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(54) **CAPSULE COMPRISING A PROBIOTIC MICROORGANISM FOR USE IN A COMPOSITION PRODUCTION AND DISTRIBUTION DEVICE**

(57) The invention relates to a capsule (1) comprising a cup composed from at least a side wall (2) and a bottom wall (4); and a cover (3), for use in a composition production and distribution device, the capsule (1) containing at least one ingredient for extemporaneously producing a personalized cosmetic and/or pharmaceutical composition by mixing said ingredient with at least a physiologically acceptable carrier, wherein said ingredient is a probiotic microorganism improving the skin microbiome balance.

CAPSULE COMPRISING A PROBIOTIC MICROORGANISM FOR USE IN A COMPOSITION PRODUCTION AND DISTRIBUTION DEVICE

The invention relates to dermatology area and, more particularly, to the self-manufacturing of personalized cosmetic and/or pharmaceutical compositions, notably for use in the treatment of dermatological skin diseases or disorders. The invention further relates to capsules containing active ingredients improving the skin microbiome balance, to be mixed with at least a physiologically acceptable carrier, for the extemporaneous preparation of personalized cosmetic and/or pharmaceutical compositions.

The human body is host to a highly complex and rich microbial community. The human microbiome comprises over ten times more microbial cells than human cells. These microorganisms are generally harmless and contribute to a healthy state by producing notably vitamins, cooperating with digesting food, or stimulating the immune system. The human microbiota mainly resides on the surface and in deep layers of skin, in the saliva and oral mucosa, in the conjunctiva, and in the gastrointestinal tract.

It has been demonstrated, primarily in the gut, that human microbiota has fundamental roles in human health and diseases. The skin is colonized by many microorganisms, most of them are beneficial or harmless.

However, the skin microbiome has specific compositions in diseases states of skin that are different compared to healthy skin. Diseases such as acne vulgaris are associated with strong alterations and deregulations of the microbiome.

Thus, to modulate the microbiome and more particularly the skin microbiome, different approaches have been developed.

One preferred approach consists in developing antibiotic-free, healthy and environment-friendly pharmaceutical compositions. Application WO16122889, notably discloses a method for modulating the abundance of a bacterial taxa in a human subject's microbiota. The method comprises administering to the human subject a pharmaceutical composition comprising prebiotics, such as a glycan therapeutic preparation, in an amount effective to modulate the abundance of the bacterial taxa.

Another approach, notably disclosed in application WO16086208 consists in modulating the microbiome by directly administering to a human subject a probiotic composition comprising an isolated, anti-inflammatory bacterial population, such that inflammation in the subject is reduced.

However, the preparation of cosmetic and/or pharmaceutical compositions comprising prebiotics or probiotic microorganisms leads to new formulation problems, notably in terms of stability from the physical and chemical point of view. It is also a challenge to maintain the probiotic microorganism's concentration under control in these cosmetic and/or pharmaceutical compositions.

Moreover, an additional problem with cosmetic and/or pharmaceutical compositions comprising probiotic microorganisms is that they generally present a short shelf life.

In this context, the Applicant proposes to develop alternative ways to produce and deliver extemporaneous cosmetic and/or pharmaceutical compositions comprising one or more probiotic microorganisms. These compositions are preferably used topically, for the prevention and/or treatment of dermatological skin diseases or disorders, such as for example acne, creasing, eczema, erythema in particular erythema of rosacea, erythema of acne or acute erythema, flushing, non-rosacea-related inflammations of skin, psoriasis, purpura, rosacea, skin sagging, telangiectasia, and/or skin-ageing, or a symptom associated therewith.

In particular, such personalized compositions comprising probiotic microorganisms significantly reduce the duration of treatment and allow obtaining a greater reduction in symptoms of skin diseases. Furthermore, the extemporaneous cosmetic and/or pharmaceutical compositions according to the invention provide a certain advantage in terms of efficacy and tolerance allowing either to increase the therapeutic effect for similar doses, or to maintain the same therapeutic effect while decreasing doses.

Consequently, in one general aspect, embodiments of the present invention relates to a capsule for use in a composition production and distribution device, the capsule containing at least a probiotic microorganism for extemporaneously producing a personalized cosmetic and/or pharmaceutical composition, notably by mixing said probiotic microorganism with at least a physiologically acceptable carrier.

Surprisingly, by using capsules according to the invention, the Applicant has developed a way to produce and distribute a personalized and ready-to-use cosmetic and/or pharmaceutical composition, that is notably stable from the physical and chemical point of view, when administered to a subject or when applied on the subject's skin.

The present invention further relates to a system intended to produce and to distribute a composition, said system comprising:

- at least one capsule according to the invention,
- at least a container comprising a physiologically acceptable carrier, and
- a composition production and distribution device,

wherein the device comprises means for mixing the content of the capsule with the content of the container and means for extemporaneously producing and delivering a personalized cosmetic and/or pharmaceutical composition.

The present invention also relates to a method for delivering a cosmetic composition from a production and distribution device, said method comprising the steps of:

- mixing the content of the capsule according to the invention with the content of at least a container comprising a physiologically acceptable carrier, and

- producing and delivering said cosmetic composition.

The invention is more detailed in the following description with reference to the accompanying drawings, wherein:

- Figures 1a, 1b, 1c, 2a, 2b and 2c are diagrammatic sections of capsules according to the invention;
- Figure 3 is a three-quarter view of the top part of a capsule according to the invention;
- Figure 4 is a three-quarter view of the bottom part of a capsule according to the invention;
- Figure 5 is a three-quarter view of the top part of another capsule according to the invention; and
- Figure 6 is a three-quarter view of the bottom part of another capsule according to the invention.

For the preparation of the extemporaneous cosmetic and/or pharmaceutical compositions according to the invention, capsules are used.

Capsules have been developed in the food science and consumer goods area. Capsules are described notably in documents EP0512468 and EP1784344.

In short, such capsules typically comprise:

- a hollow body and an injection wall which is impermeable to liquids and to air and which is attached to the body and adapted to be punctured by e.g. an injection needle of the system,

- a chamber containing a product to be extracted,

- a membrane, preferably in aluminium, disposed at the bottom end of the capsule, closing the said capsule, for retaining the internal pressure in the chamber, the said membrane being associated with piercing means for piercing dispensing holes in the said aluminium membrane when said internal pressure inside the chamber reaches a certain predetermined value,

- optionally, means configured to break the jet of fluid so as to reduce the speed of the jet of fluid injected into the capsule and distribute the fluid across the bed of substance at a reduced speed.

The capsule according to the invention, which comprises a probiotic microorganism is used for extemporaneously self-manufacturing of a personalized cosmetic and/or pharmaceutical composition when mixed with at least a physiologically acceptable carrier. The prepared composition presents a therapeutic interest for treating and/or preventing a related skin disease.

As shown at figures 1a to 6, the capsule 1 according to the invention typically comprises:

- a cup composed from side wall(s) 2 and a bottom wall 4;
- a cover 3 and
- a chamber 5.

The cup, which is the main part of the capsule, is composed from side wall(s) 2 and a bottom wall 4. The cup 2 is preferably a frustoconical (figures 1a, 1b, 1c, 3, 4, 5 and), or hemispherical (figures 2a, 2b and 2c) element. The bottom wall 4 also called base of the cup does not have to be flat, but may also assume the above-mentioned geometries. The cup may preferably be made of aluminium, pure plastic, multilayer plastic or a multilayer film, or a combination thereof.

More preferably, the cup 2 is made of:

- aluminium between 10 and 150 µm thick, preferably between 20 µm and 100 µm thick, more preferably between 50 and 60 µm thick;

- pure plastic;

- multilayer plastic optionally with an oxygen barrier layer, such as EVOH (copolymer of ethylene and vinyl alcohol) or PVDC (polyvinylidene chloride); or

- a multilayer film, such as cardboard/aluminium/plastic or cardboard/plastic optionally with an oxygen barrier layer, such as EVOH of PVDC.

In a first alternative of the invention as illustrated at figure 1b, the bottom wall 4 comprises one or more internal layers 41.

In a second alternative of the invention as illustrated at figure 1c, the cup comprises an additional layer 21 able to compartmentalize the capsule chamber 5 in two separate chambers 51 and 52.

In a third alternative of the invention as illustrated at figure 2b and 6, the bottom wall 4 comprises a portion covered with a layer of an elastic material 42 to be preferably pierced during extraction of the capsule's contents.

The cover 3 of the cup or top membrane 3 is preferably welded to the periphery of the cup by heat sealing, the parts to be welded comprising a welding lacquer on their opposite faces. Alternatively, as shown at figure 2a, the lower lip of the cup may also be folded back onto the cover for crimping 33.

The cover 3 of the capsule 1 may preferably be made of aluminium or a multilayer film. More preferably, the cover is made of:

- aluminium 15 to 60 µm thick,

- an elastic material, or

- a multilayer film comprising:

i. either 20 to 60 g/m² paper, plastic, such as 20 to 60 µm thick polyethylene, and 5 to 20 µm thick aluminium;

ii. or EVOH or PVDC 5 to 30 µm thick and plastic (PP for polypropylene, PE for polyethylene, PA for polyamide) 20 to 100 µm thick or PET (polyester) 5 to 30 µm and plastic (PP, PE) 20 to 100 µm thick or metallized PET or PET provided with an upper barrier layer, such as SiO_2.

The cover 3 of the capsule 1 may also be made of a multilayer combination of paper and aluminium.

In a first alternative of the invention, the cover is a top membrane comprising one single layer 3, as illustrated at figures 1a and 2b, of elastic material (i.e. it is a so-called monolayer membrane).

In a second alternative of the invention as illustrated at figure 1c, the cover is a top membrane comprising a laminate comprising several superimposed layers 31 which are at least partially

assembled one to another, so that at least one of the constitutive layers of the laminate is made of an elastic material. Preferably, the lamination in the area where the needle pierces the top membrane is a weaker adhesion (or no adhesion) in comparison to other regions of the membrane, in order to facilitate the reclosing movement of the elastic layer.

In a third alternative of the invention (not illustrated), the cover 3 is a top membrane comprising a non-elastic film, at least of portion of which is coated with a layer of an elastic material. The elastic material is preferably coated onto said film in a liquid phase, which is then solidified by a heat, electron beam, or UV light curing/treatment.

In a fourth alternative of the invention as illustrated at figures 1b, 2c and 3, the cover 3 is a top membrane comprising a non-elastic film, at least of portion of which is covered with a layer of an elastic material 32 with a glue using "sticker-like" application or using heat sealing or ultrasound sealing.

In a fifth alternative of the invention, the top membrane of the capsule 3 is coated at least on a portion of its surface with a layer of silicone that is applied over its melting temperature (i.e. as a liquid form) such that it then solidifies as it cools down onto the membrane onto which it is applied ("hot melt application").

In all embodiments mentioned above, the elastic material is preferably a food-grade silicon, particularly a liquid mono-component silicon which is set by reaction with the atmospheric humidity (i.e. at ambient temperature). Examples of elastic materials include but are not limited to for instance: a food-grade thermoplastic elastomer such as SBC (Styrene Block copolymers), silicone or liquid silicone rubber, ethylene vinyl alcohol (EVA) - based elastomer, EPDM (Ethylene - propylene - diene - monomer) or an isoprene rubber.

The capsule 1 according to the invention may vary in size according to the volume and to the probiotic concentration of the product to be prepared, *i.e.* the personalized cosmetic and/or pharmaceutical composition.

The personalized cosmetic and/or pharmaceutical composition dose to be delivered may preferably vary from 0.5 g to 100 g, preferably from 2 g to 10 g.

Preferably, the diameter of the cover 3 of the capsule 1 is between 5 and 50 mm, more preferably between 8 mm and 48 mm, even more preferably between 15 and 35 mm.

Preferably, the diameter of the cup of the capsule 1 is between 3 and 45 mm, more preferably between 5 mm and 35, even more preferably between 10 and 30 mm.

The capsule 1 according to the invention is filled with at least a probiotic microorganism.

By “probiotic microorganism”, it is referred to a microorganism which, when used in an adequate amount, has a positive effect on the health of its host and which may improve the skin microbiome balance.

By "skin microbiome", it is referred to the microorganisms found on healthy human skin, which generally consists of a balanced collection of skin commensal microorganisms. The skin microbiome of a human host may include a variety of resident microorganisms that help to promote the health and/or appearance of the host's skin.

In a preferred embodiment, the probiotic microorganism of the invention is selected from among *Acetobacter, Actinomyces, Acinetobacter, Aerococcus, Akkermansia, Anabaena, Anaerococcus, Anaerofustis, Anaerostipes, Anaerotruncus, Arthrospira, Arthrobacter, Aureobasidium, Bacillus, Bacteroides, Bifidobacterium, Blautia, Brachybacterium, Brevibacterium, Butyrivibrio, Carnobacterium, Clostridium, Coprococcus, Corynebacterium, Cyanobacterium, Deinococcus, Enhydrobacter, Enterococcus, Eubacterium, Faecalibacterium, Fibrobacter, Fusobacterium, Gluconacetobacter, Halobacterium, Helicobacter, Janthinobacterium, Kocuria, Lactobacillus, Lactococcus, Leuconostoc, Lysobacter, Macrococcus, Melissococcus, Micrococcus, Neisseria, Nitrosococcus, Nitrosocystis, Nitrosolobus, Nitrosomonas, Nitrosospria, Nitrosovibrio, Oenococcus, Oscillospira, Pediococcus, Peptoniphilus, Peptostreptococcus, Propionibacterium, Pseudomonas, Roseburia, Ruminococcus, Salinicoccus, Sphingomonas, Sporolactobacillus, Staphylococcus, Stenotrophomonas, Streptococcus, Tetragenococcus, Weissella* and combinations thereof, preferably *Bifidobacterium* and/or *Lactobacillus*.

Preferably, the probiotic microorganism of the invention is selected from among *Bifidobacterium adolescentis*, *Bifidobacterium animalis*, *Bifidobacterium bifidum*, *Bifidobacterium breve*, *Bifidobacterium infantis*, *Bifidobacterium pseudocatenulatum*, *Lactobacillus casei*, *Lactobacillus johnsonii*, *Lactobacillus paracasei*, *Lactobacillus reuteri*, *Lactobacillus rhamnosus* and combinations thereof, more preferably selected from among *Lactobacillus casei*, *Lactobacillus johnsonii*, *Lactobacillus paracasei*, *Lactobacillus reuteri*, *Lactobacillus rhamnosus*, and combinations thereof.

Even more preferably, the probiotic microorganism useful for the present invention is *Lactobacillus johnsonii* LA1 NCC 533 (deposit number CNCM I-1225).

Lactobacillus johnsonii LA1 NCC533 (CNCM I-1225) was deposited, according to the Treaty of Budapest, at the Collection Nationale de Cultures de Microorganismes (CNCM) [National Collection of Microorganism Cultures], Institut Pasteur, 28 rue du Docteur Roux, 75724 Paris Cedex 15, France, on June 30, 1992, under the reference CNCM I-1225.

Preferably, the probiotic microorganism according to the invention is a non-transformed probiotic microorganism, *i.e.* a natural, not genetically modified, non-pathogenic and non-invasive microorganism of the human microbiome, preferably of the skin microbiome of the healthy (non-diseased) human.

The probiotic microorganism can be used in a viable, semi-inactivated or inactivated form but preferably in an inactivated form also known as a non-replicating form. In particular, the probiotic microorganism is used in a non-replicating form, for instance thanks to a heat treatment.

The inactivated microorganisms may have intact or ruptured cell membranes. As such, the term "inactivated" also denotes the microorganism extracts and lysates comprising fractions and/or metabolites.

In the following, *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225), in particular non-replicating *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225), for example heat treated *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) will be named NMR LA1.

"Non-replicating" probiotic microorganisms and *especially Lactobacillus johnsonii* LA1 NCC533 can be inactivated, dead, or non-viable.

Probiotic microorganisms and especially *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) may be used at least partially non-replicating.

Non-replicating form, in particular heat treated microorganisms such as *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) has the advantage of being even more effective than their live counterpart. The use of non-replicating microorganisms, such as heat-treated probiotic microorganisms such as *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) instead of their live counterparts, has further the advantages of:

- reducing the potential risk of live probiotic-associated sepsis in the sensitive targeted populations,

- representing a safe alternative to immunocompromised patients.

Furthermore, thanks to lower processing hurdles, the non-replicating microorganism can be integrated in shelf stable liquid products with a long shelf life.

Heat inactivation may occur at least about 70°C and any kind of heat treatment can be used to inactivate the probiotic microorganisms such as *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225). For example, the probiotic microorganisms such as *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) may be rendered non-replicating at 110°C to 140°C for 1-30 seconds, e.g. 10-20 seconds.

Hence, in one embodiment of the present invention, at least 90%, for example at least 95% preferably at least 98%, most preferably at least 99%, ideally at least 99.9%, or all of the probiotic microorganism such as *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) are non-replicating.

It is known from the literature that probiotic microorganisms such as *Lactobacillus johnsonii* NCC533 (CNCM I-1225), in particular non-replicating forms, for example heat treated *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225), have shown superior effects on the induction of antimicrobial peptide expression than those previously identified and described in the previous literature.

The patent application WO 2010/130662 from Nestec describes that *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) strongly induces the constitutive hBDl expression, and that heat-treated *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) up-regulates hBDl more strongly than its live counterpart.

The probiotic microorganisms to be extracted, that are localized in the chamber 5 of the capsule 1 are preferably in a dry form. They are obtained via conventional methods such as spray drying; lyophilization followed by milling to micronize the powder; atomization onto a cold surface, followed by sublimation and collection of the micronized powder; evaporative drying of a non-frozen solution in a vacuum oven or centrifugal evaporator at temperatures from about-20° to 500°C, followed by milling to desirable particle size. The resultant powder particles are glassy or crystalline internally with a majority of the glassy materials coating on the surface. The advantage of coating the probiotic microorganisms with glassy materials is to increase physical stability of the product and reduction of deleterious intermolecular reactions within the particle.

In a preferred embodiment, the frozen particles is loaded on trays and immediately transferred to a vacuum drying chamber where the drying process proceeds in three major steps including:

(1) an optional, short purging and structure stabilizing step of the frozen particles under a vacuum pressure of less than 2000 mTORR,

(2) primary drying step under vacuum pressure of more than 2000 mTORR and at a temperature from about-20° to 500°C, and

(3) secondary and final drying step of the glassy amorphous material under full vacuum pressure and elevated temperature for a time sufficient to reduce the water activity of the dried formulation to 0.3 Aw or less.

The dried and stable probiotic microorganisms can be used directly as a flake, or ground into a powder.

In a preferred embodiment, the probiotic microorganisms are in the form of small dry particles, and with at least 90% dry matter per gram, preferably at least 93% dry matter per gram. The dry particles are preferably substantially regular and identical.

Preferably, the personalized cosmetic and/or pharmaceutical composition according to the invention further comprises a prebiotic.

Thus, before the production and distribution of the personalized cosmetic and/or pharmaceutical composition, the prebiotic can be present directly in the capsule according to the invention, in the physiologically acceptable carrier, or in a second, separate capsule, preferably in a second separate capsule.

By "prebiotic", it is referred to a selectively fermented ingredient that allows specific changes, both in the composition and/or activity in the microflora that confers benefits upon skin's host well-

being. Prebiotics can be administered orally or topically and can promote the growth of desirable microorganisms (probiotic) and thus improving their benefits to the host.

Particularly, the prebiotic of the invention is selected from among from among complex carbohydrates, complex sugars, guar gum, beta-glucans, biotin, cellulose, chitin, chitosan, dextrins, fructans, fructooligosaccharide (FOS), galactooligosaccharides (GOS), glucomannan oligosaccharide, gluco-oligosaccharides, hemi-celluloses, high amylose corn starch (HAS), inulin, isomalto-oligosaccharide, lactosucrose, lactulose, lignin, mannan oligosaccharides (MOS), neosugar, oligodextrose, oligofructose, oligofructose-enriched inulin, oligosaccharides, palatinose, pectin, polydextrose, psyllium, raffinose, sorbitol, soy oligosaccharide, starch, tagatose, trans-galactooligosaccharide, xylitol and xylooligosaccharides (XOS), and combinations thereof.

Preferably, the prebiotic is selected from among fructooligosaccharide (FOS), galactooligosaccharide, glucomannan oligosaccharide, inulin, isomalto-oligosaccharide, lactosucrose, lactulose, neosugar, palatinose, raffinose, sorbitol, soy oligosaccharide, xylitol and xylooligosaccharide, preferably the prebiotic is a glucomannan oligosaccharide.

Preferably, the capsule for extemporaneously producing and delivering a personalized pharmaceutical composition according to the invention, can be used in the treatment and/or prevention of a skin disease in a subject. The delivered personalized pharmaceutical composition can be topically administered to a skin area of the subject, wherein the skin area is, or is prone to be, affected by the skin disease.

As disclosed herein, the term “treatment” or “treating” refers to an amelioration, prophylaxis, or reversal of the skin disease or related dermatological disorder, or of at least one discernible symptom thereof. This also refers to an amelioration, prophylaxis, or reversal of at least one measurable physical parameter related to the skin disease or disorder being treated, which is not necessarily discernible in or by the subject. In yet another embodiment, “treatment” or “treating” refers to inhibiting or slowing the progression of a disease or disorder, either physically, e.g., stabilization of a discernible symptom; physiologically, e.g., stabilization of a physical parameter, or both. “Treatment” or “treating” further refers to delaying the onset of a disease or disorder, for example, by lessening or delaying the onset of the redness of the skin affected by the erythema or the symptom. In some embodiments, compounds of interest are administered as a preventive measure. In this context, "prevention" or "preventing" refers to a reduction in the risk of acquiring a disease or disorder specified.

One or more skin diseases or disorders may be treated using the personalized pharmaceutical composition of the invention. Skin diseases or disorders include inflammatory skin diseases and non-inflammatory skin diseases. Skin diseases or disorders include, but are not limited to, acne, actinic keratosis, actinic telangiectasia, alopecia areata, aphthous stomatitis, chapping, dermatitis, drug eruptions, drug eruptions, dry skin, eczema, erythema, erythema multiform, erythema nodosum,

fungal infections, granuloma annulare, herpes simplex, ichthyosis vulgaris, impetigo, intertrigo, keloids, keratoses, lichen simplex chronicus, milia, moluscum contagiosum, pemphigus, perioral dermatitis, pityriasis rosea, pruritus, pseudofolliculitis barbae, psoriasis, purpura, rashes, rhinophyma, rosacea, skin cancer, sunburn, telangiectasia, urticaria, vascular tumours and malformations and xerosis, or combinations thereof, or a symptom associated therewith.

Preferably, the skin disease or disorder is rosacea, telangiectasia, psoriasis, purpura, acne, eczema, atopic dermatitis, erythema, in particular erythema of rosacea, erythema of acne or acute erythema, non-rosacea-related inflammations of skin, flushing, skin sagging, creasing and/or skin ageing, or a symptom associated therewith.

One or more skin symptoms or alterations may also be treated using the personalized pharmaceutical composition of the invention, in particular skin inflammation, flushing, telangiectasia and erythema.

Moreover, one or more cosmetic skin alterations may also be treated using the personalized pharmaceutical composition of the invention, in particular loss of skin firmness, flaky skin, loss of skin radiance, greasy skin, dry skin and skin complexion.

As used herein, the term “subject” means any animal, preferably a mammal, most preferably a human, male or female, to whom will be or has been administered compounds or topical compositions according to embodiments of the invention. Preferably, a subject is in need of, or has been the object of observation or experiment of treatment or prevention of a skin disease.

The term “topical composition”, "topically administrable composition," or a "topical formulation," as used herein, means any formulation or composition which is pharmaceutically and/or cosmetically acceptable for topical delivery of the specified compounds according to embodiments of the invention. Exemplary forms of formulation that can be used for topical administration in embodiments of the present invention include, but are not limited to, sprays, mists, aerosols, solutions, lotions, gels, creams, ointments, pastes, unguents, emulsions and suspensions.

The term "topically administrable composition" as used herein, also encompasses locally applied and locally acting formulations such as formulations for use with implants, injections, or patches.

The choice of topically administrable composition will depend on several factors, including, but not limited to, the nature of the symptoms to be treated or prevented, the physiochemical characteristics of the compound to be administered and of other excipients present, their stability in the formulation, the aesthetics of any given formulation, available manufacturing equipment, and cost constraints.

These compositions are prepared according to the usual methods.

The pH of the topical compositions of the invention is preferably within a physiologically acceptable pH, e.g., within a range of about 5 to about 7, preferably within the range of about 5 to 6.

As used herein, the term "composition" is intended to encompass a product comprising the specified ingredient in the specified amount, as well as any product which results, directly or indirectly, from combinations of the specified ingredient in the specified amount.

In an alternative embodiment of the invention, the capsule is intended to be solely used, for extemporaneously producing and delivering a personalized cosmetic composition, specifically designed to prevent and/or treat the subject skin disease or disorder. The delivered personalized cosmetic composition can be topically administered to a skin area of the subject.

In a further embodiment, the present invention relates to a system intended to produce and to distribute a composition, said system comprising:

- at least one capsule according to the invention,
- at least a container comprising a physiologically acceptable carrier, and
- a composition production and distribution device,

wherein the device comprises means for mixing the content of the capsule with the content of the container and means for extemporaneously producing and delivering a personalized cosmetic and/or pharmaceutical composition.

The main part of the system according to the invention is the composition production and distribution device.

Such a device can extract the contents of the capsule according to the invention, and mix it with the contents of the container comprising a physiologically acceptable carrier in order to produce and distribute a personalized cosmetic and/or pharmaceutical composition.

Such a device and its related capsule contents extraction process is notably described in documents EP0512142 and WO2014080093. The production and distribution device according to these patent applications enables the capsule contents to be extracted under good conditions.

To extract the contents of the capsule, it can either be the top membrane 3 or the bottom wall 4 of the capsule 1 which is torn under the effect of the extraction fluid which is a physiologically acceptable carrier, initially present in a container.

An alternative device is notably described in documents EP2989260 and WO2011107221 which disclose diffusion devices adapted to receive a capsule, in particular a capsule according to the invention.

According to the invention, the container comprises a physiologically acceptable carrier which can be in liquid, more or less fluid, pasty or solid form. Preferably, the physiologically acceptable carrier is in a liquid form.

The physiologically acceptable carrier are preferably chosen from among carriers known in the art for topically administering pharmaceuticals. For instance, the carrier may include, but is not limited to, one or more of the following agents: solvents, emulsifiers, suspending agents, decomposers, binding agents, chelating agents, stabilizing agents, diluents, antioxidants, gelling

agents, preservatives, lubricants, absorption delaying agents, skin-penetrating agents, liposomes, coloring materials, odor absorbers or pigments and a mixture thereof.

The amounts of the different constituents of the compositions according to the invention are those conventionally used in the field under considerations.

As used herein, "physiologically acceptable carrier" refers to an acceptable vehicle or diluent comprising excipients and auxiliaries that facilitate processing of the active ingredients into preparations which can be used pharmaceutically. The carrier must be "acceptable" in the sense of being compatible with the other ingredients of the compositions and not deleterious to the recipient thereof. The carrier is compatible with human skin.

According to a particular embodiment of the invention, the carrier is preferably fresh water. For example, fresh water can be drinking water such as mineral water, spring water, water rich in electrolytes or osmosis water.

Preferably, the water used in the capsule according to the invention is a drinking water whose container may be a reservoir such as a bottle (bottled water), an aerosol or even a water tower (tap water).

More preferably, the fresh water is an electrolyte-rich water in which the presence of electrolytes is detected at a minimum concentration of 30 mg/l, often at a concentration greater than 100 mg/l. Non-limiting example of electrolyte-rich water include water rich in mineral salts and / or trace elements such as thermal waters, for example, Vichy, Avene, Uriage Jonzac, Bourbonne-les-Bains, Rochefort-sur-mer, Balaruc-les-Bains, or La Roche Posay water.

According to the invention, the personalized cosmetic and/or pharmaceutical composition to be produced and distributed by the device is preferably in the form of salves, ointments, emulsions, creams, milks, pomades, powders, impregnated pads, syndets, towelettes, solutions, gels, sprays or aerosols, foams, suspensions, lotions, sticks, shampoos or washing bases, preferably in the form of salves, ointments, emulsions, creams, milks, pomades, solutions, gels, foams, suspensions or lotions

Preferably, the personalized cosmetic and/or pharmaceutical composition used in the present invention is in the form of an emulsion, of a cream, of a lotion type, of a gel, or of a solution, and, more preferably in the form of an emulsion. For example, it may be in the form of an optionally gelled, oily solution, an optionally two-phase dispersion of the lotion type, an emulsion obtained by dispersion of a fatty phase in an aqueous phase (O/W) or vice versa (W/O), or a triple emulsion (W/O/W or O/W/O) or a vesicular dispersion of ionic and/or nonionic type. They can also be in the form of suspensions of microspheres or nanospheres or of lipid or polymeric vesicles or of polymeric patches and of hydrogels for controlled release. These personalized cosmetic and/or pharmaceutical compositions are preferably for topical application and can be in anhydrous form, in aqueous form, or in the form of an emulsion.

After use, the capsule can be easily removed with a minimum of waste (packaging material or personalized cosmetic and/or pharmaceutical composition).

For the extemporaneous preparation of the personalized cosmetic and/or pharmaceutical composition, one or more capsules can be used. This advantage makes it notably possible to personally adapt the composition depending on the dermatological skin disease(s) or disorders of the subject.

Moreover, the extemporaneous mixing of the different ingredients of the personalized cosmetic and/or pharmaceutical composition solves many problems of stability from the physical and chemical point of view.

In a particular embodiment of the invention, the personalized cosmetic and/or pharmaceutical composition is prepared using two or more capsules.

In a first alternative, for the extemporaneous preparation of a personalized cosmetic and/or pharmaceutical composition, only a first capsule comprising a probiotic microorganism is used. The capsule is mixed with the physiologically acceptable carrier from the container, before distribution of the ready-to-use composition.

In a second alternative, for the extemporaneous preparation of a personalized cosmetic and/or pharmaceutical composition, a first capsule comprising a probiotic microorganism is used, together with an additional second capsule, comprising a probiotic microorganism and/or a prebiotic compound. Both capsules are mixed with the physiologically acceptable carrier from the container, before distribution of the ready-to-use composition.

In a third alternative, for the extemporaneous preparation of a personalized pharmaceutical composition, at least one capsule according to the invention, a second capsule and/or the container further comprise an active ingredient selected from the group comprising, but not limited to, antibiotics, antibacterial agents, antiviral, antiparasitic, antifungal agents, anesthetics, analgesics, antiallergic agents, retinoids, free-radical scavengers, antipruriginous, antihistamines, immunosuppressant products, corticosteroids, keratolytic agents, intravenous immunoglobulin, anti-angiogenic, anti-inflammatory and/or a mixture thereof Preferably, the active ingredient is selected from the list consisting of acetaminophen, acetylsalicylic acid, acitretin, acyclovir, adapalene, alpha-tocopherol or esters thereof, amorolfine, amphotericin B, anthranoids, antibiotics of the tetracycline class, antibodies, ascorbic acid and esters thereof, benzoyl peroxide, betamethasone valerate, brimonidine, calcipotriol, calcitriol, ciclopirox, citric acid and fruit acids, clindamycin phosphate, clobetasol 17-propionate, crotamiton, cyproheptadine, diclofenac and salts and derivatives thereof, dioxyanthranol, econazole, erythromycin, estradiol, etretinate, fluocinolone acetonide, glycolic acid, glycyrrhetinic acid, hormones peptides, hydrocortisone, hydroquinone, ibuprofen and salts or derivatives thereof, isotretinoin, ivermectin, ketoconazole, kojic acid, lactic acid, lidocaine, lidocaine hydrochloride, malic acid, mequinol, metronidazole, miconazole or salts and derivatives thereof,

minoxidil, nucleic acids, octopirox, pilocaine and derivatives thereof, progesterone, pyrethrinoids, retinoic acid, retinol, rucinol, salicylic acid, salicylic acid, superoxide dismutases, tazarotene, terbinafine, tetracaine, thenaldine, tretinoin, trimeprazine, zinc pyrithione, and combinations thereof.

The above mentioned active ingredients are present at concentration:

- in the capsule according to the invention,
- in a second and separate capsule and/or
- in the container,

so that their final concentration in the personalized cosmetic and/or pharmaceutical composition is in a cosmetically and/or therapeutically effective amount of these active ingredients.

Finally, in a last embodiment, the invention is directed to a method for delivering a cosmetic and/or pharmaceutical composition from a production and distribution device, said method comprising the steps of:

- mixing the content of the capsule according to the invention with the content of a container comprising at least a physiologically acceptable carrier, and
- producing and delivering said cosmetic and/or pharmaceutical composition.

Further aspects and advantages of the invention will be disclosed in the following illustrative section.

Example: 1 Capsule according to the invention

As illustrated at figure 1a, the capsule 1 comprises a cup 2 with a base 5 and a frustoconical lateral wall . The cup is made of 50 µm thick aluminium. The capsule 1 is filled with a composition comprising a probiotic microorganism according to the invention.

The capsule 1 is closed by a cover 3 4 of aluminium and paper.

The composition comprising a probiotic microorganism according to the invention comprises from 50% to 99%, preferably from 75% to 98% of *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-225), by weight relative to the total weight of the composition.

Example 2: Preparation of a personalized cosmetic and/or pharmaceutical composition according to the invention

After mixing :

- the contents of the capsule with
- the contents of the container comprising at least a physiologically acceptable carrier,

in the composition production and distribution device, a personalized cosmetic and/or pharmaceutical composition has been prepared.

The personalized cosmetic and/or pharmaceutical composition of the invention comprises from 0.01% to 5%, preferably from 0.03% to 1% and more specifically of 0.03%, 0.1% and 1% of the

probiotic microorganism, especially *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-225), by weight relative to the total weight of the composition. In a more specific aspect, the topical pharmaceutical composition of the invention comprises an amount of the probiotic microorganism, especially *Lactobacillus johnsonii* LA1 NCC533 (CNCM I-1225) corresponding to about 10^4 to 10^{12} cfu or about 0,005 mg - 1000 mg per daily dose.

Example 3: Personalized cosmetic and/or pharmaceutical composition according to the invention

Initially present in	**Commercial name**	**Ingredient names**	**% w/w**
Container	PLANTACARE 818UP	Coco glucoside	6.00 to 15.00
Container	PROTELAN LS9011	Sodium Lauroyl sarcosinate	5.00 to 10.00
Container	PROTELAN AG 818 G	Sodium Cocoyl Glutamate	7.00 to 15.00
Container	KELTROL CG-SFT	Xanthan Gum	0.10 to 0.80
Container	NATROSOL PLUS 330CS	Cetyl Hydroxyethylcellulose	0.50 to 2.50
Container	PROBENZ SP	Sodium Benzoate	0.10 to 0.30
Container	ZEMEA	1,3-Propanediol	2.00 to 10.00
Container	GLYCERINE 4810 VEGETABLE	Glycerin	2.00 to 5.00
Container	STEPAN MILD GCC	Glyceryl caprylate/caprate	0.50 to 2.00
Container	D-PANTHENOL USP	Panthenol	0.10 to 1.00
Container	PRESTIGE SUPER SOFT SILVER	Mica / Titanium dioxide	0.05 to 0.20
Container	ACIDE CITRIQUE MONOHYDRATE	Citric acid	0.20 to 2.00
Container	ACTIVE INGREDIENT	Active ingredient	0.00 to 20.00
Capsule	PROBIOTIC	Probiotic	0.01 to 5.00
Capsule or Container	PREBIOTIC	Prebiotic	0.00 to 10.00

Container	HYDROLITE 5/5P	Pentylene Glycol	0.00 to 5.00
Container	PURIFIED WATER	Water	Qsp 100

Example 4: Personalized cosmetic and/or pharmaceutical composition according to the invention

Initially present in	**Commercial name**	**Ingredient names**	**% w/w**
Container	SATIAXANE UCX 911	Xanthan Gum	0.10 to 1.50
Container	GLYCERINE 4810 VEGETABLE	Glycerin	1.00 to 5.00
Container	ZEMEA	Propanediol	1.00 to 8.00
Container	D-PANTHENOL USP	Panthenol	0.20 to 1.20
Container	CERALUTION H	Behenyl alcohol/ glyceryl stearate/ glyceryl stearate citrate/ na dicocoylethylenediamine PEG-15 sulfate	1.00 to 5.00
Container	EMULGADE 1000NI	Cetearyl alcohol and ceteareth-20	1.00 to 3.00
Container	HUILE DE TOURNESOL OLEIQUE BIO	Sunflower (helianthus annuus) seed oil	3.00 to 8.00
Container	LIPEX SHEA SOFT	Butyrospermum Parkii	1.00 to 5.00
Container	MIGLYOL 812N	Caprylic/Capric Triglyceride	2.00 to 7.00
Container	CETIOL CC	Dicaprylyl carbonate	3.00 to 4.00
Container	LANETTE 16	Cetyl alcohol	1.00 to 3.00
Container	HYDROLITE CG	Caprylyl Glycol	0.10 to 1.00
Container	ACTIVE INGREDIENT	Active ingredient	0.00 to 20.00
Capsule	PROBIOTIC	Probiotic	0.01 to 5.00
Capsule or Container	PREBIOTIC	Prebiotic	0.00 to 10.00

Container	TITRIPLEX III	Disodium EDTA	0.05 to 0.20
Container	SODIUM HYDROXIDE (10% Aqueous solution)	Sodium hydroxide	Qs pH 5-5.5
Container	PURIFIED WATER	Water	Qsp 100

Example 5: Personalized cosmetic and/or pharmaceutical composition according to the invention

Initially present in	**Commercial name**	**Ingredient names**	**% w/w**
Container	KELTROL CG-T	Xanthan Gum	0.10 to 1.50
Container	VIVAPUR COS5	Microcrystalline Cellulose (and) Cellulose Gum	0.00 to 5.00
Container	GLYCERINE 4810 VEGETALE	Glycerin	1.00 to 5.00
Container	ZEMEA	Propanediol	5.00 to 10.00
Container	EMULIUM KAPPA	Candelilla/Jojoba/Rice Bran Polyglyceryl-3 Esters and) Glyceryl Stearate (and) Cetearyl Alcohol and) Sodium Stearoyl Lactylate	0.00 to 8.00
Container	PROLIX RB	Polyglyceryl-3 rice branate	2.00 to 6.00
Container	LIPACIDE C8G	Capryloyl Glycine	0.50 to 1.50
Container	LIPACIDE UG	Undecylenoyl glycine	0.00 to 0.50
Container	HUILE DE TOURNESOL OLEIQUE DESODORISEE BIO	Sunflower (helianthus annuus) seed oil	3.00 to 8.00
Container	ACTICIRE	Jojoba Esters/Acacia Decurrens Flower Wax/Helianthus Annuus (Sunflower) Seed Wax/Polyglycerin-3	3.00 to 8.00
Container	ISOSTERATE D'ISOSTEARYLE	Isosterate isostearyle	2.00 to 7.00
Container	CETIOL CC	Dicaprylyl carbonate	3.00 to 8.00
Container	CUTINA HVG	Hydrogenated Vegetable Glycerides	0.00 to 0.50

Container	LIPOCIRE A	C10-18 triglycerides	1.00 to 5.00
Container	DERMOSOFT 688	p-anisic acid	0.01 to 0.20
Container	D-PANTHENOL USP	Panthenol	0.20 to 1.20
Container	ACTIVE INGREDIENT	Active ingredient	0.00 to 20.00
Capsule	PROBIOTIC	Probiotic	0.01 to 5.00
Capsule or Container	PREBIOTIC	Prebiotic	0.00 to 10.00
Container	SODIUM HYDROXIDE (10% Aqu. solution)	Sodium hydroxide	Qs pH 5-5.5
Container	PURIFIED WATER	Water	Qsp 100

Example 6: Preservation and Stability Comparison of different Capsules according to the invention comprising probiotics:

The storage of three capsules according to the invention was compared.

As illustrated in FIG. 1a, each of the three capsules is identical and comprises a cup with a base and a frustoconical lateral wall. The cup is made of aluminum with a thickness of 50 microns.

Each capsule is filled with a composition comprising in particular a probiotic microorganism according to the invention, in lyophilized form or not.

Each capsule is closed by a cover of aluminum and paper.

Capsule 1 includes the product Yo-Plus™ whose main ingredients are listed below:

- skimmed milk,
- cream, and
- Lactic ferments (including *B. lactis*, *L.casei*, *L.acidophilus*).

Capsule 2 includes the product Actimel™ whose main ingredients are listed below:

- Fermented milk with *Lactobacillus casei*
- liquid sugar
- dextrose
- vitamin B6, and
- vitamin.

Capsule 3 includes the product LC1™ whose main ingredients are listed below:

- Whole milk,
- lean milk,
- milk proteins,

- lactic ferments (including *Lactobacillus johnsonii*),
- sugar 2%.

Capsule 4 includes the product Yogourmet™ culture de yaourt whose main ingredients are listed below:

- Skimmed milk powder,
- active bacterial culture (*L. casei, B. longum, L. bulgaricus, S. thermophilus*, and *L. acidophilus* in freeze-dried form).

The characteristics of the four different capsules are shown in the table below :

Information (for 100g)	Capsule 1 (Yoplus)	Capsule 2 (Actimel)	Capsule 3 (LC1)	Capsule 4 (lyophilized)
Energy (kJ)/100g	252	307	346	341
Energy (kcal)/100g	60	73	82	81
Fatty substances (g)	3,1	1,6	3,5	1,27
of which saturated fatty acids (g)	2,2	1	2,1	0,37
Carbohydrates (g)	4,7	10,8	6,6	43
Fibers (g)	-	-	-	-
Proteins (g)	4,6	3	5,1	39,29
Salt (g)	0,04	0,1	0,11	-
Calcium (mg)	146	120	Not measured	135,7
Vitamin B6 (mg)	Not measured	0,21	Not measured	Not measured
Vitamin D (µg)	Not measured	0,75	Non mesuré	Not measured
Probiotics	*B. lactis* *L. casei* and *L. acidophilus*	*L. casei*	*Lactobacillus johnsonii*	*L. casei,* *B. longum,* *L. bulgaricus,* *S. thermophilus*, and *L. acidophilus*
CFU (Colony forming Units) in the starting product	1,7 x 10^9 cfu (min)	10 x 10^9 cfu (approx)	Non mesuré	100 x 10^9 cfu (approx.)
% CFU remaining after 6h à 25°C	53,8%	Not measured	91%	99,9%
% CFU remaining after 24h à 25°C	27,1%	Not measured	44,8%	98%

% CFU remaining after 6 months at 25°C	unfit for consumption	unfit for consumption	unfit for consumption	55%
% CFU remaining after 12 months at 25°C	unfit for consumption	unfit for consumption	unfit for consumption	24%

As can be seen from the table above, it appears that the capsules comprising probiotics in freeze-dried form (lyophilized capsule 4) have a longer shelf life and stability than the other three capsules comprising probiotics in a non-freeze-dried (non-lyophilized) form and in an environment requiring low temperature storage.

CONCLUSIES

1. Capsule (1) voor gebruik in een samenstellingproductie- en distributie-inrichting, de capsule bevattende ten minste een probiotisch micro-organisme voor het onvoorbereid produceren van een gepersonaliseerde cosmetische en/of farmaceutische samenstelling.

2. De capsule (1) volgens conclusie 1, waarin het probiotische micro-organisme geselecteerd is uit *Acetobacter, Actinomyces, Acinetobacter, Aerococcus, Akkermansia, Anabaena, Anaerococcus, Anaerofustis, Anaerostipes, Anaerotruncus, Arthrospira, Arthrobacter, Aureobasidium, Bacillus, Bacteroides, Bifidobacterium, Blautia, Brachybacterium, Brevibacterium, Butyrivibrio, Carnobacterium, Clostridium, Coprococcus, Corynebacterium, Cyanobacterium, Deinococcus, Enhydrobacter, Enterococcus, Eubacterium, Faecalibacterium, Fibrobacter, Fusobacterium, Gluconacetobacter, Halobacterium, Helicobacter, Janthinobacterium, Kocuria, Lactobacillus, Lactococcus, Leuconostoc, Lysobacter, Macrococcus, Melissococcus, Micrococcus,Neisseria, Nitrosococcus, Nitrosocystis, Nitrosolobus, Nitrosomonas, Nitrosospria, Nitrosovibrio, Oenococcus, Oscillospira, Pediococcus, Peptoniphilus, Peptostreptococcus, Propionibacterium, Pseudomonas, Roseburia, Ruminococcus, Salinicoccus, Sphingomonas, Sporolactobacillus, Staphylococcus, Stenotrophomonas, Streptococcus, Tetragenococcus, Weissella* en combinaties daarvan, bij voorkeur *Bifidobacterium* en/of *Lactobacillus*.

3. De capsule (1) volgens conclusie 2, waarin het probiotische micro-organisme dat geselecteerd is uit *Bifidobacterium adolescentis*, *Bifidobacterium animalis*, *Bifidobacterium bifidum*, *Bifidobacterium breve*, *Bifidobacterium infantis*, *Bifidobacterium pseudocatenulatum*, *Lactobacillus casei*, *Lactobacillus johnsonii*, *Lactobacillus paracasei*, *Lactobacillus reuteri*, *Lactobacillus rhamnosus*, and combinations thereof, preferably selected from the group consisting of *Lactobacillus casei, Lactobacillus johnsonii*, *Lactobacillus paracasei, Lactobacillus reuteri*, *Lactobacillus rhamnosus*, en combinaties daarvan.

4. De capsule (1) volgens conclusie 3, waarin het probiotische micro-organisme *Lactobacillus johnsonii* LA1 NCC 533 (depotnummer CNCM I-1225) is.

5. De capsule (1) volgens één van de voorgaande conclusies, waarin het probiotische micro-organisme zich in de vorm van kleine droge deeltjes bevindt en met ten minste 90% droge materie per gram, bij voorkeur ten minste 93% droge materie per gram.

6. De capsule (1) volgens één van de voorgaande conclusies, omvattende:

- een kom omvattende ten minste een zijwand (2) en een bodemwand (4), met een diameter tussen 5 mm en 35 mm, en
- een deksel (3) met een diameter tussen 8 en 48 mm,

waarin de genoemde kom (2) vervaardigd is van aluminium, pure kunststof, multilaag kunststof, een multilaagse folie of een combinatie daarvan.

7. De capsule (1) volgens één van de voorafgaande conclusies, voor het gebruik daarvan bij de behandeling en/of verhindering van een huidziekte of kwaal in een individu, omvattende het topologisch toedienen aan een huidgebied van het individu van de genoemde topicale samenstelling, waarin het huidgebied is, of aangetast door, of is vatbaar om aangetast te worden door de huidziekte of kwaal.

8. De capsule (1) volgens conclusie 7, waarin de huidziekte of kwaal rosacea, telangiectasia, psoriasis, purpura, acné, eczeem erythemaor, of een daarbij behorend symptoom is.

9. Systeem bedoeld om een samenstelling te produceren en te distribueren, het systeem omvattende:

- ten minste één capsule (1) volgens één van de conclusies 1-8,
- ten minste een container omvattende een fysiologisch acceptabele drager, en
- een samenstellingproductie- en distributie-inrichting,

waarin de inrichting middelen omvat voor het mengen van de inhoud van de capsule (1) met de inhoud van de container en middelen voor het onvoorbereid produceren en leveren van een gepersonaliseerde cosmetische en/of farmaceutische samenstelling.

10. Werkwijze voor het leveren van een cosmetische samenstelling uit een productie en distributie-inrichting, de werkwijze omvattende de stappen van:

- het mengen van de inhoud van de capsule (1) volgens één van de conclusies 1-12 met de inhoud van ten minste een container omvattende een fysiologische acceptabele drager, en
- het produceren en leveren van de genoemde cosmetische samenstelling.

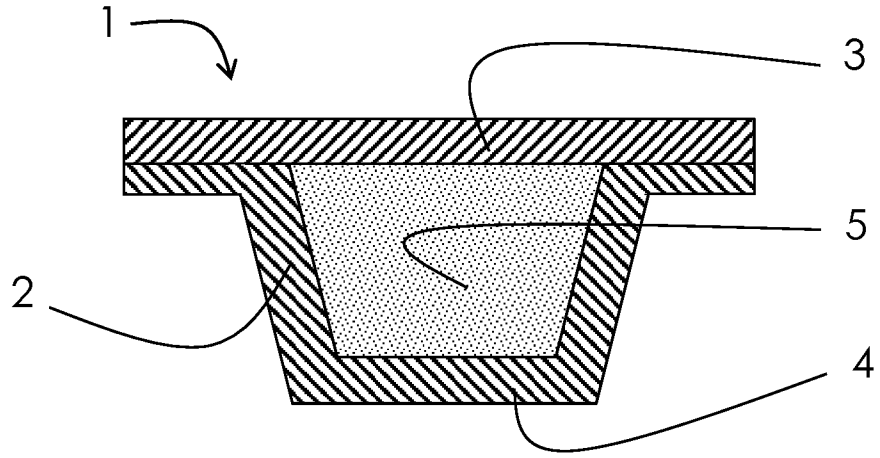

Fig. 1a

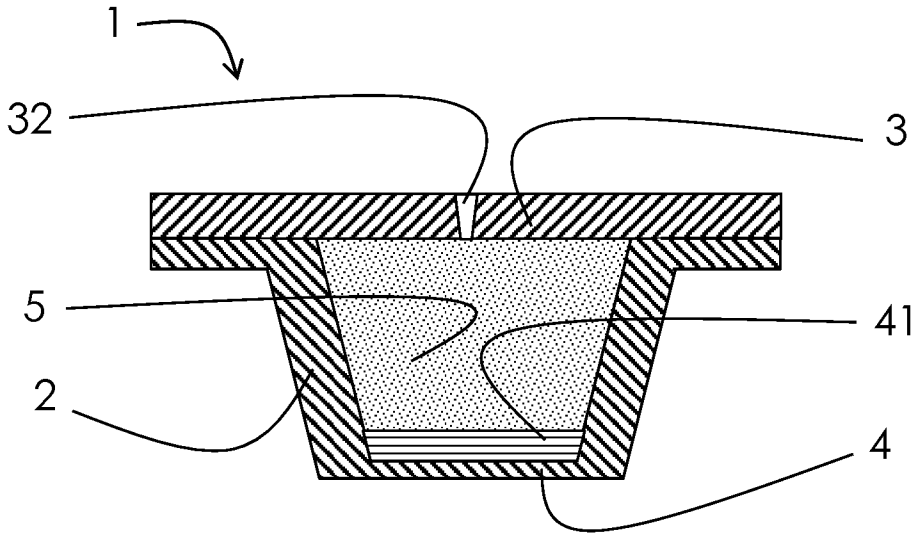

Fig. 1b

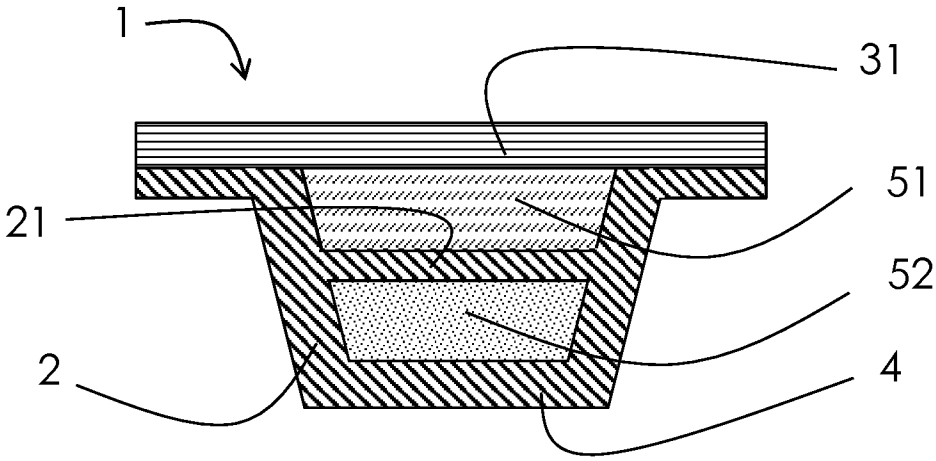

Fig. 1c

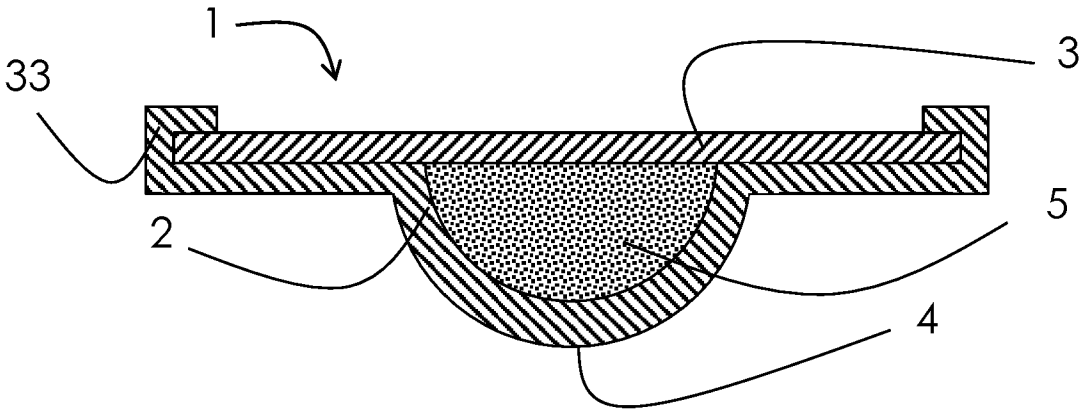

Fig. 2a

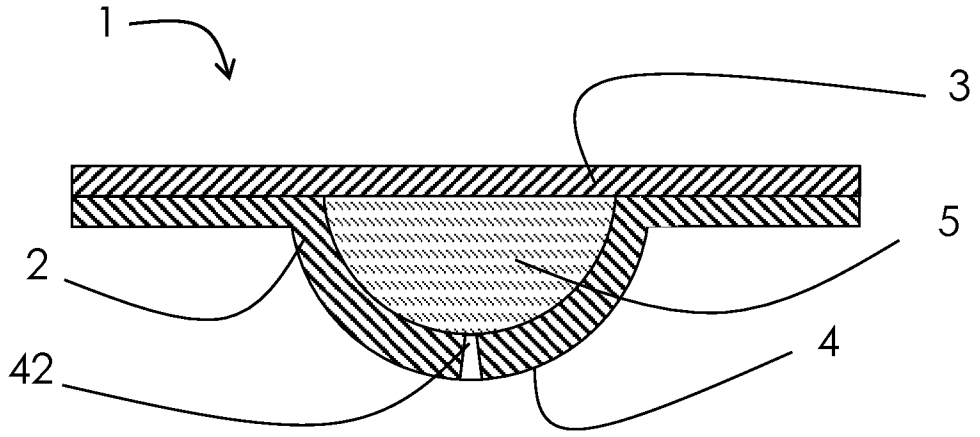

Fig. 2b

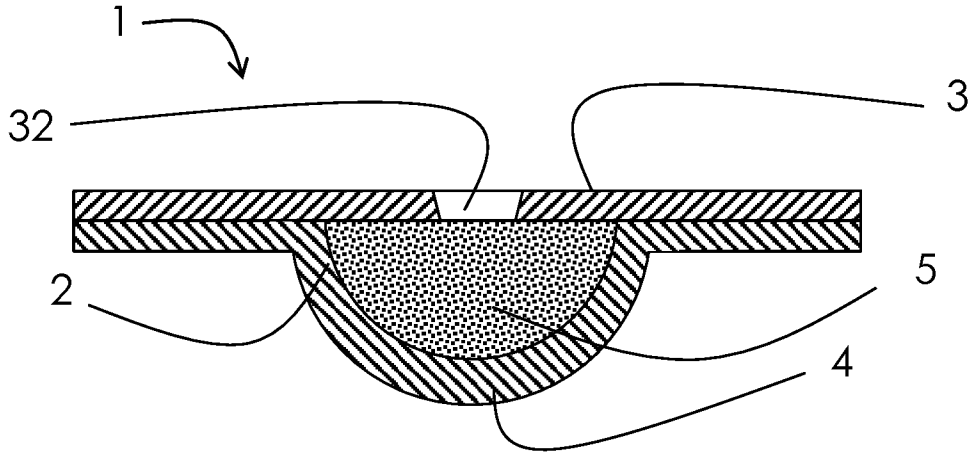

Fig. 2c

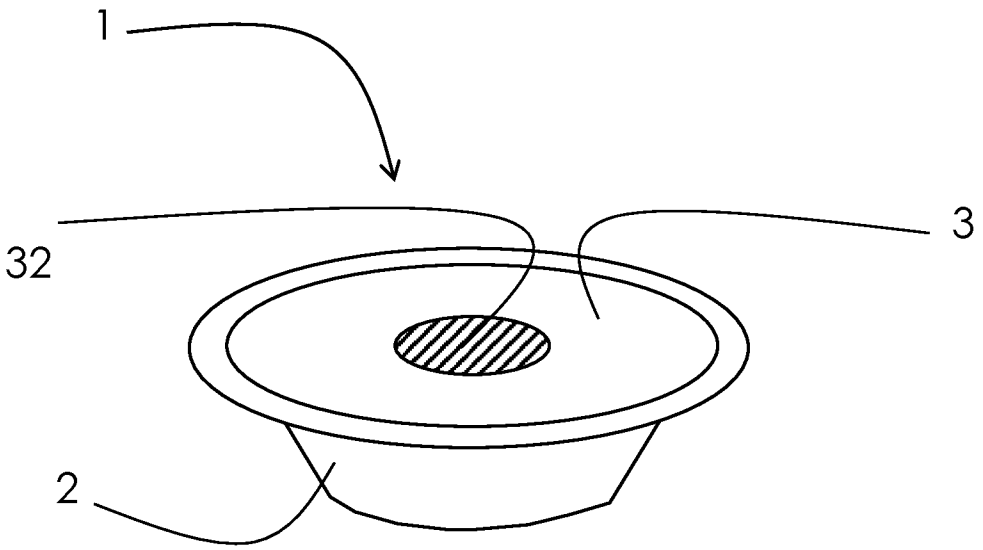

Fig. 3

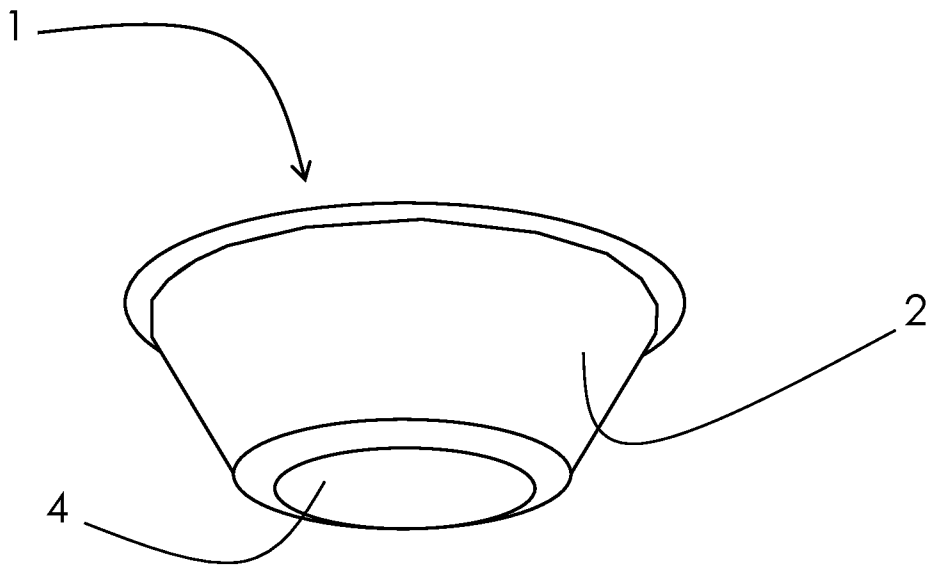

Fig. 4

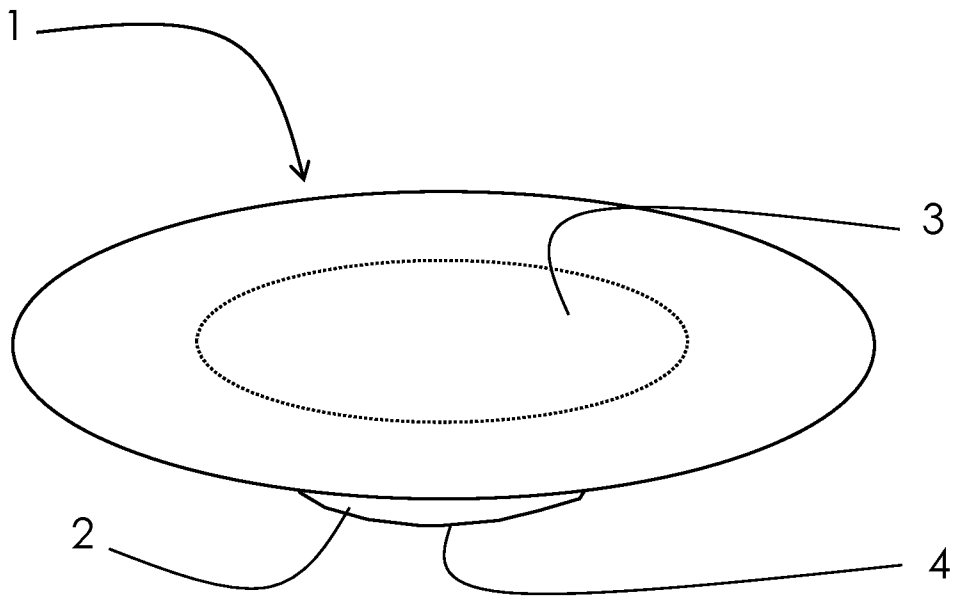

Fig. 5

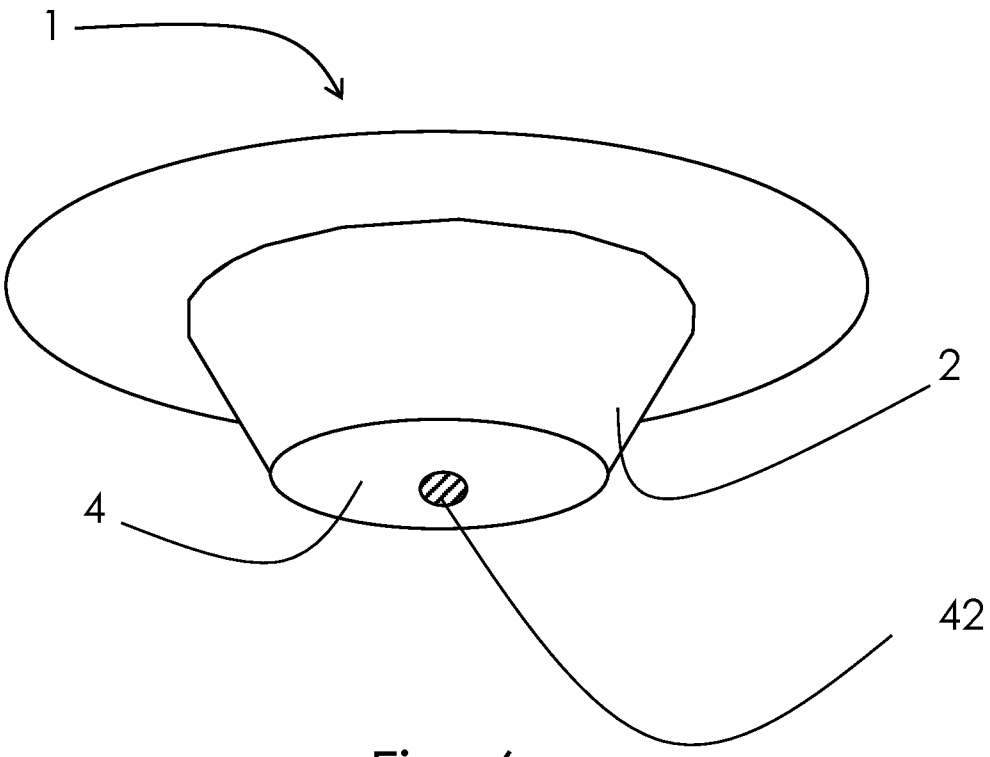

Fig. 6

ABSTRACT

The invention relates to a capsule (1) comprising a cup composed from at least a side wall (2) and a bottom wall (4); and a cover (3), for use in a composition production and distribution device, the capsule (1) containing at least one ingredient for extemporaneously producing a personalized cosmetic and/or pharmaceutical composition by mixing said ingredient with at least a physiologically acceptable carrier, wherein said ingredient is a probiotic microorganism improving the skin microbiome balance.

FIG. 2a

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Octrooiaanvrage 2020080

RAPPORT BETREFFENDE HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

Voor octrooiaanvrage 2020080 is geen onderzoek naar de stand van de techniek uitgevoerd. Het resultaat van het eerdere onderzoek naar de stand van de techniek dat door het Europees Octrooibureau is uitgevoerd voor de Europese octrooiaanvrage 16204649.4 is namelijk mede van toepassing verklaard op octrooiaanvrage 2020080. Het eerdere onderzoeksresultaat is in zijn oorspronkelijke vorm bijgevoegd.