactive.

[0036] The detergent compositions of the present invention comprises up to 3% TAED by weight of the total composition. The preferred TAED amount is up to 2%, more preferably up to 1.5% by weight of the total composition. The lesser amounts of TAED (<1%) are strongly expected to be insufficient for bleaching of white fabrics whereas the higher amounts (>3%) are prone to be promotive for fading of coloured fabrics.

[0037] The sodium percarbonate:TAED ratio of the present inventive detergent compositions is at least 8:1. In other words, the amount of said bleaching agent is at least eight times the amount of TAED by weight. Having provided the said ratio, it was found that improved colour care for coloured fabrics can be maintained. Typical persalt:TAED in concentrated laundry powders are lower than said ratio, and changes in the ratio between 4:1 - 8:1 (Handbook of Detergents: Part E: Applications, 2009, pp 402), resulting in a poorer colour care performance.

[0038] Both bleaching agent and bleach activator are added in post-addition (i.e. after the spray-drying process, not into the slurry) to detergent compositions since they are heat-sensitive ingredients.

CLAY

[0039] Another essential type of detergent ingredient added to present inventive detergent compositions is clay. Clay minerals have two important roles in washing process of coloured and white and/or light-coloured fabrics together: (i) improving the prevention of dye transfer from coloured fabrics to white and/or light-coloured fabrics synergistically with dye transfer inhibitor polymer, and (ii) improving the mechanical strength of textiles, especially the cottons, whose constituting fibres are inevitably damaged by bleaching agents in sequential washing processes.

[0040] Clay mineral can be selected from the groups of:

- smectites such as beidellite, hectorite, montmorillonite, nontronite, saponite, sauconite, stevensite and vermiculites,

- kaolin minerals such as dickite, kaolinite, hallosite and nacrite;
- chlorites such as chamosite, clinochlore, donbassite, nimite, pennantite and sudoite;
- serpentines such as amesite, antigorite, berthierine, chrysotile, cronstedtite, garnierite, greenalite and lizardite,
- micas such as biotite, celadonite, glauconite, muscovite, paragonite, phlogopite and zinnwaldite,
- brittle micas such as clintonite, margarite and thulite.

[0041] Smectites are the preferable clay minerals, and montmorillonite is the preferred one among the smectites. Bentonite is a clay which is mainly composed of montmorillonite minerals, and is preferably used in the detergent compositions of the present invention.

[0042] Bentonite clay is composed of microscopic platelets consisting of layers of aluminium hydroxide held between layers of silicate atoms. These platelets are stacked one on top of the other. Bentonite consists chiefly of crystalline clay minerals belonging to the smectite group, which are hydrous aluminum silicates containing iron and magnesium as well as either sodium or calcium.

[0043] There are two basic types of bentonite, sodium type and calcium type. Sodium type bentonites have sodium in the crystal lattice and are sometimes referred to as Wyoming Bentonite. This type of bentonite swells when wet and can increase as much as fifteen times its original volume. Calcium type bentonites have calcium in the crystal lattice and are sometimes referred to as Southern Bentonite. This type of bentonite swells about two times its unwetted volume.

[0044] The studies of the present invention clearly indicated that all types of bentonites are not equally effective in preventing the transfer of dye detached from the coloured fabrics to white and/or lighter-coloured fabrics in the same washing cycle. The inventors found that the sodium type bentonites are significantly more effective than the calcium type bentonites for preventing the dye transfer. Without wishing to be bounded by the theory, it is thought that, the sodium bentonites which are almost 7-8 times swellable than the calcium types, provide far much sorption area for the detached dyes when they are wetted in washing medium, thus resulting in more effective dye transfer inhibition when compared to calcium bentonites. The bentonites of the present invention have swelling volume of at least 4 times, preferably at least 8 times its unwetted volume where the swelling volume is determined by 2 grams of bentonite in 100 ml distilled water. The particles size of bentonite for the present invention is between 0.1-3 mm, preferably between 0.2-1.4 mm. The non-limiting commercial example that can be found in the market is Laundrosil® DGA 212 from Clariant.

[0045] The inventors also found that the amount of bentonite in detergent compositions plays an important role in whitening of white coloured fabrics. A person experienced in the art may think that higher amounts of bentonite will result more effective in dye transfer inhibiting. This is a reasonable estimate; however, the studies of the present invention revealed that if bentonite amounts are increased high enough to a critical value, the problem of graying of white textiles is more specifically observable. The studies clearly indicated that the bentonite amount should be $\leq$ 8%, preferably $\leq$ 6%, more preferably $\leq$ 4% by weight of the total detergent composition in order to maintain a balanced performance of good dye transfer inhibiting and of good whitening at the same time.

[0046] Clays are added in post-addition (i.e. after the spray-drying process, not into the slurry) to detergent compositions.

SURFACTANTS

[0047] The detergent compositions of the present invention comprise anionic and nonionic surfactants.

[0048] The preferred anionic surfactant is linear alkyl benzene sulfonic acid sodium salt (LABSA.Na). LABSA.Na is manufactured by the sulphonation of linear alkyl benzene (LAB), which produces linear alkyl benzene sulfonic acid (LABSA), and then neutralized with sodium hydroxide to yield LABSA.Na. The LAB used in LABSA.Na manufacturing may be HF and/or Detal type. The LAB used in LABSA.Na manufacturing comprises max. 1% C_9 phenyl, 8-18% C_{10} phenyl, 26-38% C_{11} phenyl, 26-38% C_{12} phenyl, 15-27% C_{13} phenyl, max. 1% C_{14} phenyl by total weight of LAB. 2-phenyl isomer content of the LAB may be 15-22% by weight for HF type, and 25-35% by weight for Detal type. The resulting LABSA.Na has a solid matter of at least 96% by weight, and demonstrates the similar carbon distribution of raw material LAB.

[0049] LABSA.Na is added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried).

[0050] The other suitable anionic surfactants may be of any types which are not sensitive to heat, and do not suffer from the conditions of spray-drying process that is applied during the preparation of powder base portion. Heat sensitive anionic surfactants may also be added to compositions in granular form in a post-addition which is established after spray-drying and cooling to lower temperatures at which anionic surfactants are not negatively affected.

[0051] The detergent compositions of the present invention comprise up to 20% anionic surfactant by weight of the total composition. The preferred anionic surfactant amount is up to 10% by weight of the total composition.

[0052] The nonionic surfactants may be selected from the groups of ethoxylated alcohols, ethoxylated alkyl phenols, fatty acid esters, alkylpolyglucosides, polyalcohols and ethoxylated polyalcohols.

[0053] The preferred nonionic surfactant group is ethoxylated alcohols. Ethoxylated alcohols may be selected from the group of: C_{12}-C_{18} fatty alcohol ethoxylates with 5-9 EO, C_{12}-C_{14} fatty alcohol ethoxylates 6-10 EO, C_{16}-C_{18} fatty alcohol ethoxylates with 10-80 EO, C_{13}-C_{15} oxo alcohol ethoxylates with 3-11 EO, C_{10}-C_{18} alcohol ethoxylates with 5-7 EO, C_{13} oxo alcohol ethoxylates with 2-20 EO, C_{10} guerbet alcohol ethoxylates with 3-14 EO, C_{10} oxo alcohol ethoxylates with 3-11 EO.

[0054] The preferred nonionic surfactant of the present invention is shown by the formula (a):

$$R_1\text{-}O\text{-}(CH_2\text{-}CH_2\text{-}O)_mH \qquad (a)$$

wherein R_1= predominantly unbranched (linear) C_{13} - C_{15} oxo alcohol and m=3 - 11. The more preferred nonionic surfactant of the present invention is oxo alcohol ethoxylate wherein ethoxyl group number (*m*) in formula (a) is 5 to 7.

[0055] The detergent composition of the present invention includes preferably ≤ 5% nonionic surfactant by weight of the total composition.

[0056] The non-limiting commercial alcohol ethoxylate brands that can be found in the market are Lutensol® from BASF, Emulsogen® and Genapol® from Clariant and Neodol from Shell.

[0057] Nonionic surfactant is added to compositions in a post-addition which is established after the spray-drying and cooling to lower temperatures at which nonionic surfactants are not negatively affected.

BUILDER SYSTEM

[0058] The detergent compositions of the present invention comprise a builder system comprising inorganic and organic builders.

[0059] Inorganic builders can be selected from carbonates, silicates, disilicates, polysilicates, silicate-soda ash co-granules and zeolites.

[0060] Organic builders can be selected from the groups of polycarboxylate polymers such as polyacrylic acid and their salts, modified polyacrylic acid and their salts, acrylic/maleic copolymers, maleic acid/olefin copolymers; monomeric polycarboxylates such as citrates, gluconates, oxydisuccinates, glycerol mono-di-and trisuccinates, carboxymethyloxy-succinates, carboxy-methyloxymalonates, dipicolinates, hydroxyethyl iminodiacetates, alkyl-and alkenylmalonates and succinates; and sulphonated fatty acid salts.

[0061] The main builders of the detergent compositions of the present invention are inorganic builders. The amount of inorganic builders may be 15%-40%, preferably 20%-30% by weight of the total composition. Organic builders are also present but in lower amounts compared to inorganic builders, as supplements. The amount of inorganic builders may be up to 10%, preferably up to 5% by weight of the total composition.

[0062] The builders of the present detergent compositions, both inorganics and organics, are preferably present in alkali metal salt, especially sodium salt, form.

[0063] The preferred builder systems of the present detergent compositions comprise sodium carbonate, sodium silicate, disilicates/polysilicates soda as co-granules as inorganic builders and polyacrylic acid sodium salt as organic builder.

[0064] The preferred amount of sodium carbonate in present detergent compositions is between 5%-30%, preferably between 10%-20% by weight of the total composition. The particle size of sodium carbonate may be up to 2 mm. Sodium carbonate has a preferred particle size of 150-600 micron at least 90% by weight, particle size greater than 600 micron at most 5% by weight, and particle size smaller than 75 micron at most 5% by weight. Sodium carbonate is added to compositions in a post-addition which is established after the spray-drying (i.e it is not included in slurry which is spray-dried). A non-limiting commercial example can be found as dense soda ash from Eti Soda Turkey.

[0065] Sodium silicate added to detergent compositions can be expressed by the formula (b):

$$m Na_2O\ nSiO_2 \qquad (b)$$

wherein the ratio *n*/*m* is referred to as the modulus of sodium silicate. The modulus of sodium silicate in present detergent compositions is preferably 3.75 to 1, more preferably 2.4 to 1.2, most preferably 1.8 to 1.4. The preferred amount of sodium silicate in the present detergent compositions is up to 10%, preferably up to 5% by weight of the total composition. Sodium silicate is added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried).

[0066] The preferred amount of disilicates/polysilicates soda ash co-granules in the present detergent compositions

is up to 15%, preferably up to 5% by weight of the total composition. These co-granules are preferably added to compositions in a post-addition which is established after the spray-drying process. Disilicates/polysilicates soda ash co-granules comprise 45-55% sodium carbonate and 21-41% silicic acid sodium salt. The particle size distribution is between 0.2mm and 1.6mm at least 94% by weight where > 1.6 mm is max. 2% and < 0.2 mm is max. 4%. A non-limiting commercial example can be found under the brand Nabion® from Woellner France.

[0067] The preferred amount of polyacrylic acid sodium salt in the present detergent compositions is up to 5%, preferably up to 2% by weight of the total composition. The preferred polyacrylic acid sodium salts are low molecular weight. The average molecular weight is below 20000, preferably below 10000. Polyacrylic acid sodium salts is added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried) since they have a property of reducing the viscosity of slurry. A non-limiting commercial example can be found under the brand Sokalan® from BASF.

OTHER INGREDIENTS

[0068] *Phosphonates:* The detergent compositions of the present invention comprise phosphonates below 5%, preferably below 1% by weight of the total composition. Phosphonates can be selected from amino tris(methylene phosphonic acid) - ATMP, (1-hydroxyethylidene) diphosphonic acid - HEDP, diethylenetriamine penta(methylene phosphonic acid) - DTPMP or their respective salts. The preferred type of phosphonate in the present detergent compositions is DTPMP sodium salt (DTPMP.Na). Phosphonate is added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried). A non-limiting commercial example can be found under the brand Dequest® from Italmatch Chemicals.

[0069] *Cellulosic polymer:* The detergent compositions of the present invention can comprise cellulosic polymers, such as polymers selected from alkyl cellulose, alkyl alkoxyalkyl cellulose, carboxyalkyl cellulose, alkyl carboxyalkyl, and any combination thereof up to 2% by weight of the total composition. Preferred cellulosic polymer is carboxymethyl cellulose. Cellulosic polymer is added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried).

[0070] *Filler:* The detergent compositions of the present invention comprise from 10% to 60% filler by weight of the total composition. Suitably, the filler can be selected from sulphate salts, sodium acetate or sodium chloride. Preferred main filler is sodium sulphate. A minor amount of magnesium sulphate, up to %2 by weight of the total composition is also preferred in present detergent compositions. Fillers are added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried).

[0071] *Optical brightener:* The detergent compositions of the present invention can comprise up to 0.5%, preferably up to 0.1% optical brightener by weight of the total composition. Optical brighteners can be selected from carbocycles, such as distyrylbenzenes, distyrylbiphenyls, and divinylstilbenes; triazinylaminostilbenes; stilbenyl-2H-triazoles, such as stilbenyl-2Hnaphthol[1 ,2-d]triazoles and bis(1 ,2,3-triazol-2-yl)stilbenes; benzoxazoles, such as stilbenyl benzoxazoles and bis(benzoxazoles); furans, benzofurans and benzimidazoles, such as bis(benzo[b]furan-2-yl)biphenyls and cationic benzimidizoles; 1,3-diphenyl-2-pyrazolines; coumarins; naphthalimides; 1,3,5-triazin-2-yl derivatives; methinecyanines; and dibenzothiphene-5,5-dioxide. Diphenylethylene triazine and 4,4'-bis(2-sodium sulfonate stryl) biphenyl are preferably used optical brighteners. Optical brighteners are added to detergent compositions before the spray-drying process (i.e. it is present in slurry which is spray-dried).

[0072] *Enzymes:* The detergent compositions can comprise one or more detergent enzymes up to 2% by weight of the total composition. Examples of suitable enzymes are amylases, arabinosidases, β-glucanases, cellulases, chondroitinase, cutinases, esterases, hemicellulases, hyaluronidase, keratanases, laccase, ligninases, lipases, lipoxygenases, malanases, mannanases, oxidases, pectinases, pentosanases, peroxidases, phenoloxidases, phospholipases, proteases, pullulanases, reductases, tannases, and xylanases or mixtures thereof. A preferred combination is a mixture of enzymes like protease, amylase, mannanase, cellulase and lipase. Enzymes are added to detergent compositions after the spray-drying process (i.e. they are not present in slurry which is spray-dried).

[0073] *Foam suppressor:* The detergent compositions can comprise up to 2% foam suppressor by weight of the total composition. The preferred foam suppressors are silicone based foam suppressors. Foam suppressors are added to detergent compositions after the spray-drying process (i.e. they are not present in slurry which is spray-dried). A non-limiting commercial example can be found under the brand XIAMETER® from Dow Corning.

[0074] *Coloured speckles:* The detergent compositions can comprise up to 5% coloured speckles by weight of the total composition. The colored speckles can be salts and/or fatty soaps. Examples of salts are sodium salts, lithium salts, potassium salts, magnesium salts, calcium salts. Sodium salts may be selected from sodium sulfate, sodium bisulfate, sodium carbonate, sodium chloride, sodium bicarbonate, sodium percarbonate, sodium nitrate, sodium nitrite, sodium thiosulfate, sodium acetate, sodium bromide, sodium chlorate, sodium perchlorate, sodium chromate, sodium dichromate, sodium iodide, sodium iodate, sodium oxalate, sodium silicate, sodium sulfide, sodium sulfite, sodium bisulfite, sodium citrate, sodium malate, sodium stearate, sodium lauryl sulfate, sodium benzoate, sodium bromate, sodium formate, sodium selenate, sodium periodate, sodium molybdate, sodium hydrates, and mixtures thereof. The

preferred salt is sodium sulfate. Coloured speckles are added to detergent compositions after the spray-drying process (i.e. they are not present in slurry which is spray-dried).

[0075] *Perfume:* Perfume oils and/or encapsulated perfumes can be added to detergent compositions. The preferred amount of perfume by weight of total composition is 0.1-3%. Perfume is added to detergent compositions after the spray-drying process (i.e. they are not present in slurry which is spray-dried).

PREPARATION OF DETERGENT COMPOSITIONS

[0076] The present inventive detergent compositions are in powder form, and are composed of a base portion and a post-addition portion.

[0077] The base portion is prepared by spray-drying an aqueous slurry mixture which comprises heat-insensitive ingredients. The slurry mixture is prepared at 60°C-80°C in a crutcher making vessel and then is pumped to the spray system. In spray system, it is atomized by passing through the pressure nozzles. The atomized slurry particles are dried counter currently with hot air whose inlet temperature is at least 275°C. The atomized and dried slurry particles are then cooled and sieved to remove oversize particles (>3 mm). The resulting portion is called base portion.

[0078] On the other hand, in post-addition part, the heat-sensitive ingredients are added to the base portion either by mixing in a mixer with the base portion or by spraying on to the base portion depending on the phase of the ingredient.

TESTS

Dye Transfer Performance Tests

[0079] Washing tests were carried out in Bosch Avantixx 7 model washing machine in a 40 min washing programme including main wash cycle of 20 min and three rinsing stages of 20 min in total. The main wash cycle was performed at 40°C. The washed items were then hanged and dried at room temperature. Following the drying, the washed items were evaluated without ironing.

[0080] The water usage in the main wash cycles was approximately 6 liters. The total water usage in rinsing stages was 23 liters. The detergent composition to be tested was dosed as 150 grams per single washing process.

[0081] The washing machine was loaded with 1 piece of coloured standart fabric (as dye giver) and 1 piece of white coloured fabric (as dye taker). Four different coloured standart fabrics were used as dye giver: EMPA 130 cotton dyed with direct red 83 (20 cm x 32 cm), EMPA 132 cottton dyed with direct black 22 (20 cm x 32 cm), EMPA 133 cotton dyed with direct blue 71 (20 cm x 32 cm) and EMPA 134 cotton dyed with direct orange 39 (20 cm x 32 cm). The white coloured fabric (dye taker) was 40/1 interlock cotton of 20 cm x 32 cm in size. In each washing process, one colour of coloured standart fabric (dye giver) was washed together with the white coloured fabric (dye taker). The results are obtained having completed a single washing process with all four colors of coloured standart fabrics. The evaluation was made visually.

Colour Care Performance Tests

[0082] Washing tests were carried out in Miele Novotronic model washing machine in a 118 min washing programme including main wash cycle of 65 min and the rest of the time for three rinsing stages. The main wash cycle was performed at 40°C. The washed items were then hanged and dried at room temperature. Following the drying, the washed items were ironed and evaluated.

[0083] The water usage in the main wash cycles was approximately 12 liters. The total water usage in rinsing stages was 38 liters. The detergent composition to be tested was dosed as 300 grams per single washing process.

[0084] The coloured standard fabrics used in the tests were AISE 14 dye set. The set were composed of AISE 01 Sulphur Black on Cotton, AISE 03 Vat Green on Cotton, AISE 05 Vat Blue on Cotton, AISE 08 Direct Yellow on Cotton, AISE 16 Reactive Red on Cotton, AISE 20 React. Black (1%) on Cotton, AISE 21 React. Black (6%) on Cotton, AISE 22 React. Orange on Cotton, AISE 24Reactive Blue on Cotton, AISE 26 React. Violet on Cotton, AISE 27 Trichromate Dye Cotton, AISE 29 Reactive Mix on Cotton, AISE 33 Disperse Blue Polyester and AISE 39 Acid Red on Nylon.

[0085] The white coloured fabrics used in the tests were 1.5 kg in total. White coloured fabrics composed of 300 gram alpaca, 300 gram batiste, 300 gram polycotton, 300 gram towel, and 300 gram polyester.

[0086] In each washing process, 12 cm x 12 cm pieces of all AISE fabrics given above were washed together with the 1.5 kg white coloured fabrics given above. The results were obtained having completed 25 sequential washing process.

[0087] The colour care performance tests were evaluated visually.

Mechanical Strength Protection Performance Tests

[0088] The mechanical strength protection performance tests were performed by applying a breaking strength test on the cotton and polycotton fabric samples which were washed 50 times sequentially at the exact washing and drying conditions given in Colour Care Performance Test part.

[0089] The test method covered the determination of the load required to break the fabrics. The test specimens were prepared first by cutting the fabrics in to the 30 mm x 120 mm pieces by assuring that the specimens do not include any wrinkles and are not chosen close to the edges of the source fabric. Then, the specimens were trimmed symmetrically until obtaining 25 mm x 100 mm sized pieces. The trimmed specimens were subjected to a test in the Zwick/Roell BT1 model device. The prepared specimen was placed between the two jaws of device, where the lower jaw is stationary and the upper jaw is upwardly movable, by assuring that the specimen is not too loose or tightened. After starting the device, the upper jaw of the device moved upwards at a constant speed until the tested specimen was broken. After the occurrence of break, the force required to break the tested specimen, in other words, the tensile strength which is a measure of the ability of a material to withstand a longitudinal stress, expressed as the greatest stress that the material can stand without breaking was measured. The tests were repeated ten times, and the results were given as the arithmetic average of five runs. The greater the tensile strength value the greater the Mechanical Strength Protection.

Bleaching Performance Tests

[0090] Tests were carried out in Miele W5872 model washing machine in a 109 min washing programme including main wash cycle of 50 min and the rest of the time for three rinsing stages. The detergent amount used in the washing programme was 150 g. The main wash cycle was performed at 40°C. The washed items were then hanged and dried at room temperature. Following the drying, the washed items were ironed from reverse side (the side which does not include bleach sensitive stains) and evaluated. The evaluations are an average of eight runs.

[0091] The white coloured fabrics used in the tests were 3.5 kg in total. White coloured fabrics composed of 500 gram alpaca, 600 gram polycotton, 1 kg cotton tery cloth, 1 kg cotton and 400 gram polyester. The bleach stains, namely tee stain, coffee stain, wine stain, cherry stain and pomegranate stain, were applied on 40/1 interlock white cotton fabrics. Bleach stained fabrics and the above mentioned 3.5 kg white fabrics were washed together.

[0092] Tee stain: 3 g black tee was brewed in 90 g water for 2 hours, and then was filtered. The filtered tee was applied in an amount of nine drops.

[0093] Coffee stain: 3 g coffee was mixed in 90 g boiled water. The solution was then applied in an amount of eleven drops.

[0094] Wine stain: Red wine (Doluca) was applied in an amount of 10 drops.

[0095] Pomegranate stain: Pomegranate juice (Sunpride) was applied in an amount of nine drops.

[0096] Cherry stain: The cherrys were squeezed in a juice exctractor to obtain cherry juice. The cherry juice was then applied in an amount of nine drops.

[0097] The evaluation of bleaching performance was done by visual grading by three expert graders, and their grades were averaged. The grading was done according to the Panel Score Unit (PSU) scale, defined as follows:

0 - There is no difference

1 - I think there is a difference

2 - I am sure there is a difference

3 - There is a large difference

4 - There is an extremely large difference

[0098] The grades were used with a "+" sign if the bleaching performance of the detergent compositions according to the present invention were better than the compared detergent compositions; and a "-"sign if the bleaching performance of the detergent compositions according to the present invention were poorer than the compared detergent compositions.

EXAMPLES

[0099] Exemplary, non-limiting embodiments of the present invention were given in Table 1 to provide a clear understanding. A person of ordinary skill in the art will recognize that other examples may be used without departing from the spirit and scope of the invention.

Table 1 - Examples

	Example 1 (Inventive)	Example 2 (not inventive)	Example 3 (not inventive)	Example 4 (not inventive)
Linear alkyl benzene sulfonic acid sodium salt (anionic surfactant)	8.50	8.50	8.50	8.50
Oxo alcohol ethoxylate (nonionic surfactant)	2.50	2.50	2.50	2.50
Sodium carbonate (builder)	15.00	15.00	15.00	15.00
Sodium silicate (builder)	4.00	4.00	4.00	4.00
Disilicates/polysilicates soda ash co-granule (builder)	4.00	4.00	4.00	4.00
Polyacrylic acid sodium salt (builder)	2.00	2.00	2.00	2.00
Calcium type bentonite (clay)	-	4.00	-	-
Sodium type bentonite (clay)	4.00	-	-	4.00
Sodium percarbonate (bleaching agent)	12.00	12.00	12.00	8
TAED (bleaching activator)	1.5	1.5	1.5	2
1-vinylimidazole, 1-vinyl-2-pyrrolidone (dye transfer inhibitor)	0.30	0.30	0.30	0.30
DTPMP.Na (phosphonate)	0.40	0.40	0.40	0.40
Carboxymethyl cellulose (cellulosic polymer)	1.00	1.00	1.00	1.00
Diphenylethylene triazine (optical brightener)	0.08	0.08	0.08	0.08
4,4'-bis(2-sodium sulfonate stryl) biphenyl (optical brightener)	0.02	0.02	0.02	0.02
Enzyme Blend B (mannanase, cellulase and lipolase mixture)	0.40	0.40	0.40	0.40
Enzyme Blend C (protease and amylase mixture)	0.40	0.40	0.40	0.40
Foam suppressor (silicone based)	1.40	1.40	1.40	1.40
Coloured speckles (sodium sulphate)	0.80	0.80	0.80	0.80
Perfume	0.65	0.65	0.65	0.65
Water	1.50	1.50	1.50	1.50
Magnesium sulphate (filler)	1.00	1.00	1.00	1.00
Sodium sulphate (filler)	remainder	remainder	remainder	remainder

Example 1 was prepared accordingly to the present invention and was inventive whereas the other examples were not prepared accordingly to the present invention and were not inventive.

[0100] *Example 1 vs Example 2:* The comparison of Example 1 and Example 2 was given below to show the effect of bentonite type. Example 1 has sodium type bentonite whereas Example 2 has calcium type bentonite. Figure 1 shows the dye transfer inhibitor performance test results. The test results indicated that Example 1 comprising sodium type bentonite is more effective than Example 2 which comprises calcium type bentonites. In addition to that, Figure 2 shows the colour care performance test results. Although colour care performances for most of the initial colours are similar, sodium type bentonite comprising detergent compositions (Example 1) are better than the calcium type bentonite com-

prising detergent compositions (Example 2) in the 2.,3., 10. and 12. samples in Figure 2. For this reason, it would be righteous to say that sodium type bentonite comprising detergent compositions have an advantage in colour care performance.

[0101] *Example 1 vs Example 3:* The comparison of Example 1 and Example 3 was given to show the effect of sodium type bentonite existence. Example 1 has sodium type bentonite whereas Example 3 does not have any type of bentonite. Mechanical strength protection tests results are given in Table 2. The test results revealed that sodium type bentonite comprising detergent compositions (Example 1) have higher tensile strength values than the tensile strength values obtained for the detergent compositions which do not comprise bentonite (Example 3). Thus, it can be concluded that the mechanical strength protection of the fabrics washed with detergent compositions comprising sodium type bentonite are more than the fabrics washed with detergent compositions that do not comprise bentonite.

Table 2 - Mechanical strength protection test results

Fabric type	Tensile strength (MPa) - Example 1 (comprises sodium type bentonite)	Tensile strength (Mpa) - Example 3 (do not comprise any type of bentonite)
White polycotton	37.14	14.24
White cotton	54.95	43.19
Multi-colour cotton	24.80	21.91

[0102] *Example 1 vs Example 4:* The comparison of Example 1 and Example 4 was given to show the effect of bleaching agent amount and bleaching agent:TAED ratio. Example 1 has 12% sodium percarbonate and 1.5% TAED by weight of the total composition whereas Example 4 has 8% sodium percarbonate and 2% TAED by weight of the total composition. Example 4 reflects the common usage amount of bleaching agent that is <10% by weight and common bleaching agent:TAED ratio that is 4:1 in detergent compositions. Table 3 shows the bleaching performance test results. The positive signs in Table 3 indicated that the bleaching performance of Example 1 (inventive composition) is better than the bleaching performance of Example 4 especially in tea, coffee, wine stains whereas pomegranate and cherry stain bleaching indicated almost an equal performance.

Table 3 - Bleaching performance test results (Example 1 vs Example 4 - Panel Score Unit (PSU))

Stain type	PSU
Tee	+1.25
Coffee	+1.00
Wine	+2.06
Pomegranate	-0.13
Cherry	+0.19

Claims

1. A powder laundry detergent composition comprising

a) anionic surfactant,
b) nonionic surfactant,
c) builder system,
d) clay,
e) bleaching agent,
f) bleaching activator,
g) dye transfer inhibitor

wherein the said detergent composition is used for washing of coloured and white coloured and/or light coloured fabrics in the same washing cycle at temperatures below or equal to 40°C by maintaining initial colours of cotton fabrics.

2. A laundry detergent composition according to claim 1, wherein the said dye transfer inhibitor is N-vinylpyrrolidone and N-vinylimidazole copolymer with an average molecular weight of 50000 to 100000, preferably from 60000 to 80000, most preferably from 65000 to 75000, and the said dye transfer inhibitor is between 0.1% and 3%, preferably 0.2% and 2%, more preferably 0.2% and 0.5% by weight of the total composition.

3. A laundry detergent composition according to claim 1, wherein the said clay is sodium type bentonite having a swelling volume of at least four, preferably at least eight times of its unwetted volume.

4. A laundry detergent composition according to claim 3, wherein the said sodium type bentonite is up to 8%, preferably 6%, more preferably 4% by weight of the total composition.

5. A laundry detergent composition according to claim 2 to claim 4, wherein the said detergent composition comprises 0.2% to 0.5% by weight of N-vinylpyrrolidone and N-vinylimidazole copolymer, and up to 4% by weight of sodium type bentonite.

6. A laundry detergent composition according to claim 1, wherein the said bleaching agent is selected from persalts, which is preferably sodium percarbonate.

7. A laundry detergent composition according to claim 6, wherein the said detergent composition comprises at least 10% of said percarbonate by weight of the total composition.

8. A laundry detergent composition according to claim 1, wherein the said bleach activator is tetraacetyl ethylene diamine (TAED).

9. A laundry detergent composition according to claim 8, wherein the said detergent composition comprises between 1% to 3% TAED by weight of the total composition, and wherein the amount of said bleaching agent is at least eight times the amount of TAED by weight.

10. A laundry detergent composition according to claim 1,claim 5 and claim 9, wherein the said detergent composition comprises 0.2% to 0.5% by weight of N-vinylpyrrolidone and N-vinylimidazole copolymer, up to 4% by weight of sodium type bentonite, between 1% to 3% by weight of TAED, at least 10% by weight of bleaching agent, wherein the amount of said bleaching agent is at least eight times the amount of TAED by weight.

11. A laundry detergent composition according to claim 1, wherein the said anionic surfactant is linear alkyl benzene sulfonic acid sodium salt and the said nonionic surfactant is oxo alcohol ethoxylate with 5-7 ethoxyl group.

12. A laundry detergent composition according to claim 10, wherein the said anionic surfactant is up to %20, preferably 10% by weight of the total composition, and the nonionic surfactant is up to 5% by weight of the total composition.

13. A laundry detergent composition according to claim 1, wherein the said builder system comprises

a) 5%-30%, preferably 10-20% sodium carbonate,
b) up to 10%, preferably up to 5% sodium silicate,
c) up to 15%, preferably up to 5% disilicates/polysilicates soda ash co-granule,
d) up to 5%, preferably up to 2% polyacrylic acid sodium salt

by weight of the total composition.

14. A laundry detergent composition according to any preceding claim wherein the said detergent composition further comprises phosphonates, cellulosic polymers, fillers, optical brighteners, enzymes, foam suppressors, coloured speckles and perfumes.

15. A laundry detergent composition according to claim 14, wherein the said detergent composition comprises:

a) 5%-10% linear alkyl benzene sulfonic acid sodium salt,
b) up to 5% oxo alcohol ethoxylate,
c) 10%-20% sodium carbonate,
d) up to 5% sodium silicate,

e) up to 5% disilicates/polysilicates soda ash co-granule,
f) up to 2% polyacrylic acid sodium salt,
g) up to 4% sodium type bentonite,
h) at least 10% sodium percarbonate,
i) 1%-3% TAED,
j) 0.2%-0.5% N-vinylpyrrolidone and N-vinylimidazole copolymer,

by weight of the total composition.

Amended claims in accordance with Rule 137(2) EPC.

1. A powder laundry detergent composition used for washing of colored and white colored and/or light colored fabrics in the same washing cycle at temperatures below or equal to 40°C **characterized in that**; said composition comprises;

a) anionic surfactant less than 10% by weight,
b) sodium bentonite within the amounts of 4% to 8% by weight,
c) bleaching agent at least 10% by weight and,
d) dye transfer inhibitor selected from polymers of vinylpyrollidone and vinylimidazole or copolymers thereof, by maintaining initial colours of cotton fabrics.

2. A laundry detergent composition according to claim 1, wherein the said dye transfer inhibitor is N-vinylpyrrolidone and N-vinylimidazole copolymer with an average molecular weight of 50000 to 100000, preferably from 60000 to 80000, most preferably from 65000 to 75000, and the said dye transfer inhibitor is between 0.1% and 3%, preferably 0.2% and 2%, more preferably 0.2% and 0.5% by weight of the total composition.

3. A laundry detergent composition according to claim 1, wherein the said detergent composition comprises 0.2% to 0.5% by weight of N-vinylpyrrolidone and N-vinylimidazole copolymer.

4. A laundry detergent composition according to claim 1, wherein the said bleaching agent is selected from persalts, which is preferably sodium percarbonate.

5. A laundry detergent composition according to claim 1, further comprising tetraacetyl ethylene diamine (TAED).

6. A laundry detergent composition according to claim 5, wherein the said detergent composition comprises between 1% to 3% TAED by weight of the total composition, and wherein the amount of said bleaching agent is at least eight times the amount of TAED by weight.

7. A laundry detergent composition according to claim 1, wherein the said anionic surfactant is linear alkyl benzene sulfonic acid sodium salt.

8. A laundry detergent composition according to claim 1, further comprising nonionic surfactant of oxo alcohol ethoxylate type with 5-7 ethoxyl group up to 5% by weight of the total composition.

9. A laundry detergent composition according to claim 1, further comprising the builder system,

e) 5%-30%, preferably 10-20% sodium carbonate,
f) up to 10%, preferably up to 5% sodium silicate,
g) up to 15%, preferably up to 5% disilicates/polysilicates soda ash co-granule,
h) up to 5%, preferably up to 2% polyacrylic acid sodium salt
by weight of the total composition.

10. A laundry detergent composition according to any preceding claim wherein the said detergent composition further comprises phosphonates, cellulosic polymers, fillers, optical brighteners, enzymes, foam suppressors, coloured speckles and perfumes.

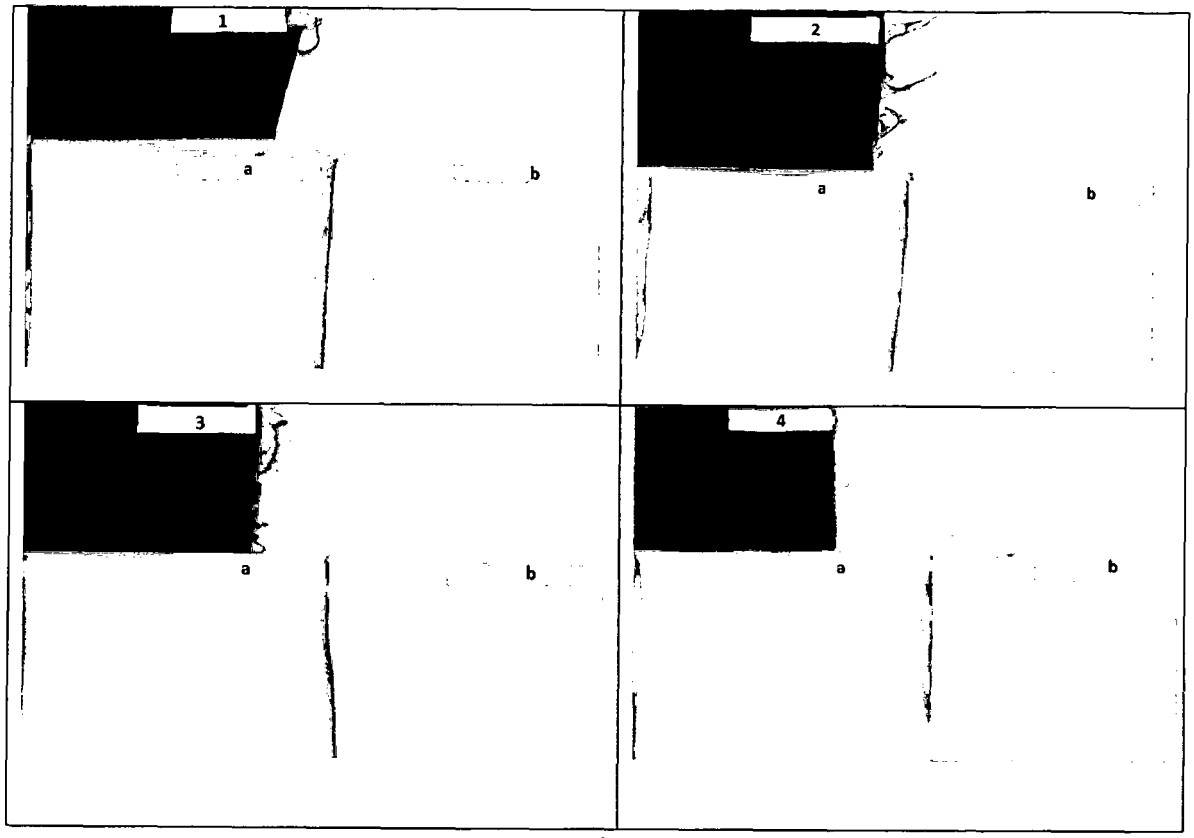

Figure 1

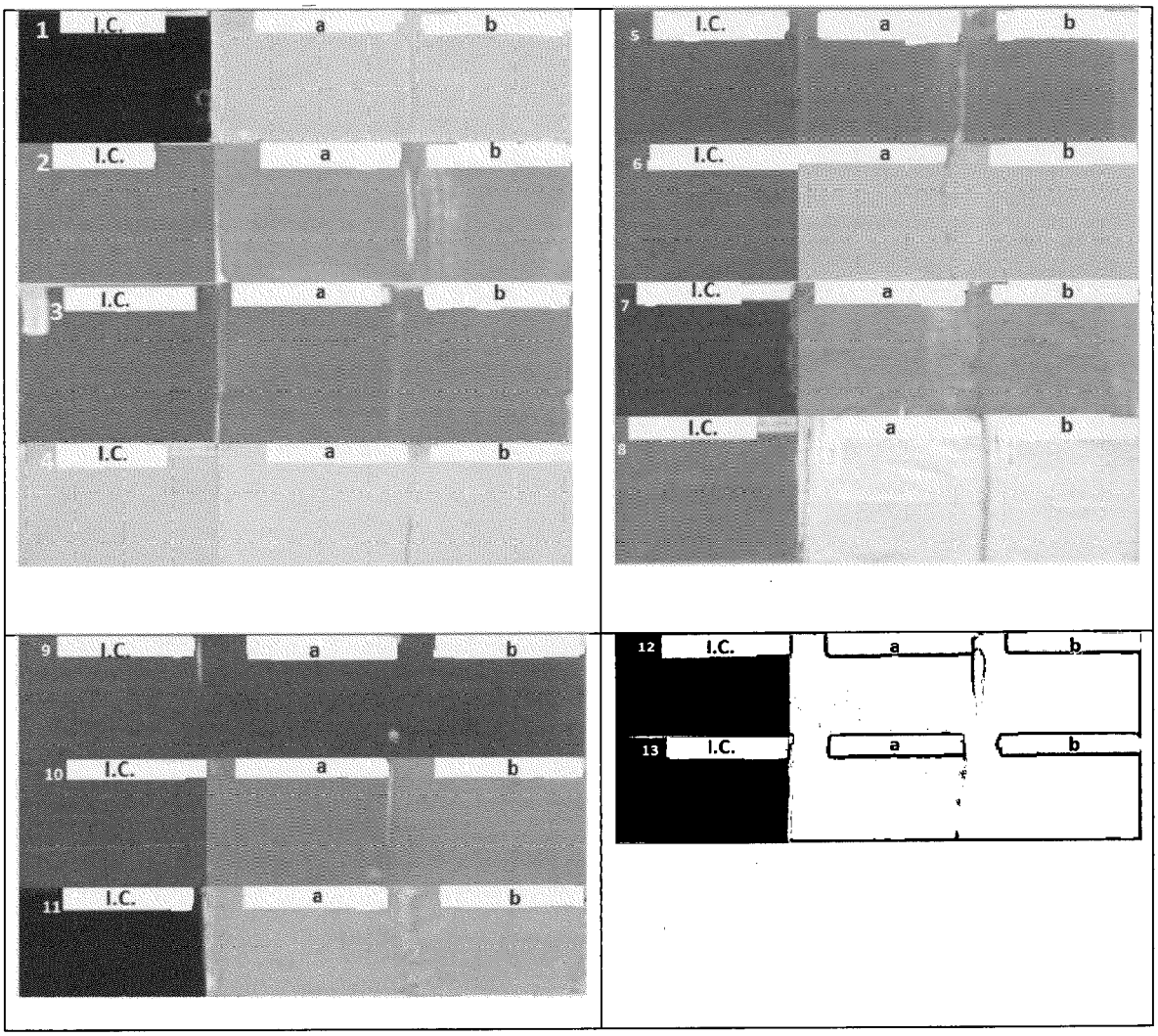
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Figure 2

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EUROPEAN SEARCH REPORT

Application Number
EP 15 00 1151

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 September 2015	Gault, Nathalie

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

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 00 1151

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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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