

SPECIFICATION

TITLE OF THE INVENTION **HAIR DRESSING COMPOSITION**

TECHNICAL FIELD

[0001] The present invention relates to a hair dressing composition. More specifically, the present invention relates to a hair dressing composition that can provide a hair style with a light and fluffy finish, without stickiness and without causing squeakiness or stiffness in the hair.

BACKGROUND ART

[0002] Conventionally, in hair dressings such as hair waxes, it was common to include a solid oil such as a wax for the purpose of setting (dressing) and fixing the hair. However, if the amount of oil is increased in order to increase the fixing strength, the setting strength (hair dressing strength) improves, but in association therewith, there is a problem in that the oil causes greasiness and stickiness, the smoothness is reduced in the feel when used, and it becomes difficult to spread.

[0003] In order to solve problems such as those mentioned above, hair dressings containing powder ingredients such as silica (silicic anhydride) and the like have been proposed. For example, Patent Document 1 describes an oil-in-water emulsified hair dressing containing (a) a specific anionic surfactant, (b) a higher alcohol, (d) water and (e) a liquid oil, and further containing, as ingredient (c), one or more substances selected from among (c-1) waxes having a melting point of 55 °C or higher, (c-2) a specific hair-fixative resin and (c-3) silicic anhydride. In particular, (c-3) silicic anhydride is considered to be effective in achieving lightness and fluffiness.

[0004] Patent Document 2 discloses an emulsified composition for use in a hair dressing agent, comprising (A) silicic anhydride and/or hydrophobic silicic anhydride, (B) at least one substance selected from among waxes, hydrocarbons, fatty acid ester oils and silicone oils, (C) a surfactant and (D) water, wherein the content ratio between (A) and (B) is adjusted to be within a predetermined range. Due to the hair dressing effects of the (A) silicic anhydride and/or hydrophobic silicic anhydride, the hair can be dressed without a sense of stickiness, the unnatural shininess that is characteristic of oil is absent, a light finish with a natural texture is obtained, and the hair re-dressing properties are also considered to be excellent.

[0005] However, although a fluffy and light finish can be obtained by using a hair dressing

that makes use of the hair dressing effects of silicic anhydride, the addition of silicic anhydride (powdery hairdressing ingredient) in an amount sufficient to obtain hair dressing effects could sometimes result in squeakiness caused by the powder and impart a stiff texture.

[0006] On the other hand, sodium acrylate-grafted starch is known as a highly water-absorbent polymer material, and Patent Document 3 discloses various cosmetics containing sodium acrylate-grafted starch. However, the hair dressing effects of sodium acrylate-grafted starch were entirely unknown.

RELATED ART

PATENT DOCUMENTS

[0007] Patent Document 1: JP 5761838 B
Patent Document 2: JP 2012-102057 A
Patent Document 3: JP 2011-256154 A

DISCLOSURE OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0008] Thus, a problem addressed by the present invention is to provide a hair dressing composition that obtains a fluffy and light finish, without squeakiness or stiffness in the hair, while also allowing the hair to be dressed with a natural texture lacking stickiness.

MEANS FOR SOLVING THE PROBLEM

[0009] As a result of carrying out diligent investigations towards solving the above-mentioned problem, the present inventors discovered that, by including a predetermined amount of sodium acrylate-grafted starch, which was conventionally used as an aqueous (highly water-absorbent) thickener, it is possible to dress hair without stickiness and with a fluffy and light finish, while avoiding squeakiness and stiffness caused by the addition of a powder, thereby arriving at the present invention.

[0010] In other words, the present invention provides an oil-in-water emulsified hair dressing composition characterized by comprising:

- (A) at least 0.01 mass% and less than 1.5 mass% of a sodium acrylate-grafted starch;
 - (B) a surfactant of at least one type selected from among anionic surfactants and non-ionic surfactants; and
 - (C) an oil;
- and containing less than 1 mass% of a powdery hairdressing ingredient.

EFFECTS OF THE INVENTION

- [0011] The hair dressing composition of the present invention obtains a fluffy and light finish (airy feeling), without squeakiness or stiffness in the hair, while also allowing the hair to be dressed with a natural texture lacking stickiness, even when a silicic anhydride (powdery hairdressing ingredient) is contained in a small amount or not contained at all.

MODES FOR CARRYING OUT THE INVENTION

- [0012] The hair dressing composition (hereinafter also referred to simply as “hair dressing”) according to the present invention is an oil-in-water emulsified composition comprising, as essential ingredients, (A) a sodium acrylate-grafted starch, (B) a surfactant of at least one type selected from among anionic surfactants and non-ionic surfactants, and (C) an oil.

- [0013] (A) Sodium acrylate-grafted starch

The sodium acrylate-grafted starch (ingredient A) in the hair dressing of the present invention is a sodium salt of acrylic acid graft-polymerized to starch, and is known to be a highly water-absorbent polymer. In the cosmetics field, sodium acrylate-grafted starch has conventionally been used as an adsorbent, a coupler, an emulsion stabilizer, a hydrophilic thickener or the like.

- [0014] Though not particularly limited, it is possible to use, as the sodium acrylate-grafted starch in the present invention, a type that is available as a commercial product prepared in the form of white particles. Examples of commercial products include MAKIMOUSSE 7 (mean particle size approximately 7 μm), MAKIMOUSSE 12 (mean particle size approximately 12 μm) and MAKIMOUSSE 400 (mean particle size approximately 400 μm) (all manufactured by Daito Kasei Kogyo), and Sanflesh ST-100C, ST100MC and IM-300MC (all manufactured by Sanyo Chemical Industries).

Additionally, highly water-absorbent polymers having a starch as the main chain and having acrylic polymers grafted thereto are included among the sodium acrylate-grafted starch. Examples of such polymers (INCI name: starch/acrylamide/sodium acrylate copolymer) include Water Lock A-240, A-180, B-204, D-223, A-100, C-200 and D-223 (manufactured by Grain Processing Corp.).

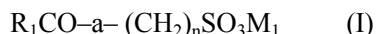
- [0015] The (A) sodium acrylate-grafted starch content in the hair dressing in the present application is at least 0.01 and less than 1.5 mass%, preferably 0.05 to 1.2 mass%, and more preferably 0.1 to 1.0 mass%. If the content is less than 0.01 mass%, then sufficient hair dressing effects cannot be obtained, and it becomes possible to feel the stickiness due to the oils. If the content is 1.5 mass% or higher, then the hair catches during application, stickiness is felt after the hair has been dressed, and the hair dressing becomes too hard

overall, making production and filling difficult.

[0016] (B) Surfactant

The surfactant (ingredient B) contained in the hair dressing of the present invention comprises at least one type of surfactant selected from among anionic surfactants and non-ionic surfactants.

[0017] The anionic surfactant (also referred to as ingredient B1) in the present invention is not particularly limited as long as it is an anionic surfactant that is generally used in cosmetics such as hair dressings. Among these, the long-chain acyl sulfonic acid salt-type anionic surfactants expressed by the below-indicated formula (I) are preferably used.



(In the above formula (I),

R_1CO- represents a saturated or unsaturated fatty acid residue (acyl group) having an average of 10 to 22 carbon atoms. Examples of R_1CO include $C_{11}H_{23}CO$, $C_{12}H_{25}CO$, $C_{13}H_{27}CO$, $C_{14}H_{29}CO$, $C_{15}H_{31}CO$, $C_{16}H_{33}CO$, $C_{17}H_{35}CO$, a coconut fatty acid residue, a palm fatty acid residue and the like. It is more preferable for the R_1CO to have an average of 12 to 22 carbon atoms in view of the safety and the like.

a represents $-O-$ or $-NR-$ (where R represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms). These are electron-donating groups. a is preferably $-O-$, $-NH-$ or $-N(CH_3)-$.

M_1 represents a hydrogen atom, an alkali metal, an alkaline earth metal, ammonium or an organic amine. Examples of M_1 include lithium, potassium, sodium, calcium, magnesium, ammonium, monoethanolamine, diethanolamine, triethanolamine, sodium taurate, sodium N-methyltaurate and the like.

n represents an integer from 1 to 3.)

[0018] Examples of compounds in which, in the abovementioned formula (I), a represents $-O-$, in other words, long-chain acyl isethionic acid salt-type anionic surfactants, include cocoyl isethionic acid salts, stearyl isethionic acid salts, lauryl isethionic acid salts, myristoyl isethionic acid salts and the like.

[0019] Examples of compounds in which, in the abovementioned formula (I), a represents $-NH-$, in other words, long-chain acyl taurine salt-type anionic surfactants, include N-lauroyl taurine salts, N-cocoyl-N-ethanol taurine salts, N-myristoyl taurine salts, N-stearyl taurine salts and the like.

[0020] Examples of compounds in which, in the abovementioned formula (I), a represents $-N(CH_3)-$, in other words, long-chain acyl methyltaurine salt-type anionic surfactants, include N-lauroyl-N-methyltaurine salts, N-palmitoyl-N-methyltaurine salts, N-stearyl-N-methyltaurine salts, N-cocoyl-N-methyltaurine salts and the like.

[0021] The non-ionic surfactant (also referred to as ingredient B2) is not particularly limited and may be of a type that is generally used in cosmetics such as hair dressings. Examples include polyhydric alcohol ester-type surfactants obtained by ester-bonding a fatty acid with a polyhydric alcohol such as glycerin, propylene glycol or sorbitol (e.g., fatty acid monoglycerides, propylene glycol fatty acid esters, sorbitan fatty acid esters, sucrose fatty acid esters and alkyl glucosides), ethylene oxide adduct-type surfactants obtained by adding several moles to several hundred moles of ethylene oxide to a substance having active hydrogen, such as a fatty acid or a higher alcohol (e.g., polyoxyethylene oleyl ether, polyoxyethylene stearyl ether, polyoxyethylene octyl dodecyl ether, polyoxyethylene octylphenyl ether, polyethylene glycol monooleate, polyethylene glycol monostearate, polyethylene glycol monolaurate, polyoxyethylene sorbitan monolaurate, polyoxyethylene sorbitan monostearate, polyoxyethylene sorbitan tristearate, polyoxyethylene sorbitan (e.g., 6 E.O.) monooleate and the like) and fatty acid alkylol amides (e.g., coconut oil fatty acid diethanolamide, coconut oil fatty acid monoethanolamide, lauric acid monoisopropanolamide and the like).

[0022] The (B) surfactant content in the hair dressing of the present invention, in terms of the total of the (B1) anionic surfactant and the (B2) non-ionic surfactant, is 0.1 to 10.0 mass%, more preferably 0.5 to 8.0 mass% or less, and more preferably 0.5 to 7.0 mass%. If more than 10.0 mass% is contained, then there can be stickiness, and if less than 0.1 mass% is contained, then there are cases in which a stable emulsion cannot be obtained.

[0023] The hair dressing of the present invention may contain one or more types of either the (B1) anionic surfactant or the (B2) non-ionic surfactant, and the effects are obtained if either (B1) or (B2) is contained. However, it preferably contains both the (B1) anionic surfactant and the (B2) non-ionic surfactant, since this further improves the stability over time.

[0024] (C) Oil

The oil (also referred to as ingredient C) contained in the hair dressing of the present invention contains (C1) a liquid oil (volatile and non-volatile oils that are liquid at 25 °C) and (C2) a solid oil (oils that are solid at 25 °C).

[0025] The liquid oil (also referred to as ingredient C1) is not particularly limited as long as it is of a type that is generally used in cosmetics such as hair dressings.

Examples of volatile oils include volatile hydrocarbon oils such as light isoparaffin (= hydrogenated polyisobutene), isododecane and isohexadecane; and volatile silicone oils such as hexamethylcyclotrisiloxane, octamethyltetracyclosiloxane, decamethylcyclopentasiloxane, dodecamethylcyclohexasiloxane, tetradecamethylcycloheptasiloxane and the like.

[0026] Examples of non-volatile oils include hydrocarbon oils such as heavy isoparaffin (= hydrogenated polyisobutene), squalane and liquid paraffin; esters such as cetyl-2-ethylhexanoate, 2-ethylhexyl palmitate, 2-octyldodecyl myristate, neopentyl glycol-2-ethylhexanoate, isopropyl myristate, myristyl myristate, cetyl 2-ethylhexanoate and pentaerythrityl tetra-2-ethylhexanoate; lipids such as olive oil, avocado oil, jojoba oil, sunflower oil, safflower oil, camellia oil, macadamia nut oil, mink oil, liquid lanolin, lanolin acetate and castor oil; silicone-based oils such as dimethylpolysiloxane, methylphenylpolysiloxane, high-polymerization gum-type dimethylpolysiloxane, polyether-modified silicone and amino-modified silicone; and fluorine-based oils such as fluorine-modified dimethylpolysiloxane, fluorine-modified methylphenylpolysiloxane, perfluoropolyether and perfluorocarbon. One or more types of ingredient C1 may be used.

[0027] The solid oil (also referred to as ingredient C2) is an oil that is solid or semi-solid at room temperature (25 °C) and is thought to be one of the sources of the hair dressing strength in the hair dressing of the present invention. Examples include vaseline and waxes. The waxes in the present invention refer to waxes having a melting point of 55 °C or higher, examples of which include natural wax esters such as candelilla wax, carnauba wax, beeswax and lanolin; and synthetic wax esters such as paraffin wax, microcrystalline wax, polyethylene wax, polypropylene wax, ceresin and the like. One or more types of ingredient C2 may be used.

[0028] The liquid oil (ingredient C1) content in the hair dressing of the present invention, relative to the overall amount of the hair dressing, should preferably be 4 to 30 mass%, more preferably 5 to 25 mass%, and particularly preferably 6 to 20 mass%.

The solid oil (ingredient C2) content in the hair dressing of the present invention, relative to the overall amount of the hair dressing, should preferably be 10 to 50 mass%, more preferably 12 to 40 mass%, and particularly preferably 15 to 30 mass%.

[0029] Additionally, the content ratio (C1) : (C2) between the liquid oils (ingredient C1) and the solid oils (ingredient C2) in the hair dressing of the present invention should preferably be in the range 1 : 1 to 1 : 5, more preferably 1 : 1 to 1 : 4, and even more preferably 1 : 1 to 1 : 3.

[0030] (D) Water

The hair dressing in the present invention is an oil-in-water emulsified composition containing water (also referred to as ingredient D) as the main ingredient of the external phase (water phase). In the hair dressing of the present invention, the external phase (water phase) should preferably be approximately 30 to 80 mass% of the composition overall, and the internal phase (oil phase) should preferably be approximately 5 to 50 mass%.

[0031] (E) Powdery hairdressing ingredient (silicic anhydride)

As types of silicic anhydride, there is (1) the type having irregularities on the powder surface and having hair dressing effects, as described, for example, in Patent Document 1, and (2) the spherical type in which the surface is relatively smooth. In the present specification, the two types are distinguished by referring to the former type (1), the “powder having irregularities on the surface”, as “silicic anhydride (or silica)”, and referring to the latter type (2), the “spherical powder having a smooth surface”, as “spherical silicic anhydride (or silica)”. In the present invention, the “powdery hairdressing ingredient (also referred to as ingredient E)” refers to the former type (1), “silicic anhydride (or silica)”.

[0032] The aforementioned “silicic anhydride” is usually produced by a dry process, and the substance that is commercially available under the product name “Aerosil” corresponds thereto. The aforementioned “spherical silicic anhydride” is produced by a wet process, or by polishing the surface of silicic anhydride produced by a dry process or the like.

The powdery hairdressing ingredient (silicic anhydride, ingredient E) content in the hair dressing of the present invention, relative to the composition overall, should be less than 1.0 mass%, more preferably 0.2 mass% or less, even more preferably 0.1 mass% or less (or less than 0.1 mass%), and even more preferably 0.05 mass% or less, and the present invention includes embodiments not containing silicic anhydride. If the powdery hairdressing ingredient is 1 mass% or higher, then there is a prominent catching sensation during application, and the hair becomes squeaky and stiff.

[0033] In conventional hair dressings, it was considered to be necessary for the dressing to contain at least 0.1 mass% silicic anhydride (powdery hairdressing ingredient) (Patent Document 1), and to preferably contain at least 0.2 mass% silicic anhydride in order to obtain adequate hair dressing strength (examples/comparative examples in Patent Document 1, and Patent Document 2). In contrast therewith, the present invention obtains good hair dressing strength by containing a sodium acrylate-grafted starch (ingredient A), so it is possible to keep the silicic anhydride content within the abovementioned ranges or to not include silicic anhydride, and the hair will not become squeaky or stiff.

[0034] In the present invention, it is essential for the silicic anhydride content to be the above-mentioned predetermined values or less, but this does not exclude the possibility of containing a powder ingredient other than silicic anhydride. The powder ingredients other than silicic anhydride ((E') other powder ingredient) that may be contained in the present invention are not particularly limited as long as they are normally used in cosmetics. Examples include inorganic powders such as spherical silicic anhydride (silica), talc, mica, kaolin, mica, silk mica (sericite), white mica, gold mica, synthetic mica, red mica, black mica, lithia mica, vermiculite, magnesium carbonate, calcium carbonate, aluminum silicate, barium silicate, calcium silicate, magnesium silicate, strontium silicate, tungstic acid metal

salts, magnesium, spherical silica, zeolite, barium sulfate, sintered calcium sulfate (calcined gypsum), calcium phosphate, fluorapatite, hydroxyapatite, ceramic powder, metal soaps (zinc myristate, calcium palmitate, aluminum stearate etc.) and boron nitride; spherical organic powders such as spherical polyamide resin powder (spherical nylon powder), spherical polyethylene, spherical crosslinked poly methyl (meth)acrylate resin powder, spherical polyester, spherical crosslinked polystyrene resin powder, spherical styrene-acrylic acid copolymer resin powder, spherical benzoguanamine resin powder, spherical polytetrafluoroethylene powder and spherical cellulose; inorganic white pigments such as titanium oxide and zinc oxide; inorganic red pigments such as iron oxide (red iron oxide) and iron titanate; inorganic brown pigments such as γ -iron oxide; inorganic yellow pigments such as yellow iron oxide and loess; inorganic black pigments such as black iron oxide, carbon black and lower-order titanium oxides; inorganic violet pigments such as manganic violet and cobalt violet; inorganic green pigments such as chromium oxide, chromium hydroxide and cobalt titanate; inorganic blue pigments such as ultramarine blue and navy blue; pearlescent pigments such as titanium oxide-coated mica, titanium oxide-coated bismuth oxychloride, titanium oxide-coated talc, colored titanium oxide-coated mica, bismuth oxychloride and argentine; metal powder pigments such as aluminum powder and copper powder; colorants in colors such as red, yellow, orange, yellow, green and blue, or colorants (organic pigments) in which these are formed into lakes with zirconium, barium, aluminum or the like; and natural pigments such as chlorophyll and β -carotene.

[0035] When these other powder ingredients (ingredient E') are to be contained, the content thereof relative to the overall amount of the hair dressing should be 0.1 to 3 mass%, preferably 0.3 to 2 mass%, and more preferably 0.5 to 2 mass%. Alternatively, the total amount of the (E) silicic anhydride and the (E') other powder ingredients may be 0.2 mass% or less. The present invention includes embodiments not containing these other powder ingredients.

[0036] The hair dressing of the present invention preferably further contains (F) a higher aliphatic alcohol. The higher aliphatic alcohol (ingredient F) is not particularly limited as long as it can be used in the fields of cosmetics, pharmaceuticals, quasi-drugs and the like.

[0037] Examples include saturated linear monohydric alcohols and unsaturated monohydric alcohols. Examples of saturated linear monohydric alcohols include dodecanol (= lauryl alcohol), tridecanol, tetradecanol (= myristyl alcohol), pentadecanol, hexadecanol (= cetyl alcohol), heptadecanol, octadecanol (= stearyl alcohol), nonadecanol, icosanol (= arachyl alcohol), heneicosanol, docosanol (= behenyl alcohol), tricosanol, tetracosanol (= carnaubyl alcohol), pentacosanol, hexacosanol (= ceryl alcohol) and the like. Examples of unsaturated monohydric alcohols include elaidyl alcohol and the like. In the present

invention, a saturated linear monohydric alcohol is preferred in view of the safety and the like.

[0038] While one or more types of the higher aliphatic alcohols (ingredient F) may be used, it is desirable for them to be contained in a combination such that the average alkyl chain length, obtained by taking the arithmetic mean, is 18 or longer, in view of the high-temperature stability and the like. Although the suitable upper limit value of the average alkyl chain length is not particularly limited, an alkyl chain having approximately 22 carbon atoms is preferred.

[0039] When the hair dressing of the present invention contains the (F) higher aliphatic alcohol, the content thereof, relative to the overall amount of the hair dressing, should preferably be 0.1 to 20 mass%, more preferably 0.5 to 15 mass%, and particularly preferably 3 to 10 mass%.

Additionally, the surfactant (ingredient B) and the higher aliphatic alcohol may form an α -gel in water, in which case the content ratio between the (B) surfactant and the (F) higher aliphatic alcohol should preferably be (B) : (F) = 1 : 2 to 1 : 10 (molar ratio).

[0040] The hair dressing strength of the hair dressing of the present invention may be improved by containing (G) a resin having film-forming properties (also referred to simply as a "resin"). The resin (G) is not particularly limited, and may be of one or more types selected from among hydrophilic polymer compounds having film-forming properties. However, it is preferable to use a cationic or non-ionic polymer compound in consideration of the compatibility with the (A) sodium acrylate-grafted starch that is contained as an essential ingredient in the present invention. When an amphoteric or an anionic polymer compound is contained, there are cases in which precipitation occurs, or the thickening effect due to the sodium acrylate-grafted starch is inhibited (thinned).

[0041] While the below-indicated resins can be named as specific examples of resins that are preferably used in the present invention, the resins are not limited thereto. It is also possible to combine one or more of these resins.

[0042] Examples of cationic resins include vinylpyrrolidone/dimethylaminoethyl methacrylate copolymer diethyl sulfuric acid salts (H. C. Polymer 1S (M), H. C. Polymer 2 (manufactured by Osaka Organic Chemical Industry) and Gafquat 755N (manufactured by ISP)), vinylpyrrolidone/dimethylaminopropyl methacrylamide/lauryl dimethylaminopropyl methacrylamide copolymer (Styleze W-20 (manufactured by ISP)), vinylpyrrolidone/N,N-dimethylaminoethyl methacrylate/alkyl acrylate/tripropylene glycol diacrylate copolymer (Cosquat GA467, Cosquat GA468 (manufactured by Osaka Organic Chemical Industry)), poly dimethyl methylene piperidinium chloride (Merquat 100 (manufactured by Nalco)), dimethyldiallylammonium chloride/acrylamide copolymer (Merquat 550

(manufactured by Nalco)), trimethylaminopropyl acrylamide chloride/dimethylacrylamide copolymer and the like.

[0043] Examples of non-ionic surfactants include polyvinylpyrrolidone (Luviskol K17, Luviskol K30, Luviskol K90 (manufactured by BASF)), PVP K (manufactured by ISP), vinylpyrrolidone/vinyl acetate copolymer (PVP/VA S-630, PVP/VA E-735, PVP/VA E-335 (all manufactured by ISP), Luviskol VA73W, Luviskol 37E (both manufactured by BASF), PVA-6450 (manufactured by Osaka Organic Chemical Industry)), vinylmethyl ether/alkyl maleate copolymer (Gantrez A-425, Gantrez ES-225, Gantrez ES-335 etc. (manufactured by ISP)), vinylpyrrolidone/methacrylamide/vinylimidazole copolymer (Luviset Clear (manufactured by BASF)) and the like.

[0044] When the hair dressing of the present invention contains the resin (ingredient G), the content (actual content) thereof, relative to the overall amount of the hair dressing, should be 0.1 to 20 mass%, preferably 0.5 to 15 mass% and more preferably 1 to 12 mass%. If less than 0.1 mass% is contained, then the effects due to containing the resin cannot be obtained, and if more than 20 mass% is contained, there may be stickiness.

[0045] The hair dressing of the present invention may contain ingredients that are normally used in cosmetics or quasi-drugs, particularly those for use in hair, within a range not inhibiting the effects of the present invention. Examples of such ingredients include surfactants (excluding the above-mentioned ingredient (B)), humectants, dispersants, preservatives, fragrances, medicinal agents, ultraviolet absorption agents or the like.

[0046] Examples of surfactants (excluding the above-mentioned ingredient (B)) include cationic surfactants such as alkyl trimethyl ammonium chloride, dialkyl dimethyl ammonium chloride and benzalkonium chloride; amphoteric surfactants such as alkyl dimethyl aminoacetic acid betaine, alkylamido dimethyl aminoacetic acid betaine and alkyl carboxyhydroxy imidazolinium betaine; polymer surfactants and the like.

[0047] Examples of humectants include polyhydric alcohols such as dynamite glycerol, 1,3-butylene glycol, dipropylene glycol and propylene glycol; and water-soluble polymers such as hyaluronic acid and chondroitin sulfate.

[0048] The hair dressing of the present invention can be produced by mixing the contained ingredients, and emulsifying by means of a known method such as, for example, phase inversion emulsification using homo-mixer. However, the production method is not limited to the above. The mixing and the emulsification may be performed separately or simultaneously.

[0049] The oil-in-water emulsified hair dressing of the present invention may be applied to various forms such as waxes, creams, gels and lotions, and can be favorably used as a hair wax, a hair milk, a hair cream or the like, particularly as a hair wax, having excellent hair

dressing effects.

EXAMPLES

[0050] Herebelow, the present invention will be explained in further detail by giving examples, but the present invention is not limited, in any way, by these examples. Where not otherwise indicated, content is indicated in mass% relative to the overall amount of the composition containing the relevant ingredient.

[0051] Hair waxes were prepared with the formulations indicated in Tables 1 to 5 below. The hair wax (sample) of each example was used by a panel of experts and evaluated according to the below-indicated criteria in the following categories (1) to (3).

[0052] (1) Catching during application (squeakiness)

Evaluation criteria:

A: No catching

B: Slight catching felt

C: Extreme catching felt

[0053] (2) Airy feeling after dressing hair

A: Extremely fluffy finish

B: Fluffy finish

C: Fluffy finish not obtained

[0054] (3) Stickiness after dressing hair

A: Absolutely no stickiness

B: Slight stickiness

C: Stickiness

[0055] [Table 1]

Ingredients	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Ex. 6
Water	54.9	54.8	54.65	54.4	67.2	52.6
EDTA-2Na	0.05	0.05	0.05	0.05	0.05	0.05
Sodium stearyl methyl taurate	1	1	1	1	0.5	1.2
Glyceryl stearate (SE)	0.5	0.5	0.5	0.5	0.5	-
Behenyl alcohol	2	2	2	2	1	2.4
Stearyl alcohol	1	1	1	1	0.5	1.2
Candelilla wax	10	10	10	10	8	10
Microcrystalline wax	5	5	5	5	4	5
Mineral oil	5	5	5	5	4	5
Cetyl ethylhexanoate	5	5	5	5	4	5
Dimethicone	1	1	1	1	1	1
Hydrogenated polyisobutene	3	3	3	3	2	5
Tocopherol	0.05	0.05	0.05	0.05	0.05	0.05
Phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5
TEA	0.5	0.5	0.5	0.5	0.5	0.5
PG	10	10	10	10	5	10
Sodium acrylate-grafted starch	0.5	0.5	0.5	0.5	1	0.3
Silicic anhydride	0	0.1	0.25	0.5	0.2	0.2
Total	100	100	100	100	100	100
Catching during application	A	A	B	B	A	A
Airy feeling after dressing hair	A	A	A	A	A	A
Stickiness after dressing hair	A	A	A	A	A	A

[0056] [Table 2]

Ingredients	Comp. Ex. 1	Comp. Ex. 2	Comp. Ex. 3	Comp. Ex. 4	Comp. Ex. 5	Comp. Ex. 6
Water	53.9	49.9	54.4	55.4	53.7	69.2
EDTA-2Na	0.05	0.05	0.05	0.05	0.05	0.05
Sodium stearyl methyl taurate	1	1	1	1	1	1
Glyceryl stearate (SE)	0.5	0.5	0.5	0.5	0.5	0.5
Behenyl alcohol	2	2	2	2	2	2
Stearyl alcohol	1	1	1	1	1	1
Candelilla wax	10	10	10	10	10	5
Microcrystalline wax	5	5	5	5	5	5
Mineral oil	5	5	5	5	5	2
Cetyl ethylhexanoate	5	5	5	5	5	-
Dimethicone	1	1	1	1	1	0.5
Hydrogenated polyisobutene	3	3	3	3	3	1
Tocopherol	0.05	0.05	0.05	0.05	0.05	0.05
Phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5
TEA	0.5	0.5	0.5	0.5	0.5	0.5
PG	10	10	10	10	10	10
Sodium acrylate-grafted starch	0.5	0.5	0	0	1.5	1.5
Silicic anhydride	1	5	1	0	0.2	0.2
Total	100	100	100	100	100	100
Catching during application	C	C	C	A	C	C
Airy feeling after dressing hair	A	A	A	C	A	C
Stickiness after dressing hair	A	A	B	C	C	C

[0057] From the results shown in Tables 1 and 2, Examples 1 to 6 containing the prescribed amount (at least 0.01 mass% and less than 1.5 mass%) of sodium acrylate-grafted starch exhibited good hair dressing effects (fluffy (airy) hair dressing) and did not feel sticky, irrespective of the silicic anhydride content. In Examples 1, 2, 5 and 6, in which the silicic anhydride content was held to 0.2 mass% or less, the hair did not catch and was able to be dressed in an airy fashion, and no stickiness was felt. In Examples 3 and 4, in which the silicic anhydride content was greater than 0.2 mass%, there was a slight catching sensation, but it was of a level that was acceptable in a product. However, in Comparative Examples 1 and 2 containing 1 mass% or more of silicic anhydride, there was a prominent catching sensation during application.

[0058] On the other hand, in Comparative Example 3, which contains silicic anhydride but does not contain sodium acrylate-grafted starch, not only was catching in the hair felt, but there was also a sticky feeling when used. Additionally, in Comparative Example 4 not containing silicic anhydride or sodium acrylate-grafted starch, a fluffy finish (airy feeling after dressing the hair) was not obtained.

[0059] In Comparative Examples 5 and 6 in which the sodium acrylate-grafted starch content was 1.5 mass%, even when the silicic anhydride content was held to 0.2 mass%, there was catching during application and stickiness after dressing the hair. In particular, in Comparative Example 6 having a liquid oil content of less than 4 mass%, the sense of catching during application and stickiness after dressing the hair were strongly felt, and the airy feeling was also lost.

[0060] [Table 3]

	Ex. 1	Ex. 7	Ex. 8	Ex. 9	Ex. 10	Ex. 11	Comp. Ex. 7
Water	54.9	49.9	53.4	46.9	51.4	53.9	58.93
EDTA-2Na	0.05	0.05	0.05	0.05	0.05	0.05	0.02
Sodium stearyl methyl taurate	1	-	-	-	-	-	-
Polysorbate 60	-	-	-	-	1.5	-	-
Glyceryl stearate (SE)	0.5	2	0.5	2	3	0.5	-
PEG-60 glyceryl isostearate	-	2	-	-	-	-	-
Ceteth-25	-	-	0.5	-	-	0.5	-
Ceteth-20	-	-	2	-	-	-	-
PEG-60 hydrogenated castor oil	-	-	-	3	-	-	-
Oleth-10 phosphate	-	-	-	2	-	-	-
Sodium cocoamphoacetate	-	-	-	-	-	-	5
Hydroxystearic acid	-	2	-	-	-	-	-
Stearic acid	-	2.5	2	4.5	-	1.5	-
Cetanol	-	-	-	-	2.5	-	-
Behenyl alcohol	2	-	-	-	-	3	-
Stearyl alcohol	1	1	1	1	1	-	-
Candelilla wax	10	10	10	10	10	10	10
Microcrystalline wax	5	5	5	5	5	5	6
Mineral oil	5	5	5	5	5	5	3
Cetyl ethylhexanoate	5	5	5	5	5	5	5
Dimethicone	1	1	1	1	1	1	0.5
Hydrogenated polyisobutene	3	3	3	3	3	3	3
Isostearic acid	-	-	-	-	-	-	1.2
Tocopherol	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TEA	0.5	0.5	0.5	0.5	0.5	0.5	0.5
PG	10	10	10	10	10	10	6
Sodium acrylate-grafted starch	0.5	0.5	0.5	0.5	0.5	0.5	0.3
Silicic anhydride	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100
Catching during application	A	A	A	A	A	A	-
Airy feeling after dressing hair	A	A	A	A	A	A	-
Stickiness after dressing hair	A	A	A	A	A	A	-

[0061] From the results shown in Table 3, Examples 1 and 7 to 11, in which anionic and/or non-ionic surfactants were used as the (B) surfactant, were evaluated as being excellent in all categories. However, Comparative Example 7, in which only an amphoteric surfactant was used as the (B) surfactant, was not able to be stably emulsified and precipitants were observed, so the property evaluations were not performed.

[0062] [Table 4]

	Ex. 12	Ex. 13	Ex. 14	Ex. 15	Ex. 16	Ex. 17	Ex. 18	Ex. 19
Water	60.93	60.93	60.93	60.93	60.93	60.93	60.93	60.93
EDTA-2Na	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Sodium stearyl methyl taurate	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Glyceryl stearate (SE)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Behenyl alcohol	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Stearyl alcohol	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Candelilla wax	10	10	10	10	10	10	10	10
Microcrystalline wax	6	-	-	-	-	-	-	6
Japan wax	-	6	-	-	-	-	-	-
Rice bran wax	-	-	6	-	-	-	-	-
Beeswax	-	-	-	6	-	-	-	-
Paraffin/microcrystalline wax	-	-	-	-	6	-	-	-
Polyethylene/ microcrystalline wax	-	-	-	-	-	6	-	-
Vaseline	-	-	-	-	-	-	6	-
Mineral oil	3	3	3	3	3	3	3	3
Cetyl ethylhexanoate	5	5	5	5	5	5	5	-
Pentaerythrityl tetraethylhexanoate	-	-	-	-	-	-	-	5
Dimethicone	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Hydrogenated polyisobutene	3	3	3	3	3	3	3	3
Tocopherol	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TEA	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
PG	6	6	6	6	6	6	6	6
Sodium acrylate-grafted starch	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Silica	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100
Catching during application	A	A	A	A	A	A	A	A
Airy feeling after dressing hair	A	A	A	A	A	A	A	A
Stickiness after dressing hair	A	A	A	A	A	A	A	A

[0063] As shown in Table 4, it was confirmed that, in the present invention, similar effects were obtained even when changing the types of the solid oils and liquid oils.

[0064] [Table 5]

	Ex. 1	Ex. 20	Ex. 21	Ex. 22	Ex. 23	Ex. 24	Ex. 25	Ex. 26	Ex. 27
Water	54.9	44.9	44.9	44.9	54.9	44.9	44.9	44.9	44.9
EDTA-2Na	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Sodium stearyl methyl taurate	1	1	1	1	1	1	1	1	1
Glyceryl stearate (SE)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Behenyl alcohol	2	2	2	2	2	2	2	2	2
Stearyl alcohol	1	1	1	1	1	1	1	1	1
Candelilla wax	10	10	10	10	10	10	10	10	10
Microcrystalline wax	5	5	5	5	5	5	5	5	5
Mineral oil	5	5	5	5	5	5	5	5	5
Cetyl ethylhexanoate	5	5	5	5	5	5	5	5	5
Dimethicone	1	1	1	1	1	1	1	1	1
Hydrogenated polyisobutene	3	3	3	3	3	3	3	3	3
Tocopherol	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Phenoxyethanol	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TEA	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
PG	10	10	10	10	10	10	10	10	10
Sodium acrylate-grafted starch	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Silicic anhydride	0	0	0	0	0	0	0	0	0
(VP/methacrylamide/vinylimidazole) copolymer	-	10	-	-	-	-	-	-	-
Polyquaternium-11	-	-	10	-	-	-	-	-	-
(Vinylpyrrolidone/VA) copolymer	-	-	-	10	-	-	-	-	-
(Methacryloyloxyethyl carboxybetaine/alkyl methacrylate) copolymer	-	-	-	-	10	-	-	-	-
Polyacrylate crosspolymer-3	-	-	-	-	-	10	-	-	-
(Acrylates/alkyl (C ₁₋₁₈) acrylate/alkyl (C ₁₋₈) acrylamide) copolymer AMP	-	-	-	-	-	-	10	-	-
Acrylates polyacrylate crosspolymer-9-AMP	-	-	-	-	-	-	-	10	-
(Alkyl acrylate/diacetone acrylamide) copolymer AMP	-	-	-	-	-	-	-	-	10
Total	100	100	100	100	100	100	100	100	100
Catching during application	A	A	A	A	A	A	A	A	A
Airy feeling after dressing hair	A	A	A	A	A	A	A	A	A
Stickiness after dressing hair	A	A	A	A	A	A	A	A	A
Hair dressing strength	A	A ⁺	A ⁺	A ⁺	A	A	A	A	A
Appearance	+	+	+	+	-	+	+	+	+
Thickening properties	+	+	+	+	+	-	-	-	-

[0065] In Table 5, the properties of samples further containing a resin (ingredient G) were evaluated. In addition to the above-mentioned categories, the “hair dressing strength”, the “appearance” and the “thickening properties” were evaluated according to the

below-indicated criteria.

[0066] Evaluation categories and evaluation criteria

· Hair dressing strength:

A⁺: Extremely excellent

A: Excellent

B: Normal

C: Inferior

[0067] · Appearance:

+: Good (uniform with no precipitants observed)

-: Poor (precipitants observed)

[0068] · Thickening properties

+: Good (thickening effects due to sodium acrylate-grafted starch maintained)

-: Poor (viscosity decrease (thinning) occurred)

[0069] From the results indicated in Table 5, it was confirmed that, when containing the resin, the basic performance such as the lack of catching during application, the sense of airy feeling after dressing the hair and the lack of stickiness after dressing the hair were achieved without problems, and there was a tendency for the hair dressing strength to further improve. However, in terms of appearance and thickening effects, although no problems occurred in Examples 20 to 22 containing a non-ionic resin ((VP/methacrylamide/vinylimidazole) copolymer and (vinylpyrrolidone/VA) copolymer) or a cationic resin (polyquaternium-11), precipitation or inhibition of the thickening effect due to the sodium acrylate-grafted starch was observed in Examples 23 to 27 containing an amphoteric or anionic resin.

[0070] Another formulation example of the hair dressing composition of the present invention is indicated below.

The hair dressing of Formulation Example A also did not catch during application, was not sticky after dressing the hair, and had airy feeling after dressing the hair. Additionally, it had excellent hair dressing strength, appearance and thickening properties.

[0071]	Formulation Example A:	Content (mass%)
	(1) Water	balance
	(2) Silicic anhydride	0.5
	(3) Potassium hydroxide	0.5
	(4) Sodium stearyl methyl taurate	1
	(5) Behenyl alcohol	2
	(6) Cetanol	1
	(7) Carnauba wax	4
	(8) Paraffin	2

(9)	Microcrystalline wax	5
(10)	Mineral oil	2
(11)	Cetyl ethylhexanoate	1
(12)	Hydrogenated polyisobutene	3
(13)	Tocopherol	0.05
(14)	Phenoxyethanol	0.5
(15)	BG	10
(16)	Sodium acrylate-grafted starch	1
(17)	(Vinylpyrrolidone/VA) copolymer	2
	Total	100

[0072] Production method:

Step 1: Stir (1) to (4) and heat to 80 °C (A).

Step 2: Heat (5) to (14) to 80 °C and melt (B).

Step 3: Add (B) to (A) and stir vigorously to emulsify (C).

Step 4: Add (15) to (17) to (C), stir until uniform overall, then cool.

CLAIMS

- [Claim 1] An oil-in-water emulsified hair dressing composition characterized by comprising:
- (A) at least 0.01 mass% and less than 1.5 mass% of a sodium acrylate-grafted starch;
 - (B) a surfactant of at least one type selected from among anionic surfactants and non-ionic surfactants; and
 - (C) an oil; and
- containing less than 1 mass% of a powdery hairdressing ingredient-
- [Claim 2] The hair dressing composition according to claim 1, wherein the ingredient (C) includes 4 to 30 mass% of a liquid oil relative to the overall amount of the composition and 10 to 50 mass% of a solid oil relative to the overall amount of the composition.
- [Claim 3] The hair dressing composition according to claim 1 or 2, containing 0.2 mass% or less of the powdery hairdressing ingredient.
- [Claim 4] The hair dressing composition according to any one of claims 1 to 3, further comprising at least one type of resin selected from among cationic resins and non-ionic resins.
- [Claim 5] The hair dressing composition according to any one of claims 1 to 4, wherein the anionic surfactant is a long-chain acyl sulfonic acid salt-type anionic surfactant.