DESCRIPTION

Title of Invention: EMULSION COMPOSITION FOR SKIN

Technical Field

[0001]

The present invention relates to a skin emulsion composition.

Background Art

[0002]

Many polymer-containing preparations are known. Polymers have particular features, such as thickening, dispersion stability, emulsion stability, film formation, and solubilization, depending on their type. Polymers are thus considered to be an important component playing a role in imparting desired properties to preparations (Non-patent Literature 1). However, a high polymer content in a preparation is likely to make the preparation, for example, sticky, spoiling the feeling of use.

[0003]

Some examples of polymers used in preparations include polyacrylic acids and alkyl-modified carboxyvinyl polymers. Although polyacrylic acids and alkyl-modified carboxyvinyl polymers are used to thicken preparations, the thickening effect of these polymers is not entirely satisfactory. Because of the insufficient thickening effect, these polymers may be added in an increased amount to enhance the effect. However, as mentioned above, a high polymer content in a preparation is likely to compromise the feeling of use of the preparation. It is therefore not an effective way to simply add a higher amount of these polymers to enhance the thickening effect.

Citation List

Non-patent Literature

[0004]

Non-patent Literature 1: Keshohin Jiten, The Society of Cosmetic Chemists of Japan, published by Maruzen, September 25, 2004, second issue, pp.177 to 181

Summary of Invention

Technical Problem

[0005]

The present inventors uniquely focused on the idea that if the thickening effect produced by polyacrylic acids or alkyl-modified carboxy polymers is further increased, viscosity can be efficiently imparted to a preparation without adding an excessive amount of these polymers, providing the preparation with a further improved feeling of use, which is likely to be spoiled by, for example, stickiness, while retaining the desired viscosity.

[0006]

An object of the present invention is to provide a skin emulsion composition with a further improved thickening effect produced by a polyacrylic acid and an alkyl-modified carboxy polymer. Another object of the invention is to provide a means to further improve the thickening effect produced by a polyacrylic acid or an alkyl-modified carboxy polymer.

Solution to Problem

[0007]

The present inventors conducted extensive research to achieve the objects, and found that applying a compound represented by formula (I) described below to a polyacrylic acid salt and an alkyl-modified carboxy polymer can increase the thickening effect produced by the polyacrylic acid salt and the alkyl-modified carboxy polymer in a skin emulsion composition. The inventors conducted further research based on these findings and completed the invention described below.

[0008]

(I) Emulsion Composition for Skin

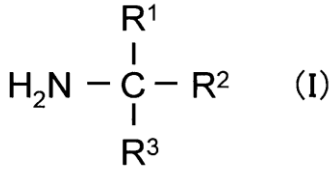
Item 1. A skin emulsion composition comprising the following

components (1) to (3), and having a viscosity of 10,000 mPa·s or more,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



(I)

wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.

Item 2. The skin emulsion composition according to Item 1, comprising ethanol in an amount of 20% by weight or less.

Item 3. The skin emulsion composition according to Item 1 or 2, wherein component (1) and component (2) are each present in an amount of 2% by weight or less of the composition.

Item 4. The skin emulsion composition according to any one of Items 1 to 3, further comprising an oil in an amount of 10% by weight or more.

Item 5. The skin emulsion composition according to any one of Items 1 to 4, which has a pH of 7 or less.

Item 6. The skin emulsion composition according to any one of Items 1 to 5, wherein component (1) is at least one member selected from the group consisting of polyacrylic acid sodium salts, polyacrylic acid potassium salts, polyacrylic acid ammonium salts, polyacrylic acid triethylamine salts, polyacrylic acid triethanolamine salts, polyacrylic acid arginine salts,

polyacrylic acid aminomethyl propanol salts, and polyacrylic acid aminomethyl propanediol salts.

Item 7. The skin emulsion composition according to any one of Items 1 to 6, wherein component (2) is an acrylic acid/alkyl methacrylate copolymer.

Item 8. The skin emulsion composition according to any one of Items 1 to 7, wherein component (3) is at least one member selected from the group consisting of aminomethyl propanol, aminomethyl propanediol, and amino hydroxymethyl propanediol.

Item 9. The skin emulsion composition according to any one of Items 1 to 8, comprising substantially no surfactant other than an acrylic acid–based surfactant.

Item 10. The skin emulsion composition according to any one of Items 1 to 9 excluding compositions for application to scalp hair and/or scalp.

Item 11. The skin emulsion composition according to any one of Items 1 to 10, wherein the oil is at least one member selected from the group consisting of waxes, solid hydrocarbon oils, solid ester oils, liquid hydrocarbon oils, liquid ester oils, plant oils, animal oils, and silicone oils.

Item 12. The skin emulsion composition according to any one of Items 1 to 11, further comprising an electrolyte, the composition being for use in moisturizing skin or preventing wrinkles on skin.

[0009]

(II) Viscosity Increasing Method

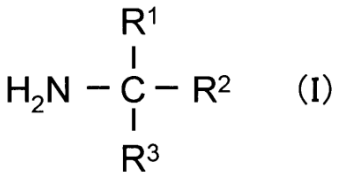
Item 1. A method for increasing the viscosity of a skin emulsion composition comprising the following components (1) and (2), the method comprising adding the following component (3) to the skin

emulsion composition,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



(I)

wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.

Item 2. The method according to Item 1, wherein the thickened skin emulsion composition has a viscosity of 10,000 mPa·s or more.

Item 3. The method according to Item 1 or 2, wherein the thickened skin emulsion composition comprises ethanol in an amount of 20% by weight or less.

Item 4. The method according to any one of Items 1 to 3, wherein component (1) and component (2) are each present in an amount of 2% by weight or less of the thickened skin emulsion composition.

Item 5. The method according to any one of Items 1 to 4, wherein the skin emulsion composition further comprises an oil, and the oil is present in an amount of 10% by weight or more of the thickened skin emulsion composition.

Item 6. The method according to any one of Items 1 to 5, wherein the thickened skin emulsion composition has a pH of 7 or less.

Item 7. The method according to any one of Items 1 to 6, wherein component (1) is at least one member selected from the group

consisting of polyacrylic acid sodium salts, polyacrylic acid potassium salts, polyacrylic acid ammonium salts, polyacrylic acid triethylamine salts, polyacrylic acid triethanolamine salts, polyacrylic acid arginine salts, polyacrylic acid aminomethyl propanol salts, and polyacrylic acid aminomethyl propanediol salts.

Item 8. The method according to any one of Items 1 to 7, wherein component (2) is an acrylic acid/alkyl methacrylate copolymer.

Item 9. The method according to any one of Items 1 to 8, wherein component (3) is at least one member selected from the group consisting of aminomethyl propanol, aminomethyl propanediol, and amino hydroxymethyl propanediol.

Item 10. The method according to any one of Items 1 to 9, wherein the oil is at least one member selected from the group consisting of waxes, solid hydrocarbon oils, solid ester oils, liquid hydrocarbon oils, liquid ester oils, plant oils, animal oils, and silicone oils.

[0010]

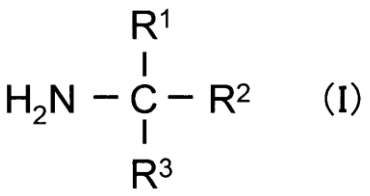
(III) Syneresis Suppressing Method

Item 1. A method for suppressing the syneresis of a skin emulsion composition comprising the following components (1) and (2), the method comprising adding the following component (3) to the skin emulsion composition,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.

Item 2. The method according to Item 1, wherein the thickened skin emulsion composition has a viscosity of 10,000 mPa·s or more.

Item 3. The method according to Item 1 or 2, wherein the thickened skin emulsion composition comprises ethanol in an amount of 20% by weight or less.

Item 4. The method according to any one of Items 1 to 3, wherein component (1) and component (2) are each present in an amount of 2% by weight or less of the skin emulsion composition.

Item 5. The method according to any one of Items 1 to 4, wherein the skin emulsion composition further comprises an oil, and the oil is present in an amount of 10% by weight or more of the thickened skin emulsion composition.

Item 6. The method according to any one of Items 1 to 5, wherein the thickened skin emulsion composition has a pH of 7 or less.

Item 7. The method according to any one of Items 1 to 6, wherein component (1) is at least one member selected from the group consisting of polyacrylic acid sodium salts, polyacrylic acid potassium salts, polyacrylic acid ammonium salts, polyacrylic acid triethylamine salts, polyacrylic acid triethanolamine salts, polyacrylic acid arginine salts, polyacrylic acid aminomethyl propanol salts, and polyacrylic acid aminomethyl propanediol salts.

Item 8. The method according to any one of Items 1 to 7, wherein component (2) is an acrylic acid/alkyl methacrylate copolymer.

Item 9. The method according to any one of Items 1 to 8, wherein component (3) is at least one member selected from the group consisting of aminomethyl propanol, aminomethyl propanediol, and amino hydroxymethyl propanediol.

Item 10. The method according to any one of Items 1 to 9, wherein the oil is at least one member selected from the group consisting of waxes, solid hydrocarbon oils, solid ester oils, liquid hydrocarbon oils, liquid ester oils, plant oils, animal oils, and silicone oils.

Item 11. A method for evaluating the syneresis of a composition comprising the steps of:

(i) placing a predetermined amount of the composition in a container equipped with a built-in centrifugal filter,

(ii) centrifuging the composition placed in the container in step (i) using a centrifuge, and

(iii) measuring the weight of the composition remaining in a filter unit built into the container and/or the weight of a filtrate obtained by filtration.

Item 12. A method for calculating the syneresis rate of a composition comprising the steps of:

(i) placing a predetermined amount of the composition in a container equipped with a built-in centrifugal filter,

(ii) centrifuging the composition placed in the container in step (i) using a centrifuge,

(iii) measuring the weight of the composition remaining in a filter unit built into the container and/or the weight of a filtrate obtained by filtration, and

(iv) calculating the syneresis rate on the basis of the weight of the composition measured in step (iii) and/or the weight of the filtrate measured in step (iii).

Advantageous Effects of Invention

[0011]

The present invention can increase the thickening effect produced by at least one member selected from the group consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer in a skin emulsion composition by applying a compound represented by formula (I) to the at least one member selected from the group consisting of polyacrylic acids and salts thereof and the alkyl-modified carboxy polymer. Even when the skin emulsion composition contains an electrolyte, which is likely to decrease the viscosity, the present invention can also increase the thickening effect produced by at least one member selected from the group consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer in the skin emulsion composition by applying the compound represented by formula (I).

Brief Description of Drawings

[0012]

Fig. 1: Fig. 1 shows that the use of aminomethyl propanediol in compositions emulsified with an oil clearly increased the viscosity.

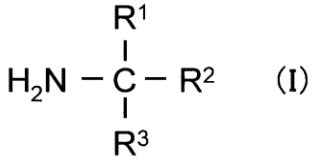
Description of Embodiments

[0013]

The following describes the present invention in more detail.

(I) Emulsion Composition for Skin

The present invention provides a skin emulsion composition comprising (1) at least one member selected from the group consisting of polyacrylic acids and salts thereof, (2) an alkyl-modified carboxy polymer, and (3) a compound represented by the following formula (I)



wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group, with the viscosity of the composition being 10,000 mPa·s or more.

[0014]

The at least one member selected from the group consisting of polyacrylic acids and salts thereof (1) is not limited as long as the effect of the present invention is obtained. Examples include polyacrylic acids, polyacrylic acid sodium salts, polyacrylic acid potassium salts, polyacrylic acid ammonium salts, polyacrylic acid triethylamine salts, polyacrylic acid triethanolamine salts, polyacrylic acid arginine salts, polyacrylic acid aminomethyl propanol salts, and polyacrylic acid aminomethyl propanediol salts, and these polyacrylic acid salts are those in which carboxylic acids are in the form of salts listed above. For example, component (1) is preferably a polyacrylic acid salt, and more preferably a cross-linked polyacrylic acid salt.

[0015]

For component (1), commercially available products may be used, and examples of commercially available products include the Lubrajel Series (ISP (Japan) Ltd), Viscomate Series (Showa Denko K.K.), and Rheogic and Junlon Series (Toagosei Co., Ltd.).

[0016]

These may be used singly or in a combination of two or more.

[0017]

The amount of component (1) is not limited as long as the effect of the present invention is obtained. For example, component (1) is present in an amount of 0.001 to 2% by weight,

preferably 0.1 to 1% by weight, more preferably 0.1 to 0.5% by weight, and still more preferably 0.2 to 0.4% by weight of the skin emulsion composition.

[0018]

The alkyl-modified carboxy polymer (2) is not limited as long as the effect of the present invention is obtained. For example, component (2) is preferably an alkyl-modified carboxyvinyl polymer, more preferably an acrylic acid/alkyl methacrylate copolymer, and still more preferably an acrylic acid/alkyl methacrylate copolymer with a molecular weight of 100,000 to 5,000,000. Preferable examples of such acrylic acid/alkyl methacrylate copolymers include acrylic acid/alkyl methacrylate copolymers with the carbon number of alkyl being 8 to 35, and more preferable examples include acrylic acid/alkyl methacrylate copolymers with the carbon number of alkyl being 10 to 30 (e.g., acrylates/C_{10-30} alkyl acrylate crosspolymer).

[0019]

For component (2), commercially available products may be used. Examples of commercially available products include Pemulen TR-1, Pemulen TR-2, Carbopol Ultrez21, Carbopol Ultrez20, Carbopol 1382, and Carbopol ETD2020 (e.g., The Lubrizol Corporation).

[0020]

These may be used singly or in a combination of two or more.

[0021]

The amount of component (2) is not limited as long as the effect of the present invention is obtained. For example, component (2) is present in an amount of 0.01 to 2% by weight, preferably 0.1 to 1% by weight, and more preferably 0.4 to 1% by weight of the skin emulsion composition.

[0022]

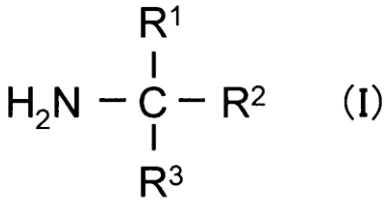
The amount of component (1) relative to the amount of component (2) is not limited as long as the effect of the present invention is obtained. For example, component (1) is present in

an amount of preferably 0.1 to 5 parts by weight, more preferably 0.2 to 2 parts by weight, and still more preferably 0.3 to 1 part by weight, per part by weight of component (2).

[0023]

The compound (3) represented by formula (I) is described by the following structure formula

[0024]



(I)

[0025]

wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group. Compound (3) is not limited as long as the effect of the present invention is obtained.

[0026]

Preferable examples of compound (3) represented by formula (I) include those wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with 1 to 3 hydroxyl groups, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with 1 to 3 hydroxyl groups.

[0027]

More preferable examples of compound (3) represented by formula (I) include aminomethyl propanol, aminomethyl propanediol, and amino hydroxymethyl propanediol. These can be described, respectively, as 2-amino-2-methyl-1-propanol, 2-amino-2-methyl-1,3-propanediol (AMPD), and 2-amino-2-hydroxymethyl-1,3-propanediol.

[0028]

These may be used singly or in a combination of two or more.

[0029]

The amount of component (3) is not limited as long as the effect of the present invention is obtained, preferably as long as the pH of the obtained skin emulsion composition falls within the range of mild acidic to neutral, and more preferably as long as the pH of the obtained skin emulsion composition is 7 or less. For example, component (3) is present in an amount of preferably 0.1 to 10% by weight, and more preferably 0.2 to 2% by weight of the skin emulsion composition.

[0030]

The amount of component (3) relative to the amount of component (2) is also not limited as long as the effect of the present invention is obtained. For example, component (3) is present in an amount of preferably 0.5 to 10 parts by weight, and more preferably 0.5 to 5 parts by weight, per part by weight of component (2). For example, when component (2) is present in an amount of 0.3 to 2 parts by weight per part by weight of component (1), component (3) is present in an amount of 0.5 to 3 parts by weight, and preferably 1 to 2 parts by weight, per part by weight of component (2).

[0031]

The viscosity of the skin emulsion composition of the present invention is, for example, 10,000 mPa·s or more, preferably 10,000 to 50,000 mPa·s, more preferably 15,000 to 45,000 mPa·s, and still more preferably 20,000 to 40,000 mPa·s at 25°C immediately after the composition has been prepared.

[0032]

In the present invention, the viscosity of the skin emulsion composition is measured by a B-type viscometer. The viscosity of 10,000 to 45,000 mPa·s is measured at 25°C with a BM rotor No. 4 (Tokyo Keiki Inc.,) at 12 rpm for 60 seconds, and the viscosity of 45,000 mPa·s or more is measured at 25°C with a Brookfield RV rotor NO.6 at 10 rpm for 60 seconds.

[0033]

It is sufficient that the pH of the skin emulsion

composition of the present invention be typically within the range of mild acidic to neutral. For example, the composition to be applied to the skin (including fingernails, the same applies hereinafter) preferably has a pH of 4 to 7, and more preferably a pH of 5.5 to 7.

[0034]

The skin emulsion composition of the present invention may optionally comprise, in addition to the components described above, any other pharmaceutically or cosmetically acceptable components. Examples of other components include oils, solvents, electrolytes, preservatives, antioxidants, anti-inflammatory agents, algefacients, fragrances, oil-soluble UV absorbers, chelating agents, neutralizers, pigments, coloring materials, lubricants, emulsion stabilizers, antifoaming agents, protectants, film-forming agents, pH adjusters, thickening agents, sugar, amino acids, vitamins, and surfactants.

[0035]

Although not limiting the present invention, the following describes some examples of other components in more detail. The use of the components described below is not particularly restricted regardless of whether they are specifically salts, derivatives, adducts, composites, or polymers of the other components, as long as their properties are not impaired.

[0036]

Oils are not limited in their form, for example, whether they are solids or liquids, as long as the effect of the present invention is produced. Examples of oils include waxes, such as candelilla wax, carnauba wax, hydrogenated jojoba oil, rice bran wax, shellac, lanolin, beeswax, whale wax, and montan wax; solid hydrocarbon oils, such as ozokerite, ceresin, paraffin, polyethylene wax, microcrystalline wax, and vaseline; solid ester oils, such as myristyl myristate, cetyl palmitate, cetyl lactate, cholesteryl oleate, phytosteryl oleate, cholesteryl stearate, and cholesteryl hydroxystearate; liquid hydrocarbon oils, such as

squalane, liquid paraffin, liquid isoparaffin, hydrogenated polyisobutene, and α-olefin oligomer; liquid ester oils, such as isopropyl myristate, octyldodecyl myristate, oleyl oleate, decyl oleate, hexyldecyl isostearate, hexyldecyl dimethyl octanoate, isopropyl palmitate, hexyl laurate, butyl stearate, and isostearyl neopentanoate; plant oils, such as avocado oil, almond oil, olive oil, sesame oil, camellia sasanqua oil, safflower oil, soybean oil, castor oil, camellia oil, corn oil, rapeseed oil, rice bran oil, persic oil, palm kernel oil, palm oil, sunflower oil, grape seed oil, cottonseed oil, macadamia nut oil, and theobroma grandiflorum seed oil; animal oils, such as turtle oil, mink oil, and yolk fatty oil; and silicone oils, such as cyclopentasiloxane, dimethicone, aminopropyl dimethicone, (dimethicone/vinylmethicone) crosspolymers, methylphenyl polysiloxane, methyl hydrogen polysiloxane, and octamethyl cyclotetrasiloxane. These may be used singly or in a combination of two or more.

[0037]

The amount of oil is not limited as long as the effect of the present invention is obtained. For example, the oil is present in an amount of preferably 10% by weight or more, more preferably 10 to 40% by weight, still more preferably 10 to 30% by weight, and particularly more preferably 15 to 25% by weight of the skin emulsion composition.

[0038]

The solvent is not limited as long as the effect of the present invention is obtained. Examples include water, such as purified water, distilled water, ion-exchanged water, and natural water; and ethanol, glycerol, propylene glycol, dipropylene glycol, butylene glycol, pentylene glycol, and diglycerol. These may be used singly or in a combination of two or more.

[0039]

The amount of the solvent is also not limited as long as the effect of the present invention is obtained. A person skilled in the art can suitably determine the amount. Although

not limited as long as the effect of the present invention is obtained, the amount of ethanol is preferably a predetermined amount or less from the standpoint of the feeling of use in the skin, particularly skin irritancy. Although the amount of ethanol is not limited as long as the effect of the present invention is obtained, ethanol is present, for example, in an amount of preferably 20% by weight or less, more preferably 0 to 15% by weight, and still more preferably 0.1 to 10% by weight of the skin emulsion composition.

[0040]

The electrolyte is not limited as long as the effect of the present invention is obtained. Examples include inorganic salts, purine-based compounds, water-soluble vitamins, derivatives thereof, and salts thereof. Examples of inorganic salts include chlorides and sulfides of metals, such as sodium, potassium, magnesium, and calcium. The "purine-based compounds" collectively refer to a variety of derivatives having a purine nucleus as the skeleton, and salts thereof. The purine-based compounds are not particularly limited as long as they are pharmaceutically or cosmetically acceptable. Examples include adenine, guanine, deaminated compounds thereof, adenosine, guanosine, inosine, phosphate esters of adenosine (e.g., adenosine monophosphates (e.g., adenosine 2'-monophosphate, adenosine 3'-monophosphate, and adenosine 5'-monophosphate), adenosine diphosphates (e.g., adenosine 5'-diphosphate), adenosine triphosphates (e.g., adenosine 5'-triphosphate), adenosine-3',5'-cyclic phosphate), phosphate esters of guanosine (e.g., guanosine monophosphate, guanosine diphosphate, and guanosine triphosphate), and phosphate esters of inosine (e.g., inosine monophosphate, inosine diphosphate, and inosine triphosphate). The salts thereof are not particularly limited as long as they are pharmaceutically or cosmetically acceptable. Examples include alkali metal salts, such as sodium salts and potassium salts, alkaline-earth metal salts, basic amino acid salts, ammonium salts, and alkanolamine salts. Examples of water-

soluble vitamins and derivatives thereof include ascorbic acid, B vitamins, lipoic acid, and derivatives thereof. Specific examples of derivatives of ascorbic acid include magnesium ascorbyl phosphate, sodium ascorbyl phosphate, disodium ascorbyl sulfate, glucoside ascorbate, glucosamine ascorbate, and dehydroascorbic acid. The salts are not particularly limited as long as they are pharmaceutically or cosmetically acceptable, and examples include alkali metal salts, such as sodium salts and potassium salts, alkaline-earth metal salts, basic amino acid salts, ammonium salts, and alkanolamine salts. These electrolytes may be used singly or in a combination of two or more.

[0041]

The amount of the electrolyte is also not limited as long as the effect of the present invention is obtained. For example, the electrolyte is present in an amount of 0.1 to 10% by weight, and preferably 0.5 to 5% by weight of the skin emulsion composition.

[0042]

Examples of preservatives or antioxidants include tocopherol, dibutyl hydroxy toluene, soybean extract, pentylene glycol, catechins, benzoic acid, isopropyl methyl phenol, salicylic acid, para-hydroxybenzoic acid esters, and phenoxyethanol.

[0043]

Examples of anti-inflammatory agents include glycyrrhizic acid, salts thereof, glycyrrhetinic acid, fatty acid esters thereof, tranexamic acid, bromelain, and chamomilla recutita extracts. Examples of chelating agents include ethylene diamine, ethylenediaminetetraacetic acid, ethylenediamine-N,N'-disuccinic acid, and etidronic acid.

[0044]

Examples of algefacients or fragrances include Mentha (menthol) and essential oils.

[0045]

Examples of oil-soluble UV absorbers include ethylhexyl

methoxycinnamate, octocrylene, diethylamino hydroxybenzoyl hexyl benzoate, polysilicone-15, homosalate, t-butyl methoxydibenzoylmethane, ethylhexyl salicylate, ethylhexyl triazone, bis-ethylhexyloxyphenol methoxyphenyl triazine, methylene bisbenzotriazolyl tetramethylbutylphenol, oxybenzone-3, and drometrizole trisiloxane.

[0046]

To further increase viscosity, plant-derived thickening agents, such as agar, guar gum, xanthan gum, glucomannan, and alginic acid may optionally be added. Adding these components is effective in further increasing the viscosity of the skin emulsion composition of the present invention. In particular, when the preparation of the present invention is used with a pump container, the thickening agent is present in an amount of preferably 1% by weight or less, more preferably 0.01 to 0.5% by weight, and still more preferably 0.05 to 0.2% by weight of the composition from the standpoint of the feeling of use, such as stringiness. However, a high content of a plant-derived thickening agent is not preferable from the antiseptic viewpoint. Thus, the amount of the thickening agent preferably falls within the ranges described above. When a preparation containing a thickening agent is packed in a pump container, the viscosity is, for example, 20,000 mPa·s or more, preferably 20,000 to 45,000 mPa·s, and still more preferably 25,000 to 40,000 mPa·s at 25°C.

[0047]

Examples of surfactants include non-ionic surfactants, anionic surfactants, cationic surfactants, and ampholytic surfactants. The surfactant is not limited as long as the effect of the present invention is obtained. However, to relieve skin irritancy, it is preferable in the present invention that the composition does not substantially contain, as any other optional components, surfactant(s) other than polyacrylic acids or salts thereof, or that the composition contains surfactant(s) other than polyacrylic acids or salts thereof in an amount of 0.2% by weight or less.

[0048]

These components may also be used singly or in a combination of two or more.

[0049]

The skin emulsion composition of the present invention is not particularly limited in its form, as long as the composition is prepared as an emulsion composition externally applied to the skin. For example, the skin emulsion composition of the present invention can be prepared as an externally applied preparation in a desired form, such as a paste, a mousse, an emulsion, a suspension, a cream, an ointment, a sheet, an aerosol, a spray, and a liniment, by adding components (1) to (3), optionally with other components. Compositions in such forms can be prepared in accordance with a typical procedure in the art.

[0050]

The skin emulsion composition of the present invention can be used primarily in cosmetic compositions such as basic skin care compositions including milky lotions, creams, lotions, and packs, externally applied pharmaceuticals, or externally applied quasi-drugs.

[0051]

The skin emulsion composition of the present invention is applied to human skin. The skin emulsion composition of the present invention is not particularly limited in the amount and frequency of application. It is sufficient, for example, to apply a suitable amount of the composition to the skin of the whole body or an intended part of the body once or several times a day, depending on the type or concentration of the contained components, user age, sex, degree of symptoms, form of application, and level of expectation. The skin emulsion composition of the present invention is preferably applied to a part other than scalp hair and/or scalp.

[0052]

The present invention can increase the thickening effect produced by at least one member selected from the group

consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer in a skin emulsion composition by applying a compound represented by formula (I) to the at least one member selected from the group consisting of polyacrylic acids and salts thereof and the alkyl-modified carboxy polymer. Even when the skin emulsion composition contains an electrolyte, which is likely to decrease the viscosity, the present invention can also increase the thickening effect produced by at least one member selected from the group consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer in the skin emulsion composition by adding a compound represented by formula (I).

[0053]

This indicates that the present invention can provide a skin emulsion composition with higher viscosity, without adding an excessively increased amount of at least one member selected from the group consisting of polyacrylic acids and salts thereof or alkyl-modified carboxy polymer. Because it is unnecessary to add an excessively increased amount of at least one member selected from the group consisting of polyacrylic acids and salts thereof or alkyl-modified carboxy polymer, the present invention can provide a skin emulsion composition with higher viscosity without reducing the feeling of use, which is likely to be spoiled by, for example, stickiness.

[0054]

The present invention can also significantly suppress the syneresis of a skin emulsion composition. Thus, the present invention can provide a markedly excellent skin emulsion composition exhibiting increased viscosity, with suppressed quality degradation that is caused by syneresis.

[0055]

(II) Viscosity Increasing Method

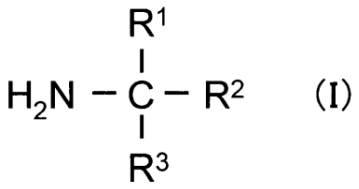
The present invention provides a method for increasing the viscosity of a skin emulsion composition comprising the following components (1) and (2), the method comprising adding

the following component (3) to the skin emulsion composition,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.

[0056]

In this invention, components (1) to (3), the skin emulsion composition, the amounts of components (1) to (3), the production method of the skin emulsion composition, the target for application, the use, the method of application, and the like are as described above. Any other components optionally usable in the skin emulsion composition are also as described above.

[0057]

The method according to the present invention can increase the thickening effect produced by at least one member selected from the group consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer in a skin emulsion composition by applying a compound represented by formula (I) to the at least one member selected from the group consisting of polyacrylic acids and salts thereof and the alkyl-modified carboxy polymer. Even when the skin emulsion composition contains an electrolyte, which is likely to decrease the viscosity, the present invention can also increase the thickening effect produced by at least one member selected from the group consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer by applying the compound represented by

formula (I).

[0058]

This indicates that the present invention can increase the viscosity of a skin emulsion composition, without adding an excessively increased amount of at least one member selected from the group consisting of polyacrylic acids and salts thereof or alkyl-modified carboxy polymer. Because it is unnecessary to add an excessively increased amount of at least one member selected from the group consisting of polyacrylic acids and salts thereof or alkyl-modified carboxy polymer, the present invention can increase the viscosity of the skin emulsion composition without reducing the feeling of use, which is likely to be spoiled by, for example, stickiness.

[0059]

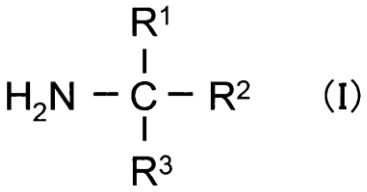
(III) Syneresis Suppressing Method

The present invention provides a method for suppressing the syneresis of a skin emulsion composition comprising the following components (1) and (2), the method comprising adding the following component (3) to the skin emulsion composition,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



(I)

wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.

[0060]

In this invention, components (1) to (3), the skin emulsion composition, the amounts of components (1) to (3), the

production method of the skin emulsion composition, the target for application, the use, the method of application, and the like are as described above. Any other components optionally usable in the skin emulsion composition are also as described above.

[0061]

In this invention, the suppression of syneresis can be evaluated by, for example, calculating the syneresis rate. The syneresis rate can be calculated and the syneresis suppression can be evaluated as described below, or in accordance with the procedure described in the Examples.

[0062]

The present invention can significantly suppress syneresis by applying a compound represented by formula (I) to a skin emulsion composition comprising at least one member selected from the group consisting of polyacrylic acids and salts thereof and an alkyl-modified carboxy polymer. Thus, as described above, the present invention can provide a markedly excellent skin emulsion composition exhibiting increased viscosity, with further suppressed quality degradation that is caused by syneresis.

[0063]

The present invention also provides a method for evaluating the syneresis of a composition and a method for calculating the syneresis rate of a composition.

[0064]

The method for evaluating the syneresis of a composition according to the present invention comprises the following steps (i) to (iii):

(i) placing a predetermined amount of the composition in a container equipped with a built-in centrifugal filter,

(ii) centrifuging the composition placed in the container in step (i) using a centrifuge, and

(iii) measuring the weight of the composition remaining in the filter unit built into the container and/or the weight of a filtrate obtained by filtration.

[0065]

The method for calculating the syneresis rate of a composition according to the present invention comprises the following steps (i) to (iv):

(i) placing a predetermined amount of the composition in a container equipped with a built-in centrifugal filter,

(ii) centrifuging the composition placed in the container in step (i) using a centrifuge,

(iii) measuring the weight of the composition remaining in the filter unit built into the container and/or the weight of a filtrate obtained by filtration, and

(iv) calculating the syneresis rate on the basis of the weight of the composition measured in step (iii) and/or the weight of the filtrate measured in step (iii).

[0066]

In these methods, either the weight of the composition remaining in the filter unit or the weight of the filtrate obtained by filtration may be measured in step (iii), or the weight of each of them may be measured in step (iii). The degree of syneresis can be determined from the values obtained by measurement.

[0067]

The syneresis rate may be specifically calculated based on the weight. For example, the syneresis rate may be calculated based on the weight of the composition and the weight of the filtrate measured in step (iii). For another example, the syneresis rate may be calculated based on the weight of the composition added in step (i), and the weight of the composition and/or the weight of the filtrate measured in step (iii).

[0068]

A smaller weight ratio of the filtrate to the composition measured in step (iii) indicates a more suppressed syneresis. A less reduced weight of the composition between before and after centrifugation and at the same time a less increased weight of the filtrate indicates a more suppressed syneresis. The method enables one to easily evaluate the

syneresis and calculate the syneresis rate of a composition, which was previously difficult to do.

Examples

[0069]

The following Examples describe the present invention. However, the present invention is not limited to the Examples.

[0070]

Test Example 1

The components were mixed in accordance with the formulations shown in Table 1 below, thereby preparing a skin emulsion composition of Example 1. Specifically, while components 1, 2, and 5 to 8 shown in Table 1 were mixed, component 3 was added thereto to adjust the pH to 6.8 to 7.0, and the mixture was homogeneously mixed with a homogenizer (T.K. Homomixer, T.K. Robomix, Tokushu Kika Kogyo), thereby obtaining a gel. Components 9 and 10 were added to the obtained gel, and the pH was confirmed to be 6.8 to 7.0, followed by emulsification with a homogenizer. The viscosity of the obtained emulsion composition (Example 1) was measured.

[0071]

Likewise, while components 1, 2, and 5 to 8 shown in Table 1 were mixed, component 4 was added thereto to adjust the pH to 6.8 to 7.0, and the mixture was homogeneously mixed with a homogenizer, thereby obtaining a gel. Components 9 and 10 were added to the obtained gel, and the pH was confirmed to be 6.8 to 7.0, followed by emulsification with a homogenizer. The viscosity of the obtained emulsion composition (Comparative Example 1) was measured.

[0072]

The pH was measured with a pH meter F-52 (Horiba, Ltd.) at room temperature.

[0073]

The viscosity was measured with a B-type viscometer. Specifically, the viscosity was measured at room temperature of

25°C with a BM-type viscometer (Tokyo Keiki Inc.) using a rotor No. 4 at 12 rpm for 60 seconds. The unit is mPa·s.

[0074]

Table 1

(Unit for Formulations: % by weight)

Component		Example 1	Comparative Example 1
1	Sodium Polyacrylate *1	0.2	0.2
2	Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer *2	0.4	0.4
3	Aminomethyl Propanediol	0.446	0
4	Potassium Hydroxide	0	0.204
5	Glycerol	7	7
6	Phenoxyethanol (Preservative)	0.2	0.2
7	Water	74.89	74.72
8	Etidronic Acid (Chelating Agent)	0.08	0.08
9	Cyclopentasiloxane *3	10	10
10	Liquid Paraffin *4	5	5
Total		100	100
pH		6.8-7.0	6.8-7.0
Viscosity (mPa·s at 25°C)		21,000	18,750

*1 Rheogic 260H, Toagosei Co., LTD.

*2 Pemulen TR-1, The Lubrizol Corporation

*3 TSF405, Momentive Performance Materials Inc.

*4 Moresco Violess U-8, Matsumura Sekiyu Kenkyujo

[0075]

As is clear from Table 1, despite the same amounts of sodium polyacrylate and acrylates/C_{10-30} alkyl acrylate crosspolymer contained in the emulsion compositions in Example 1 and Comparative Example 1, the emulsion composition prepared by using aminomethyl propanediol (Example 1 in Table 1) had a viscosity of 21,000 mPa·s, which is significantly improved as compared with the viscosity of 18,750 mPa·s of the emulsion composition prepared by using potassium hydroxide (Comparative Example 1 in Table 1). This indicates that the use of aminomethyl propanediol improves the thickening properties obtained by combining sodium polyacrylate with an acrylates/C_{10-30} alkyl acrylate crosspolymer.

[0076]

Test Example 2

The components were mixed in accordance with the formulations shown in Table 2 below, thereby preparing a skin emulsion composition of Example 2. Specifically, component 5 was added to part of component 7 shown in Table 2, and then part of component 3 was added thereto until the pH reached 6.8 to 7.0 (mixture 1). Components 1, 2, 6, 8, and 9, the remainder of component 3, and the remainder of component 7 were mixed. After the pH was confirmed to be 6.8 to 7.0, the mixture was homogeneously mixed with a homogenizer (mixture 2). The obtained mixture 1 and mixture 2 were mixed, and heated to 60°C. Components 10 and 11, which had been heated to 60°C, were added thereto while the mixture was stirred, and emulsified with a homogenizer. The viscosity of the obtained emulsion composition (Example 2) was measured.

[0077]

The procedure of Example 2 was repeated except that component 4 was used in place of component 3, thereby preparing an emulsion composition (Comparative Example 2). The viscosity of the obtained emulsion composition was measured.

[0078]

The pH and viscosity were measured in the same manner as in Test Example 1.

[0079]

Table 2

(Unit for Formulations: % by weight)

Component		Example 2	Comparative Example 2
1	Sodium Polyacrylate *1	0.4	0.4
2	Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer *2	0.4	0.4
3	Aminomethyl Propanediol	0.71	0
4	Potassium Hydroxide	0	0.29
5	Electrolyte *3	0.5	0.5
6	Glycerol	7	7
7	Water	Balance	Balance
8	Chelating Agent	0.08	0.08
9	Preservative	0.2	0.2
10	Cyclopentasiloxane *4	10	10
11	Liquid Paraffin *5	5	5
Total		100	100
pH		6.8-7.0	6.8-7.0

Viscosity (mPa·s at 25°C)	20,000	15,750

*1 Rheogic 260H, Toagosei Co., LTD.

*2 Pemulen TR-1, The Lubrizol Corporation

*3 Adenosine Monophosphate

*4 TSF405, Momentive Performance Materials Inc.

*5 Moresco Violess U-8, Matsumura Sekiyu Kenkyujo

[0080]

As is clear from Table 2, even when an electrolyte, which is likely to reduce viscosity, was contained, the emulsion composition prepared by using aminomethyl propanediol (Example 2 in Table 2) had a viscosity of 20,000 mPa·s, which is significantly improved as compared with the viscosity of 15,750 mPa·s of the emulsion composition prepared by using potassium hydroxide (Comparative Example 2 in Table 2). This also indicates that the use of aminomethyl propanediol improves the thickening properties obtained by combining sodium polyacrylate with an acrylates/C_{10-30} alkyl acrylate crosspolymer.

[0081]

Test Example 3

In the same manner as in Test Examples 1 and 2, skin emulsion compositions (Examples 3 to 8 and Comparative Examples 3 to 8) of formulations shown in Table 3 below were prepared. As a neutralizer, aminomethyl propanediol (AMPD) was used in Examples 3 to 8, and potassium hydroxide (KOH) was used in Comparative Examples 3 to 8. The viscosity of the obtained compositions was measured in the same manner as in the previous Test Examples.

[0082]

Table 3

(Unit for Formulations: % by weight)

	Ex. 3	Ex. 4	Ex. 5	Ex. 6	Ex. 7	Ex. 8
Sodium Polyacrylate	0.4	0.4	0.4	0.4	0.4	0.4
Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer	0.4	0.4	0.4	0.4	0.4	0.4
Glycerol	7	7	7	7	7	7
Liquid Paraffin	0	3	6	9	12	15
Phenoxyethanol (Preservative)	0.2	0.2	0.2	0.2	0.2	0.2
Etidronic Acid	0.05	0.05	0.05	0.05	0.05	0.05

(Chelating Agent)						
Potassium Hydroxide	0	0	0	0	0	0
Aminomethyl Propanediol	0.41	0.41	0.41	0.41	0.41	0.41
Water	Balance	Balance	Balance	Balance	Balance	Balance
Total	100	100	100	100	100	100

	Comp. Ex. 3	Comp. Ex. 4	Comp. Ex. 5	Comp. Ex. 6	Comp. Ex. 7	Comp. Ex. 8
Sodium Polyacrylate	0.4	0.4	0.4	0.4	0.4	0.4
Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer	0.4	0.4	0.4	0.4	0.4	0.4
Glycerol	7	7	7	7	7	7
Liquid Paraffin	0	3	6	9	12	15
Phenoxyethanol (Preservative)	0.2	0.2	0.2	0.2	0.2	0.2
Etidronic Acid (Chelating Agent)	0.05	0.05	0.05	0.05	0.05	0.05
Potassium Hydroxide	0.19	0.19	0.19	0.19	0.19	0.19
Aminomethyl Propanediol	0	0	0	0	0	0
Water	Balance	Balance	Balance	Balance	Balance	Balance
Total	100	100	100	100	100	100

[0083]

As is clear from Fig. 1, the use of aminomethyl propanediol as a neutralizer exhibited clear improvement in viscosity of the emulsion compositions, as compared with the use of potassium hydroxide.

[0084]

Test Example 4

To examine the stability of an emulsion composition neutralized with aminomethyl propanediol, the skin emulsion composition prepared by using aminomethyl propanediol as a neutralizer and the skin emulsion composition prepared in the same manner by using potassium hydroxide as a neutralizer were analyzed as follows. 0.5 g of a sample (skin emulsion composition) was placed in a 1.5-mL tube centrifugal device (Nanosep MF 0.2 μm, Pall Corporation) equipped with a built-in centrifugal filter, and centrifuged with a centrifuge (Centrifuge 5415R, Eppendorf AG.) at 20°C, 16,100×g rcf for 5 minutes. Subsequently, the sample remained in the filter unit and the filtrate in the filtrate receiver were measured for weight, and evaluated for the likeliness of the occurrence of syneresis. A less decrease in the sample weight and a less increase in the filtrate weight indicated a more suppressed syneresis. The

results reveal that this measurement method enables one to easily evaluate the syneresis of a composition, which was previously difficult to do.

[0085]

The results also reveal that the emulsion composition prepared by using aminomethyl propanediol exhibited more suppressed syneresis of water than the emulsion composition prepared by using potassium hydroxide. The use of aminomethyl propanediol not only improves viscosity but also effectively suppresses syneresis; more specifically, the use of aminomethyl propanediol provided a stable emulsion composition having a desired viscosity and feeling of use, while exhibiting significantly suppressed quality degradation. To suppress syneresis, the results also suggest that it is preferable to increase the amount of oil, or add a plant-derived thickening agent, such as xanthan gum.

[0086]

Test Example 5

To investigate the efficacy of the composition, the following test was conducted. The skin emulsion composition used in the test contained 0.2% by weight of sodium polyacrylate, 0.6% by weight of an acrylates/C_{10-30} alkyl acrylate crosspolymer, about 15% by weight of oil, about 1% by weight of aminomethyl propanediol, 5% by weight of ethanol, 0.5% by weight of adenosine monophosphate, 0.5% by weight of glyceryl glucoside (COSARTE-2G, Toyo Sugar Refining Co., Ltd.), 0.1% by weight of xanthan gum, a solvent, a chelating agent, an antioxidant, and a fragrance.

[0087]

The test was conducted on human male subjects aged 35 to 50 years. The subjects applied about 0.4 g of the skin emulsion composition on half of their face twice a day in the morning and evening over a time period of 8 weeks, and the horny cell layer moisture content around the corners of the eyes and the depth of wrinkles around the corners of the eyes were evaluated. The evaluation was performed by the replica method in

accordance with the guideline for evaluating anti-wrinkle products to obtain a novel efficacy issued by the Japanese Cosmetic Science Society. The results reveal that 8 weeks after the application of the composition, the part where the composition was applied exhibited a significant increase in moisture content in the horny cell layer and suppressed wrinkle formation, as compared with the part where the composition was not applied.

[0088]

Formulation Examples

The following shows formulation examples. In the formulation examples, the amount of components is denoted by the unit of % by weight.

[0089]

Formulation Example 1

Sodium Polyacrylate: 0.4
Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer: 0.4
Glycerol: 5
Dipropylene Glycol: 3
Phenoxyethanol: 0.2
Etidronic Acid: Suitable Amount
Aminomethyl Propanediol: Suitable Amount
Liquid Paraffin: 5
Cyclopentasiloxane: 10
Tocopherol: 0.1
Water: Balance
Total: 100
pH: 6.5 to 7

[0090]

Formulation Example 2

Sodium Polyacrylate: 0.4
Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer: 0.4
Glycerol: 4
Diglycerol: 2
Phenoxyethanol: 0.2

EDTA-2Na: Suitable Amount

Aminomethyl Propanol: Suitable Amount

Cyclopentasiloxane: 7

Dimethiconol: 0.2

Dimethicone: 2

Hydrogenated Polyisobutene: 5

Tocopherol: 0.1

Water: Balance

Total: 100

pH: 6.5 to 7

[0091]

Formulation Example 3

Sodium Polyacrylate: 0.2

Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer: 0.6

Glycerol: 5

Pentylene Glycol: 3

Phenoxyethanol: 0.2

Adenosine Phosphate: 0.3

Etidronic Acid: Suitable Amount

Aminomethyl Propanediol: Suitable Amount

Cyclopentasiloxane: 7

Hydrogenated Polyisobutene: 5

Macadamia Nut Oil: 2

Tocopherol: 0.1

Water: Balance

Total: 100

pH: 6.5 to 7

[0092]

Formulation Example 4

Sodium Polyacrylate: 0.2

Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer: 0.6

Glycerol: 5

Pentylene Glycol: 3

Phenoxyethanol: 0.2

Adenosine Phosphate: 0.5

Etidronic Acid: Suitable Amount
Aminomethyl Propanediol: Suitable Amount
PEG-20 Sorbitan Cocoate: 0.5
Hydrogenated Polyisobutene: 5
Isostearyl Neopentanoate: 2
Ethylhexyl Methoxycinnamate: 5
Octocrylene: 3
Tocopherol: 0.1
Water: Balance
Total: 100
pH: 6.5 to 7

[0093]

Formulation Example 5

Sodium Polyacrylate: 0.2
Acrylates/C_{10-30} Alkyl Acrylate Crosspolymer: 0.6
Glycerol: 5
Pentylene Glycol: 3
Phenoxyethanol: 0.2
Adenosine Phosphate: 0.5
Etidronic Acid: Suitable Amount
Aminomethyl Propanediol: Suitable Amount
Cyclopentasiloxane: 5
Aminopropyl Dimethicone: 0.2
Hydrogenated Polyisobutene: 5
Isostearyl Neopentanoate: 2
Macadamia Nut Oil: 1
Tocopherol: 0.1
Water: Balance
Total: 100
pH: 6.5 to 7

CLAIMS

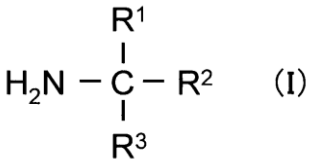
Claim 1

A skin emulsion composition comprising the following components (1) to (3), and having a viscosity of 10,000 mPa·s or more,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



(I)

wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.

Claim 2

The skin emulsion composition according to Claim 1, comprising an oil in an amount of 10% by weight or more of the composition.

Claim 3

The skin emulsion composition according to Claim 2, wherein the oil is at least one member selected from the group consisting of waxes, solid hydrocarbon oils, solid ester oils, liquid hydrocarbon oils, liquid ester oils, plant oils, animal oils, and silicone oils.

Claim 4

The skin emulsion composition according to any one of Claims 1 to 3, comprising ethanol in an amount of 20% by weight or less of the composition.

Claim 5

The skin emulsion composition according to any one of Claims 1 to 4, wherein component (1) and component (2) are each present in an amount of 2% by weight or less of the composition.

Claim 6

The skin emulsion composition according to any one of Claims 1 to 5, which has a pH of 7 or less.

Claim 7

The skin emulsion composition according to any one of Claims 1 to 6, wherein component (2) is an acrylic acid/alkyl methacrylate copolymer.

Claim 8

The skin emulsion composition according to any one of Claims 1 to 7, wherein component (3) is at least one member selected from the group consisting of aminomethyl propanol, aminomethyl propanediol, and amino hydroxymethyl propanediol.

Claim 9

The skin emulsion composition according to any one of Claims 1 to 8, excluding compositions for application to scalp hair and/or scalp.

Claim 10

The skin emulsion composition according to any one of Claims 1 to 9, further comprising an electrolyte, the composition being for use in moisturizing skin, preventing wrinkles on skin, or whitening skin.

Claim 11

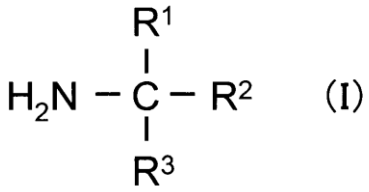
A method for increasing viscosity of a skin emulsion composition comprising the following components (1) and (2), the

method comprising adding the following component (3) to the skin emulsion composition,

(1) at least one member selected from the group consisting of polyacrylic acids and salts thereof,

(2) an alkyl-modified carboxy polymer, and

(3) a compound represented by the following formula (I)



(I)

wherein R^1, R^2, and R^3 are the same or different and represent C_{1-3} alkyl or C_{1-3} alkyl substituted with at least one hydroxyl group, with the proviso that at least one of R^1, R^2, and R^3 is C_{1-3} alkyl substituted with at least one hydroxyl group.