(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
03 October 2024 (03.10.2024)

WIPO | PCT

(10) International Publication Number
WO 2024/200338 A1

(51) International Patent Classification:
A61K 8/34 (2006.01) *A61K 8/81* (2006.01)
A61K 8/37 (2006.01) *A61Q 19/00* (2006.01)
A61K 8/60 (2006.01)

(21) International Application Number:
PCT/EP2024/057915

(22) International Filing Date:
25 March 2024 (25.03.2024)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
PCT/CN2023/084714
29 March 2023 (29.03.2023) CN

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report (Art. 21(3))*
— *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

(54) Title: MICROBIOME FRIENDLY SUBSTANCES AND MICROBIOME FRIENDLY COSMETIC FORMULATIONS

(57) Abstract: The present invention relates to the use of specific substances as microbiome friendly ingredients in a cosmetic formulation. It furthermore relates to cosmetic formulations having a composition which are microbiome friendly.

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Microbiome friendly substances and microbiome friendly cosmetic formulations

The present invention relates to the use of specific substances as microbiome friendly ingredients in a cosmetic formulation. It furthermore relates to cosmetic formulations having a composition which are microbiome friendly.

The present invention relates to the use of formulation ingredients (galenics, e.g. emulsifiers, emollients, rheology modifiers) that do not significantly alter the natural composition of the skin and/or scalp and/or mucous membrane microbial communities and with it the specific microbiomes. As the composition of the microbial communities are adapted to the host and its environment, it plays an essential role in the natural balancing processes which limit growth of pathogens and needed to help maintain the host's health.

The following definition of the skin microbiome essentially refers to a report of the International Cooperation on Cosmetics Regulation dated June 28th, 2022. The skin microbiome is present on the whole skin surface, including oral cavity and mucosal surfaces of the external genital organs. The composition of the skin microbiome is dynamic, site-specific but also differs from individual to individual. The skin microbiome includes also microorganisms found on e.g., the scalp, pilosebaceous follicles or sebaceous glands. It also comprises microorganisms detected in the epidermis or dermis. It should be noted that the two terms "microbiota" and "microbiome" are not synonymous as the microbiota only refers to the microorganisms, whereas the microbiome also includes their functional potential. These two terms are mainly used in the scientific literature, whereas in the public domain both terms are often used interchangeably.

The microbiome is a characteristic microbial community occupying a reasonably well-defined habitat which has distinct physio-chemical properties. The microbiome not only refers to the microorganisms involved but also encompasses their theatre of activity, which results in the formation of specific ecological niches. This includes their genetic material, and also structural molecules, like enzymes, membrane lipids or polysaccharides.

The field of microbiome research is one that has made major strides in the past years. Historically, the microorganisms found on or in the human body were generally viewed as being pathogens and as such deleterious to human health. With the introduction of new methodologies, this has proven to be a misconception. The microbial communities on and in our bodies have been found to contribute to our health. The microbes inhabiting e.g. our skin interact both with each other and with their hosts. On the human skin, *Staphylococcus*

epidermis can produce modulins that can hinder the growth of some pathogens; *Cutibacterium (formerly Propionibacterium) acnes* can degrade triglycerides found in sebum, which in turn sets free fatty acids needed to maintain the natural skin pH and the skin barrier. This further augment the natural immunity of the skin by both inhibiting growth of certain bacteria and by e.g. stimulating the expression of beta defensin 2 by the skin. This intricate interplay is further influenced by various factors, e.g. gender, age, body location, individual susceptibility and the environment. The composition e.g. of the skin's microbiota is adapted to its host and environment. Dysbiosis can lead to skin damage and is associated with skin conditions, such as atopic dermatitis where the pathogen *Staphylococcus aureus* is involved.

The effects of topical applications on the e.g. the skin's microbiota are increasingly being explored. The use of topically applied substances has the potential of affecting the microbial communities, which in turn can lead to dysbiosis. Currently, the focus is on how bioactives, such as pre-, pro- or postbiotics, can change the microbial composition of the skin. Yet, it is also clear that the healthy balance of the natural microbial inhabitants is also of the essence.

US 2008/0070986 discloses the use of alkyl ether citrates for protecting and maintaining the natural skin/mucous membrane microflora and the microbial skin/mucous membrane ecosystem without impairing the natural balancing processes which limit the number of pathogenic bacteria so that they do not become disease-inducing.

Specchemonline.com, Nov/Dec 2021, pages 24-26 disclose microbiome-friendly formulation chassis. Single cosmetic ingredients as well as formulations have been tested in vitro (MIC-tests; MIC: minimal inhibitory concentration) and in vivo.

EP 3 970 802 discloses a skin care composition for promoting the skin microbiome comprising (a) pyruvate and/or lactate in combination with either (b1) urea and/or arginine, or with (b2) caprylic/capric triglycerides, or with (b1) and (b2).

The problem underlying the present invention is to provide ingredients for cosmetic formulations that avoid significantly changing the healthy microbial communities and microbiomes. Such ingredients are hereinafter called microbiome friendly. Formulations which, as a whole, avoid significantly changing the healthy microbial communities and microbiomes are also called microbiome friendly.

If the said ingredients are, as such, known in the state of the art, but their use as a microbiome friendly ingredient in a cosmetic formulation is not known in the state of the art, then the solution of the problem underlying the present invention is this use.

If microbiome friendliness is determined via MIC values, then the MIC value determined for the microorganism Staphylococcus epidermidis when tested in the vehicle ethanol/water (1:1) is especially relevant.

Therefore, the solutions to the problem underlying the present invention, and a first subject of the present invention, is the use of a substance as a microbiome friendly ingredient in a cosmetic formulation, wherein this substance is selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate, Laureth-7 Citrate, Glycerin, Dehydroacetic Acid (and) Benzyl Alcohol, Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate, Phenoxyethanol (and) Ethylhexylglycerin, Phenoxyethanol (and) Hydroxyacetophenone (and) Caprylyl Glycol (and) Water, Sodium Benzoate, Acrylates/Beheneth-25 Methacrylate Copolymer, Alginate, Caesalpinia Spinosa Gum, Glucomannan, Sodium Polyacrylate, Xanthan Gum, 1,4 Butandiol, Butylene Glycol, polyethylene glycol, Triethyl Citrate, Conjugated Linoleic Acid, Vegetable Oil, Passiflora Incarnata Seed Oil, Dicaprylyl Carbonate, Isononyl Isononanoate, Coco-Caprylate/Caprate, Dicaprylyl Ether, Caprylyl Caprylate/Caprate, Butyrospermum Parkii (Shea) Butter, Propylheptyl Caprylate, Undecane (and) Tridecane, Citric Acid, Hydrogenated Vegetable Glycerides, Sucrose Polystearate (and) Cetyl Palmitate, Sodium Stearoyl Glutamate, Octyldodecanol, Phenoxyethanol (and) Methylparaben, Polyglyceryl-3 Diisostearate, Cetearyl Alcohol, Ethylparaben (and) Propylene Glycol, Dipropylheptyl Carbonate, Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate, Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water, Cetyl Ethylhexanoate, Ethylhexyl Palmitate, Triethylhexanoin, Cocoglycerides, Polyglyceryl-10 stearate, Polyglyceryl-10 Oleate, and Cetearyl Glucoside (and) Cetearyl Alcohol.

One embodiment of the present invention is the use of a substance as a microbiome friendly ingredient in a cosmetic formulation, wherein this substance is an emulsifier. This means that

one embodiment of the present invention is the use of a substance as a microbiome friendly ingredient in a cosmetic formulation, wherein this substance is selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate, Laureth-7 Citrate, Polyglyceryl-10 stearate, Polyglyceryl-10 Oleate, and Cetearyl Glucoside (and) Cetearyl Alcohol.

A preferred embodiment of the first subject of the present invention is obtained, when the use according to the previous paragraph is restricted to emulsifiers having a MIC value of not below 1. The relevance of the MIC value is explained in the experimental section of the present document. A MIC value of not below 1 essentially means that the substances having such a high MIC value have an especially favorable effect on the microbiome.

Therefore, a preferred embodiment of the first subject of the present invention is the use of a substance as a microbiome friendly ingredient in a cosmetic formulation, wherein this substance is selected from the group consisting of Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate and Potassium Cetyl Phosphate.

A more preferred embodiment is obtained, when the use is restricted to emulsifiers having a MIC value of not below 3.

Therefore, a more preferred embodiment of the first subject of the present invention is the use of a substance as a microbiome friendly ingredient in a cosmetic formulation, wherein this substance is selected from the group consisting of Glyceryl Stearate Citrate and Lecithin.

Preferably, the use described in the previous paragraphs is a non-therapeutic use.

A second subject of the present invention corresponds to the use as described in the previous paragraphs. It is a method for cosmetically treating skin in a microbiome friendly way comprising contacting the skin with a substance as defined in the previous paragraphs.

I. e., a second subject of the present invention is a method for cosmetically treating skin in a microbiome friendly way comprising contacting the skin with a substance selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate, Glycerin, Dehydroacetic Acid (and) Benzyl Alcohol, Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate, Phenoxyethanol (and) Ethylhexylglycerin, Phenoxyethanol (and) Hydroxyacetophenone (and) Caprylyl Glycol (and) Water, Sodium Benzoate, Acrylates/Beheneth-25 Methacrylate Copolymer, Alginate, Caesalpinia Spinosa Gum, Glucomannan, Sodium Polyacrylate, Xanthan Gum, 1,4 Butandiol, Butylene Glycol, polyethylene glycol, Triethyl Citrate, Laureth-7 Citrate, Conjugated Linoleic Acid, Vegetable Oil, Passiflora Incarnata Seed Oil, Dicaprylyl Carbonate, Isononyl Isononanoate, Coco-Caprylate/Caprate, Dicaprylyl Ether, Caprylyl Caprylate/Caprate, Butyrospermum Parkii (Shea) Butter, Propylheptyl Caprylate, Undecane (and) Tridecane, Citric Acid, Hydrogenated Vegetable Glycerides, Sucrose Polystearate (and) Cetyl Palmitate, Sodium Stearoyl Glutamate, Octyldodecanol, Phenoxyethanol (and) Methylparaben, Polyglyceryl-3 Diisostearate, Cetearyl Alcohol, Ethylparaben (and) Propylene Glycol, Dipropylheptyl Carbonate, Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate, Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water, Cetyl Ethylhexanoate, Ethylhexyl Palmitate, Triethylhexanoin, Cocoglycerides, Polyglyceryl-10 stearate, Polyglyceryl-10 Oleate, and Cetearyl Glucoside (and) Cetearyl Alcohol.

Preferred embodiments of the method described in the previous paragraph are methods related to selected substances corresponding to the preferred uses described in this document.

A third subject of the present invention is a substance for use in a method for treatment of the human or animal body by therapy, including prophylaxis, wherein this substance is selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and)

Glycerin, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate, Glycerin, Dehydroacetic Acid (and) Benzyl Alcohol, Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate, Phenoxyethanol (and) Ethylhexylglycerin, Phenoxyethanol (and) Hydroxyacetophenone (and) Caprylyl Glycol (and) Water, Sodium Benzoate, Acrylates/Beheneth-25 Methacrylate Copolymer, Alginate, Caesalpinia Spinosa Gum, Glucomannan, Sodium Polyacrylate, Xanthan Gum, 1,4 Butandiol, Butylene Glycol, polyethylene glycol, Triethyl Citrate, Laureth-7 Citrate, Conjugated Linoleic Acid, Vegetable Oil, Passiflora Incarnata Seed Oil, Dicaprylyl Carbonate, Isononyl Isononanoate, Coco-Caprylate/Caprate, Dicaprylyl Ether, Caprylyl Caprylate/Caprate, Butyrospermum Parkii (Shea) Butter, Propylheptyl Caprylate, Undecane (and) Tridecane, Citric Acid, Hydrogenated Vegetable Glycerides, Sucrose Polystearate (and) Cetyl Palmitate, Sodium Stearoyl Glutamate, Octyldodecanol, Phenoxyethanol (and) Methylparaben, Polyglyceryl-3 Diisostearate, Cetearyl Alcohol, Ethylparaben (and) Propylene Glycol, Dipropylheptyl Carbonate, Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate, Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water, Cetyl Ethylhexanoate, Ethylhexyl Palmitate, Triethylhexanoin, Cocoglycerides, Polyglyceryl-10 stearate, Polyglyceryl-10 Oleate, and Cetearyl Glucoside (and) Cetearyl Alcohol.

A fourth subject of the present invention is a substance for use in a method for treating or preventing a disease caused by a disorder of the skin microbiome, wherein this substance is selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate, Glycerin, Dehydroacetic Acid (and) Benzyl Alcohol, Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate, Phenoxyethanol (and) Ethylhexylglycerin, Phenoxyethanol (and) Hydroxyacetophenone (and) Caprylyl Glycol (and) Water, Sodium Benzoate, Acrylates/Beheneth-25 Methacrylate Copolymer, Alginate, Caesalpinia Spinosa Gum, Glucomannan, Sodium Polyacrylate, Xanthan Gum, 1,4 Butandiol, Butylene Glycol, polyethylene glycol, Triethyl Citrate, Laureth-7 Citrate, Conjugated Linoleic Acid, Vegetable Oil, Passiflora Incarnata Seed Oil, Dicaprylyl Carbonate, Isononyl Isononanoate, Coco-Caprylate/Caprate, Dicaprylyl Ether, Caprylyl Caprylate/Caprate, Butyrospermum Parkii (Shea) Butter, Propylheptyl Caprylate, Undecane

(and) Tridecane, Citric Acid, Hydrogenated Vegetable Glycerides, Sucrose Polystearate (and) Cetyl Palmitate, Sodium Stearoyl Glutamate, Octyldodecanol, Phenoxyethanol (and) Methylparaben, Polyglyceryl-3 Diisostearate, Cetearyl Alcohol, Ethylparaben (and) Propylene Glycol, Dipropylheptyl Carbonate, Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate, Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water, Cetyl Ethylhexanoate, Ethylhexyl Palmitate, Triethylhexanoin, Cocoglycerides, Polyglyceryl-10 stearate, Polyglyceryl-10 Oleate, and Cetearyl Glucoside (and) Cetearyl Alcohol.

A fifth subject of the present invention is a cosmetic formulation having a composition identical to the composition of any of the following formulations or having a composition deviating from the composition of the following formulations in such a way that the amounts of the components of the cosmetic formulation deviate from the amounts of the components of the following formulations by +- 20 %, preferably +- 10 %, more preferably by +- 5 %,

Formulation 1:

INCI Name	% by weight
Sucrose Polystearate (and) Cetyl Palmitate	1.00
Cetearyl Alcohol	4.00
Coco-Caprylate/Caprate	7,50
Propylheptyl Caprylate	2,50
Aqua	Add to 100
Glycerin	3.00
Xanthan Gum	1.00
Undecane (and) Tridecane	2.00
Phenoxyethanol (and) Methylparaben, Ethylparaben (and) Propylene Glycol	1.00

Formulation 2:

INCI	% by weight
Glycerin	5.00
Butylene Glycol	10.00

INCI	% by weight
Xanthan Gum	2.00
Aqua	63.95
Sodium Benzoate	0.25
Glycerin, Aqua, Sodium Levulinate, Sodium Anisate	1.00
Polyglyceryl-2 Dipolyhydroxystearate	1.00
Dipropylheptyl Carbonate	3.00
Dicaprylyl Carbonate	3.00
Caprylyl Caprylate/Caprate	10.00
Laureth-7 Citrate	0.50
Citric Acid	0.30

Formulation 3:

INCI	% by weight
Cetearyl Alcohol, Lecithin, Sodium Cetearyl Sulfate, Olus Oil [EU], Cetearyl Alcohol, Lecithin, Sodium Cetearyl Sulfate, Vegetable Oil [CTFA]	3.00
Hydrogenated Vegetable Glycerides	2.50
Caprylyl Caprylate/Caprate	6.50
Dicaprylyl Carbonate	4.00
Aqua	66.35
Butylene Glycol	10.00
Sodium Benzoate	0.25
Glycerin	5.00
Xanthan Gum	1.00
Glycerin, Aqua, Sodium Levulinate, Sodium Anisate	1.00
Citric Acid	0.40

Formulation 4:

INCI	% by weight
Aqua	Add to 100
SODIUM BENZOATE	0.25
Butylene Glycol	10.00
Disodium Cetearyl Sulfosuccinate	1.00
Glycerin	5.00
Xanthan Gum	1.00
Polyglyceryl-3 Diisostearate	2.00
Cetearyl Alcohol	2.00
Caprylyl Caprylate/Caprate	5.00
Dicaprylyl Carbonate	5.00
Undecane (and) Tridecane	2.00
CITRIC ACID	1,67
Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00

Formulation 5:

INCI	% by weight
Aqua	Add to 100
SODIUM BENZOATE	0.25
Butylene Glycol	10.00
Sodium Stearoyl Glutamate	0.50
Glycerin	5.00
Xanthan Gum	1.00
Cetearyl Glucoside (and) Cetearyl Alcohol	4.00
Cetearyl Alcohol	1.00
Caprylyl Caprylate/Caprate	5.00
Dicaprylyl Carbonate	5.00
Undecane (and) Tridecane	2.00
CITRIC ACID	1,57

Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00

Formulation 6:

INCI	% by weight
Aqua	Add to 100
Phenoxyethanol, Ethylhexylglycerin	1.00
Butylene Glycol	5.00
Lauryl Glucoside, Polyglyceryl-2 Dipolyhydroxystearate, Glycerin	3,50
Cetearyl Alcohol	1.00
Dicaprylyl Carbonate	4.00
Butyrospermum Parkii (Shea) Butter	5.00
Sodium Polyacrylate	1,50

Formulation 7:

INCI	% by weight
Polyglyceryl-10 stearate	5.00
Cetearyl Alcohol	3.00
Dicaprylyl Carbonate	5.00
Coco-Caprylate/Caprate	5.00
Caprylic/Capric Triglyceride	3.00
Glycerin	5.00
Aqua	to 100
Sodium Benzoate	0.50
Xanthan Gum	50.00
Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate	10.00
Citric Acid	1.73

Formulation 8:

INCI	% by weight
Polyglyceryl-10 Oleate	5.00
Glycerin	4.00
Coco-Caprylate/Caprate	7.00
Aqua	to 100
Phenoxyethanol, Ethylhexylglycerin	1.00
Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water	10.00
Citric Acid	q.s.

Formulation 9:

INCI	% by weight
Caprylyl Caprylate/Caprate	25.00
Cetyl Ethylhexanoate	25.00
Ethylhexyl Palmitate	25.00
Triethylhexanoin	25.00

A further embodiment of the present invention is the non-therapeutic, cosmetic use of any of the formulations 1 to 9 as a microbiome friendly cosmetic formulation.

A further embodiment of the present invention is a method for cosmetically treating skin in a microbiome friendly way comprising contacting the skin with any of the formulations 1 to 9.

A further embodiment of the present invention is a formulation, selected from the group consisting of formulations 1 to 9, for use in a method for treatment of the human or animal body by therapy, including prophylaxis.

A further embodiment of the present invention is a formulation, selected from the group consisting of formulations 1 to 9, for use in a method for treating or preventing a disease caused by a disorder of the skin microbiome.

As the composition of the healthy skin microbiota varies between individuals, the main intent was to identify ingredients that do not disrupt the complex microbial communities found on healthy skin. A selection of ingredients was screened using minimal inhibitory concentration tests (MICs) and/or using 16S rDNA/rRNA microbiome analyses of skin swabs taken before and after 28 days of use by human volunteers with healthy skin (in vivo). Based on the results, skin care formulations were developed and tested *in vivo* as proof-of-concept studies.

Significantly changing the healthy microbial communities and microbiomes can have several negative consequences. Some of these consequences are merely of cosmetic nature, e. g. red skin, dry skin or the like. Avoiding these consequences therefore is a cosmetic activity and is not therapy or prophylaxis in a medical sense. Other consequences can be pathological and can result in diseases caused by a disorder of the skin microbiome.

The expression “a composition deviating from the composition of a given formulation in such a way that the amounts of the components of the composition deviate from the amounts of the components of the given formulation by +-10 %” means that, based on a given formulation having, e. g., 5 % by weight Glycerin and 10 % Butylene Glycol, any composition having 4.5 to 5.5 % by weight Glycerin and 9 to 11 % by weight Butylene Glycol is a composition according to the definition given by the said expression.

Examples

% means % by weight unless defined differently.

Test Methods

Hydrophilic ingredients, including emulsifiers and rheology modifiers were evaluated using minimal inhibitory concentration tests (MIC tests). Lipophilic substances, including emollients, and formulations were tested on the skin of human volunteers (in vivo tests).

Minimal inhibitory concentration tests (MICs)

Minimal Inhibitory Concentration tests are tests typically used to measure growth inhibition by a substance. MICs are defined as the lowest test concentrations of the test substance at which growth of specific microorganisms are inhibited.

In the present case predefined dilutions of the test substance in the appropriate culture medium were prepared and inoculated with the microorganism of interest. After incubation, the test organisms were cultured over a time-period and under conditions normally allowing growth of the microorganism. Vehicle controls (vehicle = solvent used, e. g. water) were also assessed to determine growth without the test substance. The organisms of interest tested were the representative strains S. aureus (found on the skin, often a pathogen), S. epidermidis and Malassezia furfur. The higher the MIC value, the less inhibition of growth is observed. In the following results the test concentrations are given as percent of active substance content.

In vivo tests on human skin

In vivo studies were conducted. The general procedure was as follows. At least 20 volunteers having given informed consent and presenting with healthy skin were asked to apply the test sample to the volar forearm twice daily for 28 days. Volunteers were asked to refrain from using topical products 7 days prior to the start and throughout the study. Each test sample was applied randomized to one of four predefined tests area. An untreated area served as a reference. The skin was treated under standardized conditions. The area of interest was swabbed prior to sample application and after 28 days of use. The swabs were stored on dry ice until subjected to genetic analyses.

Genetic analyses

Primers targeting variable regions of bacterial 16S rDNA/rRNA were used to amplify the genetic material obtained during swabbing via polymerase chain reaction (PCR) techniques. Following sequencing, the sequences were clustered into operational taxonomic units (OTUs) a 97 % similarity threshold defining taxonomic levels, e.g. phyla and genus. Biodiversity was

determined using alpha diversity as a measure of microbial richness and abundance and calculating the Shannon diversity index. Wilcoxon signed-rank tests were used to determine statistical significance.

Results of MIC test (MIC in % by weight)

INCI	Type	pH	Staphylococcus aureus	Staphylococcus epidermidis	Malassezia furfur	highest concentration tested [AS %]	lowest concentration tested [AS %]	lowest MIC
Ceteareth-12	Emulsifier	6.5	>0.75	0.75	0.50	1.00	0.0001	0.50
Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil (EU)	Emulsifier	5.5	1.00	>3	1.00	3.00	0.0001	1.00
Cetearyl Glucoside (and) Cetearyl Alcohol	Emulsifier	5.5	2.00	2.00		0.25	4.00	2.00
Disodium Cetearyl Sulfosuccinate	Emulsifier	5.5	0.05	0.05	1.00	3.00	0.0001	0.05
ethyl linoleate (not an INCI)	Emulsifier		>1	>1	>1	1.00	0.002	>1
Glyceryl Oleate	Emulsifier	5.5	>2	>2		2.00	0.50	>2
Glyceryl Stearate (and) PEG-100 Stearate	Emulsifier	5.5	>2	>2		2.00	0.50	>2
Glyceryl Stearate Citrate	Emulsifier	5.5	>3	>3	>3	3.00	0.00	>3
Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin	Emulsifier	6.5	0.25	0.05	0.50	1.00	0.0001	0.05
Lecithin	Emulsifier	5.5	>3	>3	>3	3.00	0.0001	>3
Polyglyceryl-2 Dipolyhydroxystearate	Emulsifier	5.5	1.00	1.00		4.00	0.25	1.00
Potassium Cetyl Phosphate	Emulsifier	5.5	1.00	0.50	1.00	3.00	0.0001	1.00
Sodium Cetearyl Sulfate	Emulsifier	5.5	0.08	0.50	>3	3.00	0.0001	0.08
Laureth-7 Citrate	Emulsifier	5.5	0.75	0.75	0.75	1.00	0.0001	0.75
Glycerin	Humectant	5.5	20.00	30.00		30.00	5.00	20.00
Dehydroacetic Acid (and) Benzyl Alcohol	Preservative	5.5	0.25	0.25		0.10	2.00	0.25

INCI	Type	pH	Staphylococcus aureus	Staphylococcus epidermidis	Malassezia furfur	highest concentration tested [AS %]	lowest concentration tested [AS %]	lowest MIC
Glycerin. Aqua. Sodium Levulinate. Sodium Anisate	Preservative	5.5	2.00	2.00		4.00	0.25	2.00
Phenoxyethanol (and) Ethylhexylglycerin	Preservative	5.5	0.50	0.50		2.00	0.10	0.50
Phenoxyethanol (and) Hydroxyacetophenone (and) Caprylyl Glycol (and) Water	Preservative	5.5	1.00	1.00		4.00	0.25	1.00
Sodium Benzoate	Preservative	5.5	0.25	0.25		0.10	2.00	0.25
Acrylates/Beheneth-25 Methacrylate Copolymer	Rheology modifier	5.5	>1	>1		1.00	0.10	1.00
Alginate	Rheology modifier	5.5	>2	>2		2.00	0.25	>2
Caesalpinia Spinosa Gum	Rheology modifier	5.5	>2	>2		2.00	0.25	>2
Glucomannan	Rheology modifier	5.5	>1	1.00		1.00	0.10	1.00
Sodium Polyacrylate	Rheology modifier	5.5	1.00	>1		1.00	0.10	1.00
Xanthan Gum	Rheology modifier	5.5	>2	>2		2.00	0.10	>2
1.4 Butandiol	Solubilizer	6	>1	>1	>1			>1
Butylene Glycol	Solubilizer	5.5	20.00	20.00		5.00	30.00	20.00
polyethylene glycol	Solubilizer	5.5	>2	>2				>2
Triethyl Citrate	Solubilizer	5.5	1	1		2.00	0.50	1
Conjugated Linoleic Acid (not INCI)			>2	>2	>1	1.00	0.002	>1

These results are to be interpreted as follows. For each substance the lowest MIC value obtained determines whether this substance in useful as microbiome friendly cosmetic ingredient. A substance is useful as microbiome friendly cosmetic ingredient, if this lowest MIC is not lower than a threshold value. This threshold value depends on the type of the substance (solubilizer, emulsifier etc.) and is related to the amount in which these types of substances are generally used in common cosmetic formulations.

For emulsifiers the lowest MIC should not be below 0.05 %, preferably not below 0.08 %, more preferably not below 0.5 %, more preferably not below 1 %, more preferably not below 2 %, more preferably not below 3 %.

For humectants the lowest MIC should not be below 0.1 %, preferably not below 0.25 %, preferably not below 0.5 %, preferably not below 1 %, preferably not below 2 %.

For preservatives the lowest MIC should not be below 0.25 %, preferably not below 0.5 %, more preferably not below 1 %, more preferably not below 2 %..

For rheology modifiers the lowest MIC should not be below 0.1 %, preferably not below 0.25 %, preferably not below 0.5 %, preferably not below 1 %, preferably not below 2 %.

For solubilizers the lowest MIC should not be below 1 %, preferably not below 2 %, more preferably not below 20 %.

For conjugated linoleic acid the lowest MIC should not be below 1 %.

Results of genetic analyses / in vivo tests

In vivo tests were carried out with the formulations listed in the following table. Each formulation and the ingredients they contain, was found to be useful as microbiome friendly formulations as well as ingredients. Therefore, any ingredient of the formulations tested can be included in the list of ingredients present in patent claims 1, 3, 4 and 5 of the present patent application as filed.

Formulation Nr.	Ingredients	INCI	% by weight	Function	Approx. pH
SC-CN-22-VZ011102	1.3-Butanediol	Butylene Glycol	10.00	Humectant	5
SC-CN-22-VZ011302	1.3-Butanediol	Butylene Glycol	10.00	Humectant	5
SC-CN-22-VZ021001	1.3-Butanediol	Butylene Glycol	5.00	Humectant	6.00
SC-DE-20-044-2	1.3-Butanediol	Butylene Glycol	10.00	Humectant	5
SC-DE-20-067-8	1.3-Butanediol	Butylene Glycol	10.00	Humectant	5
Cegesoft® PS 6 + Myritol® 331 + Cetiol® C 5C	Cegesoft® PS 6	Vegetable Oil	33.3	Emollient	n.a.

Formulation Nr.	Ingredients	INCI	% by weight	Function	Approx. pH
Cegosoft® PFO + Eutanol® G + Cetiol® Ultimate	Cegosoft® PFO	Passiflora Incarnata Seed Oil	33.3	Emollient	n.a.
SC-DE-20-044-2	Cetiol® 4 All	Dipropylheptyl Carbonate	3.00	Emollient	5
SC-CN-22-VZ011102	Cetiol® CC	Dicaprylyl Carbonate	5.00	Emollient	5
SC-CN-22-VZ011302	Cetiol® CC	Dicaprylyl Carbonate	5.00	Emollient	5
SC-CN-22-VZ021001	Cetiol® CC	Dicaprylyl Carbonate	4.00	Emollient	6.00
SC-DE-20-044-2	Cetiol® CC	Dicaprylyl Carbonate	3.00	Emollient	5
SC-DE-20-067-8	Cetiol® CC	Dicaprylyl Carbonate	4.00	Emollient	5
Cetiol® OE + Cetiol® Sensoft + Cetiol® ININ-GL	Cetiol® ININ-GL	Isononyl Isononanoate	33.3	Emollient	n.a.
SC-DE-20-089-1	Cetiol® LC	Coco-Caprylate/Caprate	7.5	Emollient	
Cetiol® OE + Cetiol® Sensoft + Cetiol® ININ-GL	Cetiol® OE	Dicaprylyl Ether	33.3	Emollient	n.a.
SC-CN-22-VZ011102	Cetiol® RLF	Caprylyl Caprylate/Caprate	5.00	Emollient	5
SC-CN-22-VZ011302	Cetiol® RLF	Caprylyl Caprylate/Caprate	5.00	Emollient	5
SC-DE-20-044-2	Cetiol® RLF	Caprylyl Caprylate/Caprate	10.00	Emollient	5
SC-DE-20-067-8	Cetiol® RLF	Caprylyl Caprylate/Caprate	6.5	Emollient	5
SC-CN-22-VZ021001	Cetiol® SB 45	Butyrospermum Parkii (Shea) Butter	5.00	Emollient	6.00
SC-DE-20-089-1	Cetiol® Sensoft	Propylheptyl Caprylate	2.5	Emollient	
Cetiol® OE + Cetiol® Sensoft + Cetiol® ININ-GL	Cetiol® Sensoft	Propylheptyl Caprylate	33.3	Emollient	n.a.
Cegosoft® PFO + Eutanol® G + Cetiol® Ultimate	Cetiol® Ultimate	Undecane (and) Tridecane	33.3	Emollient	n.a.
SC-CN-22-VZ011102	Cetiol® Ultimate	Undecane (and) Tridecane	2.00	Emollient	5
SC-CN-22-VZ011302	Cetiol® Ultimate	Undecane (and) Tridecane	2.00	Emollient	5
SC-DE-20-089-1	Cetiol® Ultimate	Undecane (and) Tridecane	2.00	Emollient	
Cegesoft® PS 6 + Myritol® 331 + Cetiol® C 5C	Cetiol® C 5C	Coco-Caprylate/Caprate	33.3	Emollient	n.a.
SC-DE-20-067-8	Citric Acid (20% solution)	Citric Acid	0.40	pH Adjustment	5
SC-DE-20-044-2	Citric Acid (50% solution)	Citric Acid	0.30	pH Adjustment	5

Formulation Nr.	Ingredients	INCI	% by weight	Function	Approx. pH
SC-CN-22-VZ011102	CITRIC ACID 20%	CITRIC ACID	1.57	pH Adjustment	5
SC-CN-22-VZ011302	CITRIC ACID 20%	CITRIC ACID		pH Adjustment	5
SC-CN-22-VZ021001	Cosmedia® SP	Sodium Polyacrylate	1.5	Rheology modifier	6.00
SC-DE-20-067-8	Cutina® HVG	Hydrogenated Vegetable Glycerides	2.5	Consistency Agent	5
SC-DE-20-044-2	Dehymuls® PGPH	Polyglyceryl-2 Dipolyhydroxystearate	1.00	Emulsifier (W/O)	5
SC-CN-22-VZ011102	Dermosoft 1388 Eco	Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00	Additives	5
SC-DE-20-044-2	Dermosoft 1388 eco (Evonik)	Glycerin. Aqua. Sodium Levulinate. Sodium Anisate	1.00	Auxiliary	5
SC-DE-20-067-8	Dermosoft 1388 eco (Evonik)	Glycerin. Aqua. Sodium Levulinate. Sodium Anisate	1.00	Auxiliary	5
SC-CN-22-VZ011102	Emulgade® PL 68/50	Cetearyl Glucoside (and) Cetearyl Alcohol	4.00	Emulsifier	5
SC-DE-20-089-1	Emulgade® Sucro Plus	Sucrose Polystearate (and) Cetyl Palmitate	1.00	Emulsifier	
SC-CN-22-VZ011302	Eumulgin® Prisma	Disodium Cetearyl Sulfosuccinate	1.00	Emulsifier	5
SC-CN-22-VZ011102	Eumulgin® SG	Sodium Stearoyl Glutamate	0.50	Emulsifier	5
SC-CN-22-VZ021001	Eumulgin® VL 75	Lauryl Glucoside. Polyglyceryl-2 Dipolyhydroxystearate. Glycerin	3.5	Emulsifier	6.00
Cegosoft® PFO + Eutanol® G + Cetiol® Ultimate	Eutanol® G	Octyldodecanol	33.3	Emollient	n.a.
SC-DE-20-089-1	Euxyl K 320	Phenoxyethanol (and) Methylparaben.	1.00	Emollient	
SC-CN-22-VZ021001	Euxyl PE 9010	Phenoxyethanol. Ethylhexylglycerin	1.00	Preservative	6.00
SC-CN-22-VZ011102	Glycerin	Glycerin	5.00	Humectant	5
SC-CN-22-VZ011302	Glycerin	Glycerin	5.00	Humectant	5
SC-DE-20-044-2	Glycerin	Glycerin	5.00	Humectant	5
SC-DE-20-067-8	Glycerin	Glycerin	5.00	Humectant	5
SC-DE-20-089-1	Glycerin	Glycerin	3.00	Humectant	
SC-CN-22-VZ011302	Lameform® TGI	Polyglyceryl-3 Diisostearate	2.00	Emulsifier	5
SC-CN-22-VZ011102	Lanette® O	Cetearyl Alcohol	1.00	Consistency agent	5

Formulation Nr.	Ingredients	INCI	% by weight	Function	Approx. pH
SC-CN-22-VZ011302	Lanette® O	Cetearyl Alcohol	2.00	Consistency agent	5
SC-CN-22-VZ021001	Lanette® O	Cetearyl Alcohol	1.00	Consistency agent	6.00
SC-DE-20-089-1	Lanette® O	Cetearyl Alcohol	4.00	Consistency agent	
Cegesoft® PS 6 + Myritol® 331 + Cetiol® C 5C	Myritol® 331	Cocoglycerides	33.3	Emollient	n.a.
SC-CN-22-VZ011102	Na benzoat	SODIUM BENZOATE	0.25	Preservative	5
SC-CN-22-VZ011302	Na benzoat	SODIUM BENZOATE	0.25	Preservative	5
SC-DE-20-044-2	Plantapon® LC 7	Laureth-7 Citrate	0.50	Surfactant	5
SC-DE-20-067-8	Plantaquat® NC	Cetearyl Alcohol. Lecithin. Sodium Cetearyl Sulfate. Olus Oil [EU]. Cetearyl Alcohol. Lecithin. Sodium Cetearyl Sulfate. Vegetable Oil [CTFA]	3.00	Consistency agent	5
SC-DE-20-044-2	Rheocare® XGN	Xanthan Gum	2.00	Stabilizer	5
SC-DE-20-067-8	Rheocare® XGN	Xanthan Gum	1.00	Rheology modifier	5
SC-DE-20-089-1	Rheocare® XGN	Xanthan Gum	1.00	Rheology modifier	
SC-DE-20-044-2	Sodium Benzoate	Sodium Benzoate	0.25	Preservative	5
SC-DE-20-067-8	Sodium Benzoate	Sodium Benzoate	0.25	Preservative	5
SC-CN-22-VZ011102	Verdessence™ Xanthan	Xanthan Gum	1.00	Rheology modifier	5
SC-CN-22-VZ011302	Verdessence™ Xanthan	Xanthan Gum	1.00	Rheology modifier	5
SC-CN-22-VZ011302	Water. demin.	Aqua	Add to 100	Solvent	5
SC-DE-20-044-2	Water. demin.	Aqua	63.95		5
SC-DE-20-067-8	Water. demin.	Aqua	66.35		5
SC-DE-20-089-1	Water. demin.	Aqua	Add to 100	Solvent	

Formulations

The following formulations were used for the genetic analyses / in vivo tests.

Formulation no. SC-DE-20-089-1

Phase	Trade Name	INCI Name	% by weight	Function
A	Emulgade® Sucro Plus	Sucrose Polystearate (and) Cetyl Palmitate	1.00	Emulsifier
	Lanette® O	Cetearyl Alcohol	4.00	Consistency agent
	Cetiol® LC	Coco-Caprylate/Caprate	7,50	Emollient
	Cetiol® Sensoft	Propylheptyl Caprylate	2,50	Emollient
B	Water, demin.	Aqua	Add to 100	Solvent
	Glycerin	Glycerin	3.00	Humectant
C	Rheocare® XGN	Xanthan Gum	1.00	Rheology modifier
D	Cetiol® Ultimate	Undecane (and) Tridecane	2.00	Emollient
E	Euxyl K 320	Phenoxyethanol (and) Methylparaben,	1.00	Preservative
		Ethylparaben (and) Propylene Glycol		
Specification				
pH value (100%; 23°C)				6.7
Viscosity (Brookfield; RVT; spindle TE; 4 rpm; with Helipath 23°C)				33,750 mPas

Formulation no. SC-DE-20-044-2

Phase	Ingredients	INCI	% by weight	Function
A	Glycerin	Glycerin	5.00	Humectant
	1,3-Butanediol	Butylene Glycol	10.00	Humectant
	Rheocare® XGN	Xanthan Gum	2.00	Stabilizer
B	Water, demin.	Aqua	63.95	
	Sodium Benzoate	Sodium Benzoate	0.25	Preservative
	Dermosoft 1388 eco	Glycerin, Aqua, Sodium Levulinate, Sodium Anisate	1.00	Auxiliary
	(Evonik)			
C	Dehymuls® PGPH	Polyglyceryl-2 Dipolyhydroxystearate	1.00	Emulsifier (W/O)
	Cetiol® 4 All	Dipropylheptyl Carbonate	3.00	Emollient
	Cetiol® CC	Dicaprylyl Carbonate	3.00	Emollient
	Cetiol® RLF	Caprylyl Caprylate/Caprate	10.00	Emollient

Phase	Ingredients	INCI	% by weight	Function
	Plantapon® LC 7	Laureth-7 Citrate	0.50	Surfactant
E	Citric Acid (50% solution)	Citric Acid	0.30	pH Adjustment
Specification				
pH value (100%; 23°C)				4.9
Viscosity (Brookfield; RVT; spindle TE, Helipath; 4 rpm; 23°C)				62,500 mPas

Formulation no. SC-DE-20-067-8

Phase	Ingredients	INCI	% by weight	Function
A	Plantaquat® NC	Cetearyl Alcohol, Lecithin, Sodium Cetearyl Sulfate, Olus Oil [EU], Cetearyl Alcohol, Lecithin, Sodium Cetearyl Sulfate, Vegetable Oil [CTFA]	3.00	Consistency agent
	Cutina® HVG	Hydrogenated Vegetable Glycerides	2.5	Consistency Agent
	Cetiol® RLF	Caprylyl Caprylate/Caprate	6.5	Emollient
	Cetiol® CC	Dicaprylyl Carbonate	4.00	Emollient
B	Water, demin.	Aqua	66.35	
	1,3-Butanediol	Butylene Glycol	10.00	Humectant
	Sodium Benzoate	Sodium Benzoate	0.25	Preservative
C	Glycerin	Glycerin	5.00	Humectant
	Rheocare® XGN	Xanthan Gum	1.00	Rheology modifier
D	Dermosoft 1388 eco *(Evonik)*	Glycerin, Aqua, Sodium Levulinate, Sodium Anisate	1.00	Auxiliary
	Citric Acid (20% solution)	Citric Acid	0.40	pH Adjustment
Specification				
pH value (100%; 23°C)				4.9
Viscosity (Brookfield; RVT; spindle TE, Helipath; 4 rpm; 23°C)				75,000 mPas

Formulation no. SC-CN-22-VZ011302

Phase	Ingredients	INCI	% by weight	Function
A	Water, demin.	Aqua	Add to 100	Solvent
	Na benzoat	SODIUM BENZOATE	0.25	Preservative
	1,3-Butanediol	Butylene Glycol	10.00	Humectant
	Eumulgin® Prisma	Disodium Cetearyl Sulfosuccinate	1.00	Emulsifier
B	Glycerin	Glycerin	5.00	Humectant
	Verdessence™ Xanthan	Xanthan Gum	1.00	Rheology modifier
C	Lameform® TGI	Polyglyceryl-3 Diisostearate	2.00	Emulsifier
	Lanette® O	Cetearyl Alcohol	2.00	Consistency agent
	Cetiol® RLF^	Caprylyl Caprylate/Caprate	5.00	Emollient
	Cetiol® CC	Dicaprylyl Carbonate	5.00	Emollient
D	Cetiol® Ultimate	Undecane (and) Tridecane	2.00	Emollient
E	CITRIC ACID 20%	CITRIC ACID	1,67	pH Adjustment
	Dermosoft 1388 Eco	Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00	Additives
Specification				
pH value (100%; 23°C)				~ 4.95
Viscosity ((Brookfield; DV- I + Viscometer; spindle 4 ; 12 rpm; 23°C)				~ 8,633 mPas

Formulation no. SC-SC-22-VZ011102

Phase	Ingredients	INCI	% by weight	Function
A	Water, demin.	Aqua	Add to 100	Solvent
	Na benzoat	SODIUM BENZOATE	0.25	Preservative
	1,3-Butanediol	Butylene Glycol	10.00	Humectant
	Eumulgin® SG	Sodium Stearoyl Glutamate	0.50	Emulsifier
B	Glycerin	Glycerin	5.00	Humectant
	Verdessence™ Xanthan	Xanthan Gum	1.00	Rheology modifier

Phase	Ingredients	INCI	% by weight	Function
C	Emulgade® PL 68/50	Cetearyl Glucoside (and) Cetearyl Alcohol	4.00	Emulsifier
	Lanette® O	Cetearyl Alcohol	1.00	Consistency agent
	Cetiol® RLF	Caprylyl Caprylate/Caprate	5.00	Emollient
	Cetiol® CC	Dicaprylyl Carbonate	5.00	Emollient
D	Cetiol® Ultimate	Undecane (and) Tridecane	2.00	Emollient
E	CITRIC ACID 20%	CITRIC ACID	1,57	pH Adjustment
	Dermosoft 1388 Eco	Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00	Additives
Specification				
pH value (100%; 23°C)				~ 4.95
Viscosity ((Brookfield; DV- I + Viscometer; spindle 4 ; 12 rpm; 23°C)				~ 13,980 mPas

Formulation no. SC-CN-22-VZ021001

Phase	Ingredients	INCI	% by weight	Function	
A	Water, demin.	Aqua	Add to 100	Solvent	
	Euxyl PE 9010	Phenoxyethanol, Ethylhexylglycerin	1.00	Preservative	
	1,3-Butanediol	Butylene Glycol	5.00	Humectant	
B	Eumulgin® VL 75	Lauryl Glucoside, Polyglyceryl-2 Dipolyhydroxystearate, Glycerin	3,50	Emulsifier	
	Lanette® O	Cetearyl Alcohol	1.00	Consistency agent	
	Cetiol® CC	Dicaprylyl Carbonate	4.00	Emollient	
	Cetiol® SB 45	Butyrospermum Parkii (Shea) Butter	5.00	Emollient	
	Cosmedia® SP	Sodium Polyacrylate	1,50	Rheology modifier	
Specification					
pH value (100%; 23°C)					~ 5.97
Viscosity ((Brookfield; DV- I + Viscometer; spindle 6 ; 12 rpm; 23°C)					~ 42,830 mPas

Formulation no. SC-CN-22-VZ092002

Trade name	INCI	% by weight
Emulgade® Verde 10MS	Polyglyceryl-10 stearate	5.00
Lanette® O	Cetearyl Alcohol	3.00
Cetiol® CC	Dicaprylyl Carbonate	5.00
Cetiol® C 5C	Coco-Caprylate/Caprate	5.00
Myritol® 318 RC	Caprylic/Capric Triglyceride	3.00
Glycerin	Glycerin	5.00
Water, demin.	Aqua	to 100
Sodium Benzoate	Sodium Benzoate	0.50
Rheocare® XGN (1% solution)	Xanthan Gum	50.00
Mimiskin™	Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate	10.00
Citric Acid (20%)	Citric Acid	1.73

Formulation no. SC-CN-22-WL092002

Trade name	INCI	% by weight
Emulgade® Verde 10OL	Polyglyceryl-10 Oleate	5.00
Glycerin	Glycerin	4.00
Cetiol® C 5C	Coco-Caprylate/Caprate	7.00
Water, demin.	Aqua	to 100
Euxyl® PE 9010	Phenoxyethanol, Ethylhexylglycerin	1.00

Trade name	INCI	% by weight
Mimiskin™ Trop	Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water	10.00
Citric Acid Solution	Citric Acid	q.s.

Formulation no. SC-CN-22-VZ101901

Trade name	INCI	% by weight
Cetiol® RLF (standard catalyst esterification- Non enzymatic esterification)	Caprylyl Caprylate/Caprate	25.00
Cetiol® SN-1 SD	Cetyl Ethylhexanoate	25.00
Cegesoft® C 24 RC	Ethylhexyl Palmitate	25.00
Myritol® GTEH-SD	Triethylhexanoin	25.00

Claims

1. The use of a substance as a microbiome friendly ingredient in a cosmetic formulation, wherein this substance is selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate, Laureth-7 Citrate, Glycerin, Dehydroacetic Acid (and) Benzyl Alcohol, Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate, Phenoxyethanol (and) Ethylhexylglycerin, Phenoxyethanol (and) Hydroxyacetophenone (and) Caprylyl Glycol (and) Water, Sodium Benzoate, Acrylates/Beheneth-25 Methacrylate Copolymer, Alginate, Caesalpinia Spinosa Gum, Glucomannan, Sodium Polyacrylate, Xanthan Gum, 1,4 Butandiol, Butylene Glycol, polyethylene glycol, Triethyl Citrate, Conjugated Linoleic Acid, Vegetable Oil, Passiflora Incarnata Seed Oil, Dicaprylyl Carbonate, Isononyl Isononanoate, Coco-Caprylate/Caprate, Dicaprylyl Ether, Caprylyl Caprylate/Caprate, Butyrospermum Parkii (Shea) Butter, Propylheptyl Caprylate, Undecane (and) Tridecane, Citric Acid, Hydrogenated Vegetable Glycerides, Sucrose Polystearate (and) Cetyl Palmitate, Sodium Stearoyl Glutamate, Octyldodecanol, Phenoxyethanol (and) Methylparaben, Polyglyceryl-3 Diisostearate, Cetearyl Alcohol, Ethylparaben (and) Propylene Glycol, Dipropylheptyl Carbonate, Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate, Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water, Cetyl Ethylhexanoate, Ethylhexyl Palmitate, Triethylhexanoin, Cocoglycerides, Polyglyceryl-10 stearate, Polyglyceryl-10 Oleate, and Cetearyl Glucoside (and) Cetearyl Alcohol.

2. The use of a substance as a microbiome friendly ingredient in a cosmetic formulation, according to claim 1, wherein this substance is selected from the group consisting of Ceteareth-12,Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, Disodium Cetearyl Sulfosuccinate, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lauryl Glucoside (and) Polyglyceryl-2 Dipolyhydroxystearate (and) Glycerin,

Lecithin, Polyglyceryl-2 Dipolyhydroxystearate, Potassium Cetyl Phosphate, Sodium Cetearyl Sulfate and Laureth-7 Citrate.

3. The use of a substance as a microbiome friendly ingredient in a cosmetic formulation, according to claim 1, wherein this substance is selected from the group consisting of Cetearyl Alcohol (and) Lecithin (and) Sodium Cetearyl Sulfate (and) Olus Oil, Cetearyl Glucoside (and) Cetearyl Alcohol, ethyl linoleate, Glyceryl Oleate, Glyceryl Stearate (and) PEG-100 Stearate, Glyceryl Stearate Citrate, Lecithin, Polyglyceryl-2 Dipolyhydroxystearate and Potassium Cetyl Phosphate.

4. The use of a substance as a microbiome friendly ingredient in a cosmetic formulation, according to claim 1, wherein this substance is selected from the group consisting of Glyceryl Stearate Citrate and Lecithin.

5. A cosmetic formulation having a composition identical to the composition of any of the following formulations or having a composition deviating from the composition of the following formulations in such a way that the amounts of the components of the cosmetic formulation deviate from the amounts of the components of the following formulations by +- 20 %, preferably +-10 %, more preferably by +- 5 %,

Formulation 1:

INCI Name	% by weight
Sucrose Polystearate (and) Cetyl Palmitate	1.00
Cetearyl Alcohol	4.00
Coco-Caprylate/Caprate	7,50
Propylheptyl Caprylate	2,50
Aqua	Add to 100
Glycerin	3.00
Xanthan Gum	1.00
Undecane (and) Tridecane	2.00
Phenoxyethanol (and) Methylparaben, Ethylparaben (and) Propylene Glycol	1.00

Formulation 2:

INCI	% by weight
Glycerin	5.00
Butylene Glycol	10.00
Xanthan Gum	2.00
Aqua	63.95
Sodium Benzoate	0.25
Gycerin, Aqua, Sodium Levulinate, Sodium Anisate	1.00
Polyglyceryl-2 Dipolyhydroxystearate	1.00
Dipropylheptyl Carbonate	3.00
Dicaprylyl Carbonate	3.00
Caprylyl Caprylate/Caprate	10.00
Laureth-7 Citrate	0.50
Citric Acid	0.30

Formulation 3:

INCI	% by weight
Cetearyl Alcohol, Lecithin, Sodium Cetearyl Sulfate, Olus Oil [EU], Cetearyl Alcohol, Lecithin, Sodium Cetearyl Sulfate, Vegetable Oil [CTFA]	3.00
Hydrogenated Vegetable Glycerides	2.50
Caprylyl Caprylate/Caprate	6.50
Dicaprylyl Carbonate	4.00
Aqua	66.35
Butylene Glycol	10.00
Sodium Benzoate	0.25
Glycerin	5.00
Xanthan Gum	1.00
Glycerin, Aqua, Sodium Levulinate, Sodium Anisate	1.00
Citric Acid	0.40

Formulation 4:

INCI	% by weight
Aqua	Add to 100
SODIUM BENZOATE	0.25
Butylene Glycol	10.00
Disodium Cetearyl Sulfosuccinate	1.00
Glycerin	5.00
Xanthan Gum	1.00
Polyglyceryl-3 Diisostearate	2.00
Cetearyl Alcohol	2.00
Caprylyl Caprylate/Caprate	5.00
Dicaprylyl Carbonate	5.00
Undecane (and) Tridecane	2.00
CITRIC ACID	1,67
Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00

Formulation 5:

INCI	% by weight
Aqua	Add to 100
SODIUM BENZOATE	0.25
Butylene Glycol	10.00
Sodium Stearoyl Glutamate	0.50
Glycerin	5.00
Xanthan Gum	1.00
Cetearyl Glucoside (and) Cetearyl Alcohol	4.00
Cetearyl Alcohol	1.00
Caprylyl Caprylate/Caprate	5.00
Dicaprylyl Carbonate	5.00
Undecane (and) Tridecane	2.00
CITRIC ACID	1,57

Glycerin (and) Aqua (and) Sodium Levulinate (and) Sodium Anisate	1.00

Formulation 6:

INCI	% by weight
Aqua	Add to 100
Phenoxyethanol, Ethylhexylglycerin	1.00
Butylene Glycol	5.00
Lauryl Glucoside, Polyglyceryl-2 Dipolyhydroxystearate, Glycerin	3,50
Cetearyl Alcohol	1.00
Dicaprylyl Carbonate	4.00
Butyrospermum Parkii (Shea) Butter	5.00
Sodium Polyacrylate	1,50

Formulation 7:

INCI	% by weight
Polyglyceryl-10 stearate	5.00
Cetearyl Alcohol	3.00
Dicaprylyl Carbonate	5.00
Coco-Caprylate/Caprate	5.00
Caprylic/Capric Triglyceride	3.00
Glycerin	5.00
Aqua	to 100
Sodium Benzoate	0.50
Xanthan Gum	50.00
Glycerin (and) Myristyl Myristate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Potassium Cetyl Phosphate	10.00
Citric Acid	1.73

Formulation 8:

INCI	% by weight
Polyglyceryl-10 Oleate	5.00
Glycerin	4.00
Coco-Caprylate/Caprate	7.00
Aqua	to 100
Phenoxyethanol, Ethylhexylglycerin	1.00
Glycerin (and) Cetyl Palmitate (and) Ceteareth-12 (and) Glyceryl Stearate (and) Pentylene Glycol (and) Sodium Stearoyl Glutamate (and) Ceteareth-20 (and) Tetrahydroxypropyl Ethylenediamine (and) Cetearyl Alcohol (and) Water	10.00
Citric Acid	q.s.

Formulation 9:

INCI	% by weight
Caprylyl Caprylate/Caprate	25.00
Cetyl Ethylhexanoate	25.00
Ethylhexyl Palmitate	25.00
Triethylhexanoin	25.00

6. The non-therapeutic, cosmetic use of a formulation according to claim 5 as a microbiome friendly cosmetic formulation.

7. A method for cosmetically treating skin in a microbiome friendly way comprising contacting the skin with a formulation according to claim 5.

8. A formulation according to claim 5 for use in a method for treatment of the human or animal body by therapy, including prophylaxis.

9. A formulation according to claim 5 for use in a method for treating or preventing a disease caused by a disorder of the skin microbiome.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/057915

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/34 A61K8/37 A61K8/60 A61K8/81 A61Q19/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61K A61Q

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE GNPD [Online] MINTEL; 30 June 2023 (2023-06-30), anonymous: "Day Cream Light SPF 30", XP093097310, Database accession no. 10919884 the whole document -----	5
X	DATABASE GNPD [Online] MINTEL; 23 April 2020 (2020-04-23), anonymous: "Cellulite Crème Gel", XP093097313, Database accession no. 7565715 the whole document -----	5
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[X] Further documents are listed in the continuation of Box C.

[ ] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 June 2024	01/07/2024

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Yon, Jean-Michel

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/057915

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE GNPD [Online] MINTEL; 17 July 2013 (2013-07-17), anonymous: "Sleep-Recover Anti-Fatigue Night Balm", XP093097336, Database accession no. 2119877 the whole document -----	5
X	DATABASE GNPD [Online] MINTEL; 15 April 2020 (2020-04-15), anonymous: "Nude The Amazing Blemish Treatment SPF 30", XP093097352, Database accession no. 7555813 the whole document -----	5
X	DATABASE GNPD [Online] MINTEL; 10 October 2016 (2016-10-10), anonymous: "Strawberry + Cherry Detangling Spray", XP093097340, Database accession no. 4331731 the whole document -----	5
X	DATABASE GNPD [Online] MINTEL; 4 January 2017 (2017-01-04), anonymous: "Cocooning Cleansing Milk", XP093097360, Database accession no. 4506749 the whole document -----	5
X	"Fundamental Face Cream", GNPD, 1 November 2007 (2007-11-01), XP002684830, the whole document -----	5
X	DATABASE GNPD [Online] MINTEL; 2 March 2018 (2018-03-02), anonymous: "Lift Contours Neck and Décolleté Care", XP093097381, Database accession no. 5467583 the whole document -----	5
1 X	DATABASE GNPD [Online] MINTEL; 7 December 2017 (2017-12-07), anonymous: "Emulsion", XP093097373, Database accession no. 5294421 the whole document 2 -----	5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2024/057915

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-4(completely); 5-9(partially)
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims;; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-4(completely); 5-9(partially)

Present claim 1 relates to an extremely large number of possible compounds. Support and disclosure in the sense of Article 6 and 5 PCT is to be found however for only a very small proportion of the compounds claimed, see claims 5-9 as well as formulations 1-9 of pages 7 to 11 of the present description.
The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search of claim 1 (PCT Guidelines 9.19 and 9.23).
The search of claim 1 was restricted to those claimed compounds which appear to be supported.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.3), should the problems which led to the Article 17(2) PCT declaration be overcome.