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(54) Title: USE OF AN N-ACYLATED SARCOSINATE AS AN AGENT AGAINST MICROBIAL ADHESION

(57) Abstract: The present invention relates to the cosmetic use of an N-acylated sarcosinate of formula (I) as an agent for preventing or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae, in particular of *Staphylococcus aureus*. It also relates to a cosmetic process aimed at preventing and/or reducing the adhesion of microorganisms to skin exhibiting an impaired barrier function, comprising the application, to the skin of individuals exhibiting an impaired barrier function, of a composition comprising at least one sarcosinate of formula (I). It also relates to the use of at least one sarcosinate of formula (I), for the preparation of a pharmaceutical composition for use in preventing and/or treating atopic dermatitis.



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Use of an N-acylated sarcosinate as an agent against microbial adhesion

The present invention relates to the use of at least one N-acylated sarcosinate of formula (I), in a cosmetic composition as an agent for preventing or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae, in particular to the surface of a healthy skin and/or of healthy mucosae.

The term "healthy skin and/or healthy mucosae" is intended to mean a skin and/or mucosae that do not present lesions and/or infections, in particular due to microorganisms.

It also relates to a cosmetic process aimed at preventing and/or reducing the adhesion of microorganisms on the surface of the skin and/or of the mucosae exhibiting an impaired barrier function, comprising the application, to the skin and/or the mucosae exhibiting an impaired barrier function, of a composition comprising at least one N-acylated sarcosinate of formula (I).

It also relates to the use of at least one N-acylated sarcosinate of formula (I), for the preparation of a pharmaceutical composition for use in preventing and/or treating atopic dermatitis.

The term 'skin' is intended to mean in particular the skin and/or the scalp.

The term 'mucosa' is intended to mean in particular the vaginal mucosa.

Human skin is continuously populated by a multitude of different microorganisms (bacteria, yeast and fungi). Commensal microorganisms living on or in the skin may be part of a microflora that is either resident (normal) or transient. The resident microbial flora, which is essential for healthy skin, is constituted mainly of staphylococci (*Staphylococcus epidermis* and *Staphylococcus hominis*), of corynebacteria, of gram+ propionibacteria such as *Propionibacterium acnes*, and also of a fungal flora mainly composed of *Pityrosporum ovale*. They are present in well-defined distribution profiles. Usually, the transient microorganisms do not become solidly attached; they are incapable of multiplying and normally die within a few hours.

The anatomy and the physiology of the skin vary from one part of the body to the other and the resident microflora reflects these variations.

Most of the skin bacteria are present on the superficial squamous epidermis, colonizing dead cells, and closely associated with the sebaceous and sweat glands. The excretions from these glands provide water, amino acids, urea, electrolytes and specific fatty acids that serve as nutritive elements mainly for *Staphylococcus epidermidis* and aerobic corynebacteria.

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Skin disorders of the aesthetic type (spots, body odours, in particular those from the axillary or perineal region or foot odour) or of pathological type (folliculitis, pruritus, candidiasis, forms of dermatitis such as atopic dermatitis, seborrhoeic dermatitis, pityriasis versicolor, forms of dermatitis such as impetigo, superficial folliculitis, eczematous superinfections, dermatophytosis; mycosis; acne, in particular juvenile acne) are most commonly due to disruption of the ecological equilibrium of the resident flora following colonization of the skin by pathogenic exogenous germs or abnormal proliferation of an endogenous strain.

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Disorders related to hormone disturbances, such as greasy skin, or an altered surface condition of the skin and/or of the mucosae (dry skin and/or scalp, sensitive skin and/or scalp) may also promote the development of saprophytic bacterial flora.

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The pathogenic germs that are most well known are *Pseudomonas aeruginosa* (gram-), which is responsible for small spots, folliculitis, redness and pruritus, *Candida albicans*, which can cause inflammation of the corner of the lips, cutaneous candidiasis, pruritus, folliculitis and aphthae, *Staphylococcus aureus*, which can cause spots, folliculitis, impetigo, forms of dermatitis such as atopic dermatitis, psoriasis, neurodermatitis and furuncles, and group A *Streptococcus*, responding for impetigo.

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Mention may also be made of *Propionibacterium acnes*, associated with seborrhoeic dermatitis, and juvenile acne, which affects in particular adolescents.

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Greasy or shiny skin, an aesthetic disorder characterized by a sebum level of greater than 200 µg/cm² measured on the forehead, may also be a favourable terrain for the uncontrolled growth of saprophytic bacterial flora, such as *P. acnes*, and can bring about acneic lesions.

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Mention may also be made of the yeasts *Pityrosporum ovale* and *Pityrosporum orbiculare*, commonly associated with the formation of dandruff.

It is in particular known that *Staphylococcus aureus* plays a role in atopic dermatitis, as reported by Leung et al. in J AM ACAD DERMATOL, Vol. 45, number 1, July 2001. 90% of individuals with atopic dermatitis have *S. aureus* on their skin.

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Atopic dermatitis, also known as atopic dermatitis or atopic eczema, is a condition of the epidermis which affects a large number of individuals, including children and adolescents. In Europe, approximately 10% of children and 20% of the population are affected, with an increase in cases over the last few decades.

Atopic dermatitis generally occurs in individuals genetically predisposed to atopy and to the manifestations thereof, namely asthma, allergic rhinitis and allergies. This chronic skin disease is due to complex interactions between the genetic predispositions of the individual and environmental factors.

Atopic dermatitis is characterized by the barrier function breaking down and by the skin drying out - the term atopic dry skin is used. It is often associated with an invasion by *S. aureus*, in particular in oozing lesions, such as the fold of the elbow and on the forehead, whereas this germ is more or less absent in healthy individuals, in whom, as a general rule, the bacterial flora is, for example, virtually nonexistent in the fold of the elbow, and essentially amounts to *S. epidermis* and *Propionibacterium. sp.* in the highly sebaceous region of the forehead.

It is known, moreover, that atopic skin may be related to a decrease in the synthesis of ceramides 1 and/or 3, as is in particular reported in Imokawa et al., in J Invest Dermatol, 96 (4): 523-6, 1991, and Di Nardo et al. in Acta Derm Venereol, 78 (1): 27-30, (1998).

Sensitive skin, which generally exhibits dry skin and an interruption of the barrier function, is also more vulnerable to colonization by microorganisms such as *S. aureus*.

The advantage in preventing the adhesion of and/or eliminating pathogenic germs, in particular *Staphylococcus aureus*, without affecting the resident flora of the skin is thus understood from the above. It is therefore sought to normalize the microbiological balance of the skin or the cutaneous microflora.

In order to combat these microorganisms, it is common practice to use antibiotics or bactericides. However, the use of these compounds poses the problem of the nonspecificity of action which targets without distinction the pathogenic flora and the resident flora, the problem of the risk of bacterial resistance emerging, and also problems of skin tolerance (irritations, allergies, etc.).

The skin disorders related to the adhesion of microorganisms and/or the problems of skin tolerance related to the treatments for said disorders are particularly critical in individuals with skin and/or mucosae having an impaired barrier function and/or dryness of the skin.

5 This is in particular the case of the following groups of individuals:

- individuals with dry skin;
- individuals with 'fragile' or 'delicate' skin that is vulnerable and rapidly becomes imbalanced during large variations in temperature or in relative humidity (for example, in the case of baby skin);
- 10 - individuals with 'weakened' skin, such as individuals in whom the protective aqueous-lipid film composed of sweat, sebum and natural moisturizing factors becomes scarce, as is the case for individuals over the age of 60, and in particular in the context of old age (at least 75 years old);
- individuals with 'sensitive' skin, who have a lowered reactivity threshold due to
15 neurogenic hyperactivity; this skin reactivity is conventionally reflected by the manifestation of signs of discomfort or dysesthetic sensations, more or less painful sensations experienced in an area of skin, for instance stinging, tingling, itching or pruritus, a sensation of burning or heating, discomfort, tautness, etc. This skin will therefore exhibit these sensations and these clinical signs much more rapidly and
20 frequently than other types of skin;
- individuals with 'aggravated' skin, for shaved skin, for example;
- individuals with 'atopic' skin, generally genetically predisposed to allergies. Atopic skin is characterized by the barrier function breaking down and the skin drying out -
25 the terms atopic dry skin or atopic dermatitis are used. Atopic dermatitis is the first symptom of atopy and it is often associated with an invasion by *S. aureus*, in particular in oozing lesions, such as the fold of the elbow and on the forehead, whereas this germ is more or less absent in healthy individuals, in whom, as a general rule, the bacterial flora is, for example, virtually nonexistent in the fold of the elbow, and essentially amounts to *S. epidermis* and *Propionibacterium. sp.* in the
30 highly sebaceous region of the forehead.

Skin disorders related to the adhesion of microorganisms may also be particularly harmful on immunodeficient individuals, whose immune defences are weakened. Immunodeficiency promotes the abnormal development of ordinarily non-pathogenic microbes, which are then
35 responsible for "opportunistic" diseases, and also the more frequent and more serious development of infection with pathogenic germs.

It is also known practice to reduce or prevent the colonization of surfaces, such as the teeth, the skin and/or the mucosae, by pathogenic germs by preventing their attachment to these supports. The compounds used as anti-adhesion agents described in the prior art are either silicones (WO-99/62475) or carbohydrates and carbohydrate derivatives, such as those described in patent application WO-96/23479, or plant oils as described in patent application EP-1 133 979.

Now, most carbohydrates constitute a carbon source for bacteria and fungi. Their presence in cosmetic compositions consequently promotes microbial proliferation and requires the concentration of preservatives (bactericides or bacteriostatics) to be increased. This drawback thus cancels out the benefit of the approach consisting in replacing antibiotic or bactericidal compounds with compounds which reduce microbial adhesion.

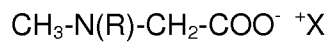
There remains therefore the need to find new compounds that are very effective in terms of anti-adhesion, without exhibiting the drawbacks mentioned above, and have good skin tolerance.

The applicant has demonstrated that, surprisingly, the use of at least one N-acylated sarcosinate of formula (I), in particular a sodium lauroyl sarcosinate, makes it possible to significantly reduce the adhesion of microorganisms to the surface of the skin and/or of the mucosae, in particular the adhesion of *Staphylococcus aureus*, and to thus prevent the proliferation of potentially pathogenic germs, in the absence of antibiotic, bactericidal or fungicidal agents, and without it being necessary to use a large amount of preservatives.

The use of sodium lauroyl sarcosinate as a surfactant or dispersant in cleansing and/or makeup-removing compositions is known from the prior art.

However, to the applicant's knowledge, its anti-adhesion activity with respect to microorganisms, in particular with respect to *Staphylococcus aureus*, has never been described or suggested, nor has its use as an agent for preventing and/or treating unpleasant body odours or dandruff states, nor has its use in compositions, especially care compositions, suitable for individuals with an impaired barrier function and/or dryness of the skin, nor has even its use for the preparation of a pharmaceutical composition for use in preventing and/or treating skin disorders, and in particular atopic dermatitis.

A subject of the invention is therefore the cosmetic use of an N-acylated sarcosinate of formula (I)



in which:

- 5 R is an acyl group $\text{O=CR}'$, R' being a linear hydrocarbon-based chain containing from 8 to 20 carbon atoms, preferably from 11 to 17 carbon atoms, and even more preferably from 11 to 13 carbon atoms; and
- X is a cation chosen from the ions of the alkali metals sodium (Na) or potassium (K), and an ammonium group,
- 10 in a composition, as an agent for preventing or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae.

According to one particular embodiment, the composition is a cosmetic composition.

- 15 Advantageously, the N-acylated sarcosinate of formula (I) is used in the composition as unique agent for preventing or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae.
- Advantageously, the N-acylated sarcosinate of formula (I) is not reacted with an other compound before introduction into said composition.
- 20 In particular, the N-acylated sarcosinate of formula (I) is sufficient at itself for preventing or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae.

- As N-acylated sarcosinates of formula (I) that can be used according to the invention, mention may in particular be made of: lauroyl sarcosinate ($\text{R}' = \text{C}_{11}$ chain), myristoyl
- 25 sarcosinate ($\text{R}' = \text{C}_{13}$ chain), palmitoyl sarcosinate ($\text{R}' = \text{C}_{15}$ chain), and stearoyl sarcosinate ($\text{R}' = \text{C}_{17}$ chain), in the form of the sodium, potassium or ammonium salts thereof.

- As particular examples of N-acylated sarcosinates according to the invention, use may be made of ammonium lauroyl sarcosinate, potassium lauroyl sarcosinate, sodium lauroyl
- 30 sarcosinate, sodium palmitoyl sarcosinate and sodium myristoyl sarcosinate.

According to one particular embodiment, the N-acylated sarcosinate of formula (I) used according to the invention is a sodium N-acylated sarcosinate.

- 35 According to the invention, use may thus be made of the sodium lauroyl sarcosinate sold under the name Oramix L30[®] by the company SEPPIC, the sodium myristoyl sarcosinate sold under the name Nikkol Sarcosinate MN[®] by the company Nikko Chemicals and the

sodium palmitoyl sarcosinate sold under the name Nikkol sarcosinate PN[®] by the company Nikko Chemicals.

Preferably, sodium lauroyl sarcosinate will be used.

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A preferred N-acylated sarcosinate according to the invention is the sodium lauroyl sarcosinate sold under the name Oramix L30[®] by the company SEPPIC, comprising 30%, with respect to active material, of sodium lauroyl sarcosinate in an aqueous solution.

10 The expression "*preventing or reducing the adhesion of microorganisms*" should be understood to mean that the N-acylated sarcosinate of formula (I) according to the invention or the composition containing same may be used both preventatively, for its ability to completely or partially prevent the adhesion of microorganisms, and curatively, for its ability to facilitate the detachment of microorganisms.

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In particular, the N-acylated sarcosinate of formula (I) is for use in preventing or reducing the adhesion of *S. aureus* to the surface of the skin and/or of the mucosae.

According to one particular embodiment, the N-acylated sarcosinate of formula (I) is for use
20 in preventing and/or reducing unpleasant body odours.

According to one particular embodiment, the N-acylated sarcosinate of formula (I) is for use in preventing and/or reducing dandruff states.

25 According to the invention, the amount of N-acylated sarcosinate of formula (I) used in the composition depends, of course, on the desired effect and may therefore vary to a large extent.

The N-acylated sarcosinate of formula (I) may be present in the composition in an amount
30 ranging from 0.001% to 10% by weight, relative to the total weight of the composition, preferably ranging from 0.01% to 5% by weight, and preferentially ranging from 0.1% to 3% by weight, and still preferably from 0.1% to 2% by weight.

The invention also relates to the use of at least one N-acylated sarcosinate of formula (I), for
35 the preparation of a pharmaceutical composition for use in preventing and/or treating skin disorders related to the adhesion of microorganisms to the surface of the skin and/or of the

mucosae.

According to one preferred embodiment, the N-acylated sarcosinate of formula (I) is used as an agent for preventing or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae.

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In particular, the invention relates to the use of at least one N-acylated sarcosinate of formula (I), for the preparation of a pharmaceutical composition for use in preventing and/or treating skin disorders related to the adhesion of *S. aureus* to the surface of the skin and/or of the mucosae.

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According to one particular embodiment, the invention relates to the use of at least one N-acylated sarcosinate of formula (I), for the preparation of a pharmaceutical composition for use in preventing and/or treating atopy, in particular atopic dermatitis.

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According to another particular embodiment, the invention relates to the use of at least one N-acylated sarcosinate of formula (I), for the preparation of a pharmaceutical composition for use in preventing and/or treating mycosis.

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According to another particular embodiment, the invention relates to the use of at least one N-acylated sarcosinate of formula (I), for the preparation of a pharmaceutical composition for use in preventing and/or treating acne, in particular juvenile acne.

Preferably, the N-acylated sarcosinate of formula (I) is the only anti-adhesion agent present in the composition.

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The compositions used according to the invention may in particular constitute cosmetic or dermatological compositions. For such an application, they contain a physiologically acceptable medium. The term "physiologically acceptable medium" is herein intended to mean a medium compatible with the skin and/or the mucosae, and possibly with the lips, the scalp, the eyelashes, the eyes and/or the hair.

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This physiologically acceptable medium may be more particularly constituted of water and, optionally, of a physiologically acceptable organic solvent chosen, for example, from lower alcohols containing from 1 to 4 carbon atoms, such as ethanol, isopropanol, propanol or butanol; polyethylene glycols having from 6 to 80 ethylene oxide units; polyols, such as propylene glycol, isoprene glycol, butylene glycol, glycerol or sorbitol. The physiologically acceptable medium of the composition according to the invention has a pH compatible with

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the skin, and preferably ranging from 3 to 8, and better still from 5 to 7.

According to one preferred embodiment, the compositions used in the present invention also comprise an oil, which provides in particular comfort and softness during application to the skin. The amount of oil may range, for example, from 2% to 70% by weight, and preferably from 5% to 30% by weight, relative to the total weight of the composition.

As oils that can be used in the invention, mention may be made of mineral oils (liquid petroleum jelly), plant oils (liquid fraction of shea butter, sunflower oil, apricot kernel oil, olive oil), animal oils (perhydrosqualene), synthetic oils (hydrogenated polyisobutene, isostearyl neopentanoate, isopropyl myristate), non-volatile or volatile silicone oils (cyclomethicones such as cyclopentasiloxane and cyclohexasiloxane) and fluoro oils (perfluoropolyethers). Fatty alcohols, fatty acids and waxes may also be used as fats. The oily phase of the emulsion may also contain gums such as silicone gums, resins and waxes.

The composition containing an oily phase may be in the form of a water-in-oil (W/O) or oil-in-water (O/W) emulsion. According to one preferred embodiment, it is in the form of a water-in-oil emulsion.

According to one preferred embodiment, the composition also contains at least one adjuvant chosen from gelling agents, moisturizers, preservatives, antioxidants, solvents, fragrances, fillers, screens, pigments, chelating agents, odour absorbers, dyestuffs and matting agents, and mixtures thereof.

In a known manner, the compositions of the invention may also contain adjuvants that are customary in the cosmetics or dermatological fields, such as hydrophilic or lipophilic gelling agents, hydrophilic or lipophilic active agents, preservatives, antioxidants, solvents, fragrances, fillers, screens, bactericides, odour absorbers, dyestuffs or salts. The amounts of these various adjuvants are those conventionally used in the field under consideration, and for example from 0.01% to 20% of the total weight of the composition, and preferably from 0.01% to 10% of the total weight of the composition. Depending on their nature, these adjuvants may be introduced into the fatty phase, into the aqueous phase and/or into lipid spherules.

The compositions used according to the invention may contain other agents for preventing the adhesion of bacteria to the surface of the skin, such as the oils and the fatty substances described in patent application EP-1 313 086, or the alkoxylated plant oils described in

patent application FR-2 832 057. They may also advantageously contain other active agents chosen from desquamating agents, moisturizing agents and antiseborrhoeic agents, and mixtures thereof.

- 5 According to one particular embodiment, the N-acylated sarcosinate of formula (I) is the only agent against microorganism adhesion present in the composition according to the invention.

As active agents for caring for the skin and/or the mucosae that can be used in the composition of the invention, mention may in particular be made of moisturizing agents,
10 desquamating agents, agents for improving the barrier function, depigmenting agents, dermodecontracting agents, anti-glycation agents, agents for stimulating the synthesis of dermal and/or epidermal macromolecules and/or for preventing degradation thereof, agents for stimulating fibroblast or keratinocyte proliferation and/or keratinocyte differentiation, agents for promoting maturation of the horny envelope, NO-synthase inhibitors, peripheral
15 benzodiazepine receptor (PBR) antagonists, agents for increasing sebaceous gland activity, agents for stimulating the energy metabolism of cells, tensioning agents, liporestructuring agents, slimming agents, agents for promoting skin microcirculation, calmatives and/or anti-irritants, sebo-regulating agents or antiseborrhoeic agents, astringents, healing agents, anti-inflammatories and anti-acne agents.

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According to another embodiment of the invention, the compositions used may also comprise at least one organic photoprotective agent and/or at least one inorganic photoprotective agent active in the UVA and/or UVB range (absorbers), which are water-soluble or liposoluble or else insoluble in the cosmetic solvents commonly used.

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The preferred organic photoprotective agents are chosen from ethylhexyl salicylate, ethylhexyl methoxycinnamate, octocrylene, phenylbenzimidazolesulphonic acid, benzophenone-3, benzophenone-4, benzophenone-5, 4-methylbenzylidenecamphor, terephthalylidenedicamphorsulphonic acid, disodium phenyl dibenzimidazole
30 tetrasulphonate, 2,4,6-tris(diisobutyl 4'-aminobenzalmalonate)-s-triazine, anisotriazine, ethylhexyl triazone, diethylhexyl butamido triazone, methylenebisbenzotriazolyltetramethylbutylphenol and drometrizole trisiloxane, and mixtures thereof.

- 35 The inorganic photoprotective agents are chosen from pigments or alternatively nanopigments (average size of primary particles: generally between 5 nm and 100 nm, preferably between 10 nm and 50 nm) of metal oxides which are coated or uncoated, for

instance nanopigments of titanium oxide (amorphous or crystalline in rutile and/or anatase form), of iron oxide, of zinc oxide, of zirconium oxide or of cerium oxide, which are all UV photoprotective agents well known per se. Conventional coating agents are, moreover, alumina and/or aluminium stearate. Such coated or uncoated metal oxide nanopigments are
5 in particular described in patent applications EP518772 and EP518773.

The photoprotective agents are generally present in the compositions according to the invention in proportions ranging from 0.1% to 20% by weight, relative to the total weight of the composition, and preferably ranging from 0.2% to 15% by weight, relative to the total
10 weight of the composition.

As gelling agents, mention may, for example, be made of cellulose derivatives such as hydroxyethylcellulose and alkylhydroxyethylcelluloses such as cetylhydroxyethylcellulose; algal derivatives such as satragum; natural gums such as tragacanth or guar gum; synthetic
15 polymers such as carboxyvinyl polymers or copolymers, and in particular those sold under the names Carbopol^R by the company Goodrich or Synthalen^R by the company 3V SA. The proportion of gelling agent preferably ranges from 0.1% to 2% of the total weight of the composition.

The compositions used according to the invention may be more or less fluid and may have the appearance of a white or coloured cream, an ointment, a milk, a lotion, a gel, a serum, a paste or a mousse. They may optionally be applied to the skin in the form of an aerosol. They may also be in solid form, and for example in the form of a stick.
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According to one particular embodiment of the invention, the composition is in the form of a lotion, an aqueous gel, a serum, an emulsion or a dispersion of lipid vesicles.
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More preferably, it is in the form of a lotion or an aqueous gel.

The N-acylated sarcosinates of formula (I) according to the invention also have the advantage, compared with other known anti-adhesion compositions, of having good water-solubility, allowing them to be used, even at a high concentration, in aqueous compositions of the lotion, makeup-removing water or tonic type, or else compositions for body care and/or cleansing, such as shower gels, shampoos or intimate gels.
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The compositions according to the invention are in particular compositions for caring for and/or for cleansing/removing makeup from the skin and/or the mucosae.
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Advantageously, the composition is a skin care and/or treatment composition.

The N-acylated sarcosinate of formula (I) may also be used in the context of the present invention in antisen products, in makeup products such as foundations, lipsticks, mascaras or face powders, in body products, and/or in deodorants.

According to one particular embodiment of the invention, the composition is a care composition.

According to another particular embodiment of the invention, the composition is a cleansing and/or makeup-removing composition.

One aspect of the invention relates to the use of the compound of formula (I) in a care and/or cleansing composition for dry skin, advantageously a care composition.

Another aspect of the invention relates to the use of the compound of formula (I) in a care and/or cleansing composition for fragile skin, advantageously a care composition.

Another aspect of the invention relates to the use of the compound of formula (I) in a care and/or cleansing composition for weakened skin, advantageously a care composition.

Another aspect of the invention relates to the use of the compound of formula (I) in a care and/or cleansing composition for sensitive skin, advantageously a care composition.

Another aspect of the invention relates to the use of the compound of formula (I) in a care and/or cleansing composition for immunodeficient skin, advantageously a care composition.

Another aspect of the invention relates to the use of the compound of formula (I) in a care and/or cleansing composition for aggravated skin, advantageously a care composition.

Since the microbial flora of the surface of the skin is responsible for a large number of disorders ranging from simple aesthetic displeasure (odour, spots, etc.) to dermatological conditions, a subject of the present invention is also the cosmetic use of the N-acylated sarcosinate of formula (I), as an agent for reducing unpleasant body odours and/or for body hygiene care.

In particular, said N-acylated sarcosinate of formula (I) is the only anti-adhesion agent present in said composition.

The phrase "*for body hygiene care*" is intended to mean a substance intended to be brought into contact with the various superficial parts of the human body and/or with the mucosae and/or with the teeth, for the purpose of cleansing them, of protecting them, of keeping them in good condition, of modifying their appearance, of fragrancng them or of correcting their odour.

The invention also relates to a cosmetic process aimed at preventing and/or reducing the adhesion of microorganisms on the surface of the skin and/or of the mucosae exhibiting an impaired barrier function, comprising the application, to the skin and/or the mucosae exhibiting an impaired barrier function, of a composition comprising at least one N-acylated sarcosinate of formula (I) as defined above.

In particular, the composition may be applied to individuals with dry skin.

According to one alternative, it may be applied to individuals with fragile or delicate skin, in particular babies.

According to another alternative, the composition is applied to individuals with weakened skin, such as individuals whose cutaneous aqueous-lipid film is impaired, in particular individuals over the age of 60.

According to yet another alternative, the composition is applied to individuals with sensitive skin.

According to another alternative, the composition is applied to individuals with aggravated skin, in particular shaved skin.

These groups of individuals and skin types were characterized previously in the description, in the introductory section of the invention.

Another aspect of the invention relates to a cosmetic process aimed at preventing and/or reducing the adhesion of microorganisms to the surface of the skin and/or of mucosae of an immunodeficient individual, comprising the application, to the skin and/or the mucosae of said individuals, of a composition comprising at least one N-acylated sarcosinate of

formula (I) as defined above.

Preferably, the composition to the skin and/or the mucosae of said individuals is a cosmetic composition.

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Another aspect of the invention relates to a process for reducing unpleasant body odours, comprising the topical application to the skin, in particular of the armpits, the perineal region or the feet, of a composition comprising, in a physiologically acceptable medium, as sole anti-adhesion agent, at least one sarcosinate of formula (I) as defined above.

10 Preferably, the process for reducing unpleasant body odours is a cosmetic and/or non-therapeutic process, and the composition applied to the skin is a cosmetic composition.

Advantageously, the cosmetic processes according to the present invention comprise the application of a composition according to the present invention to a healthy skin and/or of
15 healthy mucosae.

The term "healthy skin and/or healthy mucosae" is intended to mean a skin and/or mucosae that do not present lesions and/or infections, in particular due to microorganisms..

20 The examples which follow serve to illustrate the invention without, however, being limiting in nature. The compounds are, as appropriate, cited as chemical names or as CTFA (International Cosmetic Ingredient Dictionary and Handbook) names. The contents are expressed as percentage by weight.

Example 1: Microbial anti-adhesion test**Protocol:**

- 5 The activity of sodium lauroyl sarcosinate at 30% in an aqueous solution, sold under the name Oramix L30® by the company SEPPIC, was demonstrated on reconstructed epidermis.

Before bacterial adhesion, the reconstructed epidermis is brought into contact, for 2 hours, with 0.5% of said aqueous solution comprising 30%, with respect to active material, of sodium lauroyl sarcosinate at 37°C.

1 ml of bacterial suspension of *Staphylococcus aureus* at a concentration of 10^7 germs/ml in tryptone salt is then added thereto.

- 15 After incubation for 24 hours at 37°C, the bacterial suspension is emptied out and five rinses are performed with 1 ml of sterile distilled water.

The reconstructed epidermis detached from its support is then ground in 18 ml of tryptone salt using an automated processor.

20

This suspension is then diluted ten-fold in the tryptone salt, and 1 ml of the dilution is then inoculated into 15 ml of trypticase soybean agar and incubated for 24 hours at 37°C. The adherent and viable cells are then counted.

- 25 This anti-adhesion test makes it possible to evaluate the efficacy of molecules alone. The test was carried out 8 times and the mean of the results obtained was noted.

Before the anti-adhesion test, the following viability test is performed:

- 30 A mixture of bacteria/test product, in the same ratio as in the anti-adhesion test, is brought into contact for 24 hours at 37°C. The germs are counted by ten-fold dilution in tryptone salt and inoculation, using a scraper, of 100 µl on trypticase soybean agar. The colonies are counted after incubation for 24 hours at 37°C.

- 35 The viability essay carried out prior to the anti-adhesion test confirmed that the sodium lauroyl sarcosinate solution has no bactericidal effect.

Results:

The results obtained are recapitulated in the following table:

Formula tested	Anti-adhesion activity	
	Quantitative results (Log)	Qualitative results
Aqueous solution containing 30% of sodium lauroyl sarcosinate (Oramix L30 [®])	- 4.19	excellent
Branched C ₁₂ -C ₁₃ dialcohol tartrate	-2.31	excellent

- 5 The quantitative results correspond to a reduction in the decimal logarithm of the mean number of viable *Staphylococcus aureus* adherent on the reconstructed epidermis after treatment with the sodium lauroyl sarcosinate solution, relative to the decimal logarithm of the mean number of viable staphylococcus aureus adherent on the reconstructed epidermis after treatment with water under the same conditions.

10

The qualitative results are expressed by a variant term as a function of the values of Log reduction of the adhesion of the germs after 24 hours relative to the same test using water: the result obtained shows that the sodium lauroyl sarcosinate has an excellent bacterial anti-adhesion activity, better even than branched C₁₂-C₁₃ dialcohol tartrate.

- | | | |
|----|---|--------------|
| 15 | • results better than those obtained with water | pro-adhesion |
| | • results identical to those obtained with water | no effect |
| | • between 0.5 and 1 log reduction relative to water | poor |
| | • between 1 and 1.5 log reduction relative to water | moderate |
| | • 1.5 and 2 log reduction relative to water | good |
| 20 | • 2 log or more reduction relative to water | excellent |

These results show that sodium lauroyl sarcosinate has excellent efficacy with respect to the adhesion of *S. aureus*, even better than the efficacy of branched C₁₂-C₁₃ dialcohol tartrate. The use of sodium lauroyl sarcosinate, which is more soluble in water than branched C₁₂-C₁₃ dialcohol tartrate, also means that it can be used in aqueous compositions.

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Example 2: Formulation examplesMoisturizing care milk

	Sodium lauroyl sarcosinate (Oramix L30 [®])	1.0%
5	Stearyl alcohol	1.0%
	Glyceryl stearate	1.5%
	Dimethicone	2.0%
	Petroleum jelly	4.0%
	Liquid petroleum jelly	11%
10	PEG-100 stearate	1.5%
	Glycerol	8.0%
	Water	qs 100%

15 This milk is suitable for individuals with dry and/or sensitive skin and can be used at a rate of one daily application to the body, for a moisturizing and protective effect.

Anti-dryness liquid body soap

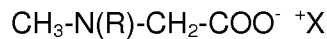
	Sodium lauroyl sarcosinate (Oramix L30 [®])	2.0%
	Disodium EDTA	0.5%
20	Glycerol	2.0%
	Shea butter	1.0%
	Disodium cocoamphodiacetate	5.0%
	Cocobetaine	4.5%
	Citric acid	0.5%
25	PEG-7 glyceryl cocoate	3.0%
	Sodium chloride	3.0%
	Fillers	1.0%
	Water	qs 100%

30 This liquid soap can be used daily on individuals with dry skin.
It is also suitable for body cleansing on individuals with atopic skin.

CLAIMS

1. Cosmetic use of at least one N-acylated sarcosinate of formula (I)

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in which:

R is an acyl group $\text{O=CR}'$, R' being a linear hydrocarbon-based chain containing from 8
10 to 20 carbon atoms; and

X is a cation chosen from the ions of the alkali metals Na or K, and an ammonium group,
in a composition, as an agent for preventing or reducing the adhesion of microorganisms
to the surface of the skin and/or of the mucosae.

- 15 2. Use according to Claim 1, characterized in that the N-acylated sarcosinate of formula (I)
is chosen from a lauroyl sarcosinate, a myristoyl sarcosinate, a palmitoyl sarcosinate
and a stearyl sarcosinate, in the form of the sodium, potassium or ammonium salts
thereof.

- 20 3. Use according to either of Claims 1 or 2, characterized in that the N-acylated sarcosinate
of formula (I) is chosen from ammonium lauroyl sarcosinate, potassium lauroyl
sarcosinate, sodium lauroyl sarcosinate, sodium palmitoyl sarcosinate and sodium
myristoyl sarcosinate.

- 25 4. Use according to any one of the preceding claims, characterized in that the N-acylated
sarcosinate of formula (I) is a sodium N-acylated sarcosinate.

5. Use according to any one of the preceding claims, characterized in that the N-acylated
sarcosinate of formula (I) is present in the composition for topical application, in an
30 amount ranging from 0.001% to 10% by weight, relative to the total weight of the
composition, preferably ranging from 0.01% to 5% by weight, and preferentially ranging
from 0.1% to 3% by weight, and still preferably from 0.1% to 2% by weight.

- 35 6. Use according to any one of the preceding claims, characterized in that the N-acylated
sarcosinate of formula (I) is for use in preventing or reducing the adhesion of *S. aureus*
to the surface of the skin and/or of the mucosae.

7. Use of at least one N-acylated sarcosinate of formula (I) as defined in any one of Claims 1 to 4, for the preparation of a pharmaceutical composition for use in preventing and/or treating skin disorders related to the adhesion of microorganisms to the surface of the skin and/or of the mucosae.
- 5 8. Use of at least one N-acylated sarcosinate of formula (I) according to the preceding claim, for the preparation of a pharmaceutical composition for use in preventing and/or treating atopic dermatitis.
- 10 9. Use according to any one of the preceding claims, characterized in that the composition also contains at least one active agent for caring for the skin and/or the mucosae, chosen from moisturizing agents, desquamating agents, agents for improving the barrier function, depigmenting agents, dermodecontracting agents, anti-glycation agents, agents for stimulating the synthesis of dermal and/or epidermal macromolecules and/or
15 for preventing degradation thereof, agents for stimulating fibroblast or keratinocyte proliferation and/or keratinocyte differentiation, agents for promoting maturation of the horny envelope, NO-synthase inhibitors, peripheral benzodiazepine receptor (PBR) antagonists, agents for increasing sebaceous gland activity, agents for stimulating the energy metabolism of cells, tensioning agents, liporestructuring agents, slimming agents,
20 agents for promoting skin microcirculation, calmatives and/or anti-irritants, sebo-regulating agents or anti-seborrhoeic agents, astringents, healing agents, anti-inflammatory and anti-acne agents.
- 25 10. Cosmetic process aimed at preventing and/or reducing the adhesion of microorganisms to the surface of skin and/or of mucosae exhibiting an impaired barrier function, comprising the application, to the skin and/or the mucosae exhibiting an impaired barrier function, of a composition comprising at least one N-acylated sarcosinate of formula (I) as defined in any one of Claims 1 to 4.
- 30 11. Process according to Claim 10, in which the composition is a care composition.
12. Process according to Claim 10, in which the composition is a cleansing and/or makeup-removing composition.
- 35 13. Cosmetic process according to one of Claims 10 to 12, characterized in that the composition is applied to individuals with dry skin.

14. Cosmetic process according to one of Claims 10 to 12, characterized in that the composition is applied to individuals with fragile or delicate skin, in particular babies.
- 5 15. Cosmetic process according to one of Claims 10 to 12, characterized in that the composition is applied to individuals whose cutaneous aqueous-lipid film is impaired, in particular individuals over the age of 60.
- 10 16. Cosmetic process according to one of Claims 10 to 12, characterized in that the composition is applied to individuals with sensitive skin.
17. Cosmetic process according to one of Claims 10 to 12, characterized in that the composition is applied to individuals with aggravated skin, in particular shaved skin.
- 15 18. Cosmetic process aimed at preventing and/or reducing the adhesion of microorganisms to the surface of the skin and/or of the mucosae of an immunodeficient individual, comprising the application, to the skin and/or the mucosae of said individuals, of a composition comprising at least one N-acylated sarcosinate of formula (I) as defined in any one of Claims 1 to 4.
- 20 19. Cosmetic process according to any one of Claims 10 to 18, characterized in that the N-acylated sarcosinate of formula (I) is the sole agent against the adhesion of microorganisms to the surface of the skin and/or of the mucosae, present in said composition.
- 25 20. Process for reducing unpleasant body odours, comprising the topical application to the skin, in particular of the armpits, the perineal region or the feet, of a composition comprising, in a physiologically acceptable medium, as sole anti-adhesion agent, at least one N-acylated sarcosinate of formula (I) as defined in any one of Claims 1 to 4.