

## SCENT BOOSTER

### Technical Field

The present invention relates to a perfumed particle comprising a carrier comprising a biopolymer, a humectant and, optionally, water, and free perfume oil and/or encapsulated perfume oil. The present invention also relates to a method of manufacturing the perfumed particle, a consumer product comprising the same and uses of application of the same.

### Background

Scent boosters are a product used in laundry to enhance and prolong the fragrance of clothing, towels, and other fabrics. Scent boosters are typically added to the wash cycle along with detergent or fabric softener to provide an extra boost of scent. The purpose of a scent booster is to intensify the fragrance of the laundry, helping to mask odors, add a fresh scent, and create a more pleasant and inviting experience when wearing or using the laundered items. Scent boosters are particularly popular for individuals who desire long-lasting and noticeable fragrances in their clothing. Scent boosters usually come in the form of small beads or granules, which are designed to dissolve during the washing process and release fragrance into the water. As the laundry agitates and circulates in the washing machine, the fragrance is absorbed into the fabrics, leaving them with an enhanced and longer-lasting scent.

Scent boosters on the market are obtained by a process from non-renewable sources and therefore show a low biodegradability. Particles from renewable sources, such as polysaccharides, and for example obtained by extrusion, in turn have been shown to have low performance and/or low particle integrity.

The most effective scent boosters contain brittle microcapsules in addition to the free perfume. These friction-sensitive microcapsules release the fragrance when the fabric is used by the end consumer. The intrinsic fragility of these microcapsules means they must be handled with care and are not compatible with high shear shaping processes such as extrusion.

There is a need for perfumed particles as scent boosters which provide good biodegradability and at the same time provide good performance, good dissolution and/or good particle integrity as well as physical consumer acceptance, such as specific shapes and good feel and touch of the perfumed particles.

The present invention provides a solution to the above needs.

Detailed Description of the Invention

The details, examples and preferences provided in relation to any particular one or more of the stated aspects of the present invention will be further described herein and apply equally to all aspects of the present invention. Any combination of the embodiments, examples and preferences described herein in all possible variations thereof is encompassed by the present invention unless otherwise indicated herein, or otherwise clearly contradicted by context.

Unless stated otherwise, percentages (%) are meant to designate percent by weight of a composition.

By “**active ingredient**”, it is meant a single compound or a combination of ingredients.

By “**perfume oil**”, it is meant a single perfuming compound or a mixture of several perfuming compounds.

By “**consumer product**” or “**end-product**” it is meant a manufactured product ready to be distributed, sold and used by a consumer.

A “**microcapsule**”, or the similar, in the present invention has a morphology that can vary from a core-shell to a matrix type. According to one embodiment, it is of the core-shell type. In this case, the microcapsules comprise a core based on a hydrophobic material, typically a perfume, and a shell.

Microcapsules have a particle size distribution in the micron range (e.g. a mean diameter) comprised between about 1 and 3000 microns, preferably comprised between 1 and 1000 microns, more preferably between 1 and 500 microns, and even more preferably between 5 and 50 microns.

By “**particle size**” it is meant an average diameter of particles based on size distribution measured by dynamic light scattering (DLS) using Zetasizer Nano ZS equipment from Malvern Instruments Ltd., UK when particles are dispersed into a water phase.

By “**microcapsules size**” it is meant the volume mean diameter (D[4,3]) of the relevant capsules, capsules suspension as obtained by laser light scattering of a diluted sample in a Malvern Mastersizer 3000.

The present invention relates to perfumed particle comprising

- a carrier comprising a biopolymer, a humectant and, optionally, water,
- free perfume oil and/or encapsulated perfume oil.

By “**perfumed particle**” is herein understood a solid particle comprising a perfume such as a perfume oil, or a mixture of different perfume oils.

In a particular embodiment, the perfumed particle is able to release the comprised perfume oil and/or encapsulated perfume oil upon contact with water such as during a laundry process.

In a particular embodiment, the perfumed particle is a solid perfumed particle.

In a particular embodiment, the perfumed particle has a soft and/or gummy solid consistency. Whereas the soft and/or gummy solid consistency can be further defined as a rubbery state having a glass transition temperature ( $T_g$ ) of below room temperature, thus a  $T_g$  of below 25°C, preferably having a  $T_g$  of below 15°C, more preferably having a  $T_g$  of below 10°C, and most preferably having a  $T_g$  of below 5°C.

In a particular embodiment, the perfumed particle is a solid perfumed particle for the use in non-food applications such as in non-food consumer products such as home-care products, laundry products, textiles, textile care products, paper products, surface care products, personal care products, skin and/or hair care products, air-freshener products, or air deodorizer products.

The perfumed particle may have any form and shape.

In a particular embodiment, the perfumed particle may be formed into tablets, pills, spheres, or similar. The perfumed particles could be also in the form of strips, bands or the like.

In a particular embodiment, the perfumed particle has a size of at least 0.6 mm, in particular of at least 0.8 mm and more particular of at least 1.0 mm.

In a particular embodiment, the perfumed particle may have a mass of at least 0.95 mg, in particular of at least 10 mg, more particular of at least 20 mg, more particular of at least 50 mg and even more particular of at least 95 mg.

In a particular embodiment, the perfumed particle may have a mass of not more than 2 g, in particular of not more than 1 g, more particular of not more than 500 mg, more particular of not more than 250 mg and even more particular of not more than 125 mg.

In a particular embodiment, the perfumed particle may have a mass from 0.95 mg to 2 g, more particular from 10 mg to 1 g, more particular from 20 mg to 500 mg, more particular from 50 mg to 250 mg and even more particular from 95 mg to 125 mg and/or any combination thereof.

In a particular embodiment, the perfumed particle may have a volume from 0.003 cm<sup>3</sup> to 0.15 cm<sup>3</sup>.

In a particular embodiment, the perfumed particle has a biodegradability of at least 40 %, 60 %, 65%, 70%, 75%, 80%, 85%, 90%, 95% or even 98% within 60 days according to OECD301F.

OECD301F is a standard test method on the biodegradability from the Organization of Economic Co-operation and Development.

In a particular embodiment, the perfumed particle is obtained by molding.

Molding is understood as a process of bringing a material into a desired form by using molds. Typically, liquid, or pliable materials are placed into a mold, whereas the mold is understood to be a cavity that carries a negative or reverse impression of the original model or final product. Molds can be made of a rigid material such as plastic resin, or of a flexible material such as rubber. But also, many other materials are available for molding. The final product is typically obtained by the casting or the impression casting procedure which is the act of inserting the liquid or molten material into the cavity of the mold, e.g. by pouring or injecting the material. After curing, e.g. by chemical reaction or cooling, the solidified part is obtained adopting the shape of the mold, which is the so-called casting.

The perfumed particles can be molded by casting the material forming the particles according to any suitable technique known to a skilled person.

In a particular embodiment, the perfumed particles are molded by native starch molding, solid molding, teflon molding or silicon molding.

The terms molding and casting can basically be used as equivalents.

In another embodiment, the obtained perfumed particles have been further processed by drying, coating and/or sifting the obtained perfumed particles.

In a particular embodiment, the perfumed particles are not obtained by extrusion or extrusion molding.

#### Carrier

According to the present invention, the perfumed particle comprises a carrier.

Under "carrier" is herein understood a material or combination of materials which is able to hold or entrap another material, in particular free perfume oil and/or encapsulated perfume oil. The carrier is able to disperse, deliver, and/or transport the hold or entrapped material, in particular free perfume oil and/or encapsulated perfume oil.

In a particular embodiment, the carrier is a solid carrier.

In a particular embodiment, the carrier has a soft and/or gummy solid consistency. Whereas the soft and/or gummy solid consistency can be further defined as a rubbery state having a glass transition temperature ( $T_g$ ) of below room temperature, thus a  $T_g$  of below 25°C, preferably having a  $T_g$  of below 15°C, more preferably having a  $T_g$  of below 10°C, and most preferably having a  $T_g$  of below 5°C.

In a particular embodiment, the carrier is water-soluble. Under “water-soluble” is understood that the carrier can be readily dissolved in water, such as to an extent of at least 90%, preferably 100%, over a certain time, such as 1h, preferably 30 min and more preferably 10 min. The water-solubility can be measured by following refractive index (RI) increase using an Anton Paar Abbemat 250 refractometer equipped with a flow cell and wherein about 2 g of the perfumed particle is poured into 500 ml of distilled water, the mixture is stirred at 300 rpm using a 5 cm magnetic stirrer at a set temperature of 30°C, the flow is about 10g/min and the results are expressed as a percentage of the maximum stable signal.

In a particular embodiment, the perfumed particle comprises the carrier in the range of from 70 to 98 wt.%, based on the total weight of the perfumed particle.

In a particular embodiment, the perfumed particle comprises the carrier in an amount of at least 75 wt.%, preferably at least 80 wt.%, based on the total weight of the perfumed particle.

In a particular embodiment, the perfumed particle comprises the carrier in an amount of not more than 95 wt.%, preferably not more than 91 wt.%, based on the total weight of the perfumed particle.

### Biopolymer

According to the present invention, the carrier comprises a biopolymer.

Under “biopolymer” is herein understood a type of polymer that is derived from natural sources, typically living organisms or renewable biomass. A biopolymer is usually composed of several repeating units, i.e. monomers, which are linked together to form a larger macromolecule. Biopolymers are distinct from synthetic polymers, which are synthetically derived such as chemically synthesized or chemically derivatized and are usually derived from petroleum or other non-renewable resources. The biopolymer as described herein is

preferably to be understood as a polymer derived from natural sources and which is not synthesized chemically or derivatized chemically.

In a particular embodiment, the biopolymer is a biodegradable biopolymer. Under “biodegradable biopolymer” is herein understood that the biopolymer can be broken down by biological processes into simpler compounds, often through the action of enzymes.

In a particular embodiment, the biopolymer is a gelling biopolymer. Under “gelling biopolymer” is herein understood that the biopolymer has the ability of forming a gel or gel-like structure when hydrated or under specific conditions. The biopolymers can thereby undergo a gelation process, where they self-assemble into a three-dimensional network, trapping water within the network and creating a gel. A “gel” is herein understood as a three-dimensional network or matrix structure formed by a dispersed phase within a continuous medium. A gel typically has a semi-solid or solid-like consistency and exhibit properties such as elasticity, cohesiveness, and/or resistance to flow.

In a particular embodiment, the biopolymer comprises gelatin (for example fish gelatin), pectin, agar-agar, carrageenan, konjac gum, starch, tapioca starch, gellan, alginate, gum arabic, xanthan, cellulose ethers, vegetal protein isolate, amylose, or any mixture thereof.

In a preferred embodiment, the biopolymer comprises gelatin, gum arabic, pectin, carrageenan or any mixture thereof.

In a preferred embodiment, the biopolymer is selected from gelatin, gum arabic, pectin or carrageenan.

In a particular embodiment, the carrier is vegan. Thereby, it is herein understood that the carrier does not contain materials from animal origin.

In a particular embodiment, the carrier comprises the biopolymer in an amount of at least 0.5 wt.%, preferably in an amount of at least 1 wt.%, based on the total weight of the carrier.

In a particular embodiment, the carrier comprises the biopolymer in an amount of not more than 35 wt.%, preferably in an amount of not more than 10 wt.%, based on the total weight of the carrier.

In a particular embodiment, the carrier comprises the biopolymer in the range from 0.5 to 35 wt.%, preferably in the range from 1 to 10 wt.%, based on the total weight of the carrier.

### Humectant

According to the present invention, the carrier comprises a humectant.

Under “humectant” is herein understood a hygroscopic substance that possesses the ability to attract and retain moisture from its surroundings. The humectant is capable of absorbing water vapor or attracting moisture from the environment, thereby maintaining or increasing the moisture content of a formulation or product.

In a particular embodiment, the humectant is able to lower the water activity of the perfumed particle.

In a particular embodiment, the humectant is able to lower the water activity of the perfumed particle below 0.9, preferably wherein the humectant is able to lower the water activity of the perfumed particle below 0.6.

The water activity can be measured by standard measurement procedures, such as hygrometers, such as resistive electrolytic hygrometers, capacitance hygrometers or dew point hygrometers.

In a particular embodiment, the humectant is a naturally derived humectant. Under naturally humectant is herein understood a humectant, which is derived from natural sources, and which thus has not been chemically synthesized, modified or derivatized.

In a particular embodiment, the humectant comprises sucrose, glycerol, glucose, syrup, corn syrup, citric acid, tartaric acid, malic acid, polyols such as sorbitol, xylitol etc., mono-, di- & trisaccharides such as maltose, urea, amino acids, bio-based and sustainable propylene glycol from natural sources – e.g. by hydrogenolysis of glycerol obtained from renewable, low-carbon feedstocks, like corn and sugar cane, whereas the hydrogen for hydrogenolysis is generated from renewable sources, or any mixture thereof.

In a preferred embodiment, the humectant comprises sucrose, corn syrup, glucose, sorbitol, bio-based and sustainable propylene glycol, or any mixture thereof.

In a preferred embodiment, the humectant is selected from sucrose, corn syrup, mixtures of sucrose and corn syrup, glucose, mixtures of sucrose and glucose or sorbitol.

In a particular embodiment, the carrier comprises the humectant in an amount of at least 30 wt.%, preferably in an amount of at least 50 wt.%, based on the total weight of the carrier.

In a particular embodiment, the carrier comprises the humectant in an amount of not more than 70 wt.%, preferably in an amount of not more than 65 wt.%, based on the total weight of the carrier.

In a particular embodiment, the carrier comprises the humectant in the range from 30 to 70 wt.%, preferably in the range from 50 to 65 wt.%, based on the total weight of the carrier.

#### Water

The carrier may optionally comprise water.

In a particular embodiment, the carrier comprises water of not more than 50 wt.%, preferably of not more than 40 wt.%, based on the total weight of the carrier.

In a particular embodiment, the carrier comprises water in the range from 10 to 50 wt.%, preferably in the range from 20 to 40 wt.%, based on the total weight of the carrier.

#### Encapsulated perfume

According to the present invention, the perfumed particle may comprise an encapsulated perfume.

In a particular embodiment, the perfumed particle comprises an encapsulated perfume.

In a particular embodiment, the encapsulated perfume is a core-shell microcapsule comprising an oil-based core comprising a hydrophobic material, preferably a perfume, and a polymeric shell.

By the expression core-shell microcapsule it is understood that the hydrophobic material in the oil-based core is surrounded by the shell of the microcapsule. "Shell" and "wall" are used indifferently in the present invention. By "oil" it is understood an organic phase that is liquid at about 20°C which forms the core of the core-shell microcapsules.

In a particular embodiment, the encapsulated perfume is a brittle core-shell microcapsule. By "brittle core-shell microcapsule" it is understood a core shell microcapsule comprising an oil-based core comprising a hydrophobic material, preferably a perfume, and a brittle or friable polymeric shell. The brittle polymeric shell is characterized by its ability to easily break or fracture when subjected to mechanical stress or pressure or other external forces, such as heat, moisture, etc..

#### Hydrophobic material and perfume

The hydrophobic material according to the invention can be "inert" material like solvents or active ingredients.

When hydrophobic materials are active ingredients, they are preferably chosen from the group consisting of flavors, flavor ingredients, perfumes, perfume ingredients, nutraceuticals, cosmetics, pest control agents, biocide actives and mixtures thereof.

According to a particular embodiment, the hydrophobic material comprises a mixture of a perfume with another ingredient selected from the group consisting of nutraceuticals, cosmetics, pest control agents and biocide actives.

According to a particular embodiment, the hydrophobic material comprises a perfume.

According to a particular embodiment, the hydrophobic material consists of a perfume.

By "perfume" (or also "perfume oil") what is meant here is an ingredient or a composition that is a liquid at about 20°C. According to any one of the above embodiments said perfume oil can be a perfuming ingredient alone or a mixture of ingredients in the form of a perfuming composition. As a "perfuming ingredient" it is meant here a compound, which is used for the primary purpose of conferring or modulating an odor. In other words, such an ingredient, to be considered as being a perfuming one, must be recognized by a person skilled in the art as being able to at least impart or modify in a positive or pleasant way the odor of a composition, and not just as having an odor. For the purpose of the present invention, perfume oil also includes a combination of perfuming ingredients with substances which together improve, enhance or modify the delivery of the perfuming ingredients, such as perfume precursors, emulsions or dispersions, as well as combinations which impart an additional benefit beyond that of modifying or imparting an odor, such as long-lastingness, blooming, malodor counteraction, antimicrobial effect, microbial stability, pest control.

The nature and type of the perfuming ingredients present in the oil phase do not warrant a more detailed description here, which in any case would not be exhaustive, the skilled person being able to select them on the basis of its general knowledge and according to intended use or application and the desired organoleptic effect. In general terms, these perfuming ingredients belong to chemical classes as varied as alcohols, aldehydes, ketones, esters, ethers, acetates, nitriles, terpenoids, nitrogenous or sulfurous heterocyclic compounds and essential oils, and said perfuming co-ingredients can be of natural or synthetic origin. Many of these co-ingredients are in any case listed in reference texts such as the book by S. Arctander, *Perfume and Flavor Chemicals*, 1969, Montclair, New Jersey, USA, or its more recent versions,

or in other works of a similar nature, as well as in the abundant patent literature in the field of perfumery.

In particular one may cite perfuming ingredients which are commonly used in perfume formulations, such as:

Aldehydic ingredients: decanal, dodecanal, 2-methyl-undecanal, 10-undecenal, octanal, nonanal and/or nonenal;

Aromatic-herbal ingredients: eucalyptus oil, camphor, eucalyptol, 5-methyltricyclo[6.2.1.0~2,7~]undecan-4-one, 1-methoxy-3-hexanethiol, 2-ethyl-4,4-dimethyl-1,3-oxathiane, 2,2,7/8,9/10-Tetramethylspiro[5.5]undec-8-en-1-one, menthol and/or alpha-pinene;

Balsamic ingredients: coumarin, ethylvanillin and/or vanillin;

Citrus ingredients: dihydromyrcenol, citral, orange oil, linalyl acetate, citronellyl nitrile, orange terpenes, limonene, 1-p-menthen-8-yl acetate and/or 1,4(8)-p-menthadiene;

Floral ingredients: methyl dihydrojasmonate, linalool, citronellol, phenylethanol, 3-(4-tert-butylphenyl)-2-methylpropanal, hexylcinnamic aldehyde, benzyl acetate, benzyl salicylate, tetrahydro-2-isobutyl-4-methyl-4(2H)-pyranol, beta ionone, methyl 2-(methylamino)benzoate, (E)-3-methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-3-buten-2-one, (1E)-1-(2,6,6-trimethyl-2-cyclohexen-1-yl)-1-penten-3-one, 1-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-2-buten-1-one, (2E)-1-(2,6,6-trimethyl-2-cyclohexen-1-yl)-2-buten-1-one, (2E)-1-[2,6,6-trimethyl-3-cyclohexen-1-yl]-2-buten-1-one, (2E)-1-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2-buten-1-one, 2,5-dimethyl-2-indanmethanol, 2,6,6-trimethyl-3-cyclohexene-1-carboxylate, 3-(4,4-dimethyl-1-cyclohexen-1-yl)propanal, hexyl salicylate, 3,7-dimethyl-1,6-nonadien-3-ol, 3-(4-isopropylphenyl)-2-methylpropanal, verdyl acetate, geraniol, p-menth-1-en-8-ol, 4-(1,1-dimethylethyl)-1-cyclohexyle acetate, 1,1-dimethyl-2-phenylethyl acetate, 4-cyclohexyl-2-methyl-2-butanol, amyl salicylate, high cis methyl dihydrojasmonate, 3-methyl-5-phenyl-1-pentanol, verdyl propionate, geranyl acetate, tetrahydro linalool, cis-7-p-menthanol, propyl (S)-2-(1,1-dimethylpropoxy)propanoate, 2-methoxynaphthalene, 2,2,2-trichloro-1-phenylethyl acetate, 4/3-(4-hydroxy-4-methylpentyl)-3-cyclohexene-1-carbaldehyde, amylcinnamic aldehyde, 8-decen-5-olide, 4-phenyl-2-butanone, isononyl acetate, 4-(1,1-dimethylethyl)-1-cyclohexyl acetate, verdyl isobutyrate and/or mixture of methylionones isomers;

Fruity ingredients: gamma-undecalactone, 2,2,5-trimethyl-5-pentylcyclopentanone, 2-methyl-4-propyl-1,3-oxathiane, 4-decanolide, ethyl 2-methyl-pentanoate, hexyl acetate, ethyl 2-methylbutanoate, gamma-nonolactone, allyl heptanoate, 2-phenoxyethyl isobutyrate, ethyl 2-methyl-1,3-dioxolane-2-acetate, 3-(3,3/1,1-dimethyl-5-indanyl)propanal, diethyl 1,4-cyclohexanedicarboxylate, 3-methyl-2-hexen-1-yl acetate, 1-[3,3-dimethylcyclohexyl]ethyl [3-ethyl-2-oxiranyl]acetate and/or diethyl 1,4-cyclohexane dicarboxylate;

Green ingredients: 2-methyl-3-hexanone (E)-oxime, 2,4-dimethyl-3-cyclohexene-1-carbaldehyde, 2-tert-butyl-1-cyclohexyl acetate, styrallyl acetate, allyl (2-methylbutoxy)acetate, 4-methyl-3-decen-5-ol, diphenyl ether, (Z)-3-hexen-1-ol and/or 1-(5,5-dimethyl-1-cyclohexen-1-yl)-4-penten-1-one;

Musk ingredients: 1,4-dioxo-5,17-cycloheptadecanedione, (Z)-4-cyclopentadecen-1-one, 3-methylcyclopentadecanone, 1-oxa-12-cyclohexadecen-2-one, 1-oxa-13-cyclohexadecen-2-one, (9Z)-9-cycloheptadecen-1-one, 2-{(1S)-1-[(1R)-3,3-dimethylcyclohexyl]ethoxy}-2-oxoethyl propionate 3-methyl-5-cyclopentadecen-1-one, 1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-g-2-benzopyrane, (1S,1'R)-2-[1-(3',3'-dimethyl-1'-cyclohexyl)ethoxy]-2-methylpropyl propanoate, oxacyclohexadecan-2-one and/or (1S,1'R)-[1-(3',3'-dimethyl-1'-cyclohexyl)ethoxycarbonyl]methyl propanoate, ;

Woody ingredients: 1-[(1RS,6SR)-2,2,6-trimethylcyclohexyl]-3-hexanol, 3,3-dimethyl-5-[(1R)-2,2,3-trimethyl-3-cyclopenten-1-yl]-4-penten-2-ol, 3,4'-dimethylspiro[oxirane-2,9'-tricyclo[6.2.1.0<sup>2,7</sup>]undec[4]ene, (1-ethoxyethoxy)cyclododecane, 2,2,9,11-tetramethylspiro[5.5]undec-8-en-1-yl acetate, 1-(octahydro-2,3,8,8-tetramethyl-2-naphthalenyl)-1-ethanone, patchouli oil, terpenes fractions of patchouli oil, clearwood®, (1'R,E)-2-ethyl-4-(2',2',3'-trimethyl-3'-cyclopenten-1'-yl)-2-buten-1-ol, 2-ethyl-4-(2,2,3-trimethyl-3-cyclopenten-1-yl)-2-buten-1-ol, methyl cedryl ketone, 5-(2,2,3-trimethyl-3-cyclopentenyl)-3-methylpentan-2-ol, 1-(2,3,8,8-tetramethyl-1,2,3,4,6,7,8,8a-octahydronaphthalen-2-yl)ethan-1-one and/or isobornyl acetate;

Other ingredients (e.g. amber, powdery spicy or watery): dodecahydro-3a,6,6,9a-tetramethyl-naphtho[2,1-b]furan and any of its stereoisomers, heliotropin, anisic aldehyde, eugenol, cinnamic aldehyde, clove oil, 3-(1,3-benzodioxol-5-yl)-2-methylpropanal, 7-methyl-2H-1,5-benzodioxepin-3(4H)-one, 2,5,5-trimethyl-1,2,3,4,4a,5,6,7-octahydro-2-naphthalenol, 1-phenylvinyl acetate, 6-methyl-7-oxa-1-thia-4-azaspiro[4.4]nonan and/or 3-(3-isopropyl-1-phenyl)butanal.

According to a particular embodiment, the perfume or perfume formulation comprises a fragrance modulator (that can be used in addition to the hydrophobic solvent when present or as substitution of the hydrophobic solvent when there is no hydrophobic solvent).

Preferably, the fragrance modulator is defined as a fragrance material with

- a vapor pressure of less than 0.0008 Torr at 22°C;
- a clogP of 3.5 and higher, preferably 4.0 and higher and more preferably 4.5
- at least two Hansen solubility parameters selected from a first group consisting of: an atomic dispersion force from 12 to 20, a dipole moment from 1 to 7, and a hydrogen bonding from 2.5 to 11,

- at least two Hansen solubility parameters selected from a second group consisting of: an atomic dispersion force from 14 to 20, a dipole moment from 1 to 8, and a hydrogen bonding from 4 to 11, when in solution with a compound having a vapor pressure range of 0.0008 to 0.08 Torr at 22°C.

Preferably as examples the following ingredients can be listed as fragrance modulators but the list is not limited to the following materials: alcohol C12, oxacyclohexadec-12/13-en-2-one, 3-[(2',2',3'-trimethyl-3'-cyclopenten-1'-yl)methoxy]-2-butanol, cyclohexadecanone, (Z)-4-cyclopentadecen-1-one, cyclopentadecanone, (8Z)-oxacycloheptadec-8-en-2-one, 2-[5-(tetrahydro-5-methyl-5-vinyl-2-furyl)-tetrahydro-5-methyl-2-furyl]-2-propanol, muguet aldehyde, 1,5,8-trimethyl-13-oxabicyclo[10.1.0]trideca-4,8-diene, (+)-4,6,6,7,8-hexamethyl-1,3,4,6,7,8-hexahydrocyclopenta[g]isochromene, (+)-(1S,2S,3S,5R)-2,6,6-trimethylspiro[bicyclo[3.1.1]heptane-3,1'-cyclohexane]-2'-en-4'-one, oxacyclohexadecan-2-one, 2-[(1S)-1-[(1R)-3,3-dimethylcyclohexyl]ethoxy]-2-oxoethyl propionate, (+)-(4R,4aS,6R)-4,4a-dimethyl-6-(1-propen-2-yl)-4,4a,5,6,7,8-hexahydro-2(3H)-naphthalenone, amylcinnamic aldehyde, hexylcinnamic aldehyde, hexyl salicylate, (1E)-1-(2,6,6-trimethyl-1-cyclohexen-1-yl)-1,6-heptadien-3-one, (9Z)-9-cycloheptadecen-1-one.

It is also understood that said ingredients may also be compounds known to release in a controlled manner various types of perfuming compounds also known as properfume or profragrance. Non-limiting examples of suitable properfumes may include

4-(dodecylthio)-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-2-butanone, 4-(dodecylthio)-4-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2-butanone, 3-(dodecylthio)-1-(2,6,6-trimethyl-3-cyclohexen-1-yl)-1-butanone, 2-(dodecylthio)octan-4-one, 2-phenylethyl oxo(phenyl)acetate, 3,7-dimethylocta-2,6-dien-1-yl oxo(phenyl)acetate, (Z)-hex-3-en-1-yl oxo(phenyl)acetate, 3,7-dimethyl-2,6-octadien-1-yl hexadecanoate, bis(3,7-dimethylocta-2,6-dien-1-yl) succinate, (2-((2-methylundec-1-en-1-yl)oxy)ethyl)benzene, 1-methoxy-4-(3-methyl-4-phenethoxybut-3-en-1-yl)benzene, (3-methyl-4-phenethoxybut-3-en-1-yl)benzene, 1-(((Z)-hex-3-en-1-yl)oxy)-2-methylundec-1-ene, (2-((2-methylundec-1-en-1-yl)oxy)ethoxy)benzene, 2-methyl-1-(octan-3-yloxy)undec-1-ene, 1-methoxy-4-(1-phenethoxyprop-1-en-2-yl)benzene, 1-methyl-4-(1-phenethoxyprop-1-en-2-yl)benzene, 2-(1-phenethoxyprop-1-en-2-yl)naphthalene, (2-phenethoxyvinyl)benzene, 2-(1-((3,7-dimethyloct-6-en-1-yl)oxy)prop-1-en-2-yl)naphthalene, (2-((2-pentylcyclopentylidene)methoxy)ethyl)benzene, 4-allyl-2-methoxy-1-((2-methoxy-2-phenylvinyl)oxy)benzene, (2-((2-heptylcyclopentylidene)methoxy)ethyl)benzene, 1-isopropyl-4-methyl-2-((2-pentylcyclopentylidene)methoxy)benzene, 2-methoxy-1-((2-pentylcyclopentylidene)methoxy)-4-propylbenzene, 3-methoxy-4-((2-methoxy-2-phenylvinyl)oxy)benzaldehyde, 4-((2-(hexyloxy)-2-phenylvinyl)oxy)-3-methoxybenzaldehyde or a mixture thereof.

The perfuming ingredients may be dissolved in a solvent of current use in the perfume industry. The solvent is preferably not an alcohol. Examples of such solvents are diethyl phthalate, isopropyl myristate, Abalyn® (rosin resins, available from Eastman), benzyl benzoate, ethyl citrate, limonene or other terpenes, or isoparaffins. Preferably, the solvent is very hydrophobic and highly sterically hindered, like for example Abalyn® or benzyl benzoate. Preferably the perfume comprises less than 30% of solvent. More preferably the perfume comprises less than 20% and even more preferably less than 10% of solvent, all these percentages being defined by weight relative to the total weight of the perfume. Most preferably, the perfume is essentially free of solvent.

According to a particular embodiment, the perfume comprises at least 35% of perfuming ingredients having a log P above 3.

LogP is the common logarithm of estimated octanol-water partition coefficient, which is known as a measure of lipophilicity.

The LogP values of many perfuming compound have been reported, for example, in the Pomona92 database, available from Daylight Chemical Information Systems, Inc. (Daylight CIS), Irvine, Calif., which also contains citations to the original literature. LogP values are most conveniently calculated by the "CLOGP" program, also available from Daylight CIS. This program also lists experimental logP values when they are available in the Pomona92 database. The "calculated logP" (cLogP) is determined by the fragment approach of Hansch and Leo (cf., A. Leo, in *Comprehensive Medicinal Chemistry*, Vol. 4, C. Hansch, P. G. Sammens, J. B. Taylor and C. A. Ramsden, Eds., p. 295, Pergamon Press, 1990). The fragment approach is based on the chemical structure of each perfume oil ingredient, and takes into account the numbers and types of atoms, the atom connectivity, and chemical bonding. The cLogP values, which are the most reliable and widely used estimates for this physicochemical property, are preferably used instead of the experimental LogP values in the selection of perfuming compounds which are useful in the present invention.

In a particular embodiment, the perfume oil comprises at least 40 wt.%, preferably at least 50 wt.%, more preferably at least 60 wt.% of ingredients having a logP above 3, preferably above 3.5 and even more preferably above 3.75.

Preferably, the perfume oil contains less than 10 wt.% of its own weight of primary alcohols, less than 15 wt.% of its own weight of secondary alcohols and less than 20% of its own weight of tertiary alcohols. Advantageously, the perfume used in the invention does not contain any primary alcohols and contains less than 15 wt.% of secondary and tertiary alcohols.

According to a particular embodiment, the perfume comprises at least 20 wt.%, preferably at least 25 wt.%, more preferably at least 40 wt.% of Bulky materials of groups 1 to 6, preferably 3 to 6.

The term Bulky materials is herein understood as perfuming ingredients having a high steric hindrance, i.e. having a substitution pattern which provides high steric hindrance and thus the Bulky materials are in particular those from one of the following groups:

- Group 1: perfuming ingredients comprising a cyclohexane, cyclohexene, cyclohexanone or cyclohexenone ring substituted with at least one 1 to 4 nodes comprising substituent, preferably at least one linear or branched C1 to C4 alkyl or alkenyl substituent;
- Group 2: perfuming ingredients comprising a cyclopentane, cyclopentene, cyclopentanone or cyclopentenone ring substituted with at least one 4 or more nodes comprising substituent, preferably at least one linear or branched C4 or longer, preferably C4 to C8 alkyl or alkenyl substituent;
- Group 3: perfuming ingredients comprising a phenyl ring or perfuming ingredients comprising a cyclohexane, cyclohexene, cyclohexanone or cyclohexenone ring substituted with at least one 5 or more nodes comprising substituent, preferably at least one linear or branched C5 or longer, preferably C5 to C8, alkyl or alkenyl substituent, or with at least one phenyl substituent and optionally one or more 1 to 3 nodes comprising substituents, preferably one or more linear or branched C1 to C3 alkyl or alkenyl substituents;
- Group 4: perfuming ingredients comprising at least two fused or linked 5 membered or 6 membered rings, preferably at least two fused or linked C5 and/or C6 rings;
- Group 5: perfuming ingredients comprising a camphor-like ring structure, i.e. two 5 or 6 membered rings that are fused in a bridge-type fashion;
- Group 6: perfuming ingredients comprising at least one 7 to 20 membered ring, preferably at least one C7 or C20 ring structure.

The term nodes as understood in this context means any atom which is able to provide at least two, preferably at least 3, more preferably 4, bonds to further atoms. Particular examples of nodes as herein understood are carbon atoms (up to 4 bonds to further atoms), nitrogen atoms (up to 3 bonds to further atoms), oxygen atoms (up to 2 bonds to further atoms) and sulfur (up to 2 bonds to further atoms). Particular examples of further atoms as understood in this context could be carbon atoms, nitrogen atoms, sulfur atoms, oxygen atoms and hydrogen atoms.

Examples of ingredients from each of these groups are:

- Group 1: 2,4-dimethyl-3-cyclohexene-1-carbaldehyde (origin: Firmenich SA, Geneva, Switzerland), isocyclocitral, menthone, isomenthone, methyl 2,2-dimethyl-6-methylene-1-cyclohexanecarboxylate (origin: Firmenich SA, Geneva, Switzerland), nerone,

terpineol, dihydroterpineol, terpenyl acetate, dihydroterpenyl acetate, dipentene, eucalyptol, hexylate, rose oxide, (S)-1,8-p-menthadiene-7-ol (origin: Firmenich SA, Geneva, Switzerland), 1-p-menthene-4-ol, (1RS,3RS,4SR)-3-p-mentanyl acetate, (1R,2S,4R)-4,6,6-trimethyl-bicyclo[3,1,1]heptan-2-ol, tetrahydro-4-methyl-2-phenyl-2H-pyran (origin: Firmenich SA, Geneva, Switzerland), cyclohexyl acetate, cyclanol acetate, 1,4-cyclohexane diethyldicarboxylate (origin: Firmenich SA, Geneva, Switzerland), (3ARS,6SR,7ASR)-perhydro-3,6-dimethyl-benzo[B]furan-2-one (origin: Firmenich SA, Geneva, Switzerland), ((6R)-perhydro-3,6-dimethyl-benzo[B]furan-2-one (origin: Firmenich SA, Geneva, Switzerland), 2,4,6-trimethyl-4-phenyl-1,3-dioxane, 2,4,6-trimethyl-3-cyclohexene-1-carbaldehyde;

- Group 2: (E)-3-methyl-5-(2,2,3-trimethyl-3-cyclopenten-1-yl)-4-penten-2-ol (origin: Givaudan SA, Vernier, Switzerland), (1'R,E)-2-ethyl-4-(2',2',3'-trimethyl-3'-cyclopenten-1'-yl)-2-buten-1-ol (origin: Firmenich SA, Geneva, Switzerland), (1'R,E)-3,3-dimethyl-5-(2',2',3'-trimethyl-3'-cyclopenten-1'-yl)-4-penten-2-ol (origin: Firmenich SA, Geneva, Switzerland), 2-heptylcyclopentanone, methyl-cis-3-oxo-2-pentyl-1-cyclopentane acetate (origin: Firmenich SA, Geneva, Switzerland), 2,2,5-Trimethyl-5-pentyl-1-cyclopentanone (origin: Firmenich SA, Geneva, Switzerland), 3,3-dimethyl-5-(2,2,3-trimethyl-3-cyclopenten-1-yl)-4-penten-2-ol (origin: Firmenich SA, Geneva, Switzerland), 3-methyl-5-(2,2,3-trimethyl-3-cyclopenten-1-yl)-2-pentanol (origin: Givaudan SA, Vernier, Switzerland);

- Group 3: damascones, 1-(5,5-dimethyl-1-cyclohexen-1-yl)-4-penten-1-one (origin: Firmenich SA, Geneva, Switzerland), nectalactone ((1'R)-2-[2-(4'-methyl-3'-cyclohexen-1'-yl)propyl]cyclopentanone), alpha-ionone, beta-ionone, damascenone, mixture of 1-(5,5-dimethyl-1-cyclohexen-1-yl)-4-penten-1-one and 1-(3,3-dimethyl-1-cyclohexen-1-yl)-4-penten-1-one (origin: Firmenich SA, Geneva, Switzerland), 1-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2-buten-1-one (origin: Firmenich SA, Geneva, Switzerland), (1S,1'R)-[1-(3',3'-Dimethyl-1'-cyclohexyl)ethoxycarbonyl]methyl propanoate (origin: Firmenich SA, Geneva, Switzerland), 2-tert-butyl-1-cyclohexyl acetate (origin: International Flavors and Fragrances, USA), 1-(2,2,3,6-tetramethyl-cyclohexyl)-3-hexanol (origin: Firmenich SA, Geneva, Switzerland), trans-1-(2,2,6-trimethyl-1-cyclohexyl)-3-hexanol (origin: Firmenich SA, Geneva, Switzerland), (E)-3-methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-3-buten-2-one, terpenyl isobutyrate, 4-(1,1-dimethylethyl)-1-cyclohexyl acetate (origin: Firmenich SA, Geneva, Switzerland), 8-methoxy-1-p-menthene, (1S,1'R)-2-[1-(3',3'-dimethyl-1'-cyclohexyl) ethoxy]-2-methylpropyl propanoate (origin: Firmenich SA, Geneva, Switzerland), para tert-butylcyclohexanone, menthenethiol, 1-methyl-4-(4-methyl-3-pentenyl)-3-cyclohexene-1-carbaldehyde, allyl cyclohexylpropionate, cyclohexyl salicylate, 2-methoxy-4-methylphenyl methyl carbonate, ethyl 2-methoxy-4-methylphenyl carbonate, 4-ethyl-2-methoxyphenyl methyl carbonate;

- Group 4: Methyl cedryl ketone (origin: International Flavors and Fragrances, USA), a mixture of (1RS,2SR,6RS,7RS,8SR)-tricyclo[5.2.1.0~2,6~]dec-3-en-8-yl 2-methylpropanoate and (1RS,2SR,6RS,7RS,8SR)-tricyclo[5.2.1.0~2,6~]dec-4-en-8-yl 2-methylpropanoate, vetyverol, vetyverone, 1-(octahydro-2,3,8,8-tetramethyl-2-naphthalenyl)-1-ethanone (origin: International Flavors and Fragrances, USA), (5RS,9RS,10SR)-2,6,9,10-tetramethyl-1-oxaspiro[4.5]deca-3,6-diene and the (5RS,9SR,10RS) isomer, 6-ethyl-2,10,10-trimethyl-1-oxaspiro[4.5]deca-3,6-diene, 1,2,3,5,6,7-hexahydro-1,1,2,3,3-pentamethyl-4-indenone (origin: International Flavors and Fragrances, USA), a mixture of 3-(3,3-dimethyl-5-indanyl)propanal and 3-(1,1-dimethyl-5-indanyl)propanal (origin: Firmenich SA, Geneva, Switzerland), 3',4-dimethyl-tricyclo[6.2.1.0(2,7)]undec-4-ene-9-spiro-2'-oxirane (origin: Firmenich SA, Geneva, Switzerland), 9/10-ethylidene-3-oxatricyclo[6.2.1.0(2,7)]undecane, (perhydro-5,5,8A-trimethyl-2-naphthalenyl acetate (origin: Firmenich SA, Geneva, Switzerland), octalynol, (dodecahydro-3a,6,6,9a-tetramethyl-naphtho[2,1-b]furan, origin: Firmenich SA, Geneva, Switzerland), tricyclo[5.2.1.0(2,6)]dec-3-en-8-yl acetate and tricyclo[5.2.1.0(2,6)]dec-4-en-8-yl acetate as well as tricyclo[5.2.1.0(2,6)]dec-3-en-8-yl propanoate and tricyclo[5.2.1.0(2,6)]dec-4-en-8-yl propanoate, (+)-(1S,2S,3S)-2,6,6-trimethyl-bicyclo[3.1.1]heptane-3-spiro-2'-cyclohexen-4'-one;

- Group 5: camphor, borneol, isobornyl acetate, 8-isopropyl-6-methyl-bicyclo[2.2.2]oct-5-ene-2-carbaldehyde, pinene, camphene, 8-methoxycedrane, (8-methoxy-2,6,6,8-tetramethyl-tricyclo[5.3.1.0(1,5)]undecane (origin: Firmenich SA, Geneva, Switzerland), cedrene, cedrenol, cedrol, mixture of 9-ethylidene-3-oxatricyclo[6.2.1.0(2,7)]undecan-4-one and 10-ethylidene-3-oxatricyclo[6.2.1.0(2,7)]undecan-4-one (origin: Firmenich SA, Geneva, Switzerland), 3-methoxy-7,7-dimethyl-10-methylene-bicyclo[4.3.1]decane (origin: Firmenich SA, Geneva, Switzerland);

- Group 6: (trimethyl-13-oxabicyclo-[10.1.0]-trideca-4,8-diene (origin: Firmenich SA, Geneva, Switzerland), Ambrettolide LG ((E)-9-hexadecen-16-olide, origin: Firmenich SA, Geneva, Switzerland), pentadecenolide (origin: Firmenich SA, Geneva, Switzerland), muscenone (3-methyl-(4/5)-cyclopentadecenone, origin: Firmenich SA, Geneva, Switzerland), 3-methylcyclopentadecanone (origin: Firmenich SA, Geneva, Switzerland), pentadecanolide (origin: Firmenich SA, Geneva, Switzerland), cyclopentadecanone (origin: Firmenich SA, Geneva, Switzerland), 1-ethoxyethoxycyclododecane (origin: Firmenich SA, Geneva, Switzerland), 1,4-dioxacycloheptadecane-5,17-dione, 4,8-cyclododecadien-1-one;

- Group 7: (+)-2-methyl-3-[4-(2-methyl-2-propanyl)phenyl]propanal (origin: Givaudan SA, Vernier, Switzerland), 2,2,2-trichloro-1-phenylethyl acetate.

Preferably, the perfume comprises at least 30%, preferably at least 50%, more preferably at least 60% of ingredients selected from Groups 1 to 7, as defined above. More

preferably said perfume comprises at least 30%, preferably at least 50% of ingredients from Groups 3 to 7, as defined above. Most preferably said perfume comprises at least 30%, preferably at least 50% of ingredients from Groups 3, 4, 6 or 7, as defined above.

According to another preferred embodiment, the perfume comprises at least 30%, preferably at least 50%, more preferably at least 60% of ingredients having a logP above 3, preferably above 3.5 and even more preferably above 3.75.

Preferably, the perfume used in the invention contains less than 10% of its own weight of primary alcohols, less than 15% of its own weight of secondary alcohols and less than 20% of its own weight of tertiary alcohols. Advantageously, the perfume used in the invention does not contain any primary alcohols and contains less than 15% of secondary and tertiary alcohols.

According to an embodiment, the oil phase (or the oil-based core) comprises:

25-100wt% of a perfume oil comprising at least 15wt% of high impact perfume raw materials having a Log T<-4, and

0-75wt% of a density balancing material having a density greater than 1.07 g/cm<sup>3</sup>.

"High impact perfume raw materials" should be understood as perfume raw materials having a LogT<-4. The odor threshold concentration of a chemical compound is determined in part by its shape, polarity, partial charges and molecular mass. For convenience, the threshold concentration is presented as the common logarithm of the threshold concentration, i.e., Log [Threshold] ("LogT").

A "density balancing material" should be understood as a material having a density preferably greater than 1.07 g/cm<sup>3</sup> and having preferably low or no odor.

The density of a component is defined as the ratio between its mass and its volume (g/cm<sup>3</sup>).

Several methods are available to determine the density of a component.

One may refer for example to the ISO 298:1998 method to measure d<sub>20</sub> densities of essential oils.

The odor threshold concentration of a perfuming compound is determined by using a gas chromatograph ("GC"). Specifically, the gas chromatograph is calibrated to determine the exact volume of the perfume oil ingredient injected by the syringe, the precise split ratio, and the hydrocarbon response using a hydrocarbon standard of known concentration and chain-length distribution. The air flow rate is accurately measured and, assuming the duration of a human inhalation to last 12 seconds, the sampled volume is calculated. Since the precise concentration at the detector at any point in time is known, the mass per volume inhaled is known and hence the concentration of the perfuming compound. To determine the threshold

concentration, solutions are delivered to the sniff port at the back-calculated concentration. A panelist sniffs the GC effluent and identifies the retention time when odor is noticed. The average across all panelists determines the odor threshold concentration of the perfuming compound. The determination of odor threshold is described in more detail in C. Vuilleumier et al., Multidimensional Visualization of Physical and Perceptual Data Leading to a Creative Approach in Fragrance Development, *Perfume & Flavorist*, Vol. 33, September, 2008, pages 54-61.

According to an embodiment, the high impact perfume raw materials having a Log T<-4 are selected from the group consisting of (+-)-1-methoxy-3-hexanethiol, 4-(4-hydroxy-1-phenyl)-2-butanone, 2-methoxy-4-(1-propenyl)-1-phenyl acetate, pyrazobutyle, 3-propylphenol, 1-(3-methyl-1-benzofuran-2-yl)ethanone, 2-(3-phenylpropyl)pyridine, 1-(3,3/5,5-dimethyl-1-cyclohexen-1-yl)-4-penten-1-one, 1-(5,5-dimethyl-1-cyclohexen-1-yl)-4-penten-1-one, a mixture comprising (3RS,3aRS,6SR,7ASR)-perhydro-3,6-dimethyl-benzo[b]furan-2-one and (3SR,3aRS,6SR,7ASR)-perhydro-3,6-dimethyl-benzo[b]furan-2-one, (+-)-1-(5-ethyl-5-methyl-1-cyclohexen-1-yl)-4-penten-1-one, (1'S,3'R)-1-methyl-2-[(1',2',2'-trimethylbicyclo[3.1.0]hex-3'-yl)methyl]cyclopropylmethanol, (+-)-3-mercaptohexyl acetate, (2E)-1-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-2-buten-1-one, H-methyl-2h-1,5-benzodioxepin-3(4H)-one, (2E,6Z)-2,6-nonadien-1-ol, (4Z)-4-dodecenal, (+-)-4-hydroxy-2,5-dimethyl-3(2H)-furanone, methyl 2,4-dihydroxy-3,6-dimethylbenzoate, 3-methylindole, (+-)-perhydro-4alpha,8abeta-dimethyl-4a-naphthalenol, patchoulol, 2-methoxy-4-(1-propenyl)phenol, mixture comprising (+-)-5,6-dihydro-4-methyl-2-phenyl-2H-pyran and tetrahydro-4-methylene-2-phenyl-2H-pyran, mixture comprising 4-methylene-2-phenyltetrahydro-2H-pyran and (+-)-4-methyl-2-phenyl-3,6-dihydro-2H-pyran, 4-hydroxy-3-methoxybenzaldehyde, nonylenic aldehyde, 2-methoxy-4-propylphenol, 3-methyl-5-phenyl-2-pentenitrile, 1-(spiro[4.5]dec-6/7-en-7-yl)-4-penten-1-one, 2-methoxynaphthalene, (-)-(3aR,5AS,9AS,9BR)-3a,6,6,9a-tetramethyldodecahydronaphtho[2,1-b]furan, 5-nonanolide, (3aR,5AS,9AS,9BR)-3a,6,6,9a-tetramethyldodecahydronaphtho[2,1-b]furan, 7-isopropyl-2H,4H-1,5-benzodioxepin-3-one, coumarin, 4-methylphenyl isobutyrate, (2E)-1-(2,6,6-trimethyl-1,3-cyclohexadien-1-yl)-2-buten-1-one, beta,2,2,3-tetramethyl-delta-methylene-3-cyclopentene-1-butanol, delta damascone ((2E)-1-[(1RS,2SR)-2,6,6-trimethyl-3-cyclohexen-1-yl]-2-buten-1-one), (+-)-3,6-dihydro-4,6-dimethyl-2-phenyl-2h-pyran, anisaldehyde, paracresol, 3-ethoxy-4-hydroxybenzaldehyde, methyl 2-aminobenzoate, ethyl methylphenylglycidate, octalactone gamma, ethyl 3-phenyl-2-propenoate, (-)-(2E)-2-ethyl-4-[(1R)-2,2,3-trimethyl-3-cyclopenten-1-yl]-2-buten-1-ol, paracresyl acetate, dodecalactone, tricyclone, (+)-(3R,5Z)-3-methyl-5-cyclopentadecen-1-one, undecalactone, (1R,4R)-8-

mercapto-3-p-menthanone, (3S,3AS,6R,7AR)-3,6-dimethylhexahydro-1-benzofuran-2(3H)-one, beta ionone, (+)-6-pentyltetrahydro-2H-pyran-2-one, (3E,5Z)-1,3,5-undecatriene, 10-undecenal, (9E)-9-undecenal (9Z)-9-undecenal, (Z)-4-decenal, (+)-ethyl 2-methylpentanoate, 1,2-diallyldisulfane, 2-tridecenenitrile, 3-tridecenenitrile, , (+)-2-ethyl-4,4-dimethyl-1,3-oxathiane, (+)-(3R,5Z)-3-methyl-5-cyclopentadecen-1-one, 3-(4-tert-butylphenyl)propanal, allyl (cyclohexyloxy)acetate, methyl naphthylketone, (+)-(4E)-3-methyl-4-cyclopentadecen-1-one, (+)-5E3-methyl-5-cyclopentadecen-1-one, cyclopropylmethyl 3-hexenoate, (4E)-4-methyl-5-(4-methylphenyl)-4-pentenal, (+)-1-(5-propyl-1,3-benzodioxol-2-yl)ethanone, 4-methyl-2-pentylpyridine, (+)-(E)-3-methyl-4-(2,6,6-trimethyl-2-cyclohexen-1-yl)-3-buten-2-one, (3aRS,5aSR,9aSR,9bRS)-3a,6,6,9a-tetramethyldodecahydronaphtho[2,1-b]furan, (2S,5R)-5-methyl-2-(2-propanyl)cyclohexanone oxime, 6-hexyltetrahydro-2H-pyran-2-one, (+)-3-(3-isopropyl-1-phenyl)butanal, methyl 2-(3-oxo-2-pentylcyclopentyl)acetate, 1-(2,6,6-trimethyl-1-cyclohex-2-enyl)pent-1-en-3-one, indol, 7-propyl-2H,4H-1,5-benzodioxepin-3-one, ethyl praline, (4-methylphenoxy)acetaldehyde, ethyl tricyclo[5.2.1.0.2,6]decane-2-carboxylate, (+)-(1'S,2S,E)-3,3-dimethyl-5-(2',2',3'-trimethyl-3'-cyclopenten-1'-yl)-4-penten-2-ol, (4E)-3,3-dimethyl-5-[(1R)-2,2,3-trimethyl-3-cyclopenten-1-yl]-4-penten-2-ol, 8-isopropyl-6-methyl-bicyclo[2.2.2]oct-5-ene-2-carbaldehyde, methyl nonylacetaldehyde, 4-formyl-2-methoxyphenyl 2-methylpropanoate, (E)-4-decenal, (+)-2-ethyl-4-(2,2,3-trimethyl-3-cyclopenten-1-yl)-2-buten-1-ol, (1R,5R)-4,7,7-trimethyl-6-thiabicyclo[3.2.1]oct-3-ene, (1R,4R,5R)-4,7,7-trimethyl-6-thiabicyclo[3.2.1]octane, (-)-(3R)-3,7-dimethyl-1,6-octadien-3-ol, (E)-3-phenyl-2-propenenitrile, 4-methoxybenzyl acetate, (E)-3-methyl-5-(2,2,3-trimethyl-3-cyclopenten-1-yl)-4-penten-2-ol, allyl (2/3-methylbutoxy)acetate, (+)-(2E)-1-(2,6,6-trimethyl-2-cyclohexen-1-yl)-2-buten-1-one, (1E)-1-(2,6,6-trimethyl-1-cyclohexen-1-yl)-1-penten-3-one, and mixtures thereof.

According to an embodiment, perfume raw materials having a Log T<-4 are chosen in the group consisting of aldehydes, ketones, alcohols, phenols, esters lactones, ethers, epoxydes, nitriles and mixtures thereof.

According to an embodiment, perfume raw materials having a Log T<-4 comprise at least one compound chosen in the group consisting of alcohols, phenols, esters lactones, ethers, epoxydes, nitriles and mixtures thereof, preferably in amount comprised between 20 and 70 wt.% based on the total weight of the perfume raw materials having a Log T<-4.

According to an embodiment, perfume raw materials having a Log T<-4 comprise between 20 and 70 wt.% by weight of aldehydes, ketones, and mixtures thereof based on the total weight of the perfume raw materials having a Log T<-4.

The remaining perfume raw materials contained in the oil-based core may have therefore a Log T>-4.

According to an embodiment, the perfume raw materials having a Log T>-4 are chosen in the group consisting of ethyl 2-methylbutyrate, (E)-3-phenyl-2-propenyl acetate, (+-)-6/8-sec-butylquinoline, (+-)-3-(1,3-benzodioxol-5-yl)-2-methylpropanal, verdyl propionate, 1-(octahydro-2,3,8,8-tetramethyl-2-naphthalenyl)-1-ethanone, methyl 2-((1R,2R)-3-oxo-2-pentylcyclopentyl)acetate, (+-)-(E)-4-methyl-3-decen-5-ol, 2,4-dimethyl-3-cyclohexene-1-carbaldehyde, 1,3,3-trimethyl-2-oxabicyclo[2.2.2]octane, tetrahydro-4-methyl-2-(2-methyl-1-propenyl)-2H-pyran, dodecanal, 1-oxa-12/13-cyclohexadecen-2-one, (+-)-3-(4-isopropylphenyl)-2-methylpropanal, aldehyde C11, (+-)-2,6-dimethyl-7-octen-2-ol, allyl 3-cyclohexylpropanoate, (Z)-3-hexenyl acetate, 5-methyl-2-(2-propenyl)cyclohexanone, allyl heptanoate, 2-(2-methyl-2-propenyl)cyclohexyl acetate, 1,1-dimethyl-2-phenylethyl butyrate, geranyl acetate, neryl acetate, (+-)-1-phenylethyl acetate, 1,1-dimethyl-2-phenylethyl acetate, 3-methyl-2-butenyl acetate, ethyl 3-oxobutanoate, (2Z)-ethyl 3-hydroxy-2-butenate, 8-p-menthanol, 8-p-menthanyl acetate, 1-p-menthanyl acetate, (+-)-2-(4-methyl-3-cyclohexen-1-yl)-2-propenyl acetate, (+-)-2-methylbutyl butanoate, 2-((1S)-1-((1R)-3,3-dimethylcyclohexyl)ethoxy)-2-oxoethyl propionate, 3,5,6-trimethyl-3-cyclohexene-1-carbaldehyde, 2,4,6-trimethyl-3-cyclohexene-1-carbaldehyde, 2-cyclohexylethyl acetate, octanal, ethyl butanoate, (+-)-(3E)-4-(2,6,6-trimethyl-1/2-cyclohexen-1-yl)-3-buten-2-one, 1-[(1R,6SR)-2,2,6-trimethylcyclohexyl]-3-hexanol, 1,3,3-trimethyl-2-oxabicyclo[2.2.2]octane, 1,3,3-trimethyl-2-oxabicyclo[2.2.2]octane, ethyl hexanoate, undecanal, decanal, 2-phenylethyl acetate, (1S,2S,4S)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol, (1S,2R,4S)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol), (+-)-3,7-dimethyl-3-octanol, 1-methyl-4-(2-propenylidene)cyclohexene, (+)-(R)-4-(2-methoxypropan-2-yl)-1-methylcyclohex-1-ene, verdyl acetate, (3R)-1-[(1R,6S)-2,2,6-trimethylcyclohexyl]-3-hexanol, (3S)-1-[(1R,6S)-2,2,6-trimethylcyclohexyl]-3-hexanol, (3R)-1-[(1S,6S)-2,2,6-trimethylcyclohexyl]-3-hexanol, (+)-(1S,1'R)-2-[1-(3',3'-dimethyl-1'-cyclohexyl)ethoxy]-2-methylpropyl propanoate, and mixtures thereof.

The nature of high impact perfume raw materials having a Log T<-4 and density balancing material having a density greater than 1.07 g/cm<sup>3</sup> are described in WO2018115250, the content of which are included by reference.

According to an embodiment, the perfume formulation comprises

- 0 to 60 wt.% of a hydrophobic solvent (based on the total weight of the perfume formulation),
- 40 to 100 wt.% of a perfume oil (based on the total weight of the perfume formulation), wherein the perfume oil has at least two, preferably all of the following characteristics:

- at least 35%, preferably at least 40%, preferably at least 50%, more preferably at least 60% of perfuming ingredients having a log P above 3, preferably above 3.5,
- at least 20%, preferably at least 25%, preferably at least 30%, more preferably at least 40% of Bulky materials of groups 1 to 6, preferably 3 to 6 as previously defined and
- at least 15%, preferably at least 20%, more preferably at least 25%, even more preferably at least 30% of high impact perfume materials having a Log T < -4 as previously defined,
- optionally, further hydrophobic active ingredients.

According to a particular embodiment, the perfume comprises 0 to 60 wt.% of a hydrophobic solvent.

According to a particular embodiment, the hydrophobic solvent is a density balancing material preferably chosen in the group consisting of benzyl salicylate, benzyl benzoate, cyclohexyl salicylate, benzyl phenylacetate, phenylethyl phenylacetate, triacetin, ethyl citrate, methyl and ethyl salicylate, benzyl cinnamate, and mixtures thereof.

In a particular embodiment, the hydrophobic solvent has Hansen Solubility Parameters compatible with entrapped perfume oil.

The term "Hansen solubility parameter" is understood refers to a solubility parameter approach proposed by Charles Hansen used to predict polymer solubility and was developed around the basis that the total energy of vaporization of a liquid consists of several individual parts. To calculate the "weighted Hansen solubility parameter" one must combine the effects of (atomic) dispersion forces, (molecular) permanent dipole-permanent dipole forces, and (molecular) hydrogen bonding (electron exchange). The weighted Hansen solubility parameter" is calculated as  $(\delta D^2 + \delta P^2 + \delta H^2)^{0.5}$ , wherein  $\delta D$  is the Hansen dispersion value (also referred to in the following as the atomic dispersion fore),  $\delta P$  is the Hansen polarizability value (also referred to in the following as the dipole moment), and  $\delta H$  is the Hansen Hydrogen-bonding ("h-bonding") value (also referred to in the following as hydrogen bonding). For a more detailed description of the parameters and values, see Charles Hansen, The Three Dimensional Solubility Parameter and Solvent Diffusion Coefficient, Danish Technical Press (Copenhagen, 1967).

Euclidean difference in solubility parameter between a fragrance and a solvent is calculated as  $(4 * (\delta D_{\text{solvent}} - \delta D_{\text{fragrance}})^2 + (\delta P_{\text{solvent}} - \delta P_{\text{fragrance}})^2 + (\delta H_{\text{solvent}} - \delta H_{\text{fragrance}})^2)^{0.5}$ , in which  $\delta D_{\text{solvent}}$ ,  $\delta P_{\text{solvent}}$ , and  $\delta H_{\text{solvent}}$ , are the Hansen dispersion

value, Hansen polarizability value, and Hansen h-bonding values of the solvent, respectively; and  $\delta D_{\text{fragrance}}$ ,  $\delta P_{\text{fragrance}}$ , and  $\delta H_{\text{fragrance}}$  are the Hansen dispersion value, Hansen polarizability value, and Hansen h-bonding values of the fragrance, respectively.

In a particular embodiment, the perfume oil and the hydrophobic solvent have at least two Hansen solubility parameters selected from a first group consisting of: an atomic dispersion force ( $\delta D$ ) from 12 to 20, a dipole moment ( $\delta P$ ) from 1 to 8, and a hydrogen bonding ( $\delta H$ ) from 2.5 to 11.

In a particular embodiment, the perfume oil and the hydrophobic solvent have at least two Hansen solubility parameters selected from a second group consisting of: an atomic dispersion force ( $\delta D$ ) from 12 to 20, preferably from 14 to 20, a dipole moment ( $\delta P$ ) from 1 to 8, preferably from 1 to 7, and a hydrogen bonding ( $\delta H$ ) from 2.5 to 11, preferably from 4 to 11.

According to a particular embodiment, the hydrophobic material is free of any active ingredient (such as perfume). According to this particular embodiment, it comprises, preferably consists of hydrophobic solvents, preferably chosen in the group consisting of isopropyl myristate, tryglycerides (e.g. Neobee® MCT oil, vegetable oils), D-limonene, silicone oil, mineral oil, and mixtures thereof with optionally hydrophilic solvents preferably chosen in the group consisting of 1,4-butanediol, benzyl alcohol, triethyl citrate, triacetin, benzyl acetate, ethyl acetate, propylene glycol (1,2-propanediol), 1,3-propanediol, dipropylene glycol, glycerol, glycol ethers and mixtures thereof.

According to any one of the invention's embodiments, the hydrophobic material represents between about 10% and 90% w/w, preferably between 10 and 60%, or even between 15% and 45% w/w, by weight, relative to the total weight of the oil phase.

#### Polymeric shell

By the expression polymeric shell is understood that the shell comprises at least one polymer forming a surrounding structure of the core.

The nature of the polymeric shell of the microcapsules of the invention can vary. As non-limiting examples, the polymer shell comprises a material selected from the group consisting of polyurea, polyurethane, polyamide, polyhydroxyalkanoates, polyacrylate, polyesters, polyaminoesters, polyepoxides, polysiloxane, polycarbonate, polysulfonamide, urea formaldehyde, melamine formaldehyde resin, melamine formaldehyde resin cross-linked with polyisocyanate or aromatic polyols, melamine urea resin, melamine glyoxal resin, gelatin/gum arabic, and mixtures thereof.

The material encapsulating the hydrophobic material composition can be microcapsules which have been widely described in the prior art.

In a first particular embodiment of the core-shell microcapsules, the core-shell microcapsule comprises an oil-based core comprising a hydrophobic active, preferably perfume, and a composite shell comprising a first material and a second material, wherein the first material and the second material are different, the first material is a coacervate, the second material is a polymeric material.

In a particular embodiment, the weight ratio between the first material and the second material is comprised between 50:50 and 99.9:0.1. In a particular embodiment, the coacervate comprises a first polyelectrolyte, preferably selected among proteins (such as gelatin), polypeptides or polysaccharides (such as chitosan), most preferably Gelatin and a second polyelectrolyte, preferably alginate salts, cellulose derivatives guar gum, pectinate salts, carrageenan, polyacrylic and methacrylic acid or xanthan gum, or yet plant gums such as acacia gum (Gum Arabic), most preferably Gum Arabic. The coacervate first material can be hardened chemically using a suitable cross-linker such as glutaraldehyde, glyoxal, formaldehyde, tannic acid or genipin or can be hardened enzymatically using an enzyme such as transglutaminase. The second polymeric material can be selected from the group consisting of polyurea, polyurethane, polyamide, polyester, polyacrylate, organosilicon, polycarbonate, polysulfonamide, polymers of urea and formaldehyde, melamine and formaldehyde, melamine and urea, or melamine and glyoxal and mixtures thereof, preferably polyurea and/or polyurethane. The second material is preferably present in an amount less than 3 wt.%, preferably less than 1 wt.% based on the total weight of the second type of microcapsule slurry.

As non-limiting examples, the polymer shell of the microcapsules comprises a material selected from the group consisting of polyurea, polyurethane, polyamide, polyhydroxyalkanoates, polyacrylate, polyesters, polyaminoesters, polyepoxides, organosilicon, polycarbonate, polysulfonamide, urea formaldehyde, melamine formaldehyde resin, melamine formaldehyde resin cross-linked with polyisocyanate or aromatic polyols, melamine urea resin, melamine glyoxal resin, gelatin/gum arabic shell wall, and mixtures thereof.

As non-limiting examples, the shell of the microcapsules can be aminoplast-based, polyurea-based or polyurethane-based. The shell of the microcapsules can also be hybrid, namely organic-inorganic such as a hybrid shell composed of at least two types of inorganic particles that are cross-linked, or yet a shell resulting from the hydrolysis and condensation reaction of a polyalkoxysilane macro-monomeric composition.

According to an aspect, the shell of microcapsules comprises an aminoplast copolymer, such as melamine-formaldehyde or urea-formaldehyde or cross-linked melamine formaldehyde or melamine glyoxal.

According to another aspect the shell of microcapsules is polyurea-based made from, for example but not limited to isocyanate-based monomers and amine-containing crosslinkers such as guanidine carbonate and/or guanazole. Certain polyurea microcapsules comprise a polyurea wall which is the reaction product of the polymerisation between at least one polyisocyanate comprising at least two isocyanate functional groups and at least one reactant selected from the group consisting of an amine (for example a water-soluble guanidine salt and guanidine); a colloidal stabilizer or emulsifier; and an encapsulated perfume. However, the use of an amine can be omitted. According to a particular aspect, the colloidal stabilizer includes an aqueous solution of between 0.1% and 0.4% of polyvinyl alcohol, between 0.6% and 1% of a cationic copolymer of vinylpyrrolidone and of a quaternized vinylimidazol (all percentages being defined by weight relative to the total weight of the colloidal stabilizer). According to another aspect, the emulsifier is an anionic or amphiphilic biopolymer, which may be, in one aspect, chosen from the group consisting of gum Arabic, soy protein, gelatin, sodium caseinate and mixtures thereof.

According to another embodiment, the microcapsule wall material of the microcapsules may comprise any suitable resin and especially including melamine, glyoxal, polyurea, polyurethane, polyamide, polyester, etc.. Suitable resins include the reaction product of an aldehyde and an amine, suitable aldehydes include, formaldehyde and glyoxal. Suitable amines include melamine, urea, benzoguanamine, glycoluril, and mixtures thereof. Suitable melamines include, methylol melamine, methylated methylol melamine, imino melamine and mixtures thereof. Suitable ureas include, dimethylol urea, methylated dimethylol urea, urea-resorcinol, and mixtures thereof. Suitable materials for making may be obtained from one or more of the following companies Solutia Inc. (St Louis, Missouri U.S.A.), Cytec Industries (West Paterson, New Jersey U.S.A.), Sigma-Aldrich (St. Louis, Missouri U.S.A.).

According to another embodiment, the microcapsules is a one-shell aminoplast core-shell microcapsule obtainable by a process comprising the steps of:

- 1) admixing a perfume oil with at least a polyisocyanate having at least two isocyanate functional groups to form an oil phase;
- 2) dispersing or dissolving into water an aminoplast resin and optionally a stabilizer to form a dispersing phase;
- 3) preparing an oil-in-water dispersion, wherein the mean droplet size is comprised between 1 and 100 microns, by admixing the oil phase and the dispersing phase;
- 4) performing a curing step to form the wall of said microcapsule; and

5) optionally drying the final dispersion to obtain the dried core-shell microcapsule.

According to an embodiment, the microcapsules is a formaldehyde-free capsule. A typical process for the preparation of aminoplast formaldehyde-free microcapsules slurry comprises the steps of

- 1) preparing an oligomeric composition comprising the reaction product of, or obtainable by reacting together:
  - a. a polyamine component in the form of melamine or of a mixture of melamine and at least one C1-C4 compound comprising two NH<sub>2</sub> functional groups;
  - b. an aldehyde component in the form of a mixture of glyoxal, a C4-6 2,2-dialkoxy-ethanal and optionally a glyoxalate, said mixture having a molar ratio glyoxal/C4-6 2,2-dialkoxy-ethanal comprised between 1/1 and 10/1; and
  - c. a protic acid catalyst;
- 2) preparing an oil-in-water dispersion, wherein the droplet size is comprised between 1 and 600 microns, and comprising:
  - a. an oil;
  - b. a water medium;
  - c. at least an oligomeric composition as obtained in step 1;
  - d. at least a cross-linker selected amongst:
    - i. C4-C12 aromatic or aliphatic di- or tri-isocyanates and their biurets, triurets, trimmers, trimethylol propane-adduct and mixtures thereof; and/or
    - ii. a di- or tri-oxiran compounds of formula:  

$$A-(\text{oxiran-2-ylmethyl})_n$$

wherein n stands for 2 or 3 and 1 represents a C2-C6 group optionally comprising from 2 to 6 nitrogen and/or oxygen atoms;
  - e. optionally a C1-C4 compounds comprising two NH<sub>2</sub> functional groups;
- 3) Heating the dispersion; and
- 4) Cooling the dispersion.

In another particular embodiment, the microcapsule comprises

- an oil-based core comprising a hydrophobic active, preferably perfume,
- optionally an inner shell made of a polymerized polyfunctional monomer;
- a biopolymer shell comprising a protein, wherein at least one protein is cross-linked.

According to a particular embodiment, the protein is chosen in the group consisting of milk proteins, caseinate salts such as sodium caseinate or calcium caseinate, casein, whey protein, hydrolyzed proteins, gelatins, gluten, pea protein, soy protein, silk protein and mixtures thereof, preferably sodium caseinate, most preferably sodium caseinate

According to a particular embodiment, the protein comprises sodium caseinate and a globular protein, preferably chosen in the group consisting of whey protein, beta-lactoglobulin, ovalbumine, bovine serum albumin, vegetable proteins, and mixtures thereof.

The protein is preferably a mixture of sodium caseinate and whey protein.

According to a particular embodiment, the biopolymer shell comprises a crosslinked protein chosen in the group consisting of sodium caseinate and/or whey protein.

According to a particular embodiment, the microcapsules slurry comprises at least one microcapsule made of:

- an oil-based core comprising the hydrophobic active, preferably perfume;
- an inner shell made of a polymerized polyfunctional monomer; preferably a polyisocyanate having at least two isocyanate functional groups
- a biopolymer shell comprising a protein, wherein at least one protein is cross-linked; wherein the protein contains preferably a mixture comprising sodium caseinate and a globular protein, preferably whey protein,
- optionally at least an outer mineral layer.

According to an embodiment, sodium caseinate and/or whey protein is (are) cross-linked protein(s).

The weight ratio between sodium caseinate and whey protein is preferably comprised between 0.01 and 100, preferably between 0.1 and 10, more preferably between 0.2 and 5.

In another particular embodiment, the microcapsules is a polyamide core-shell polyamide microcapsule comprising:

- an oil-based core comprising a hydrophobic active, preferably perfume, and
- a polyamide shell comprising or being obtainable from:
  - an acyl chloride,
  - a first amino compound,
  - a second amino compound,
  - optionally, a carbohydrate.

According to a particular embodiment, the microcapsule comprises:

- an oil-based core comprising a hydrophobic active, preferably perfume, and
- a polyamide shell comprising or being obtainable from:

- an acyl chloride, preferably in an amount comprised between 5 and 98%, preferably between 20 and 98%, more preferably between 30 and 85% w/w
- a first amino compound, preferably in an amount comprised between 1% and 50% w/w, preferably between 7 and 40% w/w;
- a second amino compound, preferably in an amount comprised between 1% and 50% w/w, preferably between 2 and 25% w/w
- a stabilizer, preferably a biopolymer, preferably in an amount comprised between 0 and 90%, preferably between 0.1 and 75%, more preferably between 1 and 70%,
- optionally, a carbohydrate.

According to a particular embodiment, the microcapsule comprises:

- an oil-based core comprising a hydrophobic active, preferably perfume, and
- a polyamide shell comprising or being obtainable from:
  - an acyl chloride,
  - a first amino-compound being an amino-acid, preferably chosen in the group consisting of L-Lysine, L-Arginine, L-Histidine, L-Tryptophane and/or mixtures thereof.
  - a second amino-compound, preferably chosen in the group consisting of ethylene diamine, diethylene triamine, cystamine and/or mixtures thereof, and
  - a biopolymer, preferably chosen in the group consisting of potato protein, chickpea protein, pea protein, algae protein, faba bean protein, barley protein, oat protein, wheat gluten protein, lupin protein, soy protein, rice protein, whey protein, white egg albumin, casein, sodium caseinate, gelatin (preferably fish gelatin), bovine serum albumin, hydrolyzed soy protein, hydrolyzed sericin, pseudo collagen, silk protein, sericin powder, gelatin and mixtures thereof,
  - optionally a carbohydrate, preferably selected from the group consisting of anionic salt of alginic acid, preferably alginic acid sodium salt, pectin, lignin, anionic modified starch, carboxymethylcellulose, carrageenan and mixtures thereof.

According to another aspect, the shell of the microcapsules is polyurea-or polyurethane-based. Examples of processes for the preparation of polyurea and polyurethane-based microcapsule slurry are for instance described in International Patent

Application Publication No. WO2007/004166, European Patent Application Publication No. EP 2300146, and European Patent Application Publication No. EP25799. Typically a process for the preparation of polyurea or polyurethane-based microcapsule slurry include the following steps:

- a) Dissolving at least one polyisocyanate having at least two isocyanate groups in an oil to form an oil phase;
- b) Preparing an aqueous solution of an emulsifier or colloidal stabilizer to form a dispersing phase;
- c) Adding the oil phase to the dispersing phase to form an oil-in-water dispersion, wherein the mean droplet size is comprised between 1 and 500  $\mu\text{m}$ , preferably between 5 and 50  $\mu\text{m}$ ; and
- d) Applying conditions sufficient to induce interfacial polymerisation and form microcapsules in form of a slurry.

#### Outer coating

According to a particular embodiment of the invention, the microcapsule comprises an outer coating, wherein the outer coating comprises a coating material selected from the group consisting of a non-ionic polysaccharide, a cationic polymer, a polysuccinimide derivative (as described for instance in WO2021185724) and mixtures thereof to form an outer coating to the microcapsule.

Non-ionic polysaccharide polymers are well known to a person skilled in the art and are described for instance in WO2012/007438 page 29, lines 1 to 25 and in WO2013/026657 page 2, lines 12 to 19 and page 4, lines 3 to 12. Preferred non-ionic polysaccharides are selected from the group consisting of locust bean gum, xyloglucan, guar gum, hydroxypropyl guar, hydroxypropyl cellulose and hydroxypropyl methyl cellulose.

Cationic polymers are well known to a person skilled in the art. Preferred cationic polymers have cationic charge densities of at least 0.5 meq/g, more preferably at least about 1.5 meq/g, but also preferably less than about 7 meq/g, more preferably less than about 6.2 meq/g. The cationic charge density of the cationic polymers may be determined by the Kjeldahl method as described in the US Pharmacopoeia under chemical tests for Nitrogen determination. The preferred cationic polymers are chosen from those that contain units comprising primary, secondary, tertiary and/or quaternary amine groups that can either form part of the main polymer chain or can be borne by a side substituent directly connected thereto. The weight average (Mw) molecular weight of the cationic polymer is preferably between

10,000 and 3.5M Dalton, more preferably between 50,000 and 1.5M Dalton. According to a particular embodiment, one will use cationic polymers based on acrylamide, methacrylamide, N-vinylpyrrolidone, quaternized N,N-dimethylaminomethacrylate, diallyldimethylammonium chloride, quaternized vinylimidazole (3-methyl-1-vinyl-1H-imidazol-3-ium chloride), vinylpyrrolidone, acrylamidopropyltrimonium chloride, cassia hydroxypropyltrimonium chloride, guar hydroxypropyltrimonium chloride or polygalactomannan 2-hydroxypropyltrimethylammonium chloride ether, starch hydroxypropyltrimonium chloride and cellulose hydroxypropyltrimonium chloride. Preferably copolymers shall be selected from the group consisting of polyquaternium-5, polyquaternium-6, polyquaternium-7, polyquaternium-10, polyquaternium-11, polyquaternium-16, polyquaternium-22, polyquaternium-28, polyquaternium-43, polyquaternium-44, polyquaternium-46, cassia hydroxypropyltrimonium chloride, guar hydroxypropyltrimonium chloride or polygalactomannan 2-hydroxypropyltrimethylammonium chloride ether, starch hydroxypropyltrimonium chloride and cellulose hydroxypropyltrimonium chloride. As specific examples of commercially available products, one may cite Salcare® SC60 (cationic copolymer of acrylamidopropyltrimonium chloride and acrylamide, origin: BASF) or Luviquat®, such as the PQ 11N, FC 550 or Style (polyquaternium-11 to 68 or quaternized copolymers of vinylpyrrolidone origin: BASF), or also the Jaguar® (C13S or C17, origin Rhodia).

According to any one of the above embodiments of the invention, there is added an amount of polymer described above comprised between about 0% and 5% w/w, or even between about 0.1% and 2% w/w, percentage being expressed on a w/w basis relative to the total weight of the microcapsule slurry. It is clearly understood by a person skilled in the art that only part of said added polymers will be incorporated into/deposited on the microcapsule shell.

According to a particular embodiment, the microcapsule comprises a mineral layer. The mineral layer preferably comprises a material chosen in the group consisting of iron oxides, iron oxyhydroxide, titanium oxides, zinc oxides, calcium carbonates, calcium phosphates, barium salt, strontium salt, magnesium salt, and mixtures thereof and mixtures thereof.

In a particular embodiment, the shell material is a biodegradable material.

In a particular embodiment, the shell has a biodegradability of at least 40%, preferably at least 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95% or 98%, within 60 days according to OECD301F.

In a particular embodiment, the core-shell microcapsule has a biodegradability of at least 40 %, preferably at least 60 %, preferably at least 65%, 70%, 75%, 80%, 85%, 90%, 95% or 98% within 60 days according to OECD301F.

Thereby it is understood that the core-shell microcapsule including all components, such as the core, shell and coating may have a biodegradability of at least 40 %, preferably at least 60 %, preferably at least 65%, 70%, 75%, 80%, 85%, 90%, 95% or 98% within 60 days according to OECD301F.

In a particular embodiment, the oil-based core, preferably perfume oil has a biodegradability of at least 40 %, preferably at least 60 %, preferably at least 65%, 70%, 75%, 80%, 85%, 90%, 95% or 98% within 60 days according to OECD301F.

OECD301F is a standard test method on the biodegradability from the Organization of Economic Co-operation and Development.

In a particular embodiment, the perfumed particle comprises encapsulated perfume in the range from 1 to 15 wt.%, preferably in the range from 2 to 10 wt.%, based on the total weight of the perfumed particle.

#### Multiple capsules system

According to an embodiment, the encapsulated perfume can be in form of different kind of microcapsules, i.e. a first, a second, a third and/or more different kind of microcapsules.

According to an embodiment, the encapsulated perfume can be in form of

- a microcapsule as described herein above as a first type of microcapsules, and
- a second, third and/or more type(s) of microcapsules, wherein the first type of microcapsules and the second, third and/or more type(s) of microcapsules differ in their hydrophobic material and/or polymeric shell material and/or in their coating material.

The definitions and embodiments for the microcapsules as described herein above as a first type of microcapsules apply to the second, third and/or more type(s) of microcapsules in a multiple capsules system *mutatis mutandis*.

#### Free perfume

According to the present invention, the perfumed particle may comprise a free perfume.

In a particular embodiment, the perfumed particle comprises a free perfume.

Under "free perfume" is herein understood as a perfume oil or a perfume formulation which is not encapsulated in a microcapsule or entrapped in a matrix other the carrier system according to the present invention.

Under "perfume" (or also "perfume oil") is herein understood a hydrophobic material and/or perfume as described herein-above.

In a particular embodiment, the perfumed particle comprises free perfume in the range from 1 to 15 wt.%, preferably in the range from 2 to 10 wt.%, based on the total weight of the perfumed particle.

In a particular embodiment, the perfume particle comprises a free perfume and an encapsulated perfume.

#### Further ingredients

The perfumed particle according to the present invention may also optionally comprise a dye, solubilizers, stabilizers, glazing agent (such as wax) and/or anticaking agents.

In case the perfumed particle comprises a dye, the dye may include those that are typically used in laundry detergent or fabric softeners. The perfumed particle may comprise from about 0.001% to about 0.1%, alternatively from about 0.01% to about 0.02%, alternatively combinations thereof, dye by weight of the perfumed particle.

In case the perfumed particle comprises a stabilizer and/or anti-caking agent, the perfumed particle from about 0.001% to 1% stabilizer and/or anti-caking agent by weight of the perfumed particle.

In a particular embodiment, the perfumed particle may be free of any laundry active and/or fabric softener actives.

A laundry active may include detergent surfactants, detergent builders, bleaching agents, enzymes, mixtures thereof, and the like. In a particular embodiment, a non-detergent level of surfactant may be used to help solubilize perfume contained in the perfumed particle.

The present invention also relates to a method of manufacturing a perfumed particle as described herein-above, wherein the method comprises the following steps:

- Mixing a biopolymer, humectant, liquid, preferably water, and free perfume and/or encapsulated perfume to form a mixture;

- Molding the mixture, preferably by native starch molding, solid molding, teflon molding or silicon molding.

In a first step of the inventive method, a biopolymer, humectant, liquid, preferably water, and free perfume and/or encapsulated perfume is mixed to form a mixture.

The definitions and embodiments for a biopolymer, humectant, optionally water, and free perfume and encapsulated perfume as described herein-above apply *mutatis mutandis*.

In a particular embodiment, the encapsulated perfume can be added as a microcapsule slurry. A microcapsule slurry can be obtained during the preparation of the encapsulated perfume in form of a microcapsule.

In a particular embodiment, the liquid can be any liquid which is able to mix the further ingredients and which preferably allow the biopolymer and humectant to form a gel.

In a particular embodiment, the liquid is an aqueous liquid.

In a particular embodiment, the liquid is water.

The ingredients in the first step can be mixed by any suitable technique and suitable order of addition of the ingredients known to a skilled person.

In a particular embodiment, the humectant is pre-mixed with a liquid to form a first pre-mixture.

In a particular embodiment, the biopolymer is pre-mixed with a liquid to form a second pre-mixture.

In a particular embodiment, the free perfume oil and/or encapsulated perfume oil is added to the first pre-mixture.

In a particular embodiment, the free perfume oil and/or encapsulated perfume oil is added to the second pre-mixture.

In a particular embodiment, the first and second pre-mixtures are mixed to form the mixture.

In a subsequent step, the mixture is molded.

The molding of the mixture brings the mixture in a specific form and solidifies the mixture. Molding and solidifying a liquid dispersion preserve the integrity of shear-sensitive microcapsules. Fragrance enhancers produced using this method are therefore more effective.

The mixture can be molded by any suitable technique known to a skilled person.

In a particular embodiment, the mixture is molded by native starch molding, solid molding, teflon molding or silicon molding.

In optional subsequent steps, the obtained perfumed particles can be further processed by drying, coating and/or sifting the obtained perfumed particles.

The perfumed particles as described hereinabove are preferably used in non-food applications, i.e. in non-food consumer products such as laundry products, textiles, textile care products, paper products, surface care products, personal care products, skin and/or hair care products, air-freshener products, or air deodorizer products.

The present invention also relates to a perfumed consumer product comprising the perfumed particle as described herein-above or as prepared by the method as described herein-above.

The consumer products of the invention can in particular be of used in perfumed consumer products such as product belonging to fine fragrance or "functional" perfumery. Functional perfumery includes in particular home-care products including laundry care.

For the sake of clarity, it has to be mentioned that, by "perfumed consumer product" it is meant a consumer product which is expected to deliver among different benefits a perfuming effect to the surface to which it is applied (e.g. skin, hair, textile, paper, or home surface) or in the air (air-freshener, deodorizer etc).

The nature and type of the other constituents of the perfumed consumer product do not warrant a more detailed description here, which in any case would not be exhaustive, the skilled person being able to select them on the basis of his general knowledge and according to the nature and the desired effect of said product. Base formulations of consumer products can be found in the abundant literature relative to such products. These formulations do not warrant a detailed description here which would in any case not be exhaustive. The person skilled in the art of formulating such consumer products is perfectly able to select the suitable components on the basis of his general knowledge and of the available literature.

In a particular embodiment, the perfumed consumer product is a fabric softener, laundry scent boosters, fabric refreshers or detergents.

In a particular embodiment, the perfumed consumer product is a solid fabric softener, solid laundry scent boosters, solid fabric refreshers or solid detergents.

In a particular embodiment, the perfumed consumer product is a laundry scent booster.

In a particular embodiment, the perfume consumer product is a solid laundry scent booster.

The present invention also relates to a use of a perfumed particle as described herein-above or as prepared by the method as described herein-above or a consumer product as described herein-above for delivering a perfume to a fabric.

The present invention also relates to a method of delivering a perfume to a fabric by bringing a perfumed particle as described herein-above or as prepared by the method as described herein-above, or a consumer product as described herein-above to a fabric.

The invention will now be further described by way of examples. It will be appreciated that the invention as claimed is not intended to be limited in any way by these examples.

ExamplesPerfume and encapsulated perfume formulationsPerfume formulation

Table 1: Perfume formulation

| Ingredient                                                                                                                 | % in oil |
|----------------------------------------------------------------------------------------------------------------------------|----------|
| 4-(1,1-dimethylethyl)-1-cyclohexyl acetate                                                                                 | 14.50    |
| linalool                                                                                                                   | 10.50    |
| 3-(4-tert-butylphenyl)-2-methylpropanal                                                                                    | 10.00    |
| 1-(octahydro-2,3,8,8-tetramethyl-2-naphthalenyl)-1-ethanone                                                                | 10.00    |
| citronellyl nitril                                                                                                         | 9.00     |
| diphenyloxyd                                                                                                               | 6.50     |
| isobornyl acetate                                                                                                          | 6.00     |
| beta ionone                                                                                                                | 6.00     |
| tricyclo[5.2.1.0 <sup>2,6</sup> ]dec-3-en-8-yl acetate (a) +<br>tricyclo[5.2.1.0 <sup>2,6</sup> ]dec-4-en-8-yl acetate (b) | 5.50     |
| ether mt                                                                                                                   | 4.00     |
| methyl dihydrojasmonate                                                                                                    | 4.00     |
| geraniol 60                                                                                                                | 3.00     |
| citral                                                                                                                     | 2.50     |
| aldehyde c 10                                                                                                              | 2.50     |
| allyl heptanoate                                                                                                           | 2.50     |
| ethyl methyl-2-butyrate                                                                                                    | 1.50     |
| geranyl acetate                                                                                                            | 1.00     |
| 2,4-dimethyl-3-cyclohexene-1-carbaldehyde                                                                                  | 1.00     |

Encapsulated perfume formulation

Table 2: encapsulated perfume formulation

| Ingredient                | % in oil |
|---------------------------|----------|
| Ethyl 2-methyl-pentanoate | 3.20%    |

|                                           |        |
|-------------------------------------------|--------|
| Eucalyptol                                | 7.80%  |
| 2,4-Dimethyl-3-cyclohexene-1-carbaldehyde | 0.75%  |
| Aldehyde C <sub>10</sub>                  | 0.75%  |
| Citronellyl Nitril                        | 4.30%  |
| Isobornyl acetate                         | 3.00%  |
| 2-tert-butyl-1-cyclohexyl acetate         | 9.80%  |
| Citronellyl Acetate                       | 1.30%  |
| 2-Methylundecanal                         | 3.00%  |
| Diphenyloxide                             | 0.80%  |
| Aldehyde C <sub>12</sub>                  | 1.30%  |
| Dicyclopentadiene acetate                 | 9.85%  |
| Ionone beta                               | 3.30%  |
| Undecalactone gamma                       | 18.75% |
| Hexyl Salicylate                          | 15.9%  |
| Benzyl Salicylate                         | 16.2%  |

The encapsulated perfume formulation has been encapsulated into a microcapsule.

#### Example 1

30% wt Gelatin is dissolved in hot water about 80°C. Separately sucrose is dissolved at 112°C within 50% wt water adding the same amount of corn syrup is added. The two solutions are blended and kept at 100°C. To 90g of the blend 5 g of microcapsules slurry are added with a gentle mixing to minimize the shear. Then 5 g of oily perfume are also gently dispersed. Native starch is employed as a molding medium in which to cast and the molding starch is placed into trays and the desired impressions are then imprinted by the use of a mold or die. The hot mixture containing free perfume and perfume microcapsules is deposited in the resulting molds and left at room temperature to allow the cast material to solidify.

After few hours the molded perfumed particles are collected by sifting the starch which can be recycled. Surface starch can be washed away by air or water or might be kept as anticaking agent. Alternatively, the soft particles can be washed from their surface starch then coated with glazing agent such as Capol™4348. Color can be added.

All particles are dissolved after a normal washing cycle at even low temperature of about 30°C.

Example 2

In the following, an alternative perfumed particle formulation is disclosed. The alternative perfumed particle formulation according to Example 2 is prepared by the same method as disclosed in Example 1.

Table 3: Perfumed particle formulation

| Ingredient                       | % weight of composition | Milligrams in a 2 g soft particle |
|----------------------------------|-------------------------|-----------------------------------|
| Gelatin (240 bloom)              | 4.86                    | 97                                |
| Glucose sirup                    | 32.41                   | 648                               |
| sucrose                          | 24.31                   | 486                               |
| water                            | 28.364                  | 567                               |
| free perfume formulation         | 5.02                    | 100                               |
| encapsulated perfume formulation | 5.02                    | 100                               |
| Brilliant blue dye ( E133)       | 0.016                   | 0.324                             |

Testing of the performance of the perfumed particles from the above perfumed particle formulation:

A complete dissolution within 20 min at 30°C under agitation with and without detergents is observed. Visible unbroken microcapsules within water are observed.

Example 3

In the following, alternative carrier formulations A to D are disclosed:

Table 4: Carrier formulation A

| Ingredient          |     |
|---------------------|-----|
| Gelatin (240 bloom) | 5   |
| Glucose syrup       | 36  |
| sucrose             | 27  |
| water               | 32  |
|                     | 100 |

Table 5 : Carrier formulation B

| gum arabic      | 34  |
|-----------------|-----|
| sorbitol powder | 33  |
| water           | 33  |
|                 | 100 |

Table 6 : Carrier formulation C

| Pectin (classic CS502) | 3.5  |
|------------------------|------|
| tri sodium citrate     | 0.2  |
| sucrose                | 32   |
| glucose syrup 42 DE    | 42   |
| citric acid            | 1    |
| water                  | 21   |
|                        | 99.7 |

Table 7 : Carrier formulation D

| Ingredient              | % weight of the carrier |
|-------------------------|-------------------------|
| Carrageenan (WHS1011-1) | 1.34                    |
| tri sodium citrate      | 0.47                    |
| sucrose                 | 23.46                   |
| glucose syrup 42 DE     | 38.2                    |
| citric acid             | 1.34                    |
| water                   | 35.19                   |
|                         | 100.00                  |

Each of the carrier formulations A to D in Tables 4 to 7 are combined with a free perfume oil and encapsulated perfume as disclosed in the example entry section.

Testing of the performance of the perfumed particles obtained from different carrier formulations A to D:

A complete dissolution within 20 min at 30°C under agitation with and without detergents is observed.

Visual inspection (e.g. in a standard optical microscope at a resolution of about 200 µm) revealed intact microcapsules in water showing an intact membrane around its content. Particles having fissures, having disintegrated, or having lost or losing content were not observed.

Another test for confirming if the microcapsules are intact is rubbing. If intact microcapsules are rubbed in a towel or are crushed, they will release the perfume. Broken microcapsules do not release perfume.

Example 4 (comparative)

In the following, the same perfumed particle formulation as described in example 1 (“Gummy”/“Gummies”) is compared to a perfumed particle formulation comprising a typical formulation of the prior art (“PEG reference”) wherein the perfumed particle formulation does not comprise a biopolymer as defined hereinabove:

The “Gummies” formulation is prepared by the same method as disclosed in example 1. The “PEG reference” using PEG 8000 is prepared according to the process disclosed in the example of US 7’867’968 B1. Dyes have been used to improve visibility and discernability of the microcapsules, however, they are not required in the formulations and are therefore not listed in the bill of ingredients in table 8.

Table 8: Comparison of ingredients of the Gummies invention vs. PEG reference

|                                  | Gummies                 | PEG reference           |
|----------------------------------|-------------------------|-------------------------|
| Ingredient                       | % weight of composition | % weight of composition |
| PEG 8000                         | –                       | 88.2                    |
| gelatin (240 bloom)              | 4.0                     | –                       |
| glucose sirup                    | 32.2                    | –                       |
| sucrose                          | 24.0                    | –                       |
| water                            | 28.0                    | –                       |
| free perfume formulation         | 7.8                     | 7.8                     |
| encapsulated perfume formulation | 4.0                     | 4.0                     |
| (total weight)                   | 100.0                   | 100.0                   |

The performances of the perfumed particles from the two different inventions are tested in laundry application using a short cotton program (1h 24 min.) at 40°C with two rinses. The

washing protocol uses 50 g of Surcare washing powder in the drawer and 14 g of perfumed particles directly placed in 36 small towels corresponding to 1.7 kg of cotton terry towels. The performance of the two systems was evaluated blindly by a group of eleven panelists rating from 0 to 10 the olfactory intensity of the wet towels after washing. The release of perfume by rupture of the microcapsules is also evaluated by rating the olfactory intensity of the dry towels before and after rubbing them.

The olfactory intensity of wet towels washed with the present invention ("Gummies") is equal to or greater than that washed with the non-natural "PEG reference" (PEG ref.), cf. Figure 1. With a significantly greater intensity ratio after vs. before rubbing, cf. Figure 2, the perfumed particles of the present invention ("Gummies") are much more effective in preserving the microparticles and thus amplifying the release of perfume when using the towels.

#### Example 5

In the following, the glass transition temperature of particles according to examples 3 and 4 are measured and disclosed:

To characterize the soft and rubbery state of our invention, the glass transition ( $T_g$ ) of different "Gummies" was measured by differential scanning calorimetry (DSC) using Mettler-Toledo DSC822e with 40  $\mu$ l sealed aluminum crucibles (Greifensee, Switzerland). About 10 mg of gummy particles were cut to fill up crucibles. The thermoscan was composed of two heating ramps from  $-55^\circ\text{C}$  up to  $75^\circ\text{C}$  at 10K/min with a cooling ramp at 30K/min in between. Approximately 10 mg of Gummy particles were cut to fill the crucibles. The thermoscan consisted of two heating ramps ranging from  $-55^\circ\text{C}$  to  $75^\circ\text{C}$  at 10K/min with a cooling ramp at 30K/min in between. The  $T_g$  is determined as the peak of the derivative of the heat flow of the second heating ramp.

|                             | Glass transition ( $T_g$ ) |
|-----------------------------|----------------------------|
| Gummies example 4 (Gummies) | $-42.5^\circ\text{C}$      |
| Gummies example 3 carrier A | $-14.5^\circ\text{C}$      |
| Gummies example 3 carrier D | $1.6^\circ\text{C}$        |

Whereas the "PEG reference" in example 4 does not show a glass transition. This is because PEG 8000 is a solid crystalline product with a melting point at about  $55-60^\circ\text{C}$ .

## CLAIMS

1. Perfumed particle comprising
  - carrier comprising a biopolymer, a humectant, preferably a humectant derived from natural sources and, optionally, water, and
  - free perfume oil and/or encapsulated perfume oil.
2. Perfumed particle according to claim 1, wherein the perfumed particle comprises the free perfume oil and encapsulated perfume oil.
3. Perfumed particle according to any of the preceding claims, wherein the perfumed particle has a soft and/or gummy solid consistency, having a glass transition temperature ( $T_g$ ) of below 25°C, preferably having a glass transition temperature ( $T_g$ ) of below 15°C, more preferably having a glass transition temperature ( $T_g$ ) of below 10°C, most preferably a glass transition temperature ( $T_g$ ) of below 5°C.
4. Perfumed particle according to any of the preceding claims, wherein the biopolymer is a gelling biopolymer, preferably wherein the biopolymer comprises gelatine, pectin, agar-agar, carrageenan, konjac gum, starch, tapioca starch, gellan, alginate, gum arabic, xanthan, cellulose ethers, vegetal protein isolate, amylose, or any mixture thereof.
5. Perfumed particle according to any of the preceding claims, wherein the humectant is able to lower the water activity of the perfumed particle below 0.9, preferably wherein the humectant is able to lower the water activity of the perfumed particle below 0.6.
6. Perfumed particle according to any of the preceding claims, wherein the humectant comprises sucrose, glycerol, glucose, syrup, corn syrup, citric acid, tartaric acid, malic acid, polyols (i.e. sorbitol, xylitol, etc.), mono, di & trisaccharides (i.e. maltose) or any mixture thereof.
7. Perfumed particle according to any of the preceding claims, wherein the encapsulated perfume comprises a core-shell microcapsule comprising an oil-based core comprising a hydrophobic material, preferably a perfume, and a polymeric shell.

8. Perfumed particle according to any of the preceding claims, wherein the perfumed particle comprises the carrier in the range of from 70 to 98 wt.%, based on the total weight of the perfumed particle.
9. Perfumed particle according to any of the preceding claims, wherein the perfumed particle comprises free perfume in the range from 1 to 15 wt.%, preferably in the range from 2 to 10 wt.%, based on the total weight of the perfumed particle.
10. Perfumed particle according to any of the preceding claims, wherein the perfumed particle comprises encapsulated perfume in the range from 1 to 15 wt.%, preferably in the range from 2 to 10 wt.%, based on the total weight of the perfumed particle.
11. Perfumed particle according to any of the preceding claims, wherein carrier comprises the biopolymer in the range from 0.5 to 35 wt.%, preferably in the range from 1 to 10 wt.%, based on the total weight of the carrier.
12. Perfumed particle according to any of the preceding claims, wherein the carrier comprises the humectant in the range from 30 to 70 wt.%, preferably in the range from 50 to 65 wt.%, based on the total weight of the carrier.
13. Perfumed particle according to any of the preceding claims, wherein the carrier comprises water in the range from 10 to 50 wt.%, preferably in the range from 20 to 40 wt.%, based on the total weight of the carrier.
14. Method of manufacturing a perfumed particle according to any of claims 1 to 13, wherein the method comprises the following steps:
  - Mixing a biopolymer, humectant, liquid, preferably water, free perfume and/or encapsulated perfume to form a mixture;
  - Molding the mixture, preferably by native starch molding, solid molding, teflon molding or silicon molding.
15. Perfumed consumer product comprising the perfumed particle according to any one of claims 1 to 13, preferably a fabric softener, laundry scent boosters, fabric refreshers, liquid or solid detergents.

16. Use of the perfumed particle according to any one of claims 1 to 13 or the perfumed consumer product according to claim 15 for delivering a perfume to a fabric.