

[Description]

[Title of Invention]

WATER-DISPERSIBLE DOSAGE FORM OF COSMETIC
COMPOSITION COMPRISING STARCH DERIVATIVE AND HIGH-CONTENT
POWDER

[Technical Field]

The present specification relates to a water-dispersible dosage form of cosmetic composition comprising a starch derivative and powder, the powder being comprised in an amount of 5 wt% or more based on the total weight of the composition.

[Background Art]

The powder has been comprised in an amount of 5 wt% or less based on the total weight of the composition in an existing water-dispersible formulation that is a continuous phase. Accordingly, although there has been an attempt to comprise the powder in a high content in the water-dispersible formulation, there have been problems such as scrubbing of dirt and dead skin cell and decrease of viscosity (stability) when the water-dispersible formulation comprises a high content of the powder.

Meanwhile, although there is not a technical problem in stabilizing high-content powder in a water-in-oil type cosmetic composition, there has been a limitation in giving immediate feeling of soft and smooth but not moisty, and it has been difficult to obtain a moisturizing effect when the water-in-oil type cosmetic composition is applied to the skin since the rate of volatilization of the water-in-oil type cosmetic composition is slow. Further, while an emulsifier with a high molecular weight has been indispensable to stabilize

high-content powder in an oil-in-water type cosmetic composition, an upper limit of the powder content has been existed due to a coagulation problem of the oil-in-water type cosmetic composition caused by the emulsifier, and an oil phase has not been indispensable in expressing finishing feeling of the powder.

Therefore, a technique of stabilizing the high-content powder has been required in a water-dispersible formulation that is not a water-in-oil type or an oil-in-water type.

[Summary of Invention]

[Technical Problem]

Therefore, inventors of the present invention have been reached the present invention by studying a water-dispersible formulation of cosmetic composition comprising high-content powder which is free from scrubbing of dirt and dead skin cell and has excellent stability without decrease of viscosity.

An aspect of the present invention is to provide a water-dispersible formulation of cosmetic composition comprising a starch derivative and powder, wherein the powder is comprised in an amount of 5 wt% or more based on the total weight of the composition.

[Solution to Problem]

An aspect of the present invention provides a water-dispersible formulation of cosmetic composition comprising a starch derivative and powder, wherein the starch derivative is a starch derivative in which a hydrophilic functional group is substituted in a hydroxy group of starch, and the powder is comprised in an amount of 5 wt% or more based on the total weight of the composition.

In an aspect of the present invention, the starch derivative may be one or more of an acrylate substituted starch, a hydroxypropyl substituted starch, a carboxymethyl substituted starch, and an octenylsuccinate substituted starch.

In an aspect of the present invention, the acrylate substituted starch may be a sodium polyacrylate starch, the hydroxypropyl substituted starch may be hydroxypropyl starch phosphate, the carboxymethyl substituted starch may be a sodium carboxymethyl starch, and the octenylsuccinate substituted starch may be a calcium starch octenylsuccinate.

In an aspect of the present invention, the starch derivative and the powder may have a weight ratio of 1:10 to 100.

In an aspect of the present invention, the starch derivative may be comprised in an amount of 0.01 to 5 wt% based on the total weight of the composition.

In an aspect of the present invention, the powder may be comprised in an amount of 10 wt% or more based on the total weight of the composition.

In an aspect of the present invention, the powder may be comprised in an amount of 10 to 20 wt% based on the total weight of the composition.

In an aspect of the present invention, the powder may be one or more of spherical powder, plate-type powder, pelletized powder, and amorphous powder.

In an aspect of the present invention, the plate-type powder, the pelletized powder and the amorphous powder may have an average particle size of 1 to 100 microns.

In an aspect of the present invention, the powder may be one or more of polymethyl methacrylate, methyl methacrylate crosspolymer, silica, talc, and mica.

[Advantageous Effects of Invention]

A water-dispersible formulation of cosmetic composition according to an aspect of the present invention comprises high-content powder and gives an excellent moisturizing effect when applied to the skin at the same time.

A water-dispersible formulation of cosmetic composition according to an aspect of the present invention comprises high-content powder and is excellent in formulation stability at the same time.

A water-dispersible formulation of cosmetic composition according to an aspect of the present invention comprises high-content powder and provides immediate feeling of soft and smooth but not moisty when applied to the skin at the same time.

A water-dispersible formulation of cosmetic composition according to an aspect of the present invention comprises high-content powder and results in very light scrubbing of dirt and dead skin cell at the same time.

A water-dispersible formulation of cosmetic composition according to an aspect of the present invention comprises high-content powder and has a very slight drop in viscosity at the same time.

[Description of Embodiments]

An aspect of the present invention is to provide a water-dispersible formulation of cosmetic composition stably comprising high-content powder without scrubbing of dirt and dead skin cell.

Hereinafter, the present invention will be described in detail.

An aspect of the present invention provides a water-dispersible formulation of cosmetic composition comprising a starch derivative and powder, wherein the starch derivative is a starch derivative in which a hydrophilic functional group is substituted in a hydroxy group of starch, and the powder is comprised in an amount of 5 wt% or more based on the total weight of the composition.

In the present specification, the "starch derivative" is a general starch in which a hydrophilic functional group is substituted to a -OH group of starch. The starch derivative is distinguished from starch in the present specification. In an aspect of the present invention, the starch derivative may be a thickener in a water dispersible formulation.

In an embodiment, the powder as a powder phase may comprise powders which are generally used in a cosmetic composition. For example, one or more spherical powders selected from inorganic particles, organic particles, inorganic-organic hybrid particles, and the like may be used. Further, ingredients of the powder may be applied to the skin and have functions such as color (tone) expression, gorgeousness, cubic effect, moisturizing effect, whitening improvement, wrinkle prevention, ultraviolet blocking, aging prevention, pearly texture, and the like. Specifically, the ingredients of the powder may have functions such as irregularity covering, wrinkle covering, duration of make-up layer, gorgeousness, and the like.

A "water-dispersible formulation of cosmetic composition" of the present specification is a cosmetic composition existing in a formulation of water phase without oil phase. Specifically, a water-dispersible formulation of the present invention may stably comprise

high-content powder.

In an aspect of the present invention, the starch derivative may be one or more of an acrylate substituted starch, a hydroxypropyl substituted starch, a carboxymethyl substituted starch, and an octenylsuccinate substituted starch.

In an aspect of the present invention, the acrylate substituted starch may be a sodium polyacrylate starch, the hydroxypropyl substituted starch may be hydroxypropyl starch phosphate, the carboxymethyl substituted starch may be a sodium carboxymethyl starch, and the octenylsuccinate substituted starch may be a calcium starch octenylsuccinate.

The sodium polyacrylate starch, hydroxypropyl starch phosphate, sodium carboxymethyl starch and calcium starch octenylsuccinate are names of INCI (International Nomenclature of Cosmetic Ingredients).

In an aspect of the present invention, the starch derivative and the powder may have a weight ratio of 1:10 to 100. Specifically, the starch derivative and the powder may have a weight ratio of 1:10 or more, 1:11 or more, 1:12 or more, 1:13 or more, 1:15 or more, 1:18 or more, 1:20 or more, 1:22 or more, 1:25 or more, 1:28 or more, 1:30 or more, 1:32 or more, 1:35 or more, 1:37 or more, 1:40 or more, 1:45 or more, 1:50 or more, or 1:60 or more. Further, the starch derivative and the powder may have a weight ratio of 1:100 or less, 1:90 or less, 1:80 or less, 1:70 or less, 1:60 or less, 1:55 or less, 1:50 or less, 1:45 or less, 1:40 or less, 1:38 or less, 1:37 or less, 1:35 or less, 1:33 or less, 1:30 or less, 1:28 or less, or 1:25 or less. When the weight ratio of the starch derivative and the powder is within the foregoing range, high-content powder may be stably

comprised in a water-dispersible formulation.

In an aspect of the present invention, the powder may be comprised in an amount of 5 wt% or more based on the total weight of the composition. Although the powder has not been comprised in an existing water-dispersible formulation in a high content of 5 wt% or more based on the total weight, the powder is comprised in the composition according to an aspect of the present invention in an amount of 5 wt% or more. The powder may be comprised in an amount of 5.0 wt% or more, 5.5 wt% or more, 6.0 wt% or more, 6.5 wt% or more, 7.0 wt% or more, 7.5 wt% or more, 8.0 wt% or more, 8.5 wt% or more, 9.0 wt% or more, 9.5 wt% or more, 10.0 wt% or more, 10.5 wt% or more, 11.0 wt% or more, 11.5 wt% or more, 12.0 wt% or more, 12.5 wt% or more, 13.0 wt% or more, 14.0 wt% or more, 15.0 wt% or more, 16.0 wt% or more, 17.0 wt% or more, 18.0 wt% or more, or 19.0 wt% or more based on the total weight of the composition.

In an aspect of the present invention, the starch derivative may be comprised in an amount of 0.01 to 5 wt% based on the total weight of the composition. Specifically, the starch derivative may be comprised in an amount of 0.01 wt% or more, 0.05 wt% or more, 0.1 wt% or more, 0.15 wt% or more, 0.20 wt% or more, 0.25 wt% or more, 0.30 wt% or more, 0.35 wt% or more, 0.40 wt% or more, 0.45 wt% or more, or 0.50 wt% or more based on the total weight of the composition. Further, the starch derivative may be comprised in an amount of 5 wt% or less, 4.5 wt% or less, 4.0 wt% or less, 3.5 wt% or less, 3.0 wt% or less, 2.5 wt% or less, 2.0 wt% or less, 1.5 wt% or less, 1.0 wt% or less, 0.8 wt% or less, 0.7 wt% or less, 0.6 wt% or less, 0.55 wt% or less, 0.53 wt% or less, 0.5 wt% or less, 0.45 wt% or less, or 0.40 wt% or less based on the total weight of the composition. Since high-

content powder is stably comprised when the amount of the starch derivative based on the total weight of the composition is within the foregoing range, there is no decrease of viscosity, and there is no scrubbing of dirt and dead skin cell when the composition is applied to the skin. Preferably, the starch derivative may be comprised in an amount of 0.2 to 0.8 wt% based on the total weight of the composition. More preferably, the starch derivative may be comprised in an amount of 0.3 to 0.5 wt% based on the total weight of the composition.

In an aspect of the present invention, the powder may be comprised in an amount of 5 to 30 wt% based on the total weight of the composition. Specifically, the powder may be comprised in an amount of 5.0 wt% or more, 6.0 wt% or more, 7.0 wt% or more, 8.0 wt% or more, 9.0 wt% or more, 10.0 wt% or more, 10.5 wt% or more, 11.0 wt% or more, 11.5 wt% or more, 12.0 wt% or more, 12.5 wt% or more, 13.0 wt% or more, 14.0 wt% or more, 15.0 wt% or more, 16.0 wt% or more, 17.0 wt% or more, 18.0 wt% or more, or 19.0 wt% or more based on the total weight of the composition. Further, the powder may be comprised in an amount of 30 wt% or less, 29 wt% or less, 28 wt% or less, 27 wt% or less, 26 wt% or less, 25 wt% or less, 24 wt% or less, 23 wt% or less, 22 wt% or less, 21 wt% or less, 20 wt% or less, 19 wt% or less, 18 wt% or less, 17 wt% or less, or 16 wt% or less based on the total weight of the composition. Preferably, the powder may be comprised in an amount of 10 to 20 wt% based on the total weight of the composition. When the powder is comprised within the foregoing range, high-content powder is stably comprised in the composition, and feeling in use of the composition is excellent at the same time.

In an aspect of the present invention, the powder may be one or more of a spherical powder, a plate-type

powder, a pelletized powder, and an amorphous powder.

In an aspect of the present invention, the plate-type powder, the pelletized powder and the amorphous powder may have an average particle size of 1 micron or more. Further, the plate-type powder, the pelletized powder and the amorphous powder may have an average particle size of 1 to 100 microns.

An "average particle size of the powder" in the present specification is an average size of primary particles of the powder, and a length between both end points of the longest line passing through the powder. The primary particles are particles before performing coagulation after performing synthesis of the powder.

Specifically, the plate-type powder, the pelletized powder and the amorphous powder may have an average particle size of the primary particles of 1 micron or more, 1.5 micron or more, 2.0 microns or more, 2.5 microns or more, 3.0 microns or more, 3.5 microns or more, 4.0 microns or more, 4.5 microns or more, or 5.0 microns or more. Further, the plate-type powder, the pelletized powder and the amorphous powder may have an average particle size of the primary particles of 100 microns or less, 90 microns or less, 80 microns or less, 70 microns or less, 60 microns or less, or 50 microns or less.

In an aspect of the present invention, 90% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 micron or more. Further, 90% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 to 100 microns.

In an aspect of the present invention, 95% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a

particle size of 1 micron or more. Further, 95% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 to 100 microns.

In an aspect of the present invention, 99% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 micron or more. Further, 99% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 to 100 microns.

In an aspect of the present invention, 99.9% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 micron or more. Further, 99.9% or more of the total particles of the plate-type powder, the pelletized powder and the amorphous powder may have a particle size of 1 to 100 microns.

A difference in scrubbing of dirt and dead skin cell may occur according to surface treatment or size of the powder. In an embodiment, a stable formulation may be formed without scrubbing when the powder is a spherical-shaped powder or a plate-type/pelletized/amorphous powder of which primary particles have an average particle size of 1 micron or more.

In an aspect of the present invention, the powder may be one or more of polymethyl methacrylate, methyl methacrylate crosspolymer, silica, talc, and mica.

In an embodiment, the polymethyl methacrylate may have a diameter of 20 microns or less. The polymethyl methacrylate may have a diameter of 20 microns or less, 19 microns or less, 18 microns or less, 17 microns or less, 16 microns or less, or 15 microns or less.

In an embodiment, the talc may be an alkyl silane-

treated talc.

In an embodiment, the mica may be an alkyl silane-treated mica.

Hereinafter, the present invention will be described in more detail through Examples. These Examples are only for illustrating the present invention, and it is apparent to those skilled in the art that the scope of the present invention is not to be construed as limited to these Examples.

Experimental Example 1: Measuring scrubbing of dirt and dead skin cell

Scrubbing values of dirt and dead skin cell were measured by the following method in Examples and Comparative Examples.

After coating 1 g of Examples and Comparative Examples on a square area 4*4 of an artificial leather and drying at 55°C for 5 minutes, it was checked with the naked eye if agglomeration had been generated by rolling the formulation sample coats 20 times at a constant pressure using a roller with a pressure of 1 kgf/cm². When agglomeration had been generated, agglomerated portions were collected to measure agglomeration amounts by a scale.

Experimental Example 2: Measuring stability according to viscosity difference

Stability values of Examples and Comparative Examples were measured by the following method.

After keeping 100 g of samples (Examples and Comparative Examples) in a thermostat with a temperature of 30°C, viscosity values were confirmed by performing a viscosity measurement process using Brookfield Viscometer

Model DV-II+ and No. 64 spindle rotated at a rotation speed of 12 rpm for 1 minute. After performing an initial viscosity measurement process of measuring viscosity values on a preparation date of preparing Examples and Comparative Examples and measuring viscosity values in 7 days after preparing of Examples and Comparative Examples, stability values of the formulations were measured by comparing differences between viscosity values of these formulations.

Comparing scrubbing values of dirt and dead skin cell and stability values of Example 1 and Comparative Examples 1 to 4

Example 1 and Comparative Examples 1 to 4 were prepared according to components of the following Table 1.

[Table 1]

		Example 1	Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4
	Water phase	to 100	to 100	to 100	to 100	to 100
Thickener	Sodium polyacrylate starch	0.4				
	Carbomer		0.4			
	Polyacrylate-13			0.4		
	Acrylate/C 10-30 alkyl acrylate crosspolymer				0.4	
	xanthan gum					0.4
Powder	polymethyl methacrylate	15	15	15	15	15

Scrubbing values of dirt and dead skin cell of Example 1 and Comparative Examples 1 to 4 were compared by the method of Experimental Example 1. The comparison results are shown in the following Table 2.

[Table 2]

	Examp e 1	Comparativ e Example 1	Comparativ e Example 2	Comparativ e Example 3	Comparativ e Example 4
Scrubbing degree of dirt and dead skin cell (naked eye evaluation)	Good	Very bad	Bad	Bad	Very bad
Scrubbing amount of dirt and dead skin cell (when coating 1 g of formulation)	0	0.1	0.04	0.05	0.12

As represented in the foregoing Table 2, it is confirmed that scrubbing is good when sodium polyacrylate is used in Example 1 compared to other Comparative Examples.

Stability values of Example 1 and Comparative Examples 1 to 4 were compared by the method of Experimental Example 2. The comparison results are shown in the following Table 3.

[Table 3]

	Examp e 1	Comparativ e Example 1	Comparativ e Example 2	Comparativ e Example 3	Comparativ e Example 4
Viscosity value on the preparation date	12000	10000	11000	11000	12000
Viscosity value in 7 days after the preparation date	11067	5000	8000	7000	6000

As represented in the foregoing Table 3, it is confirmed that the most stable formulation is formed without decrease of viscosity in Example 1 using sodium polyacrylate compared to other Comparative Examples.

Comparing scrubbing values of dirt and dead skin cell and stability values of Examples 1 to 4 and Comparative Example 5

In order to compare effects of starch derivatives, Examples 1 to 4 and Comparative Example 5 were prepared according to components of the following Table 4.

[Table 4]

		Examp e 1	Examp e 2	Examp e 3	Examp e 4	Comparativ e Example 5
	Water phase	to 100	to 100	to 100	to 100	to 100
Thickene r	Sodium polyacrylate starch	0.4				
	hydroxypropyl starch phosphate		0.4			
	sodium carboxymethyl starch			0.4		
	calcium starch octenylsuccinate				0.4	
	Starch					0.4
Powder	Polymethyl methacrylate	15	15	15	15	15

Scrubbing values of dirt and dead skin cell of for Examples 1 to 4 and Comparative Example 5 were compared by the method of Experimental Example 1. The comparison results are shown in the following Table 5.

[Table 5]

	Example 1	Example 2	Example 3	Example 4	Comparative Example 5
Scrubbing degree of dirt and dead skin cell (naked eye evaluation)	Good	Good	Good	Good	Bad
Scrubbing amount of dirt and dead skin cell (when coating 1 g of formulation)	0	0.01	0.01	0.02	0.2

As represented in the foregoing Table 5, it is confirmed that scrubbing degrees of dirt and dead skin

cell of Examples 1 to 4 are good compared to Comparative Example 5.

Stability values of Examples 1 to 4 and Comparative Example 5 were compared by the method of Experimental Example 2. The comparison results are shown in the following Table 6.

[Table 6]

	Example 1	Example 2	Example 3	Example 4	Comparative Example 5
Viscosity value on the preparation date	12000	10000	11000	10667	8000
Viscosity value in 7 days after the preparation date	11067	10500	9700	9300	1600
Rate of decline (%)	7.7	12.5	11.8	12.8	80

As represented in the foregoing Table 3, it is confirmed that stable formulations are formed without decrease of viscosity values in Examples 1 to 4 compared to Comparative Example 5.

As described above, it is confirmed that stable formulations comprising high-content powder without scrubbing of dirt and dead skin cell are formed from a starch derivative type in which a side chain is added to starch.

Comparing scrubbing values of dirt and dead skin cell of Examples 5 to 11 and Comparative Examples 6 to 9

In order to compare effects of scrubbing of dirt and dead skin cell according to types of the powder, Examples 5 to 11 and Comparative Examples 6 to 9 were prepared according to components of the following table 7.

[Table 7]

	Example 5	Example 6	Example 7	Example 8	Example 9	Example 10	Example 11	Comparative Example 6	Comparative Example 7	Comparative Example 8	Comparative Example 9
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								e 6	e 7	e 8	e 9
Water phase	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100
Sodium polyacrylate starch	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
polymethyl methacrylate (20 microns or less)	10										
Methyl methacrylate crosspolymer		10									
Silica			10								
Talc				10							
Mica					10						
Alkyl silane-treated talc						10					
Alkyl silane-treated mica							10				
Pigmentary TiO ₂								10			
Pigmentary iron oxide									10		
Micro TiO ₂ (UV grade)										10	
Micro ZnO (UV grade)											10

Scrubbing values of dirt and dead skin cell of Examples 5 to 11 and Comparative Examples 6 to 9 were compared by the method of Experimental Example 1. The comparison results are shown in the following table 8.

[Table 8]

	Example 5	Example 6	Example 7	Example 8	Example 9	Example 10	Example 11	Comparative Example 6	Comparative Example 7	Comparative Example 8	Comparative Example 9
Scrubbing degree of dirt and dead skin cell (naked eye evaluation)	Good	Good	Good	Good	Good	Good	Good	Bad	Bad	Bad	Bad
Scrubbi	0	0	0	0	0	0	0	0.09	0.1	0.1	0.09

ng amount of dirt and dead skin cell (when coating 1 g of formula tion)											
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As shown in the foregoing results, although spherical-shaped powders or plate-type/pelletized/amorphous powders of which primary particles have a size of 1 micron or more form stable formulations without scrubbing, both pigmentary pigments and UV grade inorganic UV blocking agents having a primary particle diameter of less than 1 micron form formulations which show severe scrubbing.

[Claims]

[Claim 1]

A water-dispersible formulation of cosmetic composition comprising a starch derivative and powder, wherein the starch derivative is a starch derivative in which a hydrophilic functional group is substituted in a hydroxy group of starch, and the powder is comprised in an amount of 5 wt% or more based on the total weight of the composition.

[Claim 2]

The water-dispersible formulation of cosmetic composition according to claim 1, wherein the starch derivative is one or more of an acrylate substituted starch, a hydroxypropyl substituted starch, a carboxymethyl substituted starch, and an octenylsuccinate substituted starch.

[Claim 3]

The water-dispersible formulation of cosmetic composition according to claim 2, wherein the acrylate substituted starch is a sodium polyacrylate starch, the hydroxypropyl substituted starch is hydroxypropyl starch phosphate, the carboxymethyl substituted starch is a sodium carboxymethyl starch, and the octenylsuccinate substituted starch is a calcium starch octenylsuccinate.

[Claim 4]

The water-dispersible formulation of cosmetic composition according to claim 1, wherein the starch derivative and the powder have a weight ratio of 1:10 to 100.

[Claim 5]

The water-dispersible formulation of cosmetic composition according to claim 1, wherein the starch derivative is comprised in an amount of 0.01 to 5 wt% based on the total weight of the composition.

[Claim 6]

The water-dispersible formulation of cosmetic composition according to claim 1, wherein the powder is comprised in an amount of 10 wt% or more based on the total weight of the composition.

[Claim 7]

The water-dispersible formulation of cosmetic composition according to claim 1, wherein the powder is one or more of spherical powder, plate-type powder, pelletized powder, and amorphous powder.

[Claim 8]

The water-dispersible formulation of cosmetic composition according to claim 7, wherein the plate-type powder, the pelletized powder and the amorphous powder have an average particle size of 1 to 100 microns.

[Claim 9]

The water-dispersible formulation of cosmetic composition according to claim 7, wherein the powder is one or more of polymethyl methacrylate, methyl methacrylate crosspolymer, silica, talc, and mica.