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(71) Applicant: **L'OREAL** [FR/FR]; 14 rue Royale, 75008 PARIS (FR).

(72) Inventors: **GABANT, Marion**; 1 avenue Eugène Schueller BP 22, 93601 AULNAY-SOUS-BOIS (FR). **FERRARIS, Corinne**; 188 rue Paul Hochart - BP 553, 94152 CHEVILLY-LARUE (FR).

(74) Agent: **JUPIN, Claude**; CABINET NONY, 11 rue Saint-Georges, 75009 PARIS (FR).

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(54) **Title:** COSMETIC USE OF A LEMON SAVORY HYDROLATE FOR IMPROVING THE SKIN'S BARRIER FUNCTION

(57) **Abstract:** The present invention relates to the cosmetic use of at least one hydrolate of lemon savory, in particular *Satureja montana L.* ssp. citriodora, or of a cosmetic composition comprising said hydrolate, for improving the skin's barrier function.

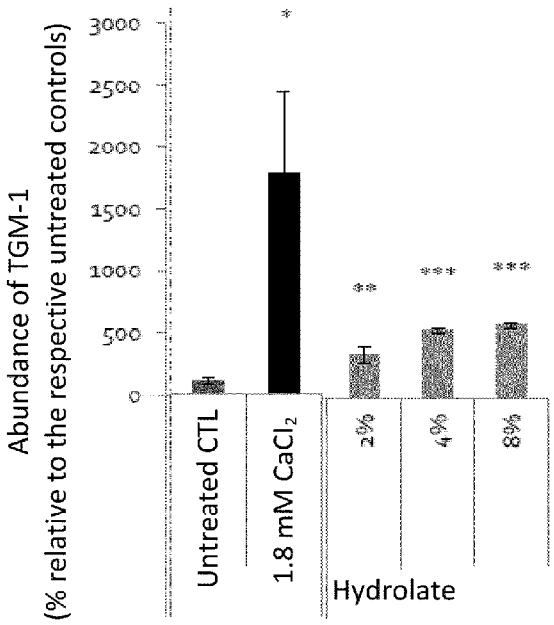

Figure 1

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COSMETIC USE OF A LEMON SAVORY HYDROLATE FOR IMPROVING THE SKIN'S BARRIER FUNCTION

The present invention relates to the field of active agents that are capable of improving the barrier function of the skin, for a cosmetic application.

The skin is the primary barrier for protecting the body from the external environment. Human skin consists of several compartments, three of which cover the whole of the body, namely a superficial compartment, which is the epidermis, the dermis and a deep compartment, which is the hypodermis.

Natural human epidermis is composed mainly of three types of cells, namely keratinocytes, which form the vast majority, melanocytes and Langerhans cells. Each of these three types of cells contributes, by virtue of its intrinsic functions, to the essential role played in the body by the skin, especially the role of protecting the body against external attacking factors, which is known as the "*barrier function*".

The epidermis is conventionally divided into a basal layer of keratinocytes constituting the germinative layer of the epidermis, a spinous layer constituted of several layers of polyhedral cells positioned on the germinative layers, one to three "granular" layers and finally the cornified layer (or *stratum corneum*), constituted of a set of layers of keratinocytes at the terminal stage of their differentiation, known as corneocytes. Corneocytes are anuclear cells mainly composed of a fibrous material containing cytokeratins, surrounded by a very strong structure 15 nm thick, known as the cornified envelope. Stacking of these corneocytes constitutes the cornified layer which is responsible for the barrier function of the epidermis.

The cornified layer constitutes a veritable protective barrier against exogenous factors and endogenous water loss. Its correct renewal and also the quality of its structure are essential for providing an effective barrier against the external environment and for limiting water losses caused by dehydration and dry skin (**Velarde MC**. J. Invest. Dermatol., 2017, 137, 1206). Among the factors involved in correct regulation of the stratum corneum is the enzyme transglutaminase-1 (TGM-1). Its role is fully illustrated in ichthyosis, a cornification disease, associated with TGM-1 mutations (**Vega VL and Mehta RC**, Clin. Insights, 2016, 1-2; **Herman ML et al.**, Human Mutat., 2009, 30, 537).

The cohesion of the epidermis as a water barrier is provided by means of the tight junctions between keratinocytes. These tight junctions are formed from

transmembrane proteins such as occludin (OCL) and claudin (CLDN-1) and are located in the granulous layer. Other proteins, such as the Zonula occludens (ZO) proteins, connect these transmembrane proteins to the cytoskeleton so as to allow the granulous cytoplasmic scaffolding (**Jin SP et al.**, J. Dermatol. Sci., 2016, 84, 97; **Velarde MC**, J. Invest. Dermatol., 2017, 137, 1206, **Brandner JM et al.**, Tissue Barrier, 2015, 3, 1).

Finally, the phase of transition of the granulous layer into the cornified layer is essential for forming a skin barrier of quality, ensuring the homeostasis of the body. Among the factors involved in this transition that may be distinguished are the transglutaminases, including transglutaminase 1 (TGM-1).

Reinforcing the quality of the epidermis by favouring the intracellular junctions and the cohesion of the cornified layer contributes towards maintaining the functions of the epidermis and good hydration.

Admittedly, active agents have already been reported for their capacity to act on the skin's barrier function, as reported in **EP 1333803 B1.**

However, the need remains, in particular naturally, to reinforce the quality of the epidermis by favouring the intracellular junctions and the cohesion of the cornified layer, which are a basic feature for maintaining the functions of the epidermis and good hydration.

DESCRIPTION OF THE INVENTION

The present invention describes cosmetic or dermatological compositions which have advantageous properties for improving the skin's barrier function. These compositions are characterized by the presence of lemon savory hydrolate as an active agent. In addition, these cosmetic or dermatological compositions containing a lemon savory hydrolate make it possible to maintain good cutaneous homeostasis by reinforcing the intercellular junctions, and participate in maintaining skin hydration.

Surprisingly, the inventors have in effect demonstrated the particular properties of hydrolates of lemon savory, in particular *Satureja montana* L. ssp. citriodora, and most particularly *Satureja montana* ssp. variegata or citriodora, for modifying the abundance of the markers TGM-1, CLDN-1 and ZO-1 on a model of normal human keratinocytes in monolayer.

These properties as a whole thus make it possible, advantageously, to envisage the use of a hydrolate of lemon savory, in particular *Satureja montana* L. ssp. citriodora, and most particularly of *Satureja montana* ssp. variegata or citriodora, or of a composition comprising said hydrolate of lemon savory, for improving the skin's barrier function.

The term “skin" means the entire skin of the body, including the scalp. More particularly, in the present invention, the skin of the neckline, of the neck and of the face, and especially the skin of the face, and also the skin of the hands and feet, and the scalp, are considered.

According to the invention, the term “preventing" or “prevention" means reducing the probability of occurrence or reducing a risk of manifestation of the phenomenon concerned.

According to a first embodiment, the invention thus relates to a cosmetic use of at least one hydrolate of lemon savory, in particular *Satureja montana* L. ssp. citriodora, and most particularly *Satureja montana* ssp. variegata or citriodora, or a cosmetic composition comprising said hydrolate, for improving the barrier function of the skin.

According to a second embodiment, the invention relates to a cosmetic process comprising a step consisting in applying at least one hydrolate of lemon savory, in particular *Satureja montana* L. ssp. citriodora, and most particularly *Satureja montana* ssp. variegata or citriodora, or a cosmetic composition comprising said hydrolate, for improving the barrier function of the skin of an individual in need thereof.

According to a third embodiment, the invention relates to a cosmetic or dermatological composition, comprising at least one hydrolate of lemon savory, in particular *Satureja montana* L. ssp. citriodora, and most particularly *Satureja montana* ssp. variegata or citriodora.

Particular indications

A hydrolate of lemon savory, in particular *Satureja montana* L. ssp. citriodora, and most particularly *Satureja montana* ssp. variegata or citriodora, or a cosmetic composition comprising said hydrolate, may advantageously be used for improving the skin’s barrier function.

Thus, according to the invention, the use of such an active agent makes it possible to exert beneficial effects for treating or preventing the cosmetic signs associated with sensitive or dry skin, such as impairment of the microrelief.

Depending on the degree of intensity of the manifestation of impairment of the skin in relation with one of the above indications, it may be a matter of an aesthetic defect. A cosmetic use of the invention thus only addresses aesthetic defects of the skin, and therefore does not exert any therapeutic effect.

The present invention is directed towards a non-therapeutic cosmetic skin care use of a hydrolate, or of a composition (cosmetic or dermatological composition) comprising said hydrolate. The term "care" means non-therapeutic care capable of producing an aesthetic effect without, however, preventing or correcting a pathological dysfunction of the skin.

Surface of the skin

The surface of human skin is not smooth. It has a relief reflected by fine lines, different from wrinkles, which may be observed with a magnifying glass in the case of children and by the naked eye in the case of the elderly. These fine lines or furrows criss-cross so as to form structures of polygonal shapes, namely the skin's microrelief.

The number and depth of the furrows constituting the skin's microrelief may be affected by many external or internal factors.

Advantageously, a hydrolate according to the invention, or a composition comprising said hydrolate, may be used for preventing and/or treating impairment of the state of the skin's surface, in particular following impairment of the skin's barrier function.

Even more particularly, a hydrolate according to the invention, or a composition comprising said hydrolate, may be used for preventing and/or treating impairment of the skin's microrelief, to reduce the number of furrows in the skin's microrelief, to smooth out the skin's surface, to prevent and/or treat a skin surface irregularity, in particular to prevent and/or treat a rough state of the skin, or to reduce the depth of the grooves in the skin's microrelief.

Dry skin

One of the functions of the *stratum corneum* is to uptake and retain the water contained in the epidermis, and any impairment of its structure and/or function, especially following or associated with impairment of the skin's barrier function, may be reflected by modifications in the moisturization of the skin. The skin is moisturized by the water of the deep layers and by sweat. An imbalance in skin moisturization may be reflected by profound physiological and cosmetic consequences.

In physiological terms, dry skin is often associated with a decrease in the degree of skin moisturization and also a modification of the process of maturation of the *stratum corneum*. In sensory terms, dry skin may be characterized by a sensation of tautness and/or skin tension.

A hydrolate according to the invention, or a composition comprising said hydrolate, may particularly be suitable for preventing and/or treating dry skin and/or the cutaneous signs associated with dry skin.

Irrespective of its origin, skin suffering from dryness may generally present the following signs: a rough appearance and scaly feel, and also decreased suppleness and elasticity.

According to one embodiment, a cosmetic use of the invention may advantageously be suitable for preventing and/or treating dry or fragile skin, and winter xerosis.

According to one embodiment, a cosmetic use of the invention may advantageously be suitable for preventing and/or treating the sensations of tautness associated with dry skin.

Hydrolate

A hydrolate is a generally very dilute product obtained from a botanically defined plant raw material by steam distillation. The hydrolate (aqueous phase) is usually separated from the essential oil by means of a physical process that does not result in any significant change in the composition.

The hydrolate in accordance with the invention may preferably be prepared according to the conventional steam distillation technique.

Steam distillation corresponds to vaporization, in the presence of steam, of a sparingly water-miscible substance. The raw material is placed in contact with steam in a stillpot. The steam entrains the essential oil vapour, which is condensed in the condenser and recovered as a liquid phase in a Florentine vase (or essence jar), where the essential oil is separated from the water by settling. The term "*aromatic water*" or "*hydrolate*" or "*floral water*" or even "*floral distilled water*" is used to describe the aqueous distillate which remains once the separation of the essential oil has been performed, generally by steam distillation.

The hydrolate may be obtained from a whole plant, preferably a plant, a shrub or a flower, or from a part of this plant chosen from the flowers, leaves, stems, seeds, fruits, roots, petals, buds and bark, which may be in various states of dryness (dry, withered or fresh form), and mixtures thereof.

According to the invention, the hydrolate of lemon savory, a plant characteristic of the Vercors and the Alps, is preferentially obtained after steam distillation of the aerial parts of the plant that are in bloom, generally at a biomass/hydrolate ratio of 1/1 and without cohobation, for approximately a period ranging from 30 min to 8 hours, preferably between 1 and 4 hours, more particularly between 1 and 2 hours, such as 1 h 30 min.

The lemon savory hydrolate is a colourless water-soluble liquid with an aromatic, slightly herbaceous, fresh odour and a lemon note, containing a large amount of water, such as greater than 90%, in particular greater than 95%, more particularly greater than 98%.

The main organic component of the hydrolate is geraniol, which is present in a content of at least 0.03% by total weight of said hydrolate, in particular approximately 0.05% by weight, for example in a content of between 0.04% and 0.06%.

Besides geraniol, the other main organic components of the lemon savory hydrolate, according to the invention, are generally nerol, citral and 1-octen-3-ol.

The contents indicated herein are given relative to the total weight of the hydrolate under consideration.

The aqueous phase (water and optionally the water-miscible solvent) may be present in the composition in a content ranging from 0.1% to 99.9% by weight, relative to the total weight of the composition, for example ranging from 40% to 95% by weight.

Compositions

An extract of lemon savory may be, as stated hereinabove, an essential oil or a hydrolate. When said extract (whether it is in the form, for example, of an essential oil or a hydrolate) is used in a composition, especially a cosmetic or dermatological composition, this extract may form a substantial, major or minor part of said composition.

Another subject of the invention is a composition, especially a cosmetic or dermatological composition, containing at least one hydrolate of lemon savory, in particular *Satureja montana L.* ssp. citriodora, and most particularly *Satureja montana* ssp. variegata or citriodora.

The composition according to the invention comprises at least one lemon savory hydrolate. When said hydrolate is used in a composition, especially a cosmetic or dermatological composition, this hydrolate can form a substantial, major or minor portion of said composition.

Thus, according to certain embodiments, said composition may comprise less than 50% by weight of said hydrolate, relative to the total weight of this composition. For example, said composition may comprise less than 40% by weight of said hydrolate, especially less than 30% by weight of said hydrolate, less than 20% by weight of said hydrolate, less than 10% by weight of said hydrolate, or less than 1% by weight of said hydrolate.

For example, this composition may comprise less than 10% by weight of said hydrolate, for example less than 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2% 1%, 0.9%, 0.8%, 0.7%, 0.6%, 0.5%, 0.4%, 0.3%, 0.2% or less than 0.1%, by weight of said hydrolate relative to the total weight of the composition.

Alternatively, this composition may comprise more than 10% by weight of said hydrolate, by weight of said hydrolate relative to the total weight of the composition

Thus, according to other embodiments, said composition may comprise 30% or more than 30% by weight of said hydrolate, i.e. for example 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, or more than 50% by weight, relative to the total

weight of the composition. For example, this composition may comprise more than 60% by weight of said hydrolate relative to the total weight of the composition, which includes more than 70%, more than 80%, or even more than 90% by weight of the total weight of the composition.

According to a particular embodiment of the invention, this hydrolate is preferably used in a content of at least 30% by weight, relative to the total weight of the composition.

According to a particular embodiment, a cosmetic or dermatological composition according to the invention may be characterized in that it contains at least 30% by weight of lemon savory hydrolate; especially at least 40% by weight of lemon savory hydrolate; especially at least 50% by weight of lemon savory hydrolate.

According to a particular embodiment, a composition according to the invention may be characterized in that the hydrolate, or the composition comprising said hydrolate, comprises geraniol. In particular, the composition comprising said hydrolate, may contain at least 0.003% by weight of geraniol, relative to the total weight of the composition.

For example, when said composition contains at least 10% by weight of lemon savory hydrolate, this composition may comprise at least 0.003% by weight of geraniol, relative to the total weight of the composition.

According to a particular embodiment, a composition according to the invention may be characterized in that the hydrolate, or the composition comprising said hydrolate, comprises nerol, citral and 1-octen-3-ol.

For example, a composition according to the invention may be characterized in that it comprises geraniol, nerol, citral and 1-octen-3-ol.

Hence, a composition according to the invention may be characterized in that it comprises:

- at least 0.003% by weight of geraniol,
- at least 0.0001% by weight of nerol, citral or 1-octen-3-ol; relative to the total weight of the composition.

In particular, a composition according to the invention may be characterized in that it comprises:

- at least 0.003% by weight of geraniol,
- at least 0.0001% by weight of nerol,
- at least 0.0001% by weight of citral,
- at least 0.0001% by weight of 1-octen-3-ol; relative to the total weight of the composition.

The compositions according to the invention may, where appropriate, comprise a mixture of essential oils and hydrolates.

For example, a composition according to the invention may comprise an essential oil of lemon savory in excess volume relative to the hydrolate. Conversely, said hydrolate may be in a volume excess relative the essential oil.

In addition, the compositions according to the invention may, where appropriate, comprise essential oils or hydrolates other than those obtained from lemon savory.

The compositions, especially cosmetic or dermatological compositions, which may be used in the context of the invention generally comprise a physiologically acceptable medium, preferably a cosmetically acceptable medium.

The term "physiologically acceptable medium" means a medium that is compatible with keratin materials and in particular the skin.

The composition according to the invention may therefore comprise water and/or any adjuvant normally used in the envisaged field of application.

Mention may be made especially of organic solvents, especially C_1-C_6 alcohols and C_2-C_{10} carboxylic acid esters; carbon-based and/or silicone oils, of mineral, animal and/or plant origin; water, waxes, pigments, fillers, dyes, surfactants, emulsifiers, coemulsifiers; cosmetic or dermatological active agents, UV-screening agents, polymers, hydrophilic or lipophilic gelling agents, thickeners, preserving agents, fragrances, bactericides, odour absorbers and antioxidants.

According to exemplary embodiments, the compositions of the invention may comprise at least 5% by weight of lemon savory hydrolate, relative to the total weight of the composition; and a pharmaceutically acceptable medium.

For example, the compositions of the invention may comprise at least 5% by weight of lemon savory hydrolate, relative to the total weight of the composition; at least one adjuvant, such as those described above, and a pharmaceutically acceptable medium.

In particular, the compositions of the invention may comprise at least 10% by weight of lemon savory hydrolate, relative to the total weight of the composition; and a pharmaceutically acceptable medium.

For example, the compositions of the invention may comprise at least 10% by weight of lemon savory hydrolate, relative to the total weight of the composition; at least one adjuvant, such as those described above, and a pharmaceutically acceptable medium.

According to one exemplary embodiment, the compositions of the invention may comprise at least 30% by weight of lemon savory hydrolate, relative to the total weight of the composition; and a pharmaceutically acceptable medium.

For example, the compositions of the invention may comprise at least 30% by weight of lemon savory hydrolate, relative to the total weight of the composition; at least one adjuvant, such as those described above, and a pharmaceutically acceptable medium.

These optional adjuvants may be present in the composition in a proportion of from 0.001% to 80% by weight and in particular from 0.1% to 40% by weight relative to the total weight of the composition.

The aqueous phase (water and optionally the water-miscible solvent) may be present in the composition in a content ranging from 0.1% to 99.9% by weight, relative to the total weight of the composition, for example ranging from 40% to 95% by weight.

The compositions according to the invention may be in any presentation form conventionally used for topical application and especially in the form of aqueous or aqueous-alcoholic solutions, oil-in-water (O/W), water-in-oil (W/O) or multiple (triple: W/O/W or O/W/O) emulsions, aqueous gels, or dispersions of a fatty phase in an aqueous phase using spherules, it being possible for these spherules to be lipid vesicles of ionic and/or nonionic type (liposomes, niosomes or oleosomes). These compositions are prepared according to the usual methods.

The compositions according to the invention may also be in anhydrous form, for instance in the form of an oil. The term "anhydrous composition" means a composition

containing less than 1% by weight of water, or even less than 0.5% water, and especially free of water, the water not being added during the preparation of the composition but corresponding to the residual water provided by the mixed ingredients.

Advantageously, the compositions according to the invention are in the form of a gel, an emulsion, a powder or a paste. In addition, the composition 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 serum, a paste, a foaming gel, a care product, a tonic or a foam. It may optionally be applied to the skin in aerosol form. It may also be in solid form, for example in stick form.

A composition according to the invention may comprise an oily phase.

A composition used according to the invention may advantageously comprise at least one liquid fatty substance other than the compounds present in the hydrolate of the invention.

The term "liquid fatty substance" means a compound with a melting point below about 30-35°C, as opposed to solid fatty substances, such as waxes, which have a melting point above about 50°C.

When the composition used according to the invention includes an oily phase, it preferably contains at least one oil other than the compounds present in the hydrolate of the invention. It may also contain other fatty substances. As oils that may be used in the composition of the invention, examples that may be mentioned include:

- hydrocarbon-based oils of animal origin, such as perhydrosqualene; hydrocarbon-based oils of plant origin, such as liquid triglycerides of fatty acids containing from 4 to 10 carbon atoms, for instance heptanoic or octanoic acid triglycerides or alternatively, for example, sunflower oil, corn oil, soybean oil, marrow oil, grapeseed oil, sesame oil, hazelnut oil, apricot oil, macadamia oil, arara oil, sunflower oil, castor oil, avocado oil, caprylic/capric acid triglycerides, for instance those sold by the company Stéarinerie Dubois or those sold under the names Miglyol 810, 812 and 818 by the company Dynamit Nobel, jojoba oil or shea butter oil; synthetic esters and synthetic ethers, especially of fatty acids, for instance oils of formulae R'000R2 and R'0R2 in which R' represents a fatty acid residue containing from 8 to 29 carbon atoms and R2 represents a branched or unbranched hydrocarbon-based chain containing from 3 to 30 carbon atoms,

for instance purcellin oil, isononyl isononanoate, isopropyl myristate, 2-ethylhexyl palmitate, 2-octyldodecyl stearate, 2-octyldodecyl erucate or isostearyl isostearate; hydroxylated esters such as isostearyl lactate, octyl hydroxystearate, octyldodecyl hydroxystearate, diisostearyl malate, triisocetyl citrate and fatty alkyl heptanoates, octanoates and decanoates; polyol esters, for instance propylene glycol dioctanoate, neopentyl glycol diheptanoate and diethylene glycol diisononanoate; and pentaerythritol esters, for instance pentaerythrityl tetraisostearate;

- linear or branched hydrocarbons of mineral or synthetic origin, such as volatile or non-volatile liquid paraffins, and derivatives thereof, petroleum jelly, polydecenes, and hydrogenated polyisobutene such as Parleam oil;

- fatty alcohols containing from 8 to 26 carbon atoms, such as cetyl alcohol, stearyl alcohol and a mixture thereof (cetylstearyl alcohol), octyldodecanol, 2-butyloctanol, 2-hexyldecanol, 2-undecylpentadecanol, oleyl alcohol or linoleyl alcohol;

- partially hydrocarbon-based and/or silicone-based fluoro oils, such as those described in JP-A-2-295 912;

- silicone oils, such as volatile or non-volatile polydimethylsiloxanes (PDMS) with a linear or cyclic silicone chain, which are liquid or pasty at ambient temperature, especially cyclopolydimethylsiloxanes (cyclomethicones) such as cyclohexasiloxane; polydimethylsiloxanes comprising alkyl, alkoxy or phenyl groups, which are pendent or at the end of a silicone chain, groups having from 2 to 24 carbon atoms; phenylsilicones, such as phenyl trimethicones, phenyl dimethicones, phenyltrimethylsiloxydiphenylsiloxanes, diphenyl dimethicones, diphenylmethyldiphenyltrisiloxanes or 2-phenylethyl trimethylsiloxy silicates, and polymethylphenylsiloxanes;

- mixtures thereof.

In the list of oils mentioned above, the term “hydrocarbon-based oil” means any oil mainly including carbon and hydrogen atoms, and possibly ester, ether, fluoro, carboxylic acid and/or alcohol groups. The other fatty substances that may be present in the oily phase are, for example, fatty acids including from 8 to 30 carbon atoms, such as stearic acid, lauric acid, palmitic acid and oleic acid; waxes, such as lanolin wax, beeswax, carnauba wax or candelilla wax, paraffin waxes, lignite wax or microcrystalline waxes, ceresin or ozokerite, and synthetic waxes, such as polyethylene waxes and Fischer-Tropsch

waxes; silicone resins such as trifluoromethyl-C1-C4-alkyl dimethicone and trifluoropropyl dimethicone; and silicone elastomers, such as the products sold under the name KSG by the company Shin-Etsu, under the name Trefil, BY29 or EPSX by the company Dow Corning, or under the name Gransil by the company Grant Industries. These fatty substances may be chosen in a varied manner by a person skilled in the art in order to prepare a composition having the desired properties, for example in terms of consistency or texture.

In the list of oils mentioned above, the term "hydrocarbon-based oil" means any oil mainly including carbon and hydrogen atoms, and possibly ester, ether, fluoro, carboxylic acid and/or alcohol groups. The other fatty substances that may be present in the oily phase are, for example, fatty acids including from 8 to 30 carbon atoms, such as stearic acid, lauric acid, palmitic acid and oleic acid; waxes, such as lanolin wax, beeswax, carnauba wax or candelilla wax, paraffin waxes, lignite wax or microcrystalline waxes, ceresin or ozokerite, and synthetic waxes, such as polyethylene waxes and Fischer-Tropsch waxes; silicone resins such as trifluoromethyl-C1-C4-alkyl dimethicone and trifluoropropyl dimethicone; and silicone elastomers, such as the products sold under the name KSG by the company Shin-Etsu, under the name Trefil, BY29 or EPSX by the company Dow Corning, or under the name Gransil by the company Grant Industries. These fatty substances may be chosen in a varied manner by a person skilled in the art in order to prepare a composition having the desired properties, for example in terms of consistency or texture.

According to a particular embodiment of the invention, the composition according to the invention is a water-in-oil (W/O) or oil-in-water (O/W) emulsion. The proportion of the oily phase of the emulsion may range from 5% to 90% by weight and preferably from 5% to 60% by weight relative to the total weight of the composition. The emulsions generally contain at least one emulsifier chosen from amphoteric, anionic, cationic and nonionic emulsifiers, used alone or as a mixture, and optionally a coemulsifier. The emulsifiers are chosen in an appropriate manner according to the emulsion to be obtained (W/O or O/W emulsion). The emulsifier and the coemulsifier are

generally present in the composition in a proportion ranging from 0.3% to 30% by weight and preferably from 0.5% to 20% by weight relative to the total weight of the composition.

For W/O emulsions, examples of emulsifiers that may be mentioned include dimethicone copolyols, such as the mixture of cyclomethicone and dimethicone copolyol sold under the trade name DC 5225 C by the company Dow Corning, and alkyl dimethicone copolyols such as the lauryl dimethicone copolyol sold under the name Dow Corning 5200 Formulation Aid by the company Dow Corning, and the cetyl dimethicone copolyol sold under the name Abil EM 90® by the company Goldschmidt. A crosslinked elastomeric solid organopolysiloxane including at least one oxyalkylenated group, such as those obtained according to the procedure of Examples 3, 4 and 8 of US-A-5 412 004 and of the examples of US-A-5 811 487, especially the product of Example 3 (synthetic example) of patent US-A-5 412 004, such as the product sold under the reference KSG 21 by the company Shin-Etsu, may also be used as surfactants for W/O emulsions.

For the O/W emulsions, examples of emulsifiers that may be mentioned include nonionic emulsifiers such as oxyalkylenated (more particularly polyoxyethylenated) fatty acid esters of glycerol; oxyalkylenated fatty acid esters of sorbitan; oxyalkylenated (oxyethylenated and/or oxypropylenated) fatty acid esters; oxyalkylenated (oxyethylenated and/or oxypropylenated) fatty alcohol ethers; sugar esters such as sucrose stearate; and mixtures thereof, such as the mixture of glyceryl stearate and PEG-40 stearate. The composition according to the invention may also contain adjuvants that are common in cosmetics, such as hydrophilic or lipophilic gelling agents, preserving agents, water, solvents, fragrances, fillers, waxes, pasty fatty substances, UV-screening agents, odour absorbers, dyestuffs, basic agents, acids, or nonionic, anionic or cationic surfactants. The amounts of these various adjuvants are those conventionally used in the field under consideration, for example from 0.01% to 20% 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 the lipid vesicles. The compositions according to the invention may also comprise at least one aqueous phase, said aqueous phase originating either from an addition or from the introduction of the lemon savory hydrolate. The aqueous phase contains water and optionally other water-soluble or water-miscible organic solvents. An aqueous phase that is suitable for use in the invention may comprise, for example, a water chosen from a natural spring water, such as water from La Roche-Posay,

water from Vittel or waters from Vichy, or a floral water such as the lemon savory hydrolate.

Needless to say, a person skilled in the art will take care to select this or these optional additional ingredients and/or active agents, and/or the amount thereof, such that the advantageous properties of a lemon savory hydrolate according to the invention are not, or are not substantially, adversely affected by the envisaged addition.

Said lemon savory hydrolate (or said composition comprising said hydrolate) is used topically in the context of a use or of a process according to the invention. Thus, according to a particular embodiment, the invention relates to a use or a process in which said hydrolate or said composition are applied topically.

According to a particular embodiment, the invention thus also relates to a lemon savory hydrolate (or a cosmetic composition comprising said hydrolate) intended to be applied topically.

According to a preferred embodiment, said hydrolate (or said composition comprising said hydrolate) is used topically.

The term “topically” means application to the surface of the skin.

The application of a composition comprising said hydrolate may optionally be followed by a step of rinsing with water.

According to one embodiment, the application is repeated, for example 1 to 3 times daily for one or more days, preferably once or twice a day, and particularly over an extended period of at least 4 weeks, or even 4 to 15 weeks, with, where appropriate, one or more periods of stoppage.

The compositions according to the invention may be applied directly to the skin or, alternatively, to cosmetic supports of occlusive or non-occlusive type, intended to be applied locally to the skin. As non-limiting examples of cosmetic supports, mention may be made especially of a patch, a wipe, a roll-on and a pen.

According to a particular embodiment, the composition according to the present invention will comprise, besides a lemon savory hydrolate as defined above, at

least one additional active agent for caring for the skin, such as elderly skin, dull skin, greasy skin or greasy-prone skin.

The composition may optionally be rinsed off after having been applied to the skin. Moreover, after the application of the composition according to the invention, a composition comprising one or more active agents chosen from antibacterial agents, antifungal agents and/or powders may be applied to the surface of the skin.

According to a particular embodiment of the invention, other agents intended to make the appearance and/or texture of the skin more attractive may also be added to the composition that is suitable for use in the invention.

In the context of the present invention, the term "*additional active agent for caring for the skin*" means a compound which, by itself, i.e. not requiring the involvement of an external agent to activate it, has a biological activity that is beneficial to the skin.

Advantageously, a composition according to the invention may comprise at least one UV-screening agent. This screening agent is chosen from UV-A and/or UV-B screening agents. Even more particularly, said UV-screening agent is chosen from water-soluble organic UV-screening agents, liposoluble organic screening agents, and mixtures thereof, and more particularly liposoluble organic UV-screening agents.

FIGURES LEGEND

Figure 1: Modifications of expression of TGM-1 using NHEK keratinocytes treated with the hydrolate described according to Example 1 for 72 hours (immunofluorescence). The results (means ± standard deviations of three independent cultures) are expressed relative to the respective untreated control conditions. p values of between $0.01<p<0.05$ are considered as significant (*), between $0.001<p<0.01$ as highly significant (**) and $p<0.001$ as very highly significant (***) (Student's t-test statistical analysis performed in order to compare the treatments individually relative to the untreated controls).

Figure 2: Modifications of expression of CLDN-1 using NHEK keratinocytes treated with the hydrolate described according to Example 1 for 72 hours (immunofluorescence). The results (means ± standard deviations of three independent

cultures) are expressed relative to the respective untreated control conditions. p values of between $0.01<p<0.05$ are considered as significant (*), between $0.001<p<0.01$ as highly significant (**) and $p<0.001$ as very highly significant (***) (Student's t-test statistical analysis performed in order to compare the treatments individually relative to the untreated controls).

Figure 3: Modifications of expression of ZO-1 using NHEK keratinocytes treated with the hydrolate described according to Example 1 for 72 hours (immunofluorescence). The results (means ± standard deviations of three independent cultures) are expressed relative to the respective untreated control conditions. p values of between $0.001<p<0.01$ are considered as highly significant (**) and $p<0.001$ as very highly significant (***) (Student's t-test statistical analysis performed in order to compare the treatments individually relative to the untreated controls).

EXAMPLES

Example 1:

Production of a lemon savory hydrolate

A lemon savory hydrolate was prepared from the aerial parts of the plant at the full bloom stage by distillation of 5 kg by fresh weight by steam distillation for 1 hour 30 minutes in a 50 litre distillation device. The hydrolate volume obtained was about 5 L.

The hydrolate obtained comprises, as major constituents (by weight relative to the total weight of the hydrolate):

- Geraniol 0.05% by weight;
- Nerol 9×10^{-4}% by weight;
- Citral 6×10^{-4}% by weight;
- 1-Octen-3-ol, 6×10^{-4}% by weight.

The composition of the hydrolate obtained was determined by gas chromatography (GC) and mass spectrometry.

Example 2: effect of the lemon savory hydrolate according to Example 1 on the reinforcement of the barrier function

A. Principle

The study consists in measuring the effect of a treatment of lemon savory hydrolate (HY) on the properties of the barrier function on normal human keratinocytes in monolayer.

The object of the study is to demonstrate, by immunolabelling, the effects of the hydrolate at three concentrations on the protein abundance of transglutaminase-1 (TGM-1), of claudin-1 (CLDN-1), of occludin (OCLN) and of the protein zonula occludens (ZO-1) using NHEK keratinocytes in monolayer treated for 72 hours.

B. Materials & Methods

The effect of the hydrolate was compared with the effect of a hypercalcium treatment (1.8 mM $CaCl_2$) used as reference condition.

A prior cytotoxicity study made it possible to define the three working concentrations for the lemon savory hydrolate for the rest of the study.

Treatment of the NHEK keratinocytes

The NHEK keratinocytes were seeded on 1.7cm^2 glass slides (Millipore, R-00753963A) 24 hours before the treatment. They were then treated for 72 hours with a hydrolate at the three chosen concentrations. The hydrolate was used directly to reconstitute the medium.

In parallel, the cells were also cultured in hypercalcium medium (1.8 mM CaCl2) in order to stimulate their differentiation and to induce the expression of the four target proteins or their cellular relocalization (reference treatment).

The experiments were performed in triplicate (n=3).

Immunofluorescence labelling of TGM-1, CLDN-1, OCLN and ZO-1

At the end of the treatments, the NHEK keratinocytes were fixed and then placed in contact with primary antibodies specific for the four proteins of interest. Fluorescein-conjugated secondary antibodies were then used in order to allow the detection

of the target proteins. The table below summarizes the references of the primary and secondary antibodies used for each of the immunolabellings.

Target proteins	**Primary antibody references**	**Secondary antibody references**
TGM-1	Harbor Bio-products, 5003	Molecular probe, A11001
CLDM-1	Invitrogen, 51-9000	Molecular probe, A11008
OCLN	Abcam, 31721	
ZO-1	Invitrogen, 40-2200	

DAPI or 4',6'-diamidino-2-phenylindole, a fluorescent molecule that is capable of binding to the adenine and thymine bases of DNA, was used in order to detect the nuclei of the NHEK keratinocytes. The slides were then mounted using Mowiol.

Products	Type	Suppliers	Catalogue references
DAPI	Reagent	Invitrogen	D1306
Mowiol	Reagent	Sigma	32,459-0

The slides were stored at 4°C and in the darkness until six images per culture were taken, using a Leica microscope (DM 2000, 40x objective lens) and a Leica camera (DFC420C). For each of the conditions, 18 photos representative of the labelling observed were thus recorded.

Image analysis by the QWin software (Leica) made it possible to express the cell surface area labelled by fluorescence by using the pixels as area units (1 pixel = 1 μm^2). A photo is represented using 4761460 pixels. The mean labelling intensity was determined for each photo. The nuclei were quantified by using a suitable program so as to relate the labelled surface area and the mean intensity to the number of cells per image.

C. Results

	Protein abundance (% relative to the untreated controls)				
Conditions	Concentrations	TGM-1	CLDN-1	OCLN	ZO-1
$CaCl_2$	1.8 mM	1780 *	1087 ***	108	262 ***
Hydrolate	2%	352 **	402 *	94	142
	4%	551 ***	459 **	92	168
	8%	591 ***	927 ***	119	195 **

The hydrolate tested is that of Example 1.

p values of between $0.001<p<0.01$ are considered as highly significant (**) and $p<0.001$ as very highly significant (***) (Student's t-test statistical analysis performed in order to compare the treatments individually relative to the untreated controls).

The modifications of the abundance of TGM-1, of CLDN-1 and of ZO-1 in NHEK keratinocytes by placing in contact with the hydrolate are indicated, respectively, in **Figures 1, 2 and 3.**

As expected, the treatment with $CaCl_2$ (positive control to validate the test) does indeed make it possible to significantly induce the abundance of TGM-1 CLDN-1 and ZO-1, which validates the experiment.

This treatment does not significantly modify the protein abundance of OCLN reproducibly, but does, nevertheless, make it possible to observe a change in cellular localization. Under normal calcium conditions, this protein is localized diffusely throughout the cytoplasm, and is more concentrated in a perinuclear ring. It is redistributed towards the periphery of the differentiated keratinocytes, in point structures which are probably membrane-bound, following the hypercalcium treatment. It is thus probable that the hypercalcium treatment promotes the translocation of OCLN towards the tight junctions, in order to ensure the cohesion functions of these specific cell structures, as observed in the upper layers of epidermis *in vivo*.

In general, the hydrolate of the invention significantly increases the expression of TGM-1 and CLDN-1 under the test conditions. The protein abundance of ZO-1, for its part, is upregulated by the hydrolate at the highest concentration.

Ref: **Pummi K1, Malminen M, Aho H, Karvonen SL, Peltonen J, Peltonen SJ,** Invest. Dermatol. 2001 Nov; 117(5), 1050-8).

"Epidermal tight junctions: ZO-1 and occludin are expressed in mature, developing, and affected skin and in vitro differentiating keratinocytes".

Ref: **Törmä H1, Lindberg M, Berne B**. J. Invest. Dermatol. 2008 May; 128(5): 1212-9. Epub 2007 Nov 15.

"Skin barrier disruption by sodium lauryl sulfate-exposure alters the expressions of involucrin, transglutaminase 1, profilaggrin, and kallikreins during the repair phase in human skin in vivo."

Example 3: Simple formulations of lemon savory hydrolate

A. Composition 1

Ingredients	**weight % relative to the total weight of the composition**
Lemon savory hydrolate	**10**
Xanthan gum	0.15
Water	89.85

B. Composition 2

Ingredients	**weight % relative to the total weight of the composition**
Microbiologically clean deionized water	**34.96**
Lemon savory hydrolate	**50**
Aqueous sodium phytate solution	**0.1**
L-Arginine	**0.61**
Glycerol	**3**
Xanthan gum	**0.15**
Powdered sodium hyaluronate (MW: 1 100 000)	**0.2**
1,3-Propanediol	**5**
(50/50 C8/C10)Alkyl polyglucoside (2) as a buffered 60% aqueous solution	**0.4**
Fragrance	**0.08**
Denatured ethanol	**5**
Salicylic acid powder	**0.5**
TOTAL	**100**

Example 4: Facial cream

Powdered potassium sorbate	**0.1**
Xanthan: Polysaccharides: Glucose/mannose/glucuronic acid (40/30/30)	**0.3**
Mixture of plant origin of lecithin, fatty acids and fatty alcohols	**5**
Lemon savory hydrolate	**50**
First cold-pressed bio sunflower oil	**20**
Glyceryl stearate citric ester	**2**
Benzyl alcohol (and) dehydroacetic acid (and) water	**0.8**
Fragrance	**0.45**
Citric acid	**0.1**
Water qs	**100**

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CLAIMS

1. Cosmetic use of at least one hydrolate of lemon savory, in particular *Satureja montana l.* ssp. citriodora, or of a cosmetic composition comprising said hydrolate, for improving the skin's barrier function.

2. Cosmetic use according to Claim 1, in which said hydrolate is a hydrolate of lemon savory, in particular *Satureja montana l.* ssp. citriodora, comprising at least 0.03% by weight of geraniol.

3. Cosmetic use according to claim 1 or 2, characterized in that the hydrolate, or the composition comprising said hydrolate, comprises nerol, citral and 1-octen-3-ol.

4. Cosmetic use according to any one of the preceding claims, characterized in that said hydrolate is obtained via a steam distillation process.

5. Cosmetic use according to any one of the preceding claims, in which the hydrolate or said composition is used for treating or preventing the cosmetic signs associated with sensitive or dry skin.

6. Cosmetic use according to any one of the preceding claims, in which said hydrolate or said composition is applicable topically.

7. Cosmetic process comprising a step consisting in applying at least one lemon savory hydrolate, or a cosmetic composition comprising said hydrolate, for improving the barrier function of the skin of an individual in need thereof.

8. Composition, especially a cosmetic or dermatological composition, comprising at least one lemon savory hydrolate.

9. Composition according to claim 8, characterized in that it contains at least 10% by weight of hydrolate of lemon savory, in particular *Satureja montana* L. ssp. citriodora.

10. Composition according to either of claims 8 and 9, characterized in that it contains at least 0.003% by weight of geraniol.

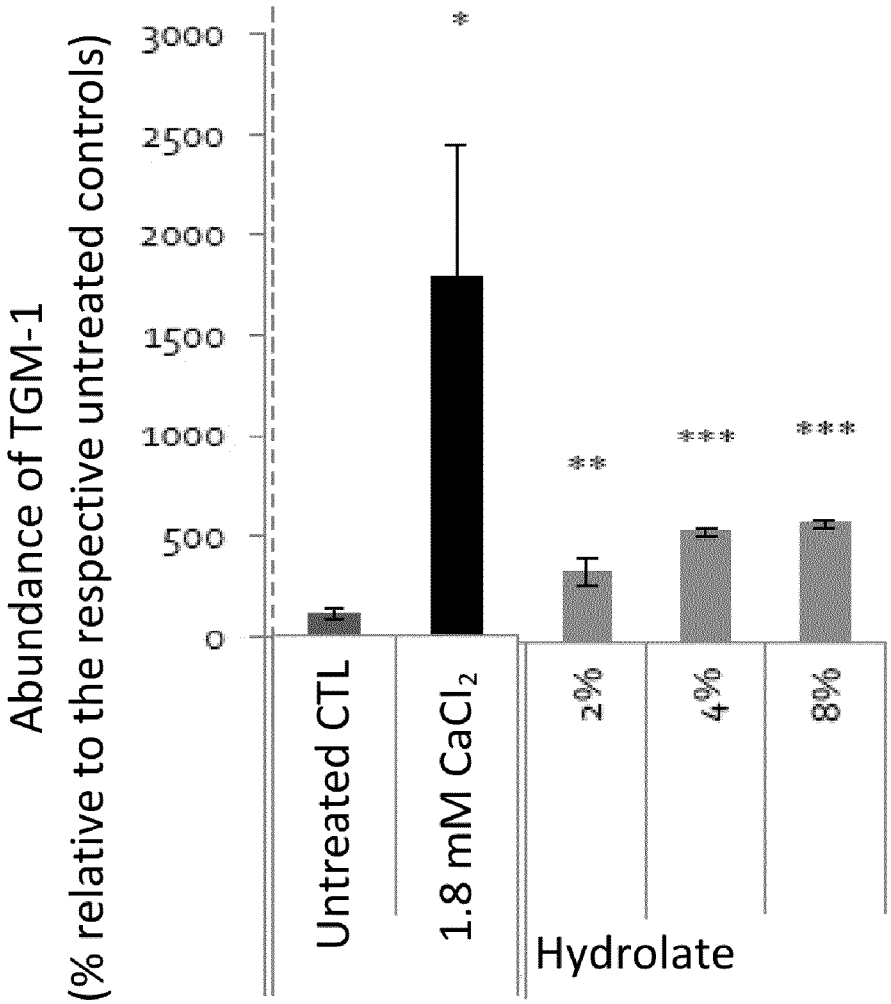
Abundance of TGM-1
(% relative to the respective untreated controls)
3000
2500
2000
1500
1000
500
0
*
**
***
***
Untreated CTL
1.8 mM CaCl2
2%
4%
8%
Hydrolate

Figure 1

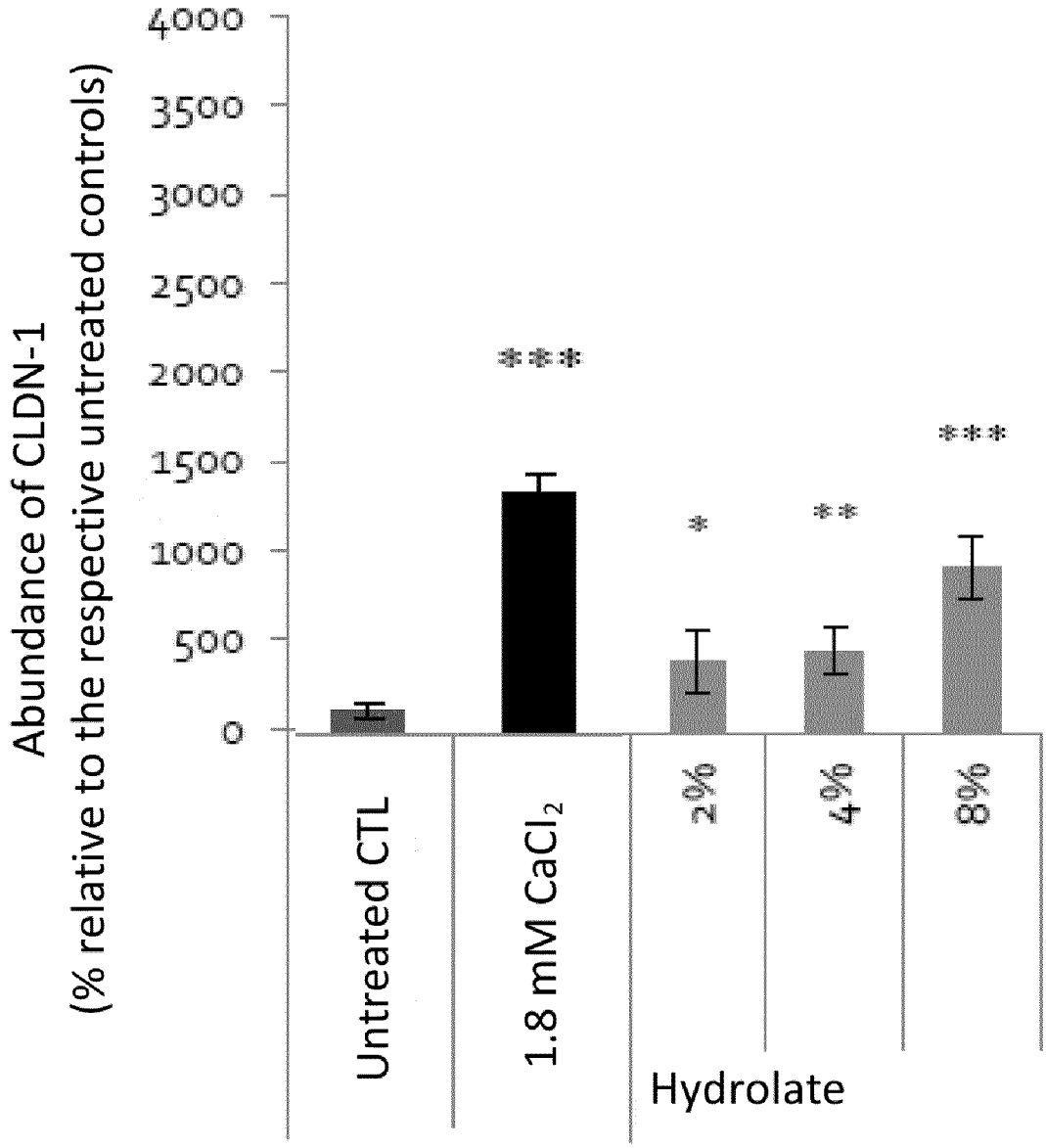
Abundance of CLDN-1
(% relative to the respective untreated controls)
4000
3500
3000
2500
2000
1500
1000
500
0
***
*
**
***
Untreated CTL
1.8 mM CaCl2
2%
4%
8%
Hydrolate

Figure 2

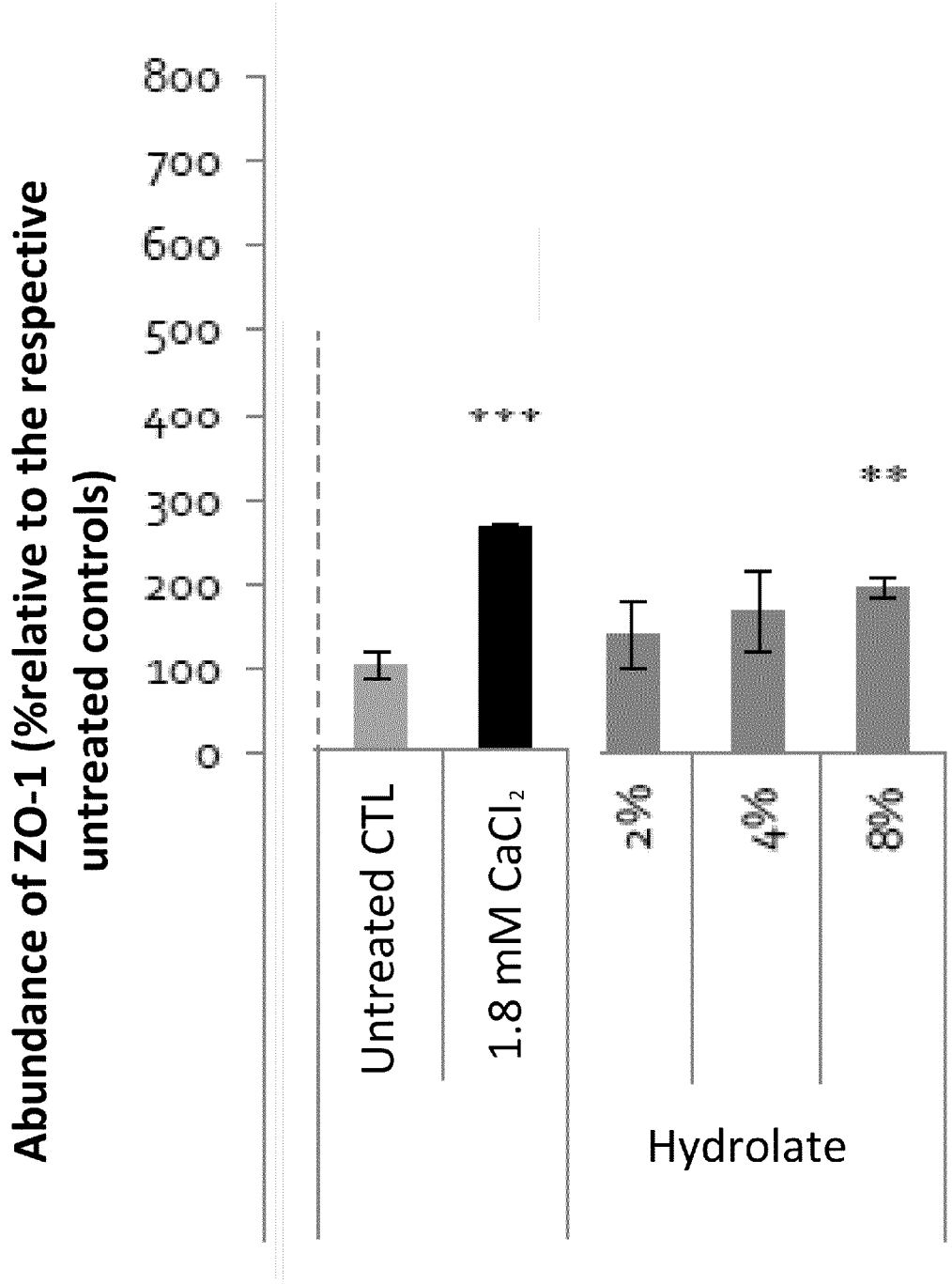
Abundance of ZO-1 (%relative to the respective untreated controls)
800
700
600
500
400
300
200
100
0
***
**
Untreated CTL
1.8 mM CaCl2
2%
4%
8%
Hydrolate

Figure 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/054488

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61Q19/08 A61K36/53 A61K8/9789 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)
A61Q A61K

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KLEDI XHAXHIU ET AL: "CHARACTERISATION OF STEAM-EXTRACTION PROGRESS OF SOME MEDICINAL PLANTS BASED ON THE EVOLUTION OF PHYSICAL-CHEMICAL PARAMETERS OF THEIR HYDROLATES", FRESENIUS ENVIRONMENTAL BULLETIN, vol. 21, no. 10a, 1 January 2012 (2012-01-01), pages 3108-3113, XP055514314, points 2.2 et 2.2; figure 1 -----	1-10
Y	FR 3 046 069 A1 (OREAL [FR]) 30 June 2017 (2017-06-30) page 13, lines 27-30 claims 10, 11, 15-17 ----- -/--	1-10

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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

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

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

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

"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
1 April 2019	11/04/2019

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	Perrone Dunet, S

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/054488

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 3 004 939 A1 (OREAL [FR]) 31 October 2014 (2014-10-31)	8
Y	page 6, lines 12-19 claims; example 1	1-10

Y	FR 2 998 478 A1 (OREAL [FR]) 30 May 2014 (2014-05-30) page 1, lines 22-27 page 2, line 20 - page 3, line 20 page 7, line 29 - page 8, line 8 page 11, line 10 - page 14, line 24 claims 1, 3, 9, 10; examples	1-10

Y	WO 2008/143145 A1 (ANBAS CORP [JP]; NAGAI KATSUYA [JP]; TANIDA MAMORU [JP]; SHEN JIAO [JP]) 27 November 2008 (2008-11-27) claims 9, 12 abrégé WPI	1-10

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2019/054488

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FR 3046069 A1	30-06-2017	CN 108472222 A	31-08-2018
		EP 3393434 A1	31-10-2018
		FR 3046069 A1	30-06-2017
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		WO 2008143145 A1	27-11-2008