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(54) Title: PERSONAL CARE COMPOSITIONS CONTAINING ENCAPSULATES

(57) Abstract: The invention provides a personal cleansing composition comprising, in an aqueous continuous phase: (i) from 5 to 30% by weight of one or more anionic cleansing surfactants; (ii) microcapsules in which a core comprising benefit agent is encapsulated in a polymeric shell, wherein the polymeric shell is an aminoplast resin; (iii) a combination of cationic polymers comprising: (a) at least one cationic polygalactomannan having a mean charge density at pH 7 of less than 1.2 meq per gram; and (b) at least one cationic polygalactomannan having a mean charge density at pH 7 at least 1.2 meq per gram; and (iv) a free fragrance.



WO 2019/063598 A1

PERSONAL CARE COMPOSITIONS CONTAINING ENCAPSULATES

Field of the Invention

- 5 The present invention relates to personal care cleansing compositions such as liquid soaps, body washes and shampoos, which comprise microcapsules.

Background and Prior Art

- 10 In personal cleansing compositions such as liquid soaps, body washes and shampoos, the deposition and delivery of benefit agents are often key drivers of product performance. For example, many of the shampoo products in the market today work to deliver benefits to hair by depositing benefit agents such as fragrance materials, silicones, dyes, and anti-dandruff agents onto the hair during washing.

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Various technologies have been employed to enhance the delivery of benefit agents at the desired time. One widely used technology is encapsulation of the benefit agent in a protective coating such as a polymeric material. The polymeric material may protect the benefit agent, such as a fragrance material, from evaporation, reaction, oxidation or

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otherwise dissipating prior to use.

- However, maximizing encapsulate deposition during cleansing is a difficult task since most personal cleansing compositions were designed to carry away particulates from the skin or hair. When encapsulates are washed away, relatively high levels of encapsulated benefit agents may be needed in the composition to deliver the consumer desired benefit.

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Accordingly, there is a need for a personal cleansing composition that provides an increased deposition of encapsulated benefit agents onto the hair or skin, without impairing other product attributes such as rheology, sensory and conditioning

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performance.

The present invention addresses this problem.

- 2 -

Definition of the Invention

In a first aspect, the present invention provides a personal cleansing composition comprising, in an aqueous continuous phase:

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(i) from 5 to 30% by weight of one or more anionic cleansing surfactants;

(ii) microcapsules in which a core comprising benefit agent is encapsulated in a polymeric shell, which is an aminoplast; and

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(iii) a combination of cationic polymers comprising:

(a) at least one cationic polygalactomannan having a mean charge density at pH 7 of less than 1.2 meq per gram, preferably from 0.5 to 1.1; and

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(b) at least one cationic polygalactomannan having a mean charge density at pH 7 at least 1.2 meq per gram, preferably from 1.2 to 3, more preferably from 1.2 to 2; and

(iv) a free fragrance.

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Detailed Description and Preferred Embodiments

All molecular weights as used herein are weight average molecular weights, unless otherwise specified.

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By "aqueous continuous phase" is meant a continuous phase which has water as its basis.

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Suitably, the composition of the invention will comprise from about 50 to about 90%, preferably from about 55 to about 85%, more preferably from about 60 to about 85%, most preferably from about 65 to about 83% water (by weight based on the total weight of the composition).

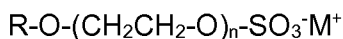
- 3 -

Typical anionic cleansing surfactants (i) for use in the invention include those surface active agents which contain an organic hydrophobic group with from 8 to 14 carbon atoms, preferably from 10 to 14 carbon atoms in their molecular structure; and at least one water-solubilising group which is preferably selected from sulphate, sulphonate, 5 sarcosinate and isethionate.

Specific examples of such anionic cleansing surfactants include ammonium lauryl sulphate, ammonium laureth sulphate, trimethylamine lauryl sulphate, trimethylamine laureth sulphate, triethanolamine lauryl sulphate, trimethylethanolamine laureth sulphate, monoethanolamine lauryl sulphate, monoethanolamine laureth sulphate, diethanolamine 10 lauryl sulphate, diethanolamine laureth sulphate, lauric monoglyceride sodium sulphate, sodium lauryl sulphate, sodium laureth sulphate, potassium lauryl sulphate, potassium laureth sulphate, sodium lauryl sarcosinate, sodium lauroyl sarcosinate, lauryl sarcosine, ammonium cocoyl sulphate, ammonium lauroyl sulphate, sodium cocoyl sulphate, sodium lauryl sulphate, potassium cocoyl sulphate, potassium lauryl sulphate, monoethanolamine 15 cocoyl sulphate, monoethanolamine lauryl sulphate, sodium tridecyl benzene sulphonate, sodium dodecyl benzene sulphonate, sodium cocoyl isethionate and mixtures thereof.

A preferred class of anionic cleansing surfactants for use in the invention are alkyl ether sulphates of general formula:

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in which R is a straight or branched chain alkyl group having 10 to 14 carbon atoms, n is a number that represents the average degree of ethoxylation and ranges from 1 to 5, 25 preferably from 1 to 3, and M is a alkali metal, ammonium or alkanolammonium cation, preferably sodium, potassium, monoethanolammonium or triethanolammonium, or a mixture thereof.

Specific examples of such preferred anionic surfactants include the sodium, potassium, 30 ammonium or ethanolamine salts of C₁₀ to C₁₂ alkyl sulphates and C₁₀ to C₁₂ alkyl ether sulphates (for example sodium lauryl ether sulphate),

Mixtures of any of the above described materials may also be used.

- 4 -

In a typical composition according to the invention the level of anionic cleansing surfactant will generally range from 5 to 30 wt %, preferably from 8 to 25 wt %, and most preferably ranges from 10 to 16 wt % by weight based on the total weight of the composition.

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The aqueous continuous phase of the composition according to the invention preferably also includes one or more amphoteric surfactants, in addition to the anionic cleansing surfactant described above. Suitable amphoteric surfactants are betaines, such as those having the general formula $R(\text{CH}_3)_2\text{N}^+\text{CH}_2\text{COO}^-$, where R is an alkyl or alkylamidoalkyl group, the alkyl group preferably having 10 to 16 carbon atoms. Particularly suitable betaines are oleyl betaine, caprylamidopropyl betaine, lauramidopropyl betaine, isostearylamidopropyl betaine, and cocoamidopropyl betaine. Cocoamidopropyl betaine is particularly preferred.

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When included, the total level of amphoteric surfactant is preferably from 0.1 to 10%, more preferably from 0.5 to 5%, and most preferably from 1 to 3% by weight based on the total weight of the hair cleansing composition).

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The compositions of the invention preferably comprise dispersed droplets of conditioning agent with a mean diameter ($D_{3,2}$) of 4 micrometres or less.

The preferred amount of these dispersed droplets is from 0.1 to 10% by weight of the total composition.

The preferred dispersed conditioning agent is an emulsified silicone.

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Droplets of emulsified silicone for inclusion in the composition of the invention typically have a mean droplet diameter ($D_{3,2}$) of 2 micrometres or less. Preferably the mean droplet diameter ($D_{3,2}$) is 1 micrometre or less, more preferably 0.5 micrometre or less, and most preferably 0.25 micrometre or less.

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A suitable method for measuring the mean droplet diameter ($D_{3,2}$) is by laser light scattering using an instrument such as a Malvern Mastersizer.

- 5 -

Suitable silicones for use in the invention include polydiorganosiloxanes, in particular polydimethylsiloxanes (dimethicones), polydimethyl siloxanes having hydroxyl end groups (dimethiconols), and amino-functional polydimethylsiloxanes (amodimethicones).

5 Such silicones are preferably non-volatile (with vapour pressure of less than 1000 Pa at 25°C), and preferably have a molecular weight of greater than 100,000, more preferably greater than 250,000.

Such silicones preferably have a kinematic viscosity of greater than 50,000 cS ($\text{mm}^2 \cdot \text{s}^{-1}$) and more preferably a kinematic viscosity of greater than 500,000 cS ($\text{mm}^2 \cdot \text{s}^{-1}$).

10 kinematic viscosities in the context of this invention are measured at 25°C and can be measured by means of a glass capillary viscometer as set out further in Dow Corning Corporate Test Method CTM004 July 20, 1970.

Suitable silicones for use in the invention are available as pre-formed silicone emulsions from suppliers such as Dow Corning and GE Silicones. The use of such pre-formed

15 silicone emulsions is preferred for ease of processing and control of silicone particle size. Such pre-formed silicone emulsions will typically additionally comprise a suitable emulsifier, and may be prepared by a chemical emulsification process such as emulsion polymerisation, or by mechanical emulsification using a high shear mixer. Pre-formed

20 silicone emulsions having a mean droplet diameter ($D_{3,2}$) of less than 0.15 micrometres are generally termed microemulsions.

Examples of suitable pre-formed silicone emulsions include emulsions DC2-1766, DC2-1784, DC-1785, DC-1786, DC-1788, DC-1310, DC-7123 and microemulsions DC2-1865

25 and DC2-1870, all available from Dow Corning. These are all emulsions/microemulsions of dimethiconol. Also suitable are amodimethicone emulsions such as DC939 (from Dow Corning) and SME253 (from GE Silicones).

Mixtures of any of the above described silicone emulsions may also be used.

30 In a typical composition according to the invention the level of silicone (*per se* as active ingredient) will generally range from 1 to 8%, and preferably ranges from 2 to 7.5% by weight based on the total weight of the composition.

- 6 -

The composition of the invention may suitably include at least one inorganic electrolyte. The inorganic electrolyte may be used to help provide viscosity to the composition.

5 The viscosity of the composition suitably ranges from 3,000 to 10,000 mPa.s, preferably from 4,000 to 8,000 mPa.s, more preferably from 5,000 to 7,000 mPa.s when measured using a Brookfield V2 viscometer (spindle RTV5, 1 minute, 20rpm) at 30°C.

10 Suitable inorganic electrolytes include metal chlorides (such as sodium chloride, potassium chloride, calcium chloride, magnesium chloride, zinc chloride, ferric chloride and aluminium chloride) and metal sulphates (such as sodium sulphate and magnesium sulphate).

15 Examples of preferred inorganic electrolytes for use in the invention include sodium chloride, potassium chloride, magnesium sulphate and mixtures thereof.

The composition of the invention comprises microcapsules (iii) in which a core comprising benefit agent is encapsulated in a polymeric shell.

20 The microcapsules are preferably present in an amount of from 0.1 to 5% by weight of the total composition.

25 The term "benefit agent" in the context of this invention includes materials which can provide a benefit to the hair and/or the scalp and/or the skin (preferably the hair and/or the scalp) as well as those materials which are beneficially incorporated into personal cleansing compositions, such as aesthetic agents.

30 The benefit agent of the core of the microcapsule may suitably be selected from perfumes, cosmetic active ingredients such as antimicrobial agents, antidandruff agents, moisturisers, conditioning agents, sunscreens agents, physiological coolants and emollient oils; and mixtures thereof.

Preferably the benefit agent of the core of the microcapsule is selected from perfumes. A perfume normally consists of a mixture of a number of perfume materials, each of which has an odour or fragrance. The number of perfume materials in a perfume is typically 10

- 7 -

or more. The range of fragrant materials used in perfumery is very wide; the materials come from a variety of chemical classes, but in general are water-insoluble oils. In many instances, the molecular weight of a perfume material is in excess of 150, but does not exceed 300.

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Examples of perfume materials for use in the invention include geraniol, geranyl acetate, linalol, linalyl acetate, tetrahydrolinalol, citronellol, citronellyl acetate, dihydromyrcenol, dihydromyrcenyl acetate, tetrahydromyrcenol, terpineol, terpinyl acetate, nopyl acetate, 2-phenyl-ethanol, 2-penylethyl acetate, benzyl alcohol, benzyl acetate, benzyl salicylate, styrallyl acetate, benzyl benzoate, amyl salicylate, dimethylbenzyl-carbinol, trichloromethylphenyl-carbinyl acetate, p-tert-butylcyclohexyl acetate, isononyl acetate, vetiveryl acetate, vetiverol, α -hexylcinnamaldehyde, 2-methyl-3-p-tert-butylphey)propanal, 2-methyl-3-(p-isopropylphenyl)propanal, 2-(p-tert-butylphey)propanal, 2,4-dimethyl-cyclohex-3-enyl-carboxaldehyde, tricyclodecenyl acetate, tricyclodecenyl propionate, 4-(4-hydroxy-4-methylpentyl)-3-cyclohexenecarboxyaldehyde, 4-(4-methyl-3-pentenyl)-3-cyclohexenecarboxaldehyde, 4-acetoxy-3-pentyl-tetrahydropyran, 3-carboxymethyl-2-pentylcyclopentane, 2-n-heptylcyclopentanone, 3-methyl-2-pentyl-2-cyclopentenone, n-decanal, n-dodecanal, 9-decenol-1, phenoxyethyl isobutyrate, phenyl-acetaldehyde dimethyl-acetal, phenylacetaldehyde diethylacetal, geranyl nitrile, citronellyl nitrile, cedryl acetate, 3-isocamphylcyclohexanol, cedryl methyl ether, isolongifolanone, aubepine nitrile, aubepine, heliotropin, coumarin, eugenol, vanillin, diphenyl oxide, hydroxycitronellal, ionones, methylionones, isomethylionones, irones, cis-3-hexenol and esters thereof, indan musks, tetralin musks, isochroman musks, macrocyclic ketones, macrolactone musks, ethylene brassylate and mixtures thereof..

Optional further materials which may be included in the core of the microcapsule include dyes, pigments and preservatives.

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The polymeric shell of the microcapsule may be prepared using methods known to those skilled in the art such as interfacial polymerisation.

Interfacial polymerisation produces encapsulated shells from the reaction of at least one oil-soluble wall forming material present in the oil phase with at least one water-soluble

- 8 -

wall forming material present in the aqueous phase. A polymerisation reaction between the two wall-forming materials occurs resulting in the formation of covalent bonds at the interface of the oil and aqueous phases to form the capsule wall. An example of a shell capsule produced by this method is a polyurethane capsule.

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Preferably the polymeric shell of the microcapsule is an aminoplast resin selected from polyurea formed by reaction of polyisocyanates and polyamines.

10 Preferably, the microcapsules are activated by shear; that is to say they are broken by shear to release the contents.

A particularly preferred microcapsule has a polyurea shell, prepared as described in US2013/0330292 A1 and US2012/0148644 A1 and available from International Flavors & Fragrances Inc.

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Advantageously the polymeric shell comprises at most 20 wt% of the weight of the microcapsules.

20 By modifying process conditions microcapsules of a desired size can be produced in known manner. The microcapsules typically have a mean diameter in the range 1 to 500 microns, preferably 1 to 300 microns, more preferably 1 to 50 microns and most preferably 1 to 10 microns. If necessary, the microcapsules as initially produced may be filtered or screened to produce a product of greater size uniformity.

25 In a typical composition according to the invention the level of microcapsules will generally range from 0.2 to 2%, and preferably ranges from 0.5 to 1.5% by weight based on the total weight of the composition.

30 The composition of the invention comprises, *inter alia*, a combination of cationic polymers comprising:

(a) at least one cationic polygalactomannan having a mean charge density at pH 7 of less than 1.2 meq per gram, preferably from 0.5 to 1.1; and

- 9 -

(b) at least one cationic polygalactomannan having a mean charge density at pH 7 at least 1.2 meq per gram, preferably from 1.2 to 3, more preferably from 1.2 to 2

5 The term "charge density" in the context of this invention refers to the ratio of the number of positive charges on a monomeric unit of which a polymer is comprised to the molecular weight of the monomeric unit. The charge density multiplied by the polymer molecular weight determines the number of positively charged sites on a given polymer chain.

10 The polygalactomannans are polysaccharides composed principally of galactose and mannose units and are usually found in the endosperm of leguminous seeds, such as guar, locust bean, honey locust, flame tree, and the like. Guar flour is composed mostly of a galactomannan which is essentially a straight chain mannan with single membered galactose branches. The mannose units are linked in a 1-4- β -glycosidic linkage and the galactose branching takes place by means of a 1-6 linkage on alternate mannose units.
15 The ratio of galactose to mannose in the guar polymer is therefore one to two.

Suitable cationic polygalactomannans (a) for use in the invention include polygalactomannans, such as guar, and polygalactomannan derivatives, such as hydroxyalkyl guar (for example hydroxyethyl guar or hydroxypropyl guar), that have
20 been cationically modified by chemical reaction with one or more derivatizing agents.

Derivatizing agents typically contain a reactive functional group, such as an epoxy group, a halide group, an ester group, an anhydride group or an ethylenically unsaturated group, and at least one cationic group such as a cationic nitrogen group, more typically a
25 quaternary ammonium group. The derivatization reaction typically introduces lateral cationic groups on the polygalactomannan backbone, generally linked via ether bonds in which the oxygen atom corresponds to hydroxyl groups on the polygalactomannan backbone which have reacted.

30 Preferred cationic polygalactomannans (a) for use in the invention include guar hydroxypropyltrimethylammonium chlorides.

Guar hydroxypropyltrimethylammonium chlorides for use in the invention are generally comprised of a nonionic guar gum backbone that is functionalized with ether-linked 2-

- 10 -

hydroxypropyltrimethylammonium chloride groups, and are typically prepared by the reaction of guar gum with N-(3-chloro-2-hydroxypropyl) trimethylammonium chloride. Cationic polygalactomannans for use in the invention (preferably guar hydroxypropyltrimethylammonium chlorides) generally have an average molecular weight
5 (weight average molecular mass (Mw) determined by size exclusion chromatography) in the range 500,000 to 3 million g/mol, more preferably 800,000 to 2.5 million g/mol.

The cationic charge density of the polymer is suitably determined via the Kjeldahl method as described in the US Pharmacopoeia under chemical tests for nitrogen determination.

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Specific examples of preferred cationic polygalactomannans (a) are guar hydroxypropyltrimonium chlorides having a cationic charge density from 0.5 to 1.1 meq/g.

Specific examples of preferred cationic polygalactomannans (b) are guar

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hydroxypropyltrimonium chlorides having a cationic charge density from 1.2 to 2 meq per gram.

Specific examples of preferred mixtures of cationic polygalactomannans are mixtures of guar hydroxypropyltrimonium chlorides in which one has a cationic charge density from
20 0.5 to 1.1 meq/g, and one has a cationic charge density from 1.2 to 2 meq per gram.

Cationic polygalactomannans (a) for use in the invention are commercially available from Rhodia as JAGUAR® C13S, JAGUAR® C14.

A cationic polygalactomannan (b) for use in the invention is commercially available from Rhodia as JAGUAR® C17.

A preferred cationic polygalactomannan (a) is selected from guar hydroxypropyltrimonium chlorides having an average molecular weight in the range 800,000 to 2.5 million g/mol and a charge density ranging from 0.5 to 1.1 meq/g.

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A preferred cationic polygalactomannan (b) is selected from guar hydroxypropyltrimonium chlorides having an average molecular weight in the range 800,000 to 2.5 million g/mol and a charge density ranging from 1.2 to 2 meq/g.

- 11 -

In a typical composition according to the invention the total level of cationic polygalactomannans will generally range from 0.05 to 0.5%, and preferably ranges from 0.1 to 0.3%, more preferably from 0.15 to 0.25 % by weight based on the total weight of the composition.

The composition of the invention comprises a free, non-encapsulated fragrance.

A composition of the invention may contain further optional ingredients to enhance performance and/or consumer acceptability. Examples of such ingredients include dyes and pigments, pH adjusting agents and preservatives or antimicrobials. Each of these ingredients will be present in an amount effective to accomplish its purpose. Generally these optional ingredients are included individually at a level of up to 5% by weight based on the total weight of the composition.

The pH of the composition of the invention preferably ranges from 4 to 7, more preferably from 5.5 to 6.5.

Mode of Use

The composition of the invention is primarily intended for topical application to the body, preferably the hair and scalp.

Most preferably the composition of the invention is topically applied to the hair and then massaged into the hair and scalp. The composition is then rinsed off the hair and scalp with water prior to drying the hair.

The invention will be further illustrated by the following, non-limiting Examples, in which all percentages quoted are by weight based on total weight unless otherwise stated.

EXAMPLES

Three shampoo compositions were prepared.

- 5 Encapsulated fragrance (Cap10, branched polyethyleneimine copolymer, purchased from IFF) was added by post dosing to each of the bases at a level of 0.4 wt % by total weight of the composition, as shown in Table 1 below.

Table 1: summary of shampoo compositions SH1, SH2 and SH3

Shampoo	Base	Encap
SH1	Commercially available shampoo, Pantene Pro-V Total Damage Care 10, available in Indonesia..	0.4 wt %
SH2	Shampoo composition, shown below	0.4 wt %
SH3	Shampoo composition with polygalactomannan blend, shown below, in accordance with the invention.	0.4 wt %

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Table 2: Composition of SH2:

Ingredient	Amount wt %)
Sodium laureth sulfate (2EO)	17.0
Cocamidopropyl betaine	5.3
Carbomer	0.4
Perfume	0.7
Silicone (DOW CORNING® 1788 Emulsion)	5.0
Encapsulated perfume (ex IFF)	0.4
Water, minors	To 100

Table 3: Composition of SH3:

Ingredient	Amount (wt %)
Sodium laureth sulfate (2EO)	17.0
Cocamidopropyl betaine	5.3
Carbomer	0.4
JAGUAR® C14S	0.15
JAGUAR® C17	0.05
Perfume	0.7
Silicone (DOW CORNING® 1788 Emulsion)	5.0
Encapsulated perfume (ex IFF)	0.4
Water, minors	To 100

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Example 1 : Deposition of capsules on hair from SH1, SH2 and SH3

To measure the deposition of capsules onto hair, the following method was used:

2 inch switches of virgin Caucasian hair were used.

5 The formulations were evaluated by measuring encapsulated perfume (encap) deposition on hair and fragrance bloom.

10 Encap deposition was measured by fluorescence spectrometry. 0.025g test formulation was applied to 250mg/2" switches of wet hair. The formulation was massaged on hair for 30 seconds followed by rinsing with warm water for 30 seconds. The treatment was repeated once. Five replicas were produced for each formulation. The hair was extracted
 15 in 2ml of ethanol and fluorescence signal analysed. The extracted samples were placed into a 96-well plate and analysed by fluorescence spectrometry on a Varioskan Fluorescence detector to determine the level of deposition of the microcapsules onto the hair. An excitation wavelength of 450nm and an emission wavelength of 520nm were used. According to a calibration plot, the efficiency of the deposition process was measured.

For fragrance assessment 7g hair switches were washed in 2g of formulation. The hair was dried overnight. A fragrance expert assessed the hedonic intensity before and after combing the hair.

The results are given in Table 2 below.

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Table 2: Level of deposition of microcapsules on hair, from SH1, SH2 and SH3

Composition	Deposition Efficiency (%)
SH1	22.0
SH2	19.0
SH3	42.0

It will be seen that deposition is greatest in SH3, in accordance with the invention.

25 This is in contrast to SH1, which contains the same amount of encaps also in combination with guar hydroxypropyltrimonium chloride polymer.

Example 2: Perfume Intensity on hair treated with SH1, SH2 and SH3

Perfume intensity of hair treated with SH1, SH2 and SH3 was evaluated by a fragrance expert before and after combing the switches.

- 5 The hair switches were first washed with the composition following wash protocol given above. 7" switches were used. The switches are then left to dry overnight. The perfume intensity was measured 24 hours after washing.

The perfume intensity results are reported in Table 3.

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Table 3: Perfume intensity of hair treated with SH1, SH2 and SH3

Composition	Measurement	Perfume intensity
SH1	Before combing	1.0
	After combing	7.0
SH2	Before combing	1.0
	After combing	6.5
SH3	Before combing	1.0
	After combing	8.0

It will be seen that perfume intensity is greatest in hair treated with SH3, in accordance with the invention.

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CLAIMS

1. A personal cleansing composition comprising, in an aqueous continuous phase:
 - 5 (i) from 5 to 30% by weight of one or more anionic cleansing surfactants;
 - (ii) microcapsules in which a core comprising benefit agent is encapsulated in a polymeric shell, wherein the polymeric shell is an aminoplast resin;
 - 10 (iii) a combination of cationic polymers comprising:
 - (a) at least one cationic polygalactomannan having a mean charge density at pH 7 of less than 1.2 meq per gram; and
 - (b) at least one cationic polygalactomannan having a mean charge density at pH 7
15 at least 1.2 meq per gram; and
 - (iv) a free fragrance.
2. A composition according to claim 1, in which the cationic polygalactomannan (a)
20 has a mean charge density at pH 7 of from 0.5 to 1.1 meq per gram.
3. A composition according to claim 1 or claim 2, in which the cationic polygalactomannan (b) has a mean charge density at pH 7 of from 1.2 to 3 meq per gram, preferably from 1.2 to 2 meq per gram.
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4. A composition according to any preceding claim, in which the the polymeric shell of the microcapsule is a polyurea.
5. A composition according to any preceding claim, in which the benefit agent of the
30 core of the microcapsule (iii) is selected from perfumes.
6. A composition according to any preceding claim, in which the cationic polygalactomannan (a) is selected from guar hydroxypropyltrimonium

- 16 -

chlorides having an average molecular weight in the range 800,000 to 2.5 million g/mol and a charge density ranging from 0.5 to 1.1 meq/g.

- 5 7. A composition according to any preceding claim, in which the cationic polygalactomannan (b) is selected from guar hydroxypropyltrimonium chlorides having an average molecular weight in the range 800,000 to 2.5 million g/mol and a charge density ranging from 1.2 to 2 meq/g.
- 10 8. A composition according to any preceding claim, in which the weight ratio of cationic polymer (a) to cationic polymer (b) in the composition ranges from 3:1 to 1:1.
- 15 9. A composition according to any preceding claim, wherein the combination of cationic polymers is present in an amount of from 0.1 to 0.5% by weight of the total composition.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/076086

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A61Q5/02 A61Q5/12 A61Q13/00 A61K8/73 A61K8/84
 A61Q19/10 A61K8/11
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 A61Q A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 2017/167552 A1 (UNILEVER PLC [GB]; UNILEVER NV [NL]; CONOPCO INC D/B/A UNILEVER [US]) 5 October 2017 (2017-10-05) page 2, line 13 - page 3, line 2 page 9, line 11 - page 9, line 26 examples claims 1-8	1-9
X	WO 2017/071915 A1 (UNILEVER PLC [GB]; UNILEVER NV [NL]; CONOPCO INC D/B/A UNILEVER [US]) 4 May 2017 (2017-05-04) page 1, line 22 - page 2, line 19 page 8, line 18 - page 8, line 27 examples claims 1-7	1-9

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

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- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 16 October 2018	Date of mailing of the international search report 25/10/2018
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Ovens, Annabel

INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	WO 2007/065537 A1 (UNILEVER PLC [GB]; UNILEVER NV [NL]; LEVER HINDUSTAN LTD [IN]; AINGER) 14 June 2007 (2007-06-14) the whole document	1-9

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Information on patent family members

International application No

PCT/EP2018/076086

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