

[Description]

[Title of Invention]

COMPOSITION FOR STABILIZING VITAMIN C DERIVATIVE BY
USING GEL STRUCTURE

[Technical Field]

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to Korean Patent Application No. 10-2019-0011598, filed January 30, 2019, the entire contents of which are incorporated herein by reference.

Disclosed herein is a composition for stabilizing a pH-sensitive ingredient, for example, vitamin C derivatives.

[Background Art]

Vitamin C, also called ascorbic acid, helps the skin care by reducing active oxygen in the body due to a strong reducing power of the vitamin C which is derived from a double bond between carbons 2 and 3, but at the same time, the vitamin C is easily oxidized by itself due to heat or light, heavy metals, oxygen in the atmosphere, and the like to inhibit stability. Since the deterioration in oxidative stability is particularly severe in an aqueous solution state in which hydrogen ions are dissociated, most of cosmetic formulations prepared by dissolving a high content of vitamin C in an aqueous phase have problems of deterioration of physical properties such as deformation and separation.

In order to solve these problems, various vitamin C derivatives have been developed, which is improved in the oxidative stability while maintaining the efficacy of vitamin C, and these derivatives have higher utilization

than a conventional vitamin C as the absorption in the human body as well as the oxidative stability is improved.

Specifically, the vitamin C derivatives included in whitening cosmetic formulations typically refer to those in which various molecules are organic-chemically attached to carbon chains of the vitamin C so as not to be easily oxidized in a raw material state or a dissolved or dispersed state while maintaining an active level indicated when the original vitamin C is applied to the skin. These chemically bound molecules serve as steric hindrances that physically protect double bonds between carbons 2 and 3 of the vitamin C from breaking easily down due to external stimuli so as not to lose the activity.

Accordingly, the vitamin C derivatives have different physical properties such as dissolution characteristics depending on types of molecules to be bound. For example, derivatives such as ascorbyl palmitate or ascorbyl stearate formed through esterification with molecules such as palmitic acid or stearic acid convert vitamin C which has been water-soluble to fat-soluble vitamin C such that it is soluble in oil phase to block the contact with water to some extent when being dispersed in the formulations, thereby increasing the oxidative stability. However, since general functional cosmetics have to consider the feeling of use and convenience, the general functional cosmetics are prepared into oil-in-water dispersion formulations requiring a small amount of oil phase solvent and a lot of purified water to be limited in their applications.

In addition, one of changes in properties of the formulation, which is most prominent by the addition of the vitamin C derivatives to the functional cosmetics, is a decrease in viscosity. In particular, water-soluble

vitamin C derivatives bound with water-soluble molecules are very high in solubility in purified water and stable without precipitates, but have problems such as a decrease in viscosity of the formulations and deterioration of temporal stability. Like conventional oil-in-water dispersion formulations, emulsifiers or oils, thickening waxes, and polymers may be added to increase the viscosity of the formulation to a desired level. However, even if the viscosity is increased, the stability is easily changed depending on a combination of other raw materials with a large amount of vitamin C derivatives and phase separation easily occurs over time, and thus it is difficult to design a systematically stable prescription. On the other hand, since ethyl ascorbyl ether (EAE) is stable at a low pH, it is difficult to use an incremental system using a pH-sensitive carbomer and there are not many incremental systems that may be used as a thickener which is not affected by a pH.

[Citation List]

[Patent Literature]

Patent Literature 1: KR 10-2010-0043655 A

[Summary of Invention]

[Technical Problem]

In an aspect, an object of the present disclosure is to provide a composition for stabilizing a pH-sensitive ingredient having stability at a low pH.

[Solution to Problem]

In an aspect, a technique disclosed in the present disclosure provides a composition for stabilizing a pH-sensitive ingredient, the composition comprising: an

anionic surfactant; and a higher alcohol.

In an exemplary embodiment, the pH-sensitive ingredient may be ethyl ascorbyl ether.

In an exemplary embodiment, the composition may include 0.01 wt% to 15 wt% of the pH-sensitive ingredient based on a total weight of the composition.

In an exemplary embodiment, the anionic surfactant may be included in an amount of 0.5 wt% to 5 wt% based on the total weight of the composition.

In an exemplary embodiment, the anionic surfactant may be at least one selected from the group consisting of stearic acid, sodium lauryl sulfate, sodium laureth sulfate, disodium lauryl sulfosuccinate, acyl-N-methyl taurate, acyl glutamate, sodium myristate, sodium laurate, sodium stearyl glutamate, glyceryl stearate citrate, polyoxyethylene glyceryl isostearate, potassium myristate, potassium laurate, potassium cocoyl glycinate, sodium cocoyl isethionate, cetyl phosphate, DEA-cetyl phosphate, dicetyl phosphate and potassium cetyl phosphate.

In an exemplary embodiment, the higher alcohol may be included in an amount of 2 wt% to 10 wt% based on the total weight of the composition.

In an exemplary embodiment, the anionic surfactant and the higher alcohol may be included at a weight ratio of 1:1 to 3.

In an exemplary embodiment, the composition may further comprise a nonionic surfactant.

In an exemplary embodiment, the nonionic surfactant may be at least one selected from the group consisting of sucrose polytearate/hydrogenated polyisobutene, sorbitan stearate/sorbityl laurate, arachidyl alcohol/behenyl alcohol/arachidyl glucoside, cetareth-12, cetyl alcohol/glyceryl stearate/PEG-75 stearate/ceteth-20/steareth-20, hydrogenated lecithin, hydrogenated

lecithin/C12-16 alcohol/palmitic acid, cetearyl alcohol/glyceryl stearate/stearic acid/hydrogenated lecithin/polyglyceryl-3methylglucose distearate, polyglyceryl-3methylglucose distearate, PEG-stearates, glyceryl stearate, glyceryl stearate SE, decylglucoside, coco-glucoside, lauryl glucoside, caprylyl/capryl glucoside, arachidyl glucoside, C14-22 alcohol/C12-20 alkylglucoside, cetearyl alcohol/cetearyl glucoside, methyl glucose sesquistearate, sorbitan stearate, sucrose cocoate, cetearyl olivate/sorbitan olivate, and sorbitan sesquioleate.

In an exemplary embodiment, the composition may further comprise a thickener.

In an exemplary embodiment, the thickener may be included in an amount of 0.1 wt% to 2.5 wt% based on the total weight of the composition.

In an exemplary embodiment, the thickener may be a thickener without an effect of neutralizing acid and base.

In an exemplary embodiment, the thickener may be at least one selected from the group consisting of hydroxyethyl acrylate/sodium acryloyl dimethyl taurate copolymer, acrylate/C10-30 alkyl acrylate crosscopolymer, polyacrylate-13/polyisobutene/polysorbate 20, polyacrylamide/C13-14 isoparaffin/laureth-7, sodium polyacrylate, hydroxyethyl acrylate/sodium acryloyl dimethyl taurate copolymer/sorbitan isostearate/purified water, polyacrylate crosspolymer-6/t-butyl alcohol/purified water, xanthan gum, and ammonium acryloyl dimethyl taurate/VP copolymer.

In an exemplary embodiment, the composition may have a pH of 5.5 or less.

In an exemplary embodiment, the composition may have a hardness of 10 N or more.

In an exemplary embodiment, the composition may be a

cream formulation.

In an exemplary embodiment, the composition may be a cosmetic composition.

In another aspect, a technique disclosed in the present disclosure provides a composition comprising: a pH-sensitive ingredient; and the composition for stabilizing the pH-sensitive ingredient, wherein the composition has a pH of 5.5 or less.

In an exemplary embodiment, the composition may have the hardness of 10 N or more.

In an exemplary embodiment, the composition may be a cream formulation.

In an exemplary embodiment, the composition may be a cosmetic composition.

[Advantageous Effects of Invention]

In an aspect, the technique disclosed in the present disclosure has an effect of providing a composition for stabilizing a pH-sensitive ingredient with stability at a low pH. The composition according to the present disclosure has an effect of stabilizing a high content of pH-sensitive ingredient in a composition and implementing cream formulations.

[Brief Description of Drawings]

FIG. 1 illustrates an optical micrograph for the cosmetic composition of Example 1 according to the present disclosure.

FIG. 2 is a photograph illustrating freeze-thaw stability of the composition according to an embodiment of the present disclosure.

FIGS. 3 and 4 are graphs confirming a skin tone recovery effect of the composition according to an embodiment of the present disclosure through a change in

melanin content.

FIGS. 5 and 6 are graphs confirming a skin tone recovery effect of the composition according to an embodiment of the present disclosure through a change in skin brightness.

[Description of Embodiments]

Hereinafter, the present disclosure will be described in detail.

In an aspect, a technique disclosed in the present disclosure provides a composition for stabilizing a pH-sensitive ingredient, the composition comprising: an anionic surfactant; and a higher alcohol.

In another aspect, a technique disclosed in the present disclosure provides a composition comprising: a pH-sensitive ingredient; an anionic surfactant; and a higher alcohol, and having a pH of 5.5 or less.

In another aspect, a technique disclosed in the present disclosure provides a composition in which a pH-sensitive ingredient is stabilized, the composition comprising: a pH-sensitive ingredient; an anionic surfactant; and a higher alcohol, and having a pH of 5.5 or less.

In an exemplary embodiment, the composition may further comprise at least one of a nonionic surfactant and a thickener.

In another aspect, a technique disclosed in the present disclosure provides a method of stabilizing a pH-sensitive ingredient contained in a composition.

In another aspect, a technique disclosed in the present disclosure provides a method for stabilizing a pH-sensitive ingredient, the method comprising: mixing a pH-sensitive ingredient with an anionic surfactant and a higher alcohol in an effective amount to stabilize the

pH-sensitive ingredient.

In an exemplary embodiment, the method may comprise: preparing a composition comprising the pH-sensitive ingredient; the anionic surfactant; and the higher alcohol.

In an exemplary embodiment, the method may further comprise: mixing at least one of a nonionic surfactant and a thickener.

In another aspect, a technique disclosed in the present disclosure provides uses of an anionic surfactant and a higher alcohol for stabilizing a pH-sensitive ingredient.

In another aspect, a technique disclosed in the present disclosure provides uses of an anionic surfactant and a higher alcohol in manufacturing a composition for stabilizing a pH-sensitive ingredient.

In an exemplary embodiment, the anionic surfactant and the higher alcohol may be mixed with the composition containing the pH-sensitive ingredient.

In an exemplary embodiment, the anionic surfactant and the higher alcohol may be used together with at least one of a nonionic surfactant and a thickener.

Herein, the 'pH-sensitive ingredient' refers to a substance in which deterioration of physical properties such as formulation separation or chemical modification occurs according to a change in ambient pH. In an exemplary embodiment, the pH-sensitive ingredient may have stability at a pH of 5.5 or less, 5.3 or less, 5.0 or less, 4.8 or less, 4.5 or less, 4.3 or less, 4.0 or less, 3.8 or less, or 3.5 or less. In another aspect, the pH-sensitive ingredient may have stability at a pH of 2.0 or more, 2.5 or more, 3.0 or more, 3.5 or more, or 4.0 or more. For example, the pH-sensitive ingredient may have stability at a pH of 3.0 to 4.5, a pH of 3.5 to 4.0, a pH

of 4.0 to 5.0, or a pH of 3.5 to 5.5.

Herein, the 'stability' may mean that there is no or slight deterioration of the composition such as discoloration, deodorization, and generation of foreign substances, a decrease in viscosity, separation of the formulation, or the like.

Herein, the 'stabilization' may mean inhibiting or minimizing deterioration of the composition such as discoloration, deodorization, and generation of foreign substances, a decrease in viscosity, separation of the formulation, or the like.

Generally, it has been known that anionic surfactants are superior in skin irritation to cationic surfactants. The composition according to the present disclosure forms a gel structure using an anionic surfactant having low skin irritation by improving the problem that it is difficult to implement a cream formulation when using a cationic surfactant to provide a composition having a stable creamy formulation even in a low pH condition.

In the case of using the cationic surfactants, when pH-sensitive ingredient such as EAE is prescribed in high content, the pH of the formulation is lowered, thereby making it difficult to implement an OW cream formulation. In order to solve this problem, the contents of the cationic surfactant and the higher alcohol need to be increased, but when the content of cationic surfactant is increased to increase the hardness, skin irritation is very likely to occur and the use of thickeners is very limited. As a result, there was no conventional cream formulation containing EAE. Low-pH products are mostly low-viscosity emulsion formulations or water in silicone (W/S) formulations free from pH effects.

In an exemplary embodiment, the pH-sensitive

ingredient may be vitamin C or vitamin C derivatives.

In an exemplary embodiment, the vitamin C derivative may be ethyl ascorbyl ether.

In an exemplary embodiment, the composition may include 0.01 wt% to 15 wt% of the pH-sensitive ingredient based on a total weight of the composition. In another exemplary embodiment, the composition may include the pH-sensitive ingredient at 0.01 wt% or more, 0.1 wt% or more, 1 wt% or more, 2 wt% or more, 3 wt% or more, 4 wt% or more, 5 wt% or more, 6 wt% or more, 7 wt% or more, 8 wt% or more, 9 wt% or more, or 10 wt% or more, based on the total weight of the composition and may provide a creamy composition having excellent formulation stability despite a high content thereof. In yet another exemplary embodiment, the composition may include the pH-sensitive ingredient at 15 wt% or less, 14 wt% or less, 13 wt% or less, 12 wt% or less, 11 wt% or less, 10 wt% or less, 9 wt% or less, 8 wt% or less, 7 wt% or less, 6 wt% or less, 5 wt% or less, 4 wt% or less, 3 wt% or less, 2 wt% or less, or 1 wt% or less, based on the total weight of the composition.

In an exemplary embodiment, the anionic surfactant and the higher alcohol may form a gel structure.

In an exemplary embodiment, the anionic surfactant may be included in an amount of 0.5 wt% to 5 wt% based on the total weight of the composition. In another exemplary embodiment, the anionic surfactant may be included in an amount of 0.5 wt% or more, 1 wt% or more, 1.5 wt% or more, 2 wt% or more, 2.5 wt% or more, or 3 wt% or more based on the total weight of the composition. In yet another exemplary embodiment, the anionic surfactant may be included in an amount of 5 wt% or less, 4.5 wt% or less, 4 wt% or less, 3.5 wt% or less, 3 wt% or less, 2.5 wt% or less, 2 wt% or less, 1.5 wt% or less, or 1 wt% or less,

based on the total weight of the composition.

When the content of the anionic surfactant is less than 0.5 wt% or less than 1 wt%, it may be difficult to stabilize the pH-sensitive ingredient because the gel structure with the higher alcohol is not smoothly formed, and thus it may be preferred that the anionic surfactant is included in an amount of 0.5 wt% or more or 1 wt% or more. In addition, even if the content of the anionic surfactant exceeds 5 wt%, there is no problem in the formulation preparation, but it may be preferred that the content of the anionic surfactant is included in an amount of 5 wt% or less from the viewpoint of minimizing irritation to the skin. The formulation preparation is impossible without using the anionic surfactant in the composition condition with the low pH according to the present disclosure.

In an exemplary embodiment, the anionic surfactant may be at least one selected from the group consisting of sulfonate-based surfactants, sulfosuccinate-based surfactants, sulfate-based surfactants, phosphate-based surfactants, carboxylate-based surfactants and amino acid-based surfactants.

In an exemplary embodiment, the anionic surfactant may be at least one selected from the group consisting of stearic acid, sodium lauryl sulfate, sodium laureth sulfate, disodium lauryl sulfosuccinate, acyl-N-methyl taurate, acyl glutamate, sodium myristate, sodium laurate, sodium stearyl glutamate, glyceryl stearate citrate, polyoxyethylene glyceryl isostearate (also referred to as PEG-15 glyceryl isostearate), potassium myristate, potassium laurate, potassium cocoyl glycinate, sodium cocoyl isethionate, cetyl phosphate, DEA-cetyl phosphate, dicetyl phosphate and potassium cetyl phosphate.

In an exemplary embodiment, the higher alcohol may

be included in an amount of 2 wt% to 10 wt% based on the total weight of the composition.

In an exemplary embodiment, the higher alcohol may be at least one selected from the group consisting of cetyl alcohol, cetearyl alcohol, stearyl alcohol, cetostearyl alcohol, behenyl alcohol, decyl alcohol, lauryl alcohol, tridecyl alcohol, myristyl alcohol, pentadecyl alcohol, heptadecyl alcohol, palmitoleyl alcohol, oleyl alcohol, linosyl alcohol, linoleyl alcohol, arachidonyl alcohol, cetoyl alcohol, erucyl alcohol, and arachidyl alcohol.

In an exemplary embodiment, the anionic surfactant and the higher alcohol are included at a weight ratio of 1:1 to 3, a weight ratio of 1:1 to 2, a weight ratio of 1:1.5 to 3, or a weight ratio of 1:2 to 3 to form a gel structure even in a low pH condition, thereby having effects of stabilizing the pH-sensitive ingredient in the cream formulation and increasing freeze-thaw stability of the composition.

In an exemplary embodiment, the composition may further comprise a nonionic surfactant. In the case of using the anionic surfactant alone, the hardness needs to be increased by additionally using a thickener to prepare a composition with a high hardness, whereas the anionic surfactant and the nonionic surfactant are used in combination to have an effect of further increasing the hardness and or the freeze-thaw stability of the composition than using the anionic surfactant alone.

In an exemplary embodiment, it may be preferred that the anionic surfactant and the nonionic surfactant are included at a weight ratio of 1:0.1 to 5, 1:0.1 to 3, 1:0.1 to 1, 1:0.5 to 5, 1:0.5 to 3, 1:0.5 to 1.5, or 1:1 to 2.

In an exemplary embodiment, the nonionic surfactant

may be included in an amount of 0.5 wt% to 5 wt% based on the total weight of the composition. In another exemplary embodiment, the nonionic surfactant may be included in an amount of 0.5 wt% or more, 1 wt% or more, 1.5 wt% or more, 2 wt% or more, 2.5 wt% or more, or 3 wt% or more based on the total weight of the composition. In yet another exemplary embodiment, the nonionic surfactant may be included in an amount of 5 wt% or less, 4.5 wt% or less, 4 wt% or less, 3.5 wt% or less, 3 wt% or less, 2.5 wt% or less, 2 wt% or less, 1.5 wt% or less, or 1 wt% or less, based on the total weight of the composition. Specifically, it may be preferred that the nonionic surfactant is included in an amount of 1 wt% to 5 wt% based on the total weight of the composition.

In an exemplary embodiment, the nonionic surfactant may be at least one selected from the group consisting of polyoxyethylene-based surfactants, polyglycerin-based surfactants, glucoside-based surfactants, and sugar ester-based surfactants.

In an exemplary embodiment, the nonionic surfactant may be at least one selected from the group consisting of sucrose polytearate/hydrogenated polyisobutene, sorbitan stearate/sorbityl laurate, arachidyl alcohol/behenyl alcohol/arachidyl glucoside, cetareth-12, cetyl alcohol/glyceryl stearate/PEG-75 stearate/ceteth-20/steareth-20, hydrogenated lecithin, hydrogenated lecithin/C12-16 alcohol/palmitic acid, cetaryl alcohol/glycerylstearate/stearic acid/hydrogenated lecithin/polyglyceryl-3methylglucose distearate, polyglyceryl-3methylglucose distearate, PEG-stearates, glyceryl stearate, glyceryl stearate SE, decylglucoside, coco-glucoside, lauryl glucoside, caprylyl/capryl glucoside, arachidyl glucoside, C14-22 alcohol/C12-20 alkylglucoside, cetaryl alcohol/cetaryl glucoside,

methyl glucose sesquistearate, sorbitan stearate, sucrose cocoate, cetearyl olivate/sorbitan olivate, and sorbitan sesquioleate.

In an exemplary embodiment, the nonionic surfactant and the higher alcohol are included at a weight ratio of 1:1 to 3, a weight ratio of 1:1 to 2, a weight ratio of 1:1.5 to 3, or a weight ratio of 1:2 to 3 to form a gel structure even in a low pH condition, thereby having effects of stabilizing the pH-sensitive ingredient in the cream formulation and increasing freeze-thaw stability of the composition.

In an exemplary embodiment, the composition may further comprise a thickener.

Herein, the thickener may be used without limitation as long as it is a thickener not requiring neutralization when the viscosity is implemented. For example, in the case of a thickener such as carbomer which is thickened while being neutralized, it is impossible to implement the viscosity in a low pH condition. In this case, in order to prepare the O/W cream formulation with the low pH, there is a problem that an excessive amount of thickener needs to be added. When the thickener is added in excess, the stickiness is greatly increased and the feeling of use of the thickener is relatively high to make it difficult to adjust the feeling of use. Therefore, in order to have a cream formulation with a low pH and a high hardness, it is preferred to use thickeners not requiring neutralization.

When the contents of the anionic surfactant and the higher alcohol are increased in order to increase the hardness of the composition, the skin irritation may be increased. The composition according to the present disclosure may increase the hardness while maintaining the formulation stability by using a small amount of

thickener without increasing the contents of the anionic surfactant and the higher alcohol.

In an exemplary embodiment, it may be preferred that the thickener is included in an amount of 0.1 wt% to 2.5 wt% based on the total weight of the composition, in terms of enhancing the freeze-thaw stability and the hardness of the composition.

In an exemplary embodiment, the thickener may be a thickener without an effect of neutralizing acid and base when thickening.

In an exemplary embodiment, the thickener may be an acrylate-based thickener.

In an exemplary embodiment, the thickener may be at least one selected from the group consisting of hydroxyethyl acrylate/sodium acryloyl dimethyl taurate copolymer, acrylate/C10-30 alkyl acrylate crosscopolymer, polyacrylate-13/polyisobutene/polysorbate 20, polyacrylamide/C13-14 isoparaffin/laureth-7, sodium polyacrylate, hydroxyethyl acrylate/sodium acryloyl dimethyl taurate copolymer/sorbitan isostearate/purified water, polyacrylate crosspolymer-6/t-butyl alcohol/purified water, xanthan gum, and ammonium acryloyl dimethyl taurate/VP copolymer.

In an exemplary embodiment, the composition may have a pH of 5.5 or less or a pH of 3.5 to 5.5.

In an exemplary embodiment, the composition may have a hardness of 10 N or more or 10 N to 30 N.

In an exemplary embodiment, the composition may be a cream formulation.

In an exemplary embodiment, the composition may be a cosmetic composition.

In an exemplary embodiment, the cosmetic composition may be for whitening.

As described above, the composition according to the

present disclosure has an effect of stabilizing an ingredient with stability at a low pH in the composition by the formation of the gel structure by the anionic surfactant and the higher alcohol without the use of a pH buffer.

In addition, the composition according to the present disclosure has an effect of enabling the implementation of a cream formulation containing a pH-sensitive ingredient. The cream formulation may be implemented even with a small amount of anionic surfactant or thickener.

The composition partially forms the viscosity by using a gel structure, and further increases the hardness while increasing the freeze-thaw stability by additionally using the thickener that does not have a neutralizing effect, so that even in a low pH condition containing a high content of the pH-sensitive ingredient, it is possible to implement an O/W cream formulation with a high hardness. As such, the content of the anionic surfactant may be minimized by using the thickener that does not have the neutralizing effect to lower the skin irritation of the composition.

The composition according to the present disclosure may implement desired efficacy and feeling of use in various combinations of oils, waxes, silicone-based materials, and the like, and may also implement a gel cream containing a high content of polyol and having a translucent appearance and a high hardness.

[Embodiments]

Hereinafter, the present disclosure will be described in more detail through Examples. These Examples are just illustrative of the present disclosure, and it will be apparent to those skilled in the art that it is

not interpreted that the scope of the present disclosure is limited to these Examples.

Test Example 1.

A cosmetic composition for O/W skin whitening was prepared according to compositions (wt%) of Tables 1 and 2 below.

Specifically, water and oil parts were heated to 70°C, respectively, and then mixed and emulsified for 3 minutes. Thereafter, when a gel was formed while cooling to 50°C or less, ethyl ascorbyl ether was added to the latter part of the process together with cooling water to minimize an effect due to heat.

In addition, the prepared cosmetic compositions were stored for 4 weeks at 45°C, respectively, and then the stabilities of pH-sensitive ingredients were evaluated and illustrated in Tables 1 and 2 below. In Tables 1 to 3 below, X represents unavailable, Δ represents unstable, o represents normal, and © represents excellent.

[Table 1]

	Compar ative Examp le 1	Compar ative Examp le 2	Compar ative Examp le 3	Compar ative Examp le 4	Compar ative Examp le 5	Compar ative Examp le 6	Compar ative Examp le 7
WATER	To 100	To 100	To 100	To 100	To 100	To 100	To 100
DISODIUM EDTA	0.05	0.05	0.05	0.05	0.05	0.05	0.05
POTASSIUM CETYL PHOSPHATE	-	1	0.5	1	0.5	1	1
GLYCERIN	5	5	5	5	5	5	5
Cetearyl Olivate*Sorbitan Olivate	2	-	1	0.5	2	2	1
Caprylyl Glycol	0.1	0.1	0.1	0.1	0.1	0.1	0.1
CITRIC ACID	0.06	0.06	0.06	0.06	0.06	0.06	0.06
SODIUM CITRATE	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ethyl Ascorbyl	13	13	13	13	13	13	13

Ether							
CETEARYL ALCOHOL	3	3	3	3	3	5	3
Caprylic/Capric Triglyceride	4	4	4	4	4	4	4
PENTAERYTHRITYL TETRAETHYLHEXANOATE	5	2	2	2	2	2	2
Dimethicone	5	5	5	5	5	5	5
HYDROXYETHYL ACRYLATE/SODIUM ACRYLOYLDIMETHYL TAURATE COPOLYMER*WATER*SORBITAN ISOSTEARATE	0.6	-	0.6	0.6	0.6	-	-
Carbomer	-	-	-	-	-	-	0.6
Stability	X	△	△	○	○	◎	◎

[Table 2]

	Example 1	Example 2	Example 3	Example 4	Example 5
WATER	To 100	To 100	To 100	To 100	To 100
DISODIUM EDTA	0.05	0.05	0.05	0.05	0.05
POTASSIUM CETYL PHOSPHATE	1	1	1	2	1
GLYCERIN	5	5	5	5	5
Cetearyl Oliviate*Sorbitan Oliviate	1	1	2	3	1
Caprylyl Glycol	0.1	0.1	0.1	0.1	0.1
CITRIC ACID	0.06	0.06	0.06	0.06	0.06
SODIUM CITRATE	0.05	0.05	0.05	0.05	0.05
Ethyl Ascorbyl Ether	13	13	13	13	13
CETEARYL ALCOHOL	3	5	3	3	3
Caprylic/Capric Triglyceride	4	4	4	4	4
PENTAERYTHRITYL TETRAETHYLHEXANOATE	2	2	2	2	2
Dimethicone	5	5	5	5	5
HYDROXYETHYL ACRYLATE/SODIUM ACRYLOYLDIMETHYL TAURATE COPOLYMER*WATER*SORBITAN ISOSTEARATE	0.6	0.6	0.6	0.6	-

Stability	◎	◎	◎	◎	◎
-----------	---	---	---	---	---

As a result, the composition of Comparative Example 1 without adding the anionic surfactant did not form a gel structure so as not to stabilize the pH-sensitive ingredient in the formulation (in this case, it was possible to prepare only a lotion formulation of about 5,000 cps). The composition of Comparative Example 2 without adding the nonionic surfactant was unstable in stability of the pH-sensitive ingredient at a high temperature of 45°C. Further, in the compositions of Comparative Examples 3 to 5 in which the anionic surfactant and the nonionic surfactant were contained, but the anionic surfactant or the nonionic surfactant was contained in the composition in an amount of 0.5 wt% such that a weight ratio of the anionic surfactant and the higher alcohol or a weight ratio of the nonionic surfactant and the higher alcohol was out of the range of 1:1 to 3, the gel structure was unstable even though the thickener was contained, and thus there was a limitation in maintaining the stability during long-term storage at a high temperature of 45°C. Meanwhile, in the composition of Comparative Example 6, in which the content of the higher alcohol was much higher than the content of the anionic surfactant, but a total content of the anionic surfactant and the nonionic surfactant was relatively higher than the content of the higher alcohol, it was confirmed that the gel structure was formed to stabilize the pH-sensitive ingredient in the gel structure. In the composition of Comparative Example 7 containing a carbomer to be thickened while being neutralized as a thickener, the formulation stability was excellent, but it was impossible to implement the viscosity of the cream formulation due to a low pH of the composition. When an

excessive amount of thickener was added to make a cream formulation with a low pH, the stickiness was increased and it was also difficult to adjust the feeling of use due to the feeling of use of the thickener.

The compositions of Examples 1 to 5 lowered the pH of the formulation to 5.5 or less to enable the stabilization of the pH-sensitive ingredient. The pH-sensitive ingredient was stabilized in the formulation by forming a gel structure at a pH of 5.5 or less, more specifically about pH 4.5 by the anionic surfactant and the higher alcohol.

Test Example 2.

The freeze-thaw stability, hardness and EAE titer of the compositions of Comparative Example 6 and Examples 1 to 5 prepared were measured and shown in Tables 3 and 4 below.

In the freeze-thaw stability, the compositions were stored for 1 week at -15°C and then taken out and thawed for one day to confirm the formulation stability. The freeze-thaw stability evaluation test was conducted for a total of 4 weeks.

The hardness of the composition was measured and compared with a hardness tester (SUN RHEO METER, CR-3000EX (S), Sun Scientific, Japan).

EAE titer analysis was performed by HPLC and performed using an YMC-Triart C18 (250 mm × 4.6 mm, 5 μm) column at a measured wavelength of 245 nm.

[Table 3]

	Comparative Example 6	Example 1	Example 2	Example 3	Example 4	Example 5
Freeze-thaw stability	△	◎	◎	◎	◎	◎

Hardness	8	12	19	15	25	8
----------	---	----	----	----	----	---

[Table 4]

2 weeks (compared to initial value, %)	4 weeks (compared to initial value, %)	8 weeks (compared to initial value, %)	16 weeks (compared to initial value, %)
101.7	99.9	103.9	111.9

The compositions of Examples 1 to 5 were shown to be excellent in freeze-thaw stability. It was confirmed that when the composition of Example 1 was stored for a long term of 4 weeks or more at room temperature and 45°C, there was no discoloration in the contents and the EAE titer was maintained well until 16 weeks (see FIG. 2 and Table 4).

When comparing the composition of Comparative Example 6 and the composition of Example 5, it was confirmed that both the composition of Comparative Example 6 and the composition of Example 5 were able to stabilize the pH-sensitive ingredient in the formulation, but the composition of Comparative Example 6 containing more than three times the content of the higher alcohol than that of the anionic surfactant was deteriorated in the freeze-thaw stability. In the composition of Comparative Example 6, an oil separation phenomenon was shown as a result of the freeze-thaw stability test, and the contents were rough after the freeze-thaw, and as a result, the gel structure was damaged and the formulation stability was deteriorated. On the other hand, the composition of Example 2 had more than three times the content of the higher alcohol than that of the anionic surfactant, but further contained a thickener to exhibit excellent freeze-thaw stability.

In addition, when a conventional vitamin C

derivative was added to the composition, only a lotion formulation of 5,000 cps or less was able to be prepared due to a decrease in viscosity, but it was confirmed that the composition according to the present disclosure may implement a cream formulation with the hardness of 10 N or more and the viscosity of 7,000 cps or more without a decrease in viscosity. The compositions of Examples 1 to 4 further increased the hardness by adding a thickener not requiring neutralization to implement cream formulations. In particular, the composition of Example 4 implemented an O/W cream formulation with a high hardness by using a thickener while increasing the contents of the anionic surfactant and the higher alcohol.

Test Example 3.

A skin tone recovery effect of the composition of Example 1 was confirmed and illustrated in FIGS. 3 to 6. Ten women in 20s to 40s were selected and randomly divided into two groups, and then melanin amount and skin brightness were measured and change rates were compared with an average value.

As a result, when the composition of Example 1 immersed with a high content of EAE was applied for 2 weeks after irradiating the skin with ultraviolet rays, a test group to which the composition was applied was much higher in change rates of melanin amount and skin brightness than those of a test group to which the composition was not applied. As a result, it was confirmed that it was effective in improving skin tone when the composition was applied. In a graph, it is shown that the melanin content of the test group to which the composition is applied is high, but this is due to individual difference in skin tone, and an effect of the composition on the change in skin tone can be confirmed

by comparing the change rates of the two test groups. In the graph, Base means immediately after irradiating ultraviolet rays, and UV 24H, UV 1W, and UV 2W mean time points of 24 hours, 1 week, and 2 weeks after UV irradiation, respectively.

As described above, specific parts of the present disclosure have been described in detail, and it will be apparent to those skilled in the art that these specific techniques are merely preferred embodiments, and the scope of the present disclosure is not limited thereto. Therefore, the substantial scope of the present disclosure will be defined by the appended claims and their equivalents.

[Claims]

[Claim 1]

A composition for stabilizing a pH-sensitive ingredient, the composition comprising:

an anionic surfactant; and
a higher alcohol.

[Claim 2]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, wherein the pH-sensitive ingredient is ethyl ascorbyl ether.

[Claim 3]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, wherein the pH-sensitive ingredient is included in an amount of 0.01 wt% to 15 wt% based on a total weight of the composition.

[Claim 4]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, wherein the anionic surfactant is included in an amount of 0.5 wt% to 5 wt% based on the total weight of the composition.

[Claim 5]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, wherein the anionic surfactant is at least one selected from the group consisting of stearic acid, sodium lauryl sulfate, sodium laureth sulfate, disodium lauryl sulfosuccinate, acyl-N-methyl taurate, acyl glutamate, sodium myristate, sodium laurate, sodium stearyl glutamate, glyceryl stearate citrate, polyoxyethylene glyceryl isostearate, potassium

myristate, potassium laurate, potassium cocoyl glycinate, sodium cocoyl isethionate, cetyl phosphate, DEA-cetyl phosphate, dicetyl phosphate, and potassium cetyl phosphate.

[Claim 6]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, wherein the higher alcohol is included in an amount of 2 wt% to 10 wt% based on the total weight of the composition.

[Claim 7]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, wherein the anionic surfactant and the higher alcohol are included at a weight ratio of 1:1 to 3.

[Claim 8]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, further comprising:
a nonionic surfactant.

[Claim 9]

The composition for stabilizing a pH-sensitive ingredient according to claim 8, wherein the nonionic surfactant is at least one selected from the group consisting of sucrose polytearate/hydrogenated polyisobutene, sorbitan stearate/sorbityl laurate, arachidyl alcohol/behenyl alcohol/arachidyl glucoside, cetareth-12, cetyl alcohol/glyceryl stearate/PEG-75 stearate/ceteth-20/steareth-20, hydrogenated lecithin, hydrogenated lecithin/C12-16 alcohol/palmitic acid, cetearyl alcohol/glycerylstearate/stearic acid/hydrogenated lecithin/polyglyceryl-3methylglucose

distearate, polyglyceryl-3methylglucose distearate, PEG-stearates, glyceryl stearate, glyceryl stearate SE, decylglucoside, coco-glucoside, lauryl glucoside, caprylyl/capryl glucoside, arachidyl glucoside, C14-22 alcohol/C12-20 alkylglucoside, cetearyl alcohol/cetearyl glucoside, methyl glucose sesquistearate, sorbitan stearate, sucrose cocoate, cetearyl olivate/sorbitan olivate, and sorbitan sesquioleate.

[Claim 10]

The composition for stabilizing a pH-sensitive ingredient according to claim 1, further comprising:
a thickener.

[Claim 11]

The composition for stabilizing a pH-sensitive ingredient according to claim 10, wherein the thickener is included in an amount of 0.1 wt% to 2.5 wt% based on the total weight of the composition.

[Claim 12]

The composition for stabilizing a pH-sensitive ingredient according to claim 10, wherein the thickener does not have an effect of neutralizing acid and base.

[Claim 13]

The composition for stabilizing a pH-sensitive ingredient according to claim 10, wherein the thickener is at least one selected from the group consisting of hydroxyethyl acrylate/sodium acryloyl dimethyl taurate copolymer, acrylate/C10-30 alkyl acrylate crosscopolymer, polyacrylate-13/polyisobutene/polysorbate 20, polyacrylamide/C13-14 isoparaffin/laureth-7, sodium polyacrylate, hydroxyethyl acrylate/sodium acryloyl

dimethyl taurate copolymer/sorbitan isostearate/purified water, polyacrylate crosspolymer-6/t-butyl alcohol/purified water, xanthan gum, and ammonium acryloyl dimethyl taurate/VP copolymer.

[Claim 14]

A composition comprising:
a pH-sensitive ingredient; and
the composition for stabilizing the pH-sensitive ingredient according to any one of claims 1 to 13,
wherein the composition has a pH of 5.5 or less.

[Claim 15]

The composition according to claim 14, wherein the composition has a hardness of 10 N or more.

[Claim 16]

The composition according to claim 14, wherein the composition is a cream formulation.

[Claim 17]

The composition according to claim 14, wherein the composition is a cosmetic composition.