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

(19) **World Intellectual Property Organization**
International Bureau

(43) **International Publication Date**
04 October 2018 (04.10.2018)

WIPO | PCT

(10) **International Publication Number**
WO 2018/178332 A1

(51) **International Patent Classification:**
A61K 8/34 (2006.01) *A61Q 19/10* (2006.01)
A61K 8/46 (2006.01) *A61K 8/73* (2006.01)
A61Q 9/02 (2006.01) *A61K 8/04* (2006.01)

(21) **International Application Number:**
PCT/EP2018/058289

(22) **International Filing Date:**
30 March 2018 (30.03.2018)

(25) **Filing Language:** English

(26) **Publication Language:** English

(30) **Priority Data:**
17 52703 30 March 2017 (30.03.2017) FR

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

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

Published:
— *with international search report (Art. 21(3))*

(54) **Title:** STABLE CLEANSING COMPOSITION IN THE FORM OF A FOAM

(57) **Abstract:** This invention relates to a cosmetic composition comprising an aqueous phase comprising: - an anionic surfactant chosen from sulfosuccinates, - an anionic surfactant chosen from acylisethionates, - a modified starch, and - at least 30% by weight in relation to the total weight of the composition of at least one polyol comprising from 2 to 8 carbon atoms, with the composition being expanded. It also relates to a method for cleansing keratin materials using such a composition.

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Stable cleansing composition in the form of a foam

This invention relates to a stable cleansing composition in the form of a foam.

The cleansing of the skin is very important for skin care and in particular the face. It must be as effective as possible because the fatty residues such as excess sebum, the remainder of cosmetic products used daily and makeup products accumulate in the skin folds and can obstruct the pores of the skin and cause the appearance of pimples. A means for correctly cleansing the skin is to use foaming cleansing products.

Foaming cleansing products currently commercially available have the form of cakes, gels or foaming liquids.
They generally contain either soaps that have the advantage of providing a creamy foam but can cause tightness due to their excessive detergency, or foaming surfactants such as sulfate surfactants, in particular sodium lauryl sulfate (SLS) or sodium laureth sulfates (SLES), which are very effective in terms of foaming and detergency must have been called into question, rightly or wrongly, for their ecotoxic or eco-harmful environmental profile.

In addition, when these cleansing products are in the form of solid cakes such as soaps, they tend to soften as they are used, and not age well. In addition, it is frequent that they break and consumers have small pieces of soap that are difficult to use. Moreover, a wet soap is generally slippery, which makes using it awkward, in particular for young children.
Because of this, another possible galenic for these cleansing products is the liquid form. Unfortunately, the more liquid the compositions are, the more difficult it is to dose them, in particular because they tend to escape between the fingers, and the more they tend to escape from their packaging, which can be very inconvenient when they come into contact with clothing.
In order to modify the texture, and in particular make it more compact, it is possible to use thickeners, but this is often done to the detriment of the cosmetic effects of the composition. Furthermore, it has been observed that the thickest compositions often have the disadvantage of requiring a lot of rinsing water in order to remove the excess product on the skin. In many countries where access to water is restricted, the rinsing time and therefore the quantity required to rinse the product well are key indicators of the qualities of the use of a composition.

Users are increasingly seeking new textures and new concepts in cleansing and/or care products for keratin materials, preferably for the skin of the face and/or of the body.

There is therefore a need to have cleansing and/or care compositions for keratin materials, preferably for the skin of the face and/or of the body, which are foaming and without surfactants of the sulfate type, which do not flow, which are compact, stable and economical.

The compositions sought must have an original compact foam texture, attractive for the user, and be associated with a different procedure for using conventional cleansing products. Moreover, such compositions must by easy to apply on keratin materials, and possibly allow for a fast foam start, i.e. the rapid obtaining of a suitable and sufficiently abundant foam, when the composition is applied, generally by friction, on said keratin materials, in particular on the skin, even beforehand in hands, possibly humidified beforehand.

This invention has for purpose to propose such compositions that do not have the disadvantages of prior art, and able to allow for the rapid obtaining of a suitable foam for the cleansing and/or care of keratin materials, in particular the skin.

The inventors have demonstrated that the expansion of a composition containing an anionic surfactant chosen from acylisethionates, an anionic surfactant chosen from sulfosuccinates, a modified starch and a substantial content of polyol, makes it possible to obtain a composition in the form of a foam that responds to these needs while remaining stable. The compositions in the form of a foam according to the invention have indeed good stability over time, in particular in terms of homogeneity and aspect of the product. As shown by the comparative example 1' described hereinafter, the absence of sulfosuccinate surfactant and modified starch does not make it possible to obtain an expanded product.

More precisely, the invention has for object a cosmetic composition, in particular for cleansing, comprising an aqueous phase comprising:

- an anionic surfactant chosen from sulfosuccinates,
- an anionic surfactant chosen from acylisethionates,
- a modified starch, and
- at least 30% by weight in relation to the total weight of the composition of at least one polyol comprising from 2 to 8 carbon atoms,

with the composition being expanded.

The composition according to the invention is in the form of foam.
The term "expanded composition" or " composition in the form of foam" means a composition comprising a gaseous phase (for example air) in the form of bubbles.

The composition in the form of foam has a light texture, easy to sample and to spread over keratin materials.

The invention also has for object a method for cleansing keratin materials comprising the application on said keratin materials of the cosmetic composition in the form of a foam according to the invention. Optionally, the keratin materials are then rinsed, for example with water.

The method for cleansing keratin materials according to the invention consists in applying on the keratin materials the composition in the form of foam; it is distinguished from the methods of prior art in that the foam does not form *in situ* on the keratin materials, i.e. the foam is not created after the application of said composition. In particular, this not a composition with delayed expansion which is a system in which a so-called volatile agent is released or formed in the composition after the latter had been applied on the keratin materials. Specifically, compositions with delayed expansion are created after exposure of a gel to atmospheric pressure, and/or to a shearing and/or at a temperature greater than ambient temperature.

Expansion

The overrun compositions according to the invention are formed in a stable manner in the form of foam using a base composition and air or an inert gas.

As an inert gas, mention can be made of nitrogen, carbon dioxide, nitrogen oxides, noble gases, or a mixture of said gases. When the composition comprises a compound sensitive to oxidation, it is preferable to use a gas without oxygen such as nitrogen, or carbon dioxide.

The expanded compositions according to the invention can be characterized by their density and/or their rate.

Density

The expanded composition of the invention can have a density less than 0.95. The reference is water, with a density equal to 1 g/cm^3.

The expanded composition of the invention advantageously has a density from 0.4 to 0.9 and preferably from 0.4 to 0.8, with this density being measured at a temperature of about 20°C and at atmospheric pressure according to the following protocol:

The test is conducted with a pycnometer of 100 ml without the lid.

Prior to the measurement, the composition to be characterized and the pycnometer are maintained at a temperature of about 20°C. The pycnometer is weighed and the value of weight measured (M_0). In a first step, the pycnometer is filled with demineralized water in order to occupy the entire volume and by avoiding the formation of bubbles during filling. The weight M1 is measured.

In a second step, the pycnometer is emptied and dried. The expanded composition is then introduced into the pycnometer in such a way as to occupy the entire volume and by avoiding the formation of bubbles during filling of the cup. The top of the pycnometer is then leveled then weighing is carried out in order to note the weight M_2.

The density is then calculated: d = **(M2 – M0) / (M1 – M0)**

M0: weight of the pycnometer empty (g)
M1: weight of the pycnometer filled with water (g)
M2: weight of the pycnometer filled with the expanded composition (g)

Stability

The expanded composition according to the invention is stable. The term "stable" means that the expanded composition according to the invention does not have any change in appearance after storage for at least 1 month at 4°C and at ambient temperature (25°C).

The composition according to the invention comprises an aqueous phase comprising:
- an anionic surfactant chosen from sulfosuccinates,
- an anionic surfactant chosen from acylisethionates,
- a modified starch, and
- at least 30% by weight in relation to the total weight of the composition of at least one polyol comprising from 2 to 8 carbon atoms.

Aqueous phase

The expanded composition according to the invention comprises an aqueous phase.
According to a particular embodiment, the composition comprises a quantity of water from 25% to 50% by weight, better from 30% to 45% by weight, and preferably from 30% to 40% by weight in relation to the total weight of the composition.

The water used can be sterile demineralized water and/or floral water such as rose water, cornflower water, chamomile water or linden water, and/or a spring or natural mineral water, such as for example: Vittel water, water from the basin of Vichy, Uriage water, la Roche Posay water, la Bourboule water, Enghien-les-Bains water, Saint Gervais-les-Bains water, Néris-les-Bains water, Allevar-les-Bains water, Digne water, Maizières water, Neyrac-les-Bains water, Lons-le-Saunier water, les Eaux Bonnes, Rochefort water, Saint Christau water, Fumades water and Tercis-les-bains water, Avene water.

Preferably, the aqueous phase of the composition according to the invention further comprises from 35 to 60% by weight in relation to the total weight of the composition of at least one polyol. The polyol(s) can be present in a quantity between 40% and 55% by weight, and better between 45% and 55% by weight in relation to the total weight of the composition.

The term "polyols" means any organic molecule that contains at least two free hydroxyl groups. The polyol according to the invention comprises from 2 to 8 carbon atoms.
As polyols comprising from 2 to 8 carbon atoms, mention can be made for example glycerin, sorbitol, glycols such as butylene glycol, propylene glycol, isoprene glycol, dipropylene glycol, hexylene glycol, polypropylene glycol.

Sulfosuccinate anionic surfactant

The sulfosuccinate anionic surfactants used in the expanded composition according to the invention are part of the carboxylate anionic surfactants.

The sulfosuccinate anionic surfactant or surfactants can be oxyalkylenated and then preferably comprise from 1 to 50 ethylene oxide patterns, better from 1 to 10 ethylene oxide patterns.
The sulfosuccinate anionic surfactant or surfactants that are suitable for the invention can be chosen from an alkyl(C8-C30)sulfosuccinate, an alkyl(C8-C30)amide-sulfosuccinate,

oxyalkylenated or not, and preferably, they are alkyl(C8-C30)sulfosuccinates oxyalkylenated or not, i.e. alkyl(C8-C30)sulfosuccinates or alkyl(C8-C30)ethersulfosuccinates.

The alkyl radical of the sulfosuccinate or sulfosuccinates then comprises from 8 to 30 carbon atoms, preferably from 10 to 18 carbon atoms, and more preferentially from 10 to 16, better from 10 to 14.

As non-oxyalkylenated alkylsulfosuccinates, mention can be made of laurylic alcohol sulfosuccinates (C12/C14 70/30) (DISODIUM LAURYL SULFOSUCCINATE) such as the one marketed under the trade name Rewopol® SB F 12 P by Evonik Goldschmidt, KOHACOOL L-40 by TOHO CHEMICAL, MACKANATE LO-FF by RHODIA.

As oxyalkylenated sulfosuccinates, mention can be made of oxyethylenated laurylic alcohol sulfosuccinates (C12/C14 70/30) (DISODIUM LAURETH SULFOSUCCINATE) such as those that are marketed under the names SETACIN 103 SPECIAL NP® by Zschimmer&Schwarz, REWOPOL SB FA 30 U by Evonik Goldschmidt, GOODWAY MES by SHANGHAI GOODWAY CHEMICAL, REWOPOL SB FA 30 PH by Evonik Goldschmidt, ALKONIX SS K by ULTRA-OXITENO, DISODIUM LAURETH SULFOSUCCINATE by GUANGZHOU FLOWER'S SONG FINE CHEMICAL, KOHACOOL L- 300 by TOHO CHEMICAL, EMPICOL SDD OF by HUNTSMAN, disodium salt of an C12-C14 alcohol hemi-sulfosuccinate, marketed under the name SETACIN F SPECIAL PASTE® by Zschimmer&Schwarz, oxyethylene disodium oleamidosulfosuccinate (2 OE) marketed under the name STANDAPOL SH 135® by Cognis, lauric amide oxyethylene mono-sulfosuccinate (5 OE) marketed under the name LEBON A-5000® by Sanyo, di-sodium salt of lauryl citrate oxyethylene mono-sulfosuccinate (10 OE) marketed under the name REWOPOL SB CS 50® by Witco, ricinoleic mono-ethanolamide mono-sulfosuccinate marketed under the name REWODERM S 1333® by Witco. Polydimethylsiloxane sulfosuccinates such as disodium dimethicone sulfosuccinate PEG-12 marketed under the name MACKANATE-DC30® by the Mac Intyre Company can also be used.

According to a particular embodiment, the sulfosuccinate anionic surfactant or surfactants satisfy the following formula:

CH3-(CH2)n-(O-CH2-CH2)m-O-CO-CH(SO3M)-CH2-CO-OM'

wherein:

n designates an integer ranging from 7 to 29, preferably from 9 to 17, and even more preferably from 9 to 15, preferably from 9 to 13;

m designates an integer varying from 0 to 50, M and M' designate, independently of each other, a hydrogen atom, an alkali metal or alkali earth metal, an ammonium group or a cation coming from an amine.

When the sulfosuccinate anionic surfactant or surfactants are not oxyalkylenated, m is equal to 0.

When the sulfosuccinate anionic surfactant or surfactants are oxyalkylenated, m designates an integer ranging from 1 to 50, preferably from 1 to 10, and even more preferably from 1 to 8, preferably from 1 to 6.

When the sulfosuccinate or sulfosuccinates are in the form of salt, they can be chosen from alkali metal salts such as sodium or potassium salt and preferably sodium, ammonium salts, amine salts and in particular aminoalcohols, alkaline earth metal salts such as magnesium salt. In this case, one or the other of the sulfonate functions, or both, can be found in the form of salt.

According to a particular embodiment of the invention, the sulfosuccinate or sulfosuccinates are in the form of salt. Preferably, they are chosen from alkali metal salts, and more particularly sodium salt. Preferably, they are di-salts of sodium.

According to a particular embodiment, the sulfosuccinate anionic surfactant or surfactants used in the framework of the invention are alkylsulfosuccinates oxyalkylenated or not in which the alkyl radical comprises from 8 to 30 carbon atoms, preferably from 10 to 18, and more preferably from 10 to 16, preferably from 10 to 14, more preferably if it is a lauryl or laurethsulfosuccinate, even more preferably a lauryl or laurethsulfosuccinate alkali metal salt, and even more preferably disodium lauryl sulfosuccinate or disodium laureth sulfosuccinate.

The sulfosuccinate or sulfosuccinates can be present in a composition according to the invention with a content of active material (AM) ranging from 5% to 15% by weight, preferably from 7% to 13% by weight, and even better 8.5% to 11.5% by weight in relation to the total weight of the composition.

<u>Acylisethionate anionic surfactant</u>

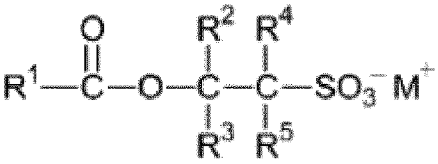
The expanded composition according to the invention also comprises at least one acylisethionate anionic surfactant.

The term "acyl" radical means, in terms of this invention, a radical having formula R1-CO with R1 representing a linear or branched, saturated or unsaturated hydrocarbon chain, comprising preferably only carbon atoms and hydrogen atoms. Preferably, it is linear and saturated.

The alkyl radical of the acylisethionate or acylisethionates then comprises from 8 to 30 carbon atoms, preferably from 10 to 18 carbon atoms, and more preferentially from 10 to 16, better from 10 to 14.

The acyl group can be in particular chosen from the lauroyl, myristoyl, palmitoyl, stearoyl, olivoyl, cocoyl, oleoyl groups, and mixtures thereof.

According to a particular embodiment, the acylisethionate or acylisethionates are chosen from the compounds having formula (I):



$$R^1-\overset{\overset{\displaystyle O}{\|}}{C}-O-\underset{\underset{\displaystyle R^3}{|}}{\overset{\overset{\displaystyle R^2}{|}}{C}}-\underset{\underset{\displaystyle R^5}{|}}{\overset{\overset{\displaystyle R^4}{|}}{C}}-SO_3^-\,M^+$$

(I)

wherein:

R1 is a linear or branched, saturated or unsaturated hydrocarbon chain, comprising from 7 to 29 carbon atoms, preferably from 9 to 17 carbon atoms, and more preferentially from 9 to 15, better from 9 to 13;

M+ designates a hydrogen atom, an alkali metal such as Na, Li, K, preferably Na or K, an alkali earth metal such as Mg or an ammonium group;

R2, R3, R4 and R5 are, independently from one another, a hydrogen atom, or a linear or branched alkyl group comprising from 1 to 4 carbon atoms.

According to a particular embodiment, R1 is an alkyl group comprising from 7 to 29 carbon atoms, preferably from 9 to 17 carbon atoms, and more preferentially from 9 to 15, better from 9 to 13. Preferably, R1-CO- is a cocoyl group.

R2, R3, R4 and R5 are, independently from one another, a hydrogen atom, or a linear or branched alkyl group comprising from 1 to 4 carbon atoms such as methyl, ethyl, propyl or butyl, in particular a methyl group.

According to a particular embodiment, one of the radicals R4 or R5 is a linear or branched alkyl group comprising from 1 to 4 carbon atoms. Preferably, the radicals R2, R3, R4 and R5 are each a hydrogen atom.

When the acylisethionate or acylisethionates are in the form of salt, they can be chosen from alkali metal salts such as Na, Li, K, preferably Na or K, from alkaline earth metal salts such as Mg and ammonium salts.

Preferably, they are chosen from alkali metal salts, and more particularly sodium salt.

As examples of acylisethionates that can be used in the framework of the invention, mention can be made for example of a compound bearing the INCI name sodium lauroyl methyl isethionate such as the references Iselux LQ-CLR, Iselux LQ-CLR-SB or the sodium lauroyl methyl isethionate / sodium methyl isethionate mixture such as ISELUX (Pellets) proposed by INNOSPEC, or cocoyl isethionate, preferably sodium cocoyl isethionate, in particular the one sold under the name Hostapon SCI 85G® by Clariant or under the name Jordapon® CI by BASF.

The acylisethionate or acylisethionates can be present in the composition in a content ranging from 0.5% to 5% by weight, preferably from 1% to 4.5% by weight and better from 2% to 4% by weight in relation to the total weight of the composition.

Preferably, the expanded composition according to the invention has a (sulfosuccinate anionic surfactant) / (acylisethionate anionic surfactant) ratio by weight from 2.5 to 4, preferably from 2.6 to 3.9 and better from 2.7 to 3.8.

Modified starch

Starch(es) that can be used in this invention are particularly macromolecules in the form of polymers composed of elementary patterns that are anhydroglucose units. The number of these patterns and their assembly provide a means of distinguishing amylose (linear polymer) and amylopectin (ramified polymer). The relative proportions of amylose and of amylopectin, as well as their degree of polymerization, vary according to the plant origin of the starches.

The modified starch used in this invention contributes to the good stability of the expanded composition according to the invention.

The starch molecules used in this invention may originate from a plant source such as cereals, tubercles, roots, vegetables and fruits. Thus, the starch(es) may originate from a plant source chosen from among maize, peas, potatoes, sweet potatoes, banana, barley, wheat, rice, oat, sago, tapioca and sorghum. The starch is preferably derived from potatoes.

Hydrolysates from starches mentioned above may also be used.

Starches are usually in the form of a white powder, insoluble in cold water, with an elementary particle size varying from 3 to 100 microns.

The starches used in the composition according to the invention may be chemically modified by one or several of the following reactions: pregelatinization, oxidation, cross-linking, esterification, heat treatments.

In particular, these reactions may be performed as follows:

- pregelatinization by splitting starch granules (for example drying and baking in a dryer drum);
- oxidation by strong oxidants leading to the introduction of carboxyl groups in the starch molecule and depolymerization of the starch molecule (for example by treating an aqueous solution of starch by sodium hypochlorite);
- cross-linking by functional agents capable of reacting with hydroxyl groups of starch molecules that will thus be bonded to each other (for example with glyceryl and/or phosphate groups);
- esterification in an alkaline medium for grafting of functional groups, particularly acyl in C1-C6 (acetyl), hydroxyalkyled in C1-C6 (hydroxyethyl, hydroxypropyl), carboxymethyl) octenylsuccinic.

In particular, monostarch phosphates (of the Am-O-PO-(OX)2type), distarch phosphates (of the Am-O-PO-(OX)-O-Am type) or even tristarch phosphates (of the Am-O-PO-(O-Am)2type) or mixes of them may be obtained by cross linking with phosphorated compounds.

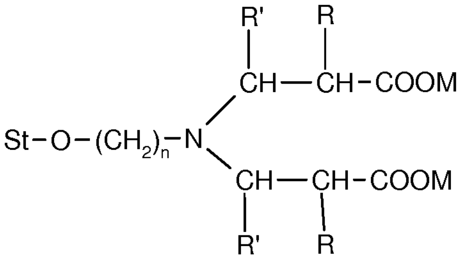
In particular, X denotes alkaline metals (for example sodium or potassium), alkaline earth metals (for example calcium, magnesium), ammonia salts, amine salts like monoethanolamine, diethanolamine, triethanolamine, amino-3 propanediol-1,2 salts, ammonium salts derived from basic aminoacids like as lysine, arginine, sarcosine, ornithine, citrulline.

The phosphorated compounds may for example be sodium tripolyphosphate, sodium orthophosphate, phosphorus oxichloride or sodium trimetaphosphate.

Distarch phosphates will be in particular used, or compounds rich in distarch phosphate such as the product marketed under references PREJEL VA-70-T AGGL (gelatinized hydroxypropylated manioc distarch phosphate) or PREJEL TK1 (gelatinized manioc distarch phosphate) or PREJEL 200 (gelatinized acetylated manioc distarch phosphate) by the AVEBE Company or STRUCTURE ZEA or STRUCTURE XL by the NATIONAL STARCH Company (gelatinized hydroxypropylated maize distarch phosphate).

Amphoteric starches can also be used in the invention, these amphoteric starches contain one or several anionic groups and one or several cationic groups. The anionic and cationic groups may be related to the same reactive site of the starch molecule or to different reactive sites, but they are preferably related to the same reactive site. The anionic groups may be of the carboxylic, phosphate or sulfate type, and preferably carboxylic. Cationic groups may be of the primary, secondary, tertiary of quaternary amine type.

Amphoteric starches are chosen particularly from among compounds with the following formulas:



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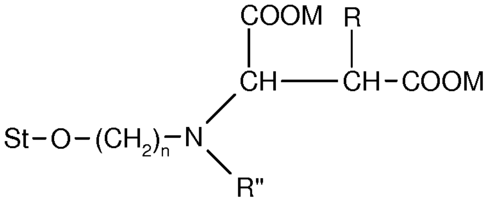

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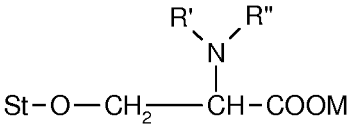
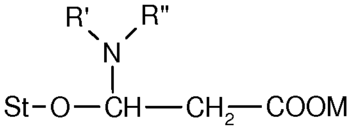


$$\mathrm{St{-}O{-}CH_2{-}CH(NR'R'')\text{-}COOM}$$

(I'')



$$\mathrm{St{-}O{-}CH(NR'R''){-}CH_2{-}COOM}$$

(I''')

formulas in which:

St-O represents a starch molecule,

R, identical or different, represents a hydrogen atom or a methyl group,

R', identical or different, represents a hydrogen atom, a methyl group or a -COOH group,

n is an integer equal to 2 or 3,

M, identical or different, denotes a hydrogen atom, an alkali metal or alkali earth metal such as Na, K, Li, NH4, a quaternary ammonium or an organic amine,

R'' represents a hydrogen atom or an alkyl group having from 1 to 18 carbon atoms.

These compounds are described particularly in patents US 5,455,340 and US 4,017,460 which are included as references.

As amphoteric starches, the starches having formulas (I) or (I') will in particular be used. In particular, potato starches modified by 2-chloroethyl aminodipropionic acid, i.e. starches of formula (I) or (I') are used in which R, R', R'' and M are a hydrogen atom and n is equal to 2. Mention can be made in particular of potato starch modified by 2-chloroethyl aminodipropionic acid neutralized with soda, marketed under the reference STRUCTURE SOLANACE by NATIONAL STARCH.

O-carboxymethylated starch designates a starch that has been modified by substitution, in the free hydroxyl groups, of a hydrogen with a carboxymethylated group –CH2COOH. It can be as such, or in the form of salt, for example an alkali metal salt.

O-carboxymethylated starches can be prepared, for example, by reacting a starch with monochloroacetic acid, or a monochloroacetic acid alkali salt (for example sodium salt).

Preferably, and O-carboxymethylated starch is used that has the form of an alkali metal salt, and more preferably, in the form of a sodium salt.

Preferably, the O-carboxymethylated starch is prepared using potato starch.

The O-carboxymethylated starch can also be partially or entirely cross-linked. Preferably, it is partially cross-linked. The cross-linking of the starch can be carried out for example by heating the starch, or by having it react with cross-linking agents such as phosphates, glycerol.

Even more preferably, the O-carboxymethylated starch is a sodium salt of starch, in particular of potato, O-carboxymethylated and partially cross-linked. Such a product is for example marketed under the name PRIMOJEL by AVEBE.

The modified starch can be present in the composition in a content ranging from 0.5% to 5% by weight, preferably from 1% to 4% by weight and better from 1.5% to 3.5% by weight in relation to the total weight of the composition.

The expanded composition according to the invention can also comprise various additives, such as conditioning agents, thickeners that confer gentleness when applied and/or preservatives.

The expanded composition according to the invention can in particular comprise at least one conditioning agent, in order to increase the quantity of foam.

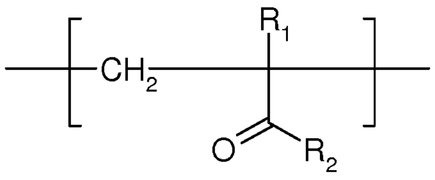
This conditioning agent can be chosen from amphoteric polymers comprising the repetition of:

(i) one or several patterns coming from a monomer of the (meth)acrylamide type,

(ii) one or several patterns coming from a monomer of the (meth)acrylamidoalkyltrialkylammonium type, and

(iii) one or several patterns coming from an acid monomer of the (meth)acrylic acid type.

Preferably, the patterns coming from a monomer of the (meth)acrylamide (i) type of the amphoteric polymer are patterns of the following structure (II):



(II)

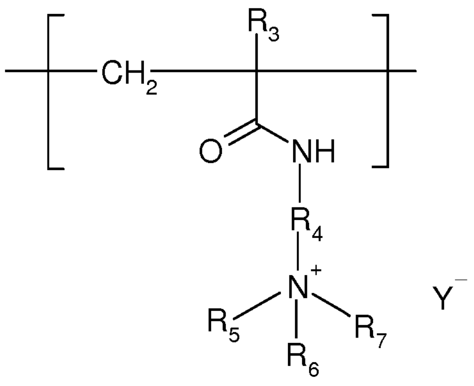
in which:

- R1 designates H or CH3,
- R2 is chosen from an amino, dimethylamino, tert-butylamino, dodecylamino, or -NH-CH2OH group.

Preferably, the amphoteric polymer comprises the repetition of only a single pattern of formula (II).

The pattern coming from a monomer of the (meth)acrylamide type of formula (II) in which R1 designates H and R2 is an amino radical is particularly preferred. It corresponds to the acrylamide monomer strictly speaking.

Also preferably, the patterns coming from a monomer of the (meth)acrylamidoalkyltrialkylammonium (ii) type of the amphoteric polymer are patterns of the following structure (III):



(III)

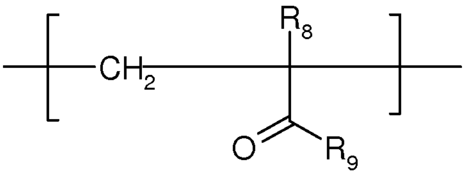
in which:

- R3 designates H or CH3,
- R4 designates a (CH2)k group with k an integer from 1 to 6, and preferably from 2 to 4;
- R5 and R6, and R7, identical or different, each designate an alkyl group having from 1 to 4 carbon atoms;
- Y- is an anion such as bromide, chloride, acetate, borate, citrate, tartrate, bisulfate, bisulfite, sulfate, phosphate.

Among these patterns coming from a monomer of the (meth)acrylamidoalkyltrialkylammonium type, preference is given to those coming from the methacrylamidopropyltrimethylammonium chloride monomer, for which R3 designates a methyl group, k is 3, R5, R6 and R7 designate a methyl group, and Y- designates a chloride anion.

Preferably, the amphoteric polymer comprises the repetition of only a single pattern of formula (III).

Finally, the patterns coming from an acid monomer of the (meth)acrylic acid type (iii) of the amphoteric polymer are preferably chosen from the patterns of formula (IV):



(IV)

in which:

- R8 designates H or CH3,
- R9 designates a hydroxyl group or a –NH-C(CH3)2-CH2-SO3H group.

The preferred patterns of formula (IV) correspond to the acrylic acid, methacrylic acid and 2-acrylamido 2-methyl propane sulfonic acid monomers.

Preferably, the pattern coming from an acid monomer of the (meth)acrylic acid type is that coming from acrylic acid, for which R8 designates a hydrogen atom and R9 designates a hydroxyl radical.

The acid monomer or monomers of the (meth)acrylic acid type can be non-neutralized or partially or entirely neutralized by an organic or mineral base.

Preferably, the amphoteric polymer comprises the repetition of only a single pattern of formula (IV).

According to a preferred embodiment of the invention, the amphoteric polymer or polymers comprise at least 30% in moles of patterns coming from a monomer of the (meth)acrylamide type. Preferably, they comprise from 30 to 70% in moles of patterns coming from a monomer of the (meth)acrylamide type, more preferably from 40 to 60% in moles, with respect to the total number of moles of monomers present in the amphoteric polymer.

The contents in patterns coming from a monomer of the (meth)acrylamidoalkyltrialkylammonium type can advantageously be the following: from 10 to 60% in moles, preferably from 20 to 55% in moles with respect to the total number of moles of monomers present in the amphoteric polymer.

The contents in patterns coming from an acid monomer of the (meth)acrylic acid type can advantageously be the following: from 1 to 20% in moles, preferably from 5 to 15% in moles with respect to the total number of moles of monomers present in the amphoteric polymer.

According to a preferred embodiment of the invention, the amphoteric polymer comprises:

- from 30 to 70% in moles of patterns coming from a monomer of the (meth)acrylamide type, more preferably from 40 to 60% in moles,
- from 10 to 60% in moles, preferably from 20 to 55% in moles of patterns coming from a monomer of the (meth)acrylamidoalkyltrialkylammonium type,
- from 1 to 20% in moles, preferably from 5 to 15% in moles of patterns coming from an acid monomer of the (meth)acrylic acid type,

with respect to the total number of moles of monomers present in the amphoteric polymer.

The amphoteric polymer or polymers can also comprise additional patterns, different from the patterns coming from a monomer of the (meth)acrylamide type, of the (meth)acrylamidoalkyltrialkylammonium type and of the (meth)acrylic acid type.

According to a preferred embodiment of the invention, the amphoteric polymer or polymers are comprised solely of patterns coming from monomers of the (meth)acrylamide type (i), of the (meth)acrylamidoalkyltrialkylammonium type (ii) and of the (meth)acrylic acid type (iii).

More particularly, the amphoteric polymer comprises patterns coming from the following monomers (i) acrylamide, (ii) acrylamidopropyl trimethylammonium chloride, and (iii) acrylic acid.

As examples of particularly preferred amphoteric polymers, mention can be made of acrylamide terpolymers/methacrylamidopropyltrimethylammonium chloride (MAPTAC)/acrylic acid. Such polymers are listed in the C.T.F.A. dictionary International Cosmetic Ingredient Dictionary, 10th edition 2004, under the name "Polyquaternium 53". Corresponding products are in particular marketed under the names MERQUAT 2003 or MERQUAT 2003PR by NALCO.

The amphoteric polymer can be prepared conventionally, by polymerization using its various monomers, according to techniques known to those skilled in the art and in particular by radical polymerization.

The amphoteric polymer can be present in the composition in a content of active material ranging from 0.05% to 1% by weight, preferably from 0.05% to 0.5% by weight relative to the total weight of the composition.

The composition according to the invention can also comprise at least one thickener. This thickener can furthermore improve the sensory effects when applied, and in particular confer gentleness when applied. The thickener is preferably chosen from esters or PEG esters.

These esters or PEG esters have the following formula (A):

$$R1\text{-}(O\text{-}CH2\text{-}CH2)n\text{-}OR2$$

in which R1 designates an alkyl group or a linear or branched, saturated or unsaturated acyl group having from 8 to 30 carbon atoms,

R2 designates a hydrogen atom, a linear or branched, saturated or unsaturated alkyl group or acyl group having from 1 to 30 carbon atoms, and

n is an integer between 80 and 350.

Preferably R1 is an acyl group having from 12 to 20 carbon atoms.

Preferably R2 is an acyl group comprising 12 to 20 carbon atoms.

Preferably n is an integer between 100 and 300.

Preferably, the weight ratio of the hydrophilic portion (-(O-CH2-CH2)nO) over the hydrophobic portion (R1 and/or R2) is between 8 and 1000.

A compound having formula (A) in which R1 and R2 designate an acyl group having from 12 to 20 carbon atoms and n is between 100 and 300 is preferably used.

Mention can be made for example of PEG-150 distearate and PEG-250 distearate.

Such compounds are in particular sold under the trade name Emanon 32998 by KAO and under the trade name KESSCO PEG 6000 DS by AKZO.

The PEG ether or ester having formula (A) is generally present in a content between 0.1 and 5% and preferably between 0.5 and 3% by weight, better between 1 and 2.5% by weight in relation to the total weight of the composition.

The expanded compositions according to the invention can be prepared by methods of mixing, stirring, or dispersion of compressed gases such as air, nitrogen, carbon dioxide, a nitrogen oxide or a noble gas.

In particular, the composition is prepared by mixing, generally hot, of ingredients under stirring then expansion under the action of a gas, with the gas able to be introduced during the step of cooling of the composition, or after preparation of the composition, for example using an expender of the Mondomix type, a mixer of the Kenwood type, scraped surface exchanger or a dynamic mixer (Becomix tank for example). The gas is preferably air or nitrogen.

The composition according to the invention can also be used as a shaving composition.

As such, this invention also relates to a shaving method comprising a step of application of the composition according to the invention on the skin in particular on the face.
This step is followed by a step of shaving, advantageously by means of a razor, of keratin fibers, in particular the hairs of the zone whereon the composition has been applied.

The invention will now be illustrated using the following examples. The examples hereinafter are given by way of illustration and are not intended to limit the invention. Unless mentioned otherwise, the quantities are given as a percentage by weight.

Example 1: Expanded cleansing composition according to the invention

The composition is prepared according to the method described hereinafter:

The water, propylene glycol, preservatives, modified starch are mixed at 75°C in a tank under a turbine, then the surfactants are added. It was cooled to 62°C and the cationic polymer and the PEG-150 distearate are added. It was cooled to 50°C and then sorbitol and the glycerin were added. It was cooled to 20°C by introducing air starting at 30°C using an open valve of the turbine in order to as such obtained an expanded composition.

Ingredients	**Quantity (% by weight)**
Propylene glycol	15%
Glycerin	20%
Sorbitol	15%
Terpolymer acrylic acid/acrylamide/ methacrylamidopropyltrimonium chloride in aqueous solution at 20.5% of active material in the water (MERQUAT® 2003PR POLYMER from Nalco)	0.75%
PEG-150 Distearate (KESSCO PEG 6000 DS from Akzo)	1.5%
Disodium lauryl sulfosuccinate (REWOPOL® SB F 12 P from Evonik Goldschmidt)	10.15%
Sodium cocoyl isethionate (Hostapon SCI 85G® from Clariant)	3.45%
Hydroxypropyl starch phosphate (STRUCTURE XL from Akzo Nobel)	3%
Preservatives q.s.	

Water	qs 100%

The density parameters were measured according to the protocols described hereinabove.

The results are as follows:
Density before expansion = 0.99
Density after expansion = 0.5

The expanded composition is stable after storage for at least 2 months at 4°C and at ambient temperature (25°C).

The composition obtained is used to cleanse the face in the following way: a small quantity of the composition was taken which was placed in the palm of the hand; water was added then the mixture was made to foam, which was then applied on the face. This was then rinsed with water.

The product was also used as a shaving foam product: the composition obtained was applied on the beard, the made to foam with water and then shaving was carried out, then rinsed with water.

Comparative example 1': Comparative composition

The composition is similar to that of the example 1, but it is free of disodium lauryl sulfosuccinate, and free of hydroxypropyl starch phosphate. The quantities are offset by the water):

Ingredients	**Quantity (% by weight)**
Propylene glycol	15%
Glycerin	20%
Sorbitol	15%
Terpolymer acrylic acid/acrylamide/ methacrylamidopropyltrimonium chloride in aqueous solution at 20.5% of active material in the water (MERQUAT® 2003PR POLYMER from Nalco)	0.75%

PEG-150 Distearate	1.5%
(KESSCO PEG 6000 DS from Akzo)	
Sodium cocoyl isethionate	3.45%
(Hostapon SCI 85G® from Clariant)	
Preservatives q.s.	
Water	qs 100%

The density parameters were measured according to the protocols described hereinabove.

The results are as follows:
Density after expansion = 1.0174

The comparative composition 1' is very different from that of example 1: it is fluid, and after the step of expansion, the composition does not retain the air bubbles, it is therefore not aerated.
The comparative composition 1' is not stable at ambient temperature after storage for one week: it has a phase shift.

Examples 2 and 3: Expanded cleansing products according to the invention

The following composition was prepared:

Ingredients	**Quantity (% by weight)**
Propylene glycol	15%
Glycerin	20%
Sorbitol	15%
Disodium lauryl sulfosuccinate	
(REWOPOL® SB F 12 P from Evonik Goldschmidt)	10.15%
Sodium cocoyl isethionate	
(Hostapon SCI 85G® from Clariant)	3.45%
Hydroxypropyl starch phosphate	
(STRUCTURE XL from Akzo Nobel)	3%
Preservatives q.s.	
Water	qs 100%

After expanding at different aeration rates, the following was obtained:

- a composition with a density of 0.72 (example 2), and
- a composition with a density of 0.89 (example 3).

The two compositions have good stability. The compositions are suitable for the cleansing of the face, according to the same protocol as that described in example 1.

CLAIMS

1. Cosmetic composition comprising an aqueous phase comprising:
- an anionic surfactant chosen from sulfosuccinates,
- an anionic surfactant chosen from acylisethionates,
- a modified starch, and
- at least 30% by weight in relation to the total weight of the composition of at least one polyol comprising from 2 to 8 carbon atoms,

with the composition being expanded.

2. Composition according to claim 1, characterized in that it has a density less than 0.95, preferably a density from 0.4 to 0.9 and preferably from 0.4 to 0.8.

3. Composition according to one of claims 1 to 2, characterized in that it comprises a quantity of water from 25% to 50% by weight, preferably from 30% to 45% by weight, and better from 30% to 40% by weight in relation to the total weight of the composition.

4. Composition according to one of claims 1 to 3, characterized in that the polyol comprising from 2 to 8 carbon atoms is present in a quantity between 35% and 60% by weight, preferably between 40% and 55% by weight and better between 45% to 55% by weight in relation to the total weight of the composition.

5. Composition according to one of claims 1 to 4, characterized in that the polyol comprising from 2 to 8 carbon atoms is chosen from glycerin, sorbitol, glycols such as butylene glycol, propylene glycol, isoprene glycol, dipropylene glycol, hexylene glycol and polypropylene glycol.

6. Composition according to one of claims 1 to 5, characterized in that the sulfosuccinate anionic surfactant is chosen from an alkyl(C8-C30)sulfosuccinate, an alkyl(C8-C30)amide-sulfosuccinate, oxyalkylenated or not, and preferably from alkyl(C8-C30)sulfosuccinates and alkyl(C8-C30)ethersulfosuccinates.

7. Composition according to one of claims 1 to 6, characterized in that the sulfosuccinate anionic surfactant responds to the following formula:

$$CH_3-(CH_2)_n-(O-CH_2-CH_2)_m-O-CO-CH(SO_3M)-CH_2-CO-OM'$$

wherein:

n designates an integer ranging from 7 to 29, preferably from 9 to 17, and even more preferably from 9 to 15, preferably from 9 to 13;

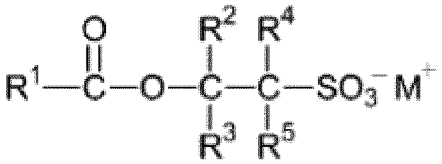
m designates an integer varying from 0 to 50,

M and M' designate, independently of each other, a hydrogen atom, an alkali metal or alkali earth metal, an ammonium group or a cation coming from an amine.

8. Composition according to one of claims 1 to 7, characterized in that the sulfosuccinate anionic surfactant is an alkylsulfosuccinate oxyalkylenated or not in which the alkyl radical comprises from 8 to 30 carbon atoms, preferably from 10 to 18, and more preferably from 10 to 16, preferably from 10 to 14, more preferably if it is a lauryl or laurethsulfosuccinate, even more preferably a lauryl or laurethsulfosuccinate alkali metal salt, and even more preferably disodium lauryl sulfosuccinate or disodium laureth sulfosuccinate.

9. Composition according to any one of claims 1 to 8, characterized in that the sulfosuccinate anionic surfactant polymer is present in a content of active material ranging from 5% to 15% by weight, preferably from 7% to 13% by weight, and better from 8.5% to 11.5% by weight with respect to the total weight of the composition.

10. Composition according to one of claims 1 to 9, characterized in that the sulfosuccinate anionic surfactant is chosen from compounds having formula (I):



$$R^1-\overset{\overset{\displaystyle O}{\|}}{C}-O-\underset{\underset{\displaystyle R^3}{|}}{\overset{\overset{\displaystyle R^2}{|}}{C}}-\underset{\underset{\displaystyle R^5}{|}}{\overset{\overset{\displaystyle R^4}{|}}{C}}-SO_3^-\,M^+$$

(I)

wherein:

R1 is a linear or branched, saturated or unsaturated hydrocarbon chain, comprising from 7 to 29 carbon atoms, preferably from 9 to 17 carbon atoms, and more preferentially from 9 to 15, better from 9 to 13;

M+ designates a hydrogen atom, an alkali metal such as Na, Li, K, preferably Na or K, an alkali earth metal such as Mg or an ammonium group;

R2, R3, R4 and R5 are, independently from one another, a hydrogen atom, or a linear or branched alkyl group comprising from 1 to 4 carbon atoms.

11. Composition according to one of claims 1 to 10, characterized in that the acylisethionate anionic surfactant is chosen from sodium lauroyl methyl isethionate, sodium lauroyl methyl isethionate / sodium methyl isethionate mixture and cocoyl isethionate, preferably sodium cocoyl isethionate.

12. Composition according to any of claims 1 to 11, characterized in that the acylisethionate anionic surfactant is present in a content of ranging from 0.5% to 5% by weight, preferably from 1% to 4.5% by weight and better from 2% to 4% by weight with respect to the total weight of the composition.

13. Composition according to one of claims 1 to 12, characterized in that the modified starch is a monoamidon phosphate of the Am-O-PO-(OX)2 type, a diamidon phosphate of the Am-O-PO-(OX)-O-Am type or a triamidon phosphate of the Am-O-PO- (O-Am)2) type, where X designates an alkali metal, an alkali earth metal, an ammonia salt, an amine salt or an ammonium salt coming from a basic amino acid.

14. Composition according to any of claims 1 to 13, characterized in that it comprises a least one conditioning agent from among amphoteric polymers comprising the repetition of:
(i) one or several patterns coming from a monomer of the (meth)acrylamide type,
(ii) one or several patterns coming from a monomer of the (meth)acrylamidoalkyltrialkylammonium type, and
(iii) one or several patterns coming from an acid monomer of the (meth)acrylic acid type.

15. Composition according to any of claims 1 to 14, characterized in that it comprises a least one thickener, preferable chosen from PEG esters or ethers having the following formula (A):

$$R1\text{-}(O\text{-}CH2\text{-}CH2)n\text{-}OR2$$

in which R1 designates an alkyl group or a linear or branched, saturated or unsaturated acyl group having from 8 to 30 carbon atoms,
R2 designates a hydrogen atom, a linear or branched, saturated or unsaturated alkyl group or acyl group having from 1 to 30 carbon atoms, and
n is an integer between 80 and 350.

16. Method for cleansing keratin materials comprising the applying of a cosmetic composition according to one of claims 1 to 15 onto said keratin materials.

17. Method for shaving, comprising the applying of a composition according to one of claims 1 to 15 on the face.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/058289

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61K8/34 A61K8/46 A61Q9/02 A61Q19/10 A61K8/73
A61K8/04
ADD.

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

B. FIELDS SEARCHED

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

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

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

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 2 740 467 A1 (OTC GMBH [DE]) 11 June 2014 (2014-06-11) paragraphs [0001], [0008] claims 1-4, 6, 14-15 example 2 -----	1-17
Y	WO 2004/022684 A1 (KIMBERLY CLARK CO [US]) 18 March 2004 (2004-03-18) claim 1 table 5 page 2, lines 1-3, 25-26 -----	1-17
Y	FR 3 007 641 A1 (OREAL [FR]) 2 January 2015 (2015-01-02) claim 1 ----- -/--	1-17

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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

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

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

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search 16 May 2018	Date of mailing of the international search report 01/06/2018
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Briand, Benoit

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	LE GRIMOIRE DU CHAMANE: "le cleanser conditionner français", INTERNET CITATION, 8 April 2014 (2014-04-08), XP002772674, Retrieved from the Internet: URL:http://chamanedaniel.canalblog.com/archives/2014/04/08/29624368.html [retrieved on 2017-08-01] the whole document -----	1-17

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/058289

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