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(21) International Application Number: PCT/EP93/03096 (22) International Filing Date: 4 November 1993 (04.11.93) (30) Priority data: 9223604.1 11 November 1992 (11.11.92) GB (71) Applicant (for AU BB CA GB IE LK MN MW NZ SD only): UNILEVER PLC [GB/GB]; Unilever House, Blackfriars, London EC4P 4BQ (GB). (71) Applicant (for all designated States except AU BB CA GB IE LK MN MW NZ SD): UNILEVER NV [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL). (72) Inventors: FRANKLIN, Kevin, Ronald ; 2a Downham Road North, Heswall, Wirral, Merseyside L61 6UR (GB). HEWITT-JONES, Jacqueline, Diane ; 6a Barsbank Lane, Lymm, Cheshire WA13 OES (GB).		(74) Agent: TONGE, Robert, James; Unilever plc, Patent Division, Colworth House, Sharnbrook, Bedford MK44 1LQ (GB). (81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CZ, DE, DK, ES, FI, GB, HU, JP, KP, KR, KZ, LK, LU, LV, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SK, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: COSMETIC COMPOSITION (57) Abstract A gel composition having anti-microbial action comprising: (i) a zinc aluminium layered double hydroxide having the general structure (1): $[Zn_{(1-x)}Al_x(OH)_2]^x + B^{y-x/y} \cdot ZH_2O$, where B is an interlayer anion, y is a charge on the anion, x is 0.1 to 0.5, z is 0 to 100 providing that at least 50 % of the interlayer anion is selected from a monocarboxylic acid, a monoalkyl sulphate, a monoalkyl ether sulphate, an alkyl benzene sulphonate and mixtures thereof; and (ii) a lipophillic organic compound that is liquid at room temperature.		

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COSMETIC COMPOSITIONFIELD OF INVENTION

5 The invention relates to a novel gel composition having antimicrobial action which can be applied topically to the human body surface, especially the skin (including the mucosae), hair and nails, comprising a zinc aluminium layered double hydroxide and a lipophilic organic compound
10 that is liquid at room temperature.

BACKGROUND AND PRIOR ART

15 Most cosmetic compositions contain gels which have an influence on the final properties of the final composition.

Known gel compositions contain swellable clay minerals with layer structures which take up liquid with formation of a highly viscous gel. However, such gel compositions contain
20 a high percentage of polar additives such that they may have a skin-irritant effect.

DE 37 32 265 (Giulini Chemie GmbH) discloses gel compositions containing a magnesium aluminium hydroxo compound having a layered structure and a lipophilic organic compound which is liquid at room temperature.
25 However such gel compositions do not contain skin benefit properties without the further addition of compounds to the gel formulation.

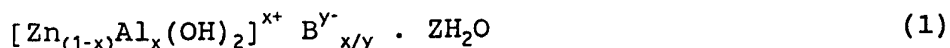
30 We have now found that gel formulations comprising a zinc aluminium layered hydroxide and a lipophilic organic compound which is liquid at room temperature has all the benefits claimed by Giulini in DE 37 37 265 but also
35 surprisingly has highly desirable benefit properties such as antimicrobial activity.

SUMMARY OF THE INVENTION

Accordingly the invention provides a gel composition having anti-microbial action comprising:

5

(i) a zinc aluminium layered double hydroxide having the general structure (1)



10

where B is an interlayer anion
y is a charge on the anion
x is 0.1 to 0.5
z is 0 to 100

15

providing that at least 50% of the interlayer anion is selected from a monocarboxylic acid having the general structure (2)

20



a monoalkyl sulphate group having the general structure (3);

25



a monoalkyl ether sulphate group having the general structure (4)

30



an alkyl benzene sulphonate group having the general structure (5)

35



and mixtures thereof

where n is an integer of from 6 to 20
and m is an integer of from 1 to 6; and

(ii) a lipophillic organic compound that is liquid at room
5 temperature.

DEFINITION OF THE INVENTION

The gel composition according to the invention, in its
10 simplest form, comprises a zinc aluminium layered double
hydroxide and a lipophillic organic compound that is liquid
at room temperature.

The gel composition so formed will generally retain its
15 gel-like characteristics over a wide temperature range for
example from -15°C to $+60^{\circ}\text{C}$.

The zinc aluminium layered double hydroxide

20 With respect to structure (1) as defined above, x is
preferably 0.15 to 0.4; more preferably 0.25 to 0.35 and z
is preferably 0 to 4, more preferably 0 to 1.

Also with respect to structure (1), it is preferred that at
25 least 70%, and most preferred at least 80%, of the
interlayer anion (B) is selected from monocarboxylate, mono
alkyl sulphate, monoalkyl ether sulphate, alkyl benzene
sulphonate or mixtures thereof, the respective structure
being as defined by structures (2), (3), (4) and (5).

30 Preferably the interlayer anion (B) is a monocarboxylic acid
having the general structure (2).

The remaining interlayer anion component may be any
35 inorganic or organic anion. Preferred are nitrate,
carbonate, sulphate, chloride, citrate, benzoate and
mixtures thereof.

Preferably gel compositions according to the invention comprise 1 to 40 wt%, more preferably 5 to 40 wt% and even more preferably 15 to 40 wt % of the zinc aluminium layered double hydroxide.

5

Synthesis of the zinc aluminium layered double hydroxide

The Zn/Al layered double hydroxides may be prepared by several methods. Not wishing to preclude other routes, they may be precipitated from a solution containing a mixture of zinc and aluminium salts (for example, nitrates, chlorides, sulphates) by addition of sodium hydroxide or a similar base as detailed by Thevenot et al (Clays and Clay Minerals (1989) 5 396) or by direct reaction of a zinc oxide slurry with an aluminium salt solution. The crystallinity and crystal size of the product may subsequently be increased by ageing the layered double hydroxide in its supernatant at temperatures up to 200°C. Moncarboxylate, sulphonate, alkyl sulphate or alkyl ether sulphate ions may be introduced into the layered double hydroxide by ion exchange or using the partial decomposition-reformation procedure described by Dimotakis and Pinnavaia (Inorganic Chemistry (1990) 13, 2393).

It is preferred that the crystal size is small since smaller crystals provide better thickening properties. Especially preferred are crystals having a plate diameter of less than 0.2 μm .

Specific Examples of synthesis

1. Zn/Al hydroxy nitrate

Preparation

35

94.5g of zinc oxide (ZnO) were weighed into a 1 litre polypropylene bottle and then slurried in 250ml water.

145.1g of aluminium nitrate ($\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$) were dissolved in 500ml of water and then added with stirring to the slurry. The bottle was capped, shaken vigorously, and then placed in a thermostated oven at 90°C for 6 days. The solid was filtered off, washed thoroughly with water, and then freeze dried. The material was finally equilibrated with water vapour at a water activity of 0.75.

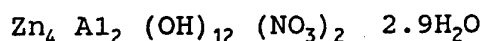
Characterisation

Confirmed by XRD to be a layered double hydroxide with the Hydrotalcite structure. The basal spacing was 8.8Å (characteristic of a nitrate form material).

The Zn/Al ratio was found by XRF analysis to be 2.0.

IR indicated that Nitrate is the only anion present.

The water content was determined by thermal analysis and is consistent with the molar composition.



The water is labile and may vary slightly with storage.

TEM shows the crystals to be stacks of hexagonal plates of about 0.2µm diameter.

2. Zn/Al HYDROXY LAURATE

Preparation

A solution of potassium laurate was first prepared by dissolving 28.43g of lauric acid and 8.34g of potassium hydroxide in 700ml of water and heating to about 70°C. 50g of Zn/Al hydroxy nitrate, prepared according to the method above, were placed in a 1L polypropylene bottle and the

potassium laurate solution was added. The bottle was capped, shaken for 2 minutes and then placed in a thermostated oven at 90°C for 18 hrs. The solid was filtered off, washed thoroughly with hot water, and freeze
5 dried. The material was finally equilibrated with water vapour at a water activity of 0.75.

Characterisation

10 XRD showed the material was a layered double hydroxide and that the basal spacing had increased from 8.8Å to 24Å.

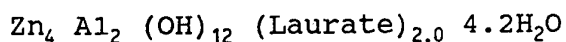
Thermal analysis and elemental micro analysis gave the following percentages

15

% Residual Oxide (4 ZnO, Al ₂ O ₃)	= 42.51%
% Carbon	= 29.68%

This is consistent with the molar composition

20



3. Zn/Al HYDROXY STEARATE

25 Preparation

The procedure in 2) above was followed except that the lauric acid was replaced with 40.66g of stearic acid.

30 Characterisation

XRD showed the material was still a layered double hydroxide and that the basal spacing had increased from 8.8Å to 30.5Å.

35

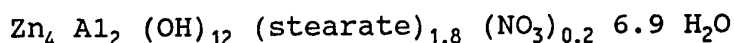
Thermal analysis and elemental micro analysis gave the following percentages

7

% Residual Oxide (4 ZnO, Al₂O₃) = 36.55%
% Carbon = 33.72%

This is consistent with the molar composition

5



4. Zn/Al HYDROXY OCTANOATE

10 Preparation

The procedure in 2 above was followed except that the lauric acid and potassium hydroxide were replaced with 23.8g of sodium octanoate.

15

Characterisation

XRD showed the material was still a layered double hydroxide and that the basal spacing had increased from 8.8Å to 19.5Å.

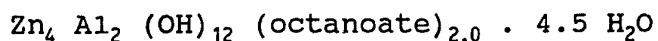
20

Thermal analysis and elemental micro analysis gave the following percentages

25 % Residual Oxide (4 ZnO, Al₂O₃) = 48.20%
 % Carbon = 21.82%

This is consistent with the molar composition

30



The Lipophillic organic compound

Suitable compounds are liquid at room temperature (20°C).

35

Preferred lipophillic organic compounds may be selected from plant and animal fats, waxes and oils; marine oils;

paraffinic hydrocarbons; silicone oils; aliphatic and aromatic esters; higher alcohols and ethers and mixtures thereof.

5 Preferably gel compositions according to the invention comprise 50 to 90 wt % of the composition, more preferably 60 to 80 wt % of the composition and even more preferably 70 wt % of the composition of the lipophillic organic compounds.

10

OTHER INGREDIENTS

The gel composition according to the invention can optionally comprise other ingredients to provide additional skin or hair benefits.

15

In particular the gel composition may optionally comprise a secondary thickener compound that is solid at room temperature. Such secondary thickeners must also be compatible with, and able to form some structure in, the lipophillic organic compound disclosed above.

20

Preferred secondary thickeners may be selected from plant and animal fats, waxes and oils, paraffinic hydrocarbons; silicone oils; aliphatic and aromatic esters; higher alcohols and ethers; polyethylene and copolymers of polyethylene and mixtures thereof.

25

Examples of the preferred secondary thickeners include sucrose fatty acid polyesters (for example sucrose octaisostearate, sucrose octa-2-ethylhexanoate, those derived from palm and palmkernel oil mixtures, soyabean oil, soyabean and palm oil mixtures, palm oil, coconut oil and mixed fish oils); high melting point triglycerides (eg. hardened palm oil, hardened rape seed oil); Candeulla wax; jojoba wax; beeswax, paraffin waxes, petroleum waxes, ceracin wax; polyethylene homopolymers (such as A-C

30

35

polyethylene 1702 (trademark), A-C polyethylene 617 (trademark), A-C polyethylene 6 (trademark)); and polyethylene vinyl acetate copolymers (such as A-C ethylene-vinyl acetate 405 (trademark), A-C ethylene vinyl acetate 400 (trademark)).

Addition of such secondary thickeners is particularly advantageous because we have shown that their incorporation in gel compositions according to the invention increases the occlusive property of the gel. Such occlusive properties are highly desirable for skin care compositions since an occlusive layer prevents water loss through the skin to the environment, thereby allowing water diffusing from the underlying tissues to accumulate in the stratum corneum.

A gel composition according to the invention which additionally comprises a secondary thickener can therefore be used for providing an occlusive layer on human skin, hair or nails following topical application thereto of the gel composition.

Preferably gel compositions according to the invention comprise 0 to 40 wt % of the composition, even more preferably 10 to 30 wt % of the composition of the secondary thickener.

The gel composition according to the invention can also include healing agents, humectants, thickeners, antioxidants, stabilisers, film formers, emulsifiers, surfactants, sunscreens, preservatives, perfumes and colourants.

The gel composition according to the invention can also comprise other ingredients conventionally used in cosmetic products which are suited to topical application to human skin or hair.

Other ingredients, when present, can form up to 50% by weight of the composition and can conveniently form the balance of the gel base.

5 Process for preparing the gel composition

The invention also provides a process for the preparation of a gel suitable for topical application to skin or hair, which comprises the step of blending a layered, double
10 hydroxide as herein defined, with a solvent chosen from a lipophillic organic compound that is liquid at room temperature and optionally a secondary thickener compound as herein defined.

15 According to a preferred embodiment of the process for preparation of the gel, the layered double hydroxide and solvent are heated together with stirring to dissolve the layered double hydroxide. The suspension is then subjected to high shearing forces until thickening has occurred.

20 When polyethylene is used as an optional secondary thickener it is preferred to stir the suspension on cooling through the cloud point to ensure efficient gelling.

25 Use of the gel composition

The gel composition according to the invention is intended primarily as a product for topical application to human skin, to reduce moisture loss. The skin can thereby be
30 protected from adverse climatic conditions, for example from excessive exposure to sun and wind, or from detergent damage, for example that following immersion of the hands in aqueous detergent solution when washing dishes or clothes. A further use for the gel composition of the
35 invention is in the manufacture of colour cosmetics, lipsticks and lip salves.

The gel composition can also act as a carrier for sunscreen agents, perfumes or germicides or other skin benefit agents.

5 Furthermore, the gel can be combined with water to provide a water in oil emulsion. Such an emulsion may contain normal emulsifying agents or may, due to the intrinsic stabilising properties of the zinc aluminium layered double hydroxide, be prepared with no additional emulsifying agent.
10

The gel composition can also be used to treat the hair and the scalp, particularly as a hair hold preparation or grooming aid, to maintain hair in a desired configuration or style.
15

In use, a small quantity of the gel composition, for example from 1 to 5g, is applied to the skin or hair from a suitable container or applicator and, if necessary, it is then spread over and/or rubbed into the skin or hair using the hand or fingers or a suitable spreading device.
20

Product form and packaging

25 The gel composition of the invention can be formulated as a soft solid or jelly-like product having the rheological and other physical properties as herein defined, and it can be packaged in a suitable container to suit its viscosity and intended use by the consumer. For example, the gel composition can be stored in a deformable tube or in a lidded jar.
30

The invention accordingly also provides a closed container containing the gel composition as herein defined.
35

Physical properties of the gelsViscosity Measurement

5 Viscosity measurements were made using a Brookfield
Viscometer: a multispeed rotational viscometer calibrated
to measure the torque required to rotate a spindle,
attached to a Beryllium copper spring, at constant speed.
The measurements were taken using a Brookfield model RVT,
10 at a speed of 20 r.p.m., using a T-bar spindle D (cross bar
length 2.1cm), at room temperature (ca. 23°C) and using a
Helopath stand.

Procedure for Taking Measurements

15 The T-bar spindle D was attached to the viscometer coupling
and the instrument levelled using an internal spirit gauge.
The spindle was carefully inserted into the sample,
avoiding trapping air below the spindle surface, and the
20 locking lever depressed whilst the motor was started to
rotate the spindle. Slow release of the locking lever
allows a pointer to move on the viscosity scale and this is
given 5-10 seconds to steady before locking in position.
The motor was switched off and the reading on the scale
25 taken. From this:

$$\text{VISCOSITY} = \text{READING} \times \text{SPINDLE FACTOR}^*$$

* factor for spindle D = 1000

30

Four measurements were taken for each sample and an average
recorded.

(ii) Occlusivity

35

The gel composition according to the invention may have a
significant Occlusivity Value if secondary thickeners are

included in the composition, such compositions may be employed like petrolatum, to provide an occlusive layer on skin or elsewhere on the body surface. For such a use it is preferred that the gel composition will have an
5 Occlusivity Value of at least 20%, as measured by the Occlusivity Value Test. Details of how this test is performed are given below.

Occlusivity Value Test

10

In view of the wide variation in the characteristics and properties of human skin, as seen amongst a group of individuals of differing ages, races and habitat, it is necessary to provide a standard in vitro test which is
15 readily reproducible, in order to measure the occlusivity of the gel composition.

An empirical test has accordingly been devised using a standard viscose cellulose film, namely Visking dialysis
20 tubing available from Medicell International Ltd. as a substitute for human skin. This film has a molecular weight cut-off of from 12,000 to 14,000.

In this test, the occlusivity of a film of the oleogel to the passage of water vapour applied to the dialysis film is
25 measured in a standard manner as follows:

Preparation of occlusivity cell

30 A 5ml beaker, for example a Dispo beaker available from American Scientific Products, the diameter of the open end of which is 25mm (i.e. an area of $\sim 5\text{cm}^2$), is used to provide an occlusivity cell.

35 1ml distilled water is introduced into the beaker and a film of Visking dialysis tubing is stretched across the open end of the beaker and fixed in place with adhesive,

for example Assembly Aid Adhesive (3M).

5 The rate of water loss through the Visking film at 20°C, at atmospheric pressure and at 50% external relative humidity, is determined by measuring the decrease in weight of the beaker with time using a Sartorius 4503 microbalance, with a D to A converter feeding the output to a chart recorder.

10 After a steady-state water loss rate has been established, a product whose Occlusivity Value is to be tested, i.e. the gel composition of the invention is applied as a film to the surface of the Visking dialysis tubing. When the test substance is liquid or a soft solid, it can be applied using a plastic-gloved finger. When the test material is
15 a solid, it is necessary first to melt it as it is applied to the surface of the Visking dialysis film.

The new steady-state water loss rate, under the same physical conditions of pressure, temperature and relative
20 humidity, is then recorded after excess water from the product has been lost.

Occlusivity of the product film (i.e. the gel composition) is then calculated as:

25

$$\% \text{ occlusivity} = 1 - \frac{\text{water loss rate with product}}{\text{water loss rate without product}} \times 100$$

30 All water loss rates are corrected for the relatively small rate of water loss through the walls of the beaker (if any). This is determined by measuring the water loss from a beaker where the Visking film is replaced with
35 impermeable aluminium foil.

Occlusivity is normally determined 4 times for each sample.

For each measurement, the sample loading is determined from the increase in recorded weight immediately after application to the Visking film of the composition of the invention. Since the loading is not reproducible precisely, a straight line is fitted to a loading versus occlusivity plot (by linear regression) and the occlusivity at a typical consumer product loading of 10g/sq m is then interpolated. In each case, the occlusivity is approximately linearly dependent on the loading for the range covered.

The occlusivity is then expressed as an arithmetic mean of the 4 determinations $\pm$ 2 standard errors for 95% significance.

Experience has shown that about 10mg of the product applied to the Visking film is sufficient to provide an occlusive layer; without an occlusive layer, the film will normally transmit about 25g water vapour/m²/hr.

EXAMPLES

The invention is illustrated with reference to the following examples in accordance with the invention.

EXAMPLE 1, COMPARATIVE EXAMPLE A

In a weakly acidic environment such as that found on skin, the Zn/Al laurate layered double hydroxide releases zinc ions which results in antimicrobial activity and confers a mild antiseptic character on products. This was demonstrated by simulating this activity in a microbial challenge test. The anti-microbial activity of Zn/Al laurate layered double hydroxide (Example 1) was compared with the anti-microbial activity of Mg/Al laurate layered double hydroxide (comparative Example A).

Mixtures of the layered double hydroxide (0.6g) in glycerol (0.1g) and 1M hydrochloric acid (0.6g) were prepared. These mixtures had a pH of 6-7.

5 Agar was seeded with the test organism Candida albicans (1ml of inoculum in 100ml agar) and the plates allowed to settle. Using a sterile spatula, the layered double hydroxide mixture was placed onto the centre of the agar plate. The plate was then incubated at 28°C for at least
10 four days.

Results: Zones of inhibition were observed around the Zn/Al laurate double layered hydroxide, but not around the Mg/Al laurate double layered hydroxide.

15

EXAMPLES 2-5

Simple two component gels prepared with Zn/Al laurate layered double hydroxides

20

40g Zn/Al laurate layered double hydroxide powder was suspended in 60g of oil in a beaker. The suspension was stirred vigorously with a Heidolph overhead stirrer and heated to about 90°C. The heat was removed and the
25 resulting gel allowed to cool. Viscosity results for the gels are given in Table 1.

Table 1

30

Example	Type of Oil	Viscosity (CP)
2	Sunflower Oil	86540
3	Carnation Mineral Oil	24583
4	Volatile Silicone *	15380
5	Rapeseed Oil +	29000

35

* Mixtures of Cyclomethicone pentameric and Cyclomethicone tetrameric.

+ 30g of layered double hydroxide and 70g of oil used.

EXAMPLES 6-8Gels prepared with Zn/Al laurate layered double hydroxide and a secondary thickener

5 The secondary thickener, which was sucrose polyester, beeswax and/or polyethylene/vinyl acetate copolymer, was first combined using heating and stirring with rapeseed oil. The Zn/Al layered double hydroxide powder was
 10 suspended in the mixture and heated on a hot plate to 90°C with stirring. A shearing aid, polyoxyethylene-(4)-lauryl alcohol (0.05% based on the powder used), was then added and the suspension heated to about 120°C with stirring. Without cooling the suspension was subjected to high
 15 shearing forces in a Silverson mixer for about 1-5 minutes until thickening occurred.

Compositions, viscosity results and occlusivity results are given in Table 2.

Table 2

Composition ingredient %	Example		
	6	7	8
25 Zn\Al laurate layered double hydroxide	20	15	15
Rapeseed Oil	40	75	80
30 Sucrose polyester	40	0	0
White Beeswax	0	10	2.5
Polyethylene/vinyl acetate	0	0	2.5
35 Viscosity (cp)	>100000	38250	37500
Occlusivity %	33	38	28

EXAMPLES 9 & 10Water in oil emulsions prepared from Zn/Al layered double hydroxide - oil gels

5 20g of Zn/Al laurate layered double hydroxide was suspended in 48g of vegetable oil. The suspension was stirred rapidly and heated to 90°C. The resulting gel was allowed to cool and 32g of water was added to the gel with vigorous
10 mixing to produce a creamy white water-in-oil emulsion. For Example 10, 1g of the emulsifier Arlocel 83 was dissolved in the gel prior to addition of the water. Both the emulsions with and without the Arlocel 83 were found to be stable for several months and had the following
15 viscosities:

Example 9 - 16940 cp

Example 10 - 20630 cp

CLAIMS

1. A gel composition having anti-microbial action comprising:

5

(i) a zinc aluminium layered double hydroxide having the general structure (1)



10

where B is an interlayer anion
y is a charge on the anion
x is 0.1 to 0.5
z is 0 to 100

15

providing that at least 50% of the interlayer anion is selected from a monocarboxylic acid having the general structure (2)



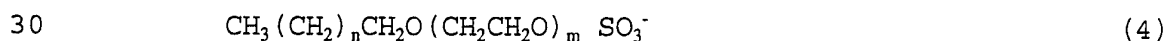
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a monoalkyl sulphate group having the general structure (3);



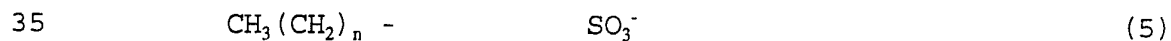
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a monoalkyl ether sulphate group having the general structure (4)



30

an alkyl benzene sulphonate group having the general structure (5)



35

and mixtures thereof

where n is an integer of from 6 to 20
and m is an integer of from 1 to 6; and

5 (ii) a lipophillic organic compound that is liquid at room temperature.

2. A gel composition according to claim 1 wherein the lipophillic organic compound is selected from plant fats, plant waxes, plant oils, animal fats, animal waxes, animal
10 oils, marine oils, paraffinic hydrocarbons, silicone oils, aliphatic and aromatic esters, higher alcohols and ethers and mixtures thereof.

3. A gel composition according to claims 1 and 2
15 comprising 1-40 wt % of the composition of the zinc aluminium layered double hydroxide.

4. A gel composition according to any preceding claim comprising 5 to 40 wt % of the composition of the zinc
20 aluminium layered double hydroxide.

5. A gel composition according to any preceding claim comprising 15 to 40 wt % of the composition of the zinc aluminium layered double hydroxide.
25

6. A gel composition according to any preceding claim comprising 50 to 90 wt % of the composition of the lipophillic organic compound.

30 7. A gel composition according to any preceding claim comprising 60 to 80 wt % of the composition of the lipophillic organic compound.

8. A gel composition according to any preceding claim
35 additionally comprising a secondary thickener compound that is solid at room temperature.

9. A gel composition according to claim 8 wherein the secondary thickener compound is selected from plant and animal fats, plant and animal waxes, plant and animal oils, paraffinic hydrocarbons, silicone oils, aliphatic and aromatic esters, higher alcohols and ethers, polyethylene and copolymers of polyethylene and mixtures thereof.

10. A gel composition according to claims 8 and 9 comprising 0 to 40 wt % of the composition of the secondary thickener.

11. A gel composition according to claims 8, 9 and 10 comprising 10 to 30 wt % of the composition of the secondary thickener.

12. The use of a new gel composition in accordance to any preceding claim in a cosmetic composition.

13. The use of a gel composition according to claims 1 to 11 as a vehicle for a protection agent or a benefit agent for topical application to human skin, hair or nails.

INTERNATIONAL SEARCH REPORT

Int. l. onal Application No

PCT/EP 93/03096

A. CLASSIFICATION OF SUBJECT MATTER

IPC 5 A61K7/48 A61K7/06 A61K7/04

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)

IPC 5 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 practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 419 759 (GIULINI CHEMIE) 3 April 1991 see the whole document ---	1-13
A	EP,A,0 318 642 (GIULINI CHEMIE) 7 June 1989 see the whole document & DE,A,37 32 265 (GIULINI CHEMIE) cited in the application ---	1-13
A	SEIFEN, OLE, FETTE, WACHSE vol. 116, no. 18, 18 November 1990, AUGSBURG, DE pages 727 - 733 ASSMUS 'Neue lipophile rheologische Additive und Stabilisatoren für Kosmetika' see page 727 - page 733 -----	1-13



Further documents are listed in the continuation of box C.



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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 93/03096

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