

DESCRIPTION

OXIDATIVE HAIR DYE COMPOSITION

TECHNICAL FIELD

[0001]

The present invention relates to an oxidative hair dye composition containing a carbonate as an alkaline agent.

BACKGROUND ART

[0002]

A hair dye composition that exhibits advantageous effects by mixing a plurality of chemicals is generally known. As the hair dye composition, for example, a hair dye composition that is composed of a first agent which contains an alkaline agent and an oxidative dye and a second agent which contains an oxidant such as hydrogen peroxide is known. The alkaline agent improves hair-dyeing power by facilitating the action of the oxidant contained in the second agent and by swelling hair and improving permeability of a dye into hair. Ammonia and the like have been conventionally known as an alkaline agent used for an oxidative hair dye composition. However, there has been a problem that ammonia is accompanied by irritant odor when the amount of ammonia compounded is increased.

[0003]

For example, oxidative hair dye compositions disclosed in Patent Documents 1 to 3 below have been conventionally known. In Patent Documents 1 to 3, the amount of ammonia compounded is lowered as compared to the amount conventionally compounded and an improvement in hair-dyeing power is achieved by using ammonia and a carbonate together as alkaline agents.

PRIOR ART DOCUMENT

Patent Document

[0004]

Patent Document 1: Japanese Laid-Open Patent Publication No. 2001-206825

Patent Document 2: Japanese Laid-Open Patent Publication No. 2001-328926

Patent Document 3: Japanese Laid-Open Patent Publication No. 2008-127343

SUMMARY OF THE INVENTION

Problems that the Invention is to Solve

[0005]

There has been a problem that with the oxidative hair dye compositions disclosed in Patent Documents 1 to 3, tints, namely saturation and color intensity, may be reduced due to the carbonate compounded as an alkaline agent. Meanwhile, there has been a problem that simply reducing the amount of the carbonate compounded and increasing the amount of ammonia compounded cannot reduce irritation.

[0006]

An object of the present invention is to provide an oxidative hair dye composition containing a carbonate as an alkaline agent, wherein the composition is capable of improving tints while maintaining a low irritant property.

Means for Solving the Problems

[0007]

The present invention is based on the finding that an oxidative hair dye composition containing a carbonate as an alkaline agent can improve tints while maintaining a low irritant property when used together with a particular sugar alcohol.

[0008]

To achieve the object, an oxidative hair dye composition according to one embodiment of the present

invention containing an alkaline agent and an oxidant is characterized in that the oxidative hair dye composition contains (A) a carbonate, (B) an oxidative dye, and (C) at least one sugar alcohol selected from the group consisting of sugar alcohols having 4 or more carbon atoms. The sugar alcohol (C) may be an alditol. The oxidative dye (B) may contain at least one coupler selected from 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, α -naphthol, and salts thereof.

[0009]

The oxidative dye (B) may contain at least one coupler selected from 2,4-diaminophenoxyethanol hydrochloride, 5-amino-o-cresol, and salts thereof. The mass ratio of the total content of the at least one coupler selected from 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, α -naphthol, and salts thereof to the total content of the oxidative dye (B) in the oxidative hair dye composition may be 0.01 to 0.9.

EFFECTS OF THE INVENTION

[0010]

According to the present invention, tints can be improved while maintaining a low irritant property.

MODES FOR CARRYING OUT THE INVENTION

[0011]

Hereinafter, an embodiment in which the present invention is embodied in a two-agent type oxidative hair dye composition will be described.

The two-agent type oxidative hair dye composition is, for example, composed of: a first agent that contains at least (A) a carbonate and (B) an oxidative dye; and a second agent that contains at least an oxidant. The oxidative hair dye composition is used for hair-dyeing treatment after a

mixture is prepared by mixing the first agent and the second agent.

[0012]

<First Agent>

The first agent contains, for example, a sugar alcohol (C) in addition to the alkaline agent and the dye. The carbonate (A) is compounded to improve brightness. The carbonate (A) is not particularly limited, and known carbonates such as, for example, sodium carbonate, sodium bicarbonate, potassium carbonate, potassium bicarbonate, lithium carbonate, calcium carbonate, magnesium carbonate, barium carbonate, guanidine carbonate, guanidine bicarbonate, ammonium carbonate, and ammonium bicarbonate can be used. These carbonates may be contained singly or in a combination of two or more.

[0013]

The lower limit of the content of the carbonate (A) in the mixture of the first agent and the second agent may be set appropriately and is preferably 0.01% by mass or more, more preferably 0.1% by mass or more, and still more preferably 0.5% by mass or more. When the content of the carbonate (A) is 0.01% by mass or more, the brightness among other things can be further improved. In the case where ammonia is used as an alkaline agent together with the carbonate, the amount of ammonia to be used is reduced, so that an effect of reducing irritation stemming from ammonia can also be expected.

[0014]

The upper limit of the content of the carbonate (A) in the mixture of the first agent and the second agent may be set appropriately and is preferably 20% by mass or less, more preferably 15% by mass or less, and still more preferably 10% by mass or less. Particularly in the case where a solubilizing agent is used, the solubility to the

solubilizing agent can be improved when the content of the carbonate (A) is 20% by mass or less.

[0015]

As the alkaline agent, an alkaline agent other than the carbonate (A) may be used together with the carbonate. Examples of the alkaline agent other than the carbonate (A) include ammonia, alkanolamines, silicates, metasilicates, sulfonates, chlorides, phosphates, organic amines, and basic amino acids. Specific examples of the alkanolamine include monoethanolamine and triethanolamine. Specific examples of the silicate include sodium silicate and potassium silicate. Specific examples of the metasilicate include sodium metasilicate and potassium metasilicate. Specific examples of the sulfate include ammonium sulfate. Specific examples of the chloride include ammonium chloride. Specific examples of the phosphate include monoammonium phosphate and diammonium phosphate. Specific examples of the organic amine include 2-amino-2-methyl-1-propanol (AMP), 2-amino-2-methyl-1,3-propanediol, and guanidine. Specific examples of the basic amino acid include arginine and lysine. These alkaline agents may be contained singly or in a combination of two or more. Among these alkaline agents, ammonia and ammonium salts are used preferably from the viewpoint of hair-dyeing power.

[0016]

The mass ratio of the content of the carbonate (A) to the total content of the alkaline agent in the mixture of the first agent and the second agent is not particularly limited but is preferably 0.4 or more, more preferably 0.5 or more, and still more preferably 0.6 or more from the viewpoint of exhibiting the effect of carbonate in reducing irritation. That is, the proportion of the content of the alkaline agent other than the carbonate (A) in the whole alkaline agent is preferably 60% by mass or less, more preferably 50% by mass or less, and still more preferably

40% by mass or less. The lower limit of the proportion of the content of the alkaline agent other than the carbonate (A) is not particularly limited but is preferably 5% by mass or more, and more preferably 10% by mass or more from the viewpoint of improving brightness.

[0017]

It is preferable that the alkaline agent be compounded such that the pH of the mixture of the first agent and the second agent, namely the oxidative hair dye composition at the time of use, is in the range of 7 to 12. By setting the pH of the mixture to 7 or higher, the action of the oxidant contained in the second agent can be further facilitated. By setting the pH of the mixture to 12 or lower, damage of hair can be further suppressed.

[0018]

The oxidative dye (B) is a compound capable of developing color due to oxidative polymerization caused by the oxidant contained in the second agent and is classified into a dye intermediate and a coupler, and the oxidative dye preferably contains a dye intermediate and a coupler.

[0019]

Examples of the dye intermediate include p-phenylenediamine, toluene-2,5-diamine (para-toluylenediamine), N-phenyl-p-phenylenediamine, 4,4'-diaminodiphenylamine, p-aminophenol, o-aminophenol, p-methylaminophenol, N,N-bis(2-hydroxyethyl)-p-phenylenediamine, 2-hydroxyethyl-p-phenylenediamine, o-chloro-p-phenylenediamine, 4-amino-m-cresol, 2-amino-4-hydroxyethylaminoanisole, 2,4-diaminophenol, and salts thereof. These specific examples of the dye intermediate may be contained singly or in a combination of two or more.

[0020]

The coupler develops color when coupled with a dye intermediate. Examples of the coupler include resorcin, 5-amino-o-cresol, m-aminophenol, α -naphthol, 5-(2-

hydroxyethylamino)-2-methylphenol, m-phenylenediamine, 2,4-diaminophenoxyethanol, toluene-3,4-diamine, 2,6-diaminopyridine, diphenylamine, N,N-diethyl-m-aminophenol, phenylmethylpyrazolone, 1,5-dihydroxynaphthalene, and salts thereof. Further, examples of 2,4-diaminophenoxyethanol include 2,4-diaminophenoxyethanol hydrochloride. These specific examples of the coupler may be contained singly or in a combination of two or more. The oxidative dye (B) is preferably composed of at least one dye intermediate selected from the specific examples of the dye intermediate and at least one coupler selected from the specific examples of the coupler, so that the oxidative dyes can change hair to different colors. Optionally, the first agent may contain an oxidative dye other than the above-described ones, for example, an oxidative dye listed in "The Japanese Standards of Quasi-Drug Ingredients" (published June, 2006, YAKUJI NIPPO LIMITED).

[0021]

The lower limit of the content of the oxidative dye (B) in the mixture of the first agent and the second agent may be set appropriately and is preferably 0.01% by mass or more, more preferably 0.1% by mass or more, and still more preferably 0.5% by mass or more. When the content of the oxidative dye (B) is 0.01% by mass or more, tints among other things can be further improved.

[0022]

The upper limit of the content of the oxidative dye (B) in the mixture of the first agent and the second agent may be set appropriately and is preferably 10% by mass or less, more preferably 7% by mass or less, and still more preferably 5% by mass or less. Particularly in the case where a solubilizing agent is used, the solubility to the solubilizing agent can be improved when the content of the oxidative dye (B) is 10% by mass or less.

[0023]

Among the specific examples of the coupler described above, at least one coupler (hereinafter, referred to as "coupler P") selected from 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, and α -naphthol is preferable from the viewpoint of improving tints. At least one selected from 2,4-diaminophenoxyethanol hydrochloride, 5-amino-o-cresol, and salts thereof is further preferable from the viewpoint of being capable of obtaining a vivid color tone.

[0024]

The lower limit of the content of the coupler P in the mixture of the first agent and the second agent may be set appropriately and is preferably 0.01% by mass or more. When the content of the coupler P is 0.01% by mass or more, tints among other things can be further improved.

[0025]

The upper limit of the content of the coupler P in the mixture of the first agent and the second agent may be set appropriately and is preferably 10% by mass or less, more preferably 7% by mass or less, and still more preferably 5% by mass or less. Particularly in the case where a solubilizing agent is used, the solubility to the solubilizing agent can be improved when the content of the coupler P is 10% by mass or less.

[0026]

In the case where the coupler P is used as the oxidative dye (B), the lower limit of the mass ratio of the total content of the coupler P to the total content of the oxidative dye (B) in the mixture of the first agent and the second agent may be set appropriately and is preferably 0.01 or more, and more preferably 0.1 or more. When the mass ratio is 0.01 or more, tints among other things can be further improved.

[0027]

The upper limit of the mass ratio of the total content of the coupler P to the total content of the oxidative dye (B) in the mixture of the first agent and the second agent may be set appropriately and is preferably 0.9 or less, and more preferably 0.8 or less. When the mass ratio is 0.9 or less, tints among other things can be further improved.

[0028]

The sugar alcohol (C) is compounded to improve tints after hair-dyeing treatment. As the sugar alcohol (C), a sugar alcohol having 4 or more carbon atoms, preferably 4 to 8 carbon atoms is used. When the sugar alcohol has 4 or more carbon atoms, tints among other things can be improved. Specific examples of the sugar alcohol (C) include cyclitols, maltitol, and sugar derivatives produced by reduction of the carbonyl group of an aldose or a ketose. Specific examples of the sugar derivative (alditol) produced by reduction of the carbonyl group of an aldose include erythritol (C4), threitol (C4), xylitol (C5), arabinitol (C5), sorbitol (C6), mannitol (C6), galactitol (C6), volemitol (C7), and D-erythro-D-galacto-octitol (C8). Signs C4 to C8 in parentheses represent the number of carbon atoms. These sugar alcohols (C) may be contained singly or in a combination of two or more. Among these sugar alcohols, alditols are preferable and xylitol is further preferable from the viewpoint of being excellent in an effect of improving tints.

[0029]

The lower limit of the content of the sugar alcohol (C) in the mixture of the first agent and the second agent may be set appropriately and is preferably 0.01% or more, more preferably 0.1% by mass or more, and still more preferably 0.5% by mass or more. When the content of the sugar alcohol (C) is 0.01% by mass or more, tints among other things can be improved.

[0030]

The upper limit of the content of the sugar alcohol (C) in the mixture of the first agent and the second agent may be set appropriately and is preferably 10% by mass or less, more preferably 7% by mass or less, and still more preferably 5% by mass or less. Particularly in the case where a solubilizing agent is used, the solubility to the solubilizing agent can be improved when the content of the sugar alcohol (C) is 10% by mass or less.

[0031]

If necessary, the first agent may further contain a component other than the previously mentioned components, for example, a solubilizing agent, a water-soluble polymer, an oily component, a polyhydric alcohol other than the above-described ones, a surfactant, a sugar other than the above-described ones, a preservative, a stabilizer, a pH adjusting agent other than the above-described ones, a plant extract, a galenical extract, a vitamin, a perfume, an antioxidant, a UV absorber, a chelating agent, and an oxidizing aid.

[0032]

The solubilizing agent is compounded to make the first agent in a liquid form. Examples of the solubilizing agent to be used include water and organic solvents. Specific examples of the organic solvent include ethanol, n-propanol, isopropanol, methyl cellosolve, ethyl cellosolve, methyl carbitol, ethyl carbitol, benzyl alcohol, phenethyl alcohol, γ -phenylpropyl alcohol, cinnamic alcohol, anise alcohol, p-methylbenzyl alcohol, α -dimethylphenethyl alcohol, α -phenylethanol, phenoxyethanol, phenoxyisopropanol, 2-benzyloxyethanol, N-alkyl pyrrolidones, alkylene carbonates, and alkyl ethers. These solubilizing agents may be contained singly or in a combination of two or more. Among these solubilizing agents, water is excellent in ability of dissolving the other components in the first agent and therefore is preferably used. In the case where water is

used as a solvent, the water content (content at the time of use) in the mixture of the first agent and the second agent is preferably 50% by mass or more, and more preferably 60% by mass or more.

[0033]

The water-soluble polymer gives an appropriate viscosity to the mixture. Specific examples of the water-soluble polymer include natural polymers, semisynthetic polymers, synthetic polymers, and inorganic polymers. Examples of the natural water-soluble polymer include guar gum, locust bean gum, quince seed, carrageenan, galactan, gum arabic, tragacanth gum, pectin, mannan, xanthan gum, dextran, succinoglucan, curdlan, hyaluronic acid, gelatin, casein, albumin, and collagen.

[0034]

Examples of the semisynthetic water-soluble polymer include methyl cellulose, ethyl cellulose, hydroxyethyl cellulose, hydroxyethyl cellulose dimethyl diallyl ammonium chloride, hydroxypropyl cellulose, carboxymethyl cellulose, sodium carboxymethyl cellulose, hydroxypropyl methyl cellulose, cationized cellulose, cationized guar gum, starch phosphates, propylene glycol alginate, and alginates.

[0035]

Examples of the synthetic water-soluble polymer include polyvinyl alcohol, polyvinylpyrrolidone, polyvinyl methyl ether, carboxy vinyl polymers, sodium polyacrylate, polyacrylamide, polyethylene oxide, ethylene oxide-propylene oxide block copolymers, acrylic acid/alkyl acrylate copolymers, and polydimethylmethylenepiperidinium chloride. Examples of the synthetic polymer include copolymers of a half ester of itaconic acid and a polyoxyethylene alkyl ether or an ester of methacrylic acid and a polyoxyethylene alkyl ether and at least one monomer selected from acrylic acid, methacrylic acid, and alkyl esters thereof. These

water-soluble polymers may be contained singly or in a combination of two or more.

[0036]

The oily component gives hair moist feeling. Therefore, the first agent contains an oily component in the range not inhibiting the advantageous effects of the present invention. Examples of the oily component include oil and fat, wax, higher alcohols, hydrocarbons, higher fatty acids, alkyl glyceryl ethers, esters, and silicones.

[0037]

Examples of the oil and fat include lanolin, olive oil, camellia oil, shea fat, almond oil, safflower oil, sunflower oil, soybean oil, cotton oil, sesame oil, corn oil, rapeseed oil, rice bran oil, rice embryo bud oil, grape seed oil, avocado oil, macadamia nut oil, castor oil, coconut oil, and evening primrose seed oil. Examples of the wax include beeswax, candelilla wax, carnauba wax, jojoba oil, and lanolin. Examples of the higher alcohol include cetyl alcohol (cetanol), 2-hexyldecanol, stearyl alcohol, isostearyl alcohol, cetostearyl alcohol, oleyl alcohol, arachyl alcohol, behenyl alcohol, 2-octyldodecanol, lauryl alcohol, myristyl alcohol, decyltetradecanol, and lanolin alcohol.

[0038]

Examples of the hydrocarbon include paraffin, olefin oligomers, polyisobutene, hydrogenated polyisobutene, mineral oil, squalane, polybutene, polyethylene, microcrystalline wax, and vaseline. Examples of the higher fatty acid include lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, isostearic acid, 12-hydroxystearic acid, oleic acid, and lanolin fatty acid. Examples of the alkyl glyceryl ether include batyl alcohol, chimyl alcohol, selachyl alcohol, and isostearyl glyceryl ether.

[0039]

Examples of the ester include diisopropyl adipate, isopropyl myristate, cetyl octanoate, isononyl isononanoate, octyldodecyl myristate, isopropyl palmitate, stearyl stearate, myristyl myristate, isotridecyl myristate, 2-ethylhexyl palmitate, octyldodecyl ricinoleate, cholesteryl/lanosteryl esters of a fatty acid having 10 to 30 carbon atoms, cetyl lactate, lanolin acetate, ethylene glycol di-2-ethylhexanoate, fatty acid esters of pentaerythritol, fatty acid esters of dipentaerythritol, cetyl caprate, caprylic triglyceride, diisostearyl malate, dioctyl succinate, and cetyl 2-ethylhexanoate.

[0040]

Examples of the silicone include dimethylpolysiloxane (dimethicone), methylphenylpolysiloxane, decamethylcyclopentasiloxane, dodecamethylcyclohexasiloxane, terminal hydroxy group-modified dimethylpolysiloxanes, highly polymerized silicones, polyether-modified silicones (for example, (PEG/PPG/butylene/dimethicone) copolymer), amino-modified silicones, betaine-modified silicones, alkyl-modified silicones, alkoxy-modified silicones, mercapto-modified silicones, carboxy-modified silicones, and fluorine-modified silicones. These oily components may be contained singly or in a combination of two or more.

[0041]

Examples of the polyhydric alcohol include glycols and glycerin. Examples of the glycol include ethylene glycol, diethylene glycol, triethylene glycol, polyethylene glycol, propylene glycol, dipropylene glycol, isoprene glycol, and 1,3-butylene glycol. Examples of the glycerin include glycerin, diglycerin, and polyglycerin. These polyhydric alcohols may be contained singly or in a combination of two or more.

[0042]

The surfactant emulsifies or solubilizes an oxidative hair dye composition at the time of use as an emulsifier or

a component that solubilizes respective components to adjust viscosity or improve the stability of viscosity. Examples of the surfactant include anionic surfactants, cationic surfactants, amphoteric surfactants, and nonionic surfactants.

[0043]

Examples of the anionic surfactant include alkyl ether sulfates, alkyl sulfates, alkyl ether sulfate salts, alkenyl ether sulfates, alkenyl sulfates, olefin sulfonates, alkane sulfonates, saturated or unsaturated fatty acid salts, alkyl or alkenyl ether carboxylates, α -sulfo fatty acid salts, N-acyl amino acid type surfactants, phosphoric acid mono or di-ester type surfactants, sulfosuccinates, and derivatives thereof. Examples of the counter ion for an anionic group of these surfactants include a sodium ion, a potassium ion, and triethanolamine. More specifically, examples of the alkyl ether sulfate salt include sodium polyoxyethylene (hereinafter, referred to as "POE") lauryl ether sulfate. Examples of the alkyl sulfate include sodium lauryl sulfate and sodium cetyl sulfate. Examples of the derivative of an alkyl sulfate include sodium POE lauryl sulfate. Examples of the sulfosuccinate include disodium lauryl sulfosuccinate.

[0044]

Examples of the cationic surfactant include lauryltrimethylammonium chloride, cetyltrimethylammonium chloride, stearyltrimethylammonium chloride, alkyltrimethylammonium chlorides, distearyldimethylammonium chloride, cetyltrimethylammonium bromide, stearyltrimethylammonium bromide, ethyl sulfuric acid lanolin fatty acid aminopropylethyl dimethylammonium, stearyltrimethylammonium saccharinate, cetyltrimethylammonium saccharinate, methacryloyloxyethyltrimethylammonium chloride, and behenyltrimethylammonium methyl sulfate.

[0045]

Specific examples of the amphoteric surfactant include coco betaine, lauramidopropyl betaine, cocamidopropyl betaine, sodium lauroamphoacetate, sodium cocoamphoacetate, a coconut oil fatty acid amidepropyl betaine, and lauryl betaine (lauryl dimethylaminoacetic acid betaine).

[0046]

Specific examples of the nonionic surfactant include ether type nonionic surfactants, ester type nonionic surfactants, and alkyl glucosides. Specific examples of the ether type nonionic surfactant include POE cetyl ether (ceteth), POE stearyl ether (steareth), POE behenyl ether, POE oleyl ether (oleth), POE lauryl ether (laureth), POE octyldodecyl ether, POE hexyldecyl ether, POE isostearyl ether, POE nonylphenyl ether, and POE octylphenyl ether.

[0047]

Specific examples of the ester type nonionic surfactant include POE sorbitan monooleate, POE sorbitan monostearate, POE sorbitan monopalmitate, POE sorbitan monolaurate, POE sorbitan trioleate, POE glycerin monostearate, POE glycerin monomyristate, POE sorbit tetraoleate, POE sorbit hexastearate, POE sorbit monolaurate, POE sorbit beeswax, polyethylene glycol monooleate, polyethylene glycol monostearate, polyethylene glycol monolaurate, lipophilic glycerin monooleate, lipophilic glycerin monostearate, selfemulsifying glycerin monostearate, sorbitan monooleate, sorbitan sesquioleate, sorbitan trioleate, sorbitan monostearate, sorbitan monopalmitate, sorbitan monolaurate, sucrose fatty acid esters, decaglyceryl monolaurate, decaglyceryl monostearate, decaglyceryl monooleate, and decaglyceryl monomyristate.

[0048]

Examples of the alkyl glucoside include alkyl (having 8 to 16 carbon atoms) glucosides, POE methyl glucoside, and POE methyl glucoside dioleate. These specific examples of

the surfactant may be contained singly or in a combination of two or more.

[0049]

Examples of the sugar include monosaccharides such as glucose and galactose, and disaccharides such as maltose, sucrose, fructose, and trehalose. Examples of the preservative include paraben. Examples of the stabilizer include phenacetin, 8-hydroxyquinoline, acetanilide, sodium pyrophosphate, barbituric acid, uric acid, and tannic acid. Examples of the pH adjusting agent include citric acid, tartaric acid, lactic acid, malic acid, succinic acid, fumaric acid, maleic acid, pyrophosphoric acid, gluconic acid, glucuronic acid, and benzoic acid. Examples of the antioxidant include ascorbic acid and sulfites. Examples of the chelating agent include edetic acid (ethylenediaminetetraacetic acid (EDTA)), disodium edetate, tetrasodium edetate, diethylenetriaminepentaacetic acid and salts thereof, ethylenediaminehydroxyethyltriacetic acid and salts thereof, and hydroxyethane diphosphonic acid (HEDP) and salts thereof.

[0050]

The formulation of the first agent is not particularly limited, and specific examples include a liquid type, a gel type, a foam type, a cream type, and a solid type. Examples of the liquid type include an aqueous solution, a dispersion, and an emulsion.

[0051]

<Second Agent>

In the second agent, a solubilizing agent can also be compounded in addition to an oxidant. The oxidant further improves decolorization property for melanin contained in hair. Specific examples of the oxidant include hydrogen peroxide, urea peroxide, melamine peroxide, sodium percarbonate, potassium percarbonate, sodium perborate, potassium perborate, ammonium persulfate, potassium

persulfate, sodium persulfate, sodium peroxide, potassium peroxide, magnesium peroxide, barium peroxide, calcium peroxide, strontium peroxide, hydrogen peroxide adducts of sulfates, hydrogen peroxide adducts of phosphates, and hydrogen peroxide adducts of pyrophosphates. These specific examples of the oxidant may be contained singly or in a combination of two or more. The content of the oxidant in the second agent may be set appropriately and is preferably 0.1% by mass or more, more preferably 2.0% by mass or more, and most preferably 3.0% by mass or more. When the content of the oxidant is 0.1% by mass or more, the decolorization property for melanin can be further improved. The content of the oxidant in the second agent is preferably 15.0% by mass or less, more preferably 9.0% by mass or less, and most preferably 6.0% by mass or less. When the content of the oxidant is 15.0% by mass or less, damage of hair, or the like can be further suppressed.

[0052]

In the case where hydrogen peroxide is compounded as an oxidant in the second agent, the second agent preferably contains a stabilizer such as ethylene glycol phenyl ether (phenoxyethanol), and hydroxyethane diphosphonic acid and salts thereof to improve the stability of hydrogen peroxide. Examples of the salt of hydroxyethane diphosphonic acid include tetrasodium hydroxyethane diphosphonate and disodium hydroxyethane diphosphonate. The second agent may contain each of components that are generally contained in an oxidative hair dye composition and that do not inhibit the actions of the previously mentioned components, and it may appropriately contain, for example, the previously mentioned components contained in the first agent in the range not inhibiting the advantageous effects of the present invention.

[0053]

The formulation of the second agent is not particularly limited, and specific examples include a liquid type, a gel

type, a foam type, a cream type, and a solid type. Examples of the liquid type include an aqueous solution, a dispersion, and an emulsion. A mixture is prepared by mixing the first agent and the second agent at the time when the oxidative hair dye composition is used. Subsequently, the required amount of the mixture is adhered to a comb or brush to be applied to hair.

[0054]

The oxidative hair dye composition according to the present embodiment has the following advantages.

(1) The present embodiment is an oxidative hair dye containing (A) a carbonate used in combination with (C) at least one sugar alcohol selected from the group consisting of sugar alcohols having 4 or more carbon atoms. Accordingly, tints can be improved while maintaining brightness and a low irritant property.

[0055]

(2) Preferably, at least one coupler selected from 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, α -naphthol, and salts thereof is used as (B) an oxidative dye. Accordingly, tints can be further improved.

[0056]

The embodiment may be modified as follows.

- In the embodiment, a direct dye listed in "The Japanese Standards of Quasi-Drug Ingredients" (published June, 2006, YAKUJI NIPPO LIMITED) may be optionally contained as a dye other than the oxidative dyes mentioned above.

[0057]

- In the embodiment, the oxidative hair dye composition has been formulated as a multi-agent type oxidative hair dye composition composed of: a first agent which contains (A) a carbonate, (B) an oxidative dye, and the like; and a second agent which contains an oxidant and the like. However, the

oxidative hair dye composition is not limited to the two-agent type, and it may be formulated as a multiple-agent type, for example, a three-agent type in which a part of the components contained in the first agent and the second agent is constituted as a separate agent.

[0058]

- In the embodiment, the sugar alcohol (C) has been compounded in the first agent. However, the sugar alcohol (C) may be compounded in any one of the first agent and the second agent.

Examples

[0059]

Next, the embodiment will be described in more detail with examples and comparative examples. However, the present invention is not limited to the constitutions described in the examples.

First agents and second agents of oxidative hair dye compositions, each containing components shown in Tables 1A to 1D and 2, were prepared. The numerical value in a column of each component in Tables 1A to 1D and 2 represents the content of the component in the column, and the unit is % by mass. Oxidative hair dye compositions were each prepared by mixing the first agent and the second agent in a mass ratio of 1:1. The obtained oxidative hair dye compositions were each applied to a tuft of human black hair (15 cm, manufactured by Beaulax Co., Ltd.) (hereinafter, simply referred to as hair tuft) with a brush and the hair tuft was left to stand at room temperature (25°C) for 30 minutes. Next, the oxidative hair dye composition adhered to the hair tuft was washed with water, and then the hair tuft was shampooed (with Bigen treatment shampoo, manufactured by Hoyu Co., Ltd) twice and rinsed (with Bigen treatment rinse manufactured by Hoyu Co., Ltd.) once. Subsequently, the hair tuft was dried with warm air and then left to stand for

one day. The hair tufts after the hair-dyeing treatment were evaluated for brightness and tints according to the methods shown below. Further, the hair tufts during the hair-dyeing treatment with an oxidative hair dye composition of each of examples and comparative examples were evaluated for the irritant property by evaluating irritant odor according to the method shown below.

[0060]

Notations (A) to (C) in the "Component" columns in the tables each represent a compound corresponding to each component ((A): carbonate, (B): oxidative dye, (C): sugar alcohol, respectively) described in appended claims of the present application. Meanwhile, notation "c" in the "Component" columns in the tables represents a compound for comparison with the component (C) described in appended claims of the present application.

[0061]

The coupler P in the tables represents 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, or α -naphthol. The coupler Q in the tables represents a coupler other than the coupler P.

[0062]

<Irritant Odor>

Sensory evaluation was conducted by 20 panelists who specialize in evaluation of odor, for the hair tufts during hair-dyeing treatment with the oxidative hair dye composition of each example. Irritant odor at the time of use was evaluated based on the number of panelists who hardly felt the odor of ammonia. The oxidation hair dye composition was rated as "excellent: 5" when 17 or more panelists among the 20 panelists hardly felt the odor, "good: 4" when 13 to 16 panelists hardly felt the odor, "acceptable: 3" when 9 to 12 panelists hardly felt the odor, "slightly bad: 2" when 5 to 8 panelists hardly felt the odor,

and "bad: 1" when 4 or less panelists hardly felt the odor. The results are shown in Tables 1A to 1D.

[0063]

<Brightness>

The brightness of the tufts of human hair after treatment with the oxidative hair dye compositions was visually observed by 10 panelists under a standard light source and scored by five-grade evaluation of excellent (5 points), good (4 points), acceptable (3 points), slightly poor (2 points), and poor (1 point). The average value of results of scoring by the panelists was calculated, and the evaluation results were determined as "excellent: 5" when the average value was 4.6 points or more, "good: 4" when the average value was 3.6 points or more and less than 4.6, "acceptable: 3" when the average value was 2.6 points or more and less than 3.6 points, "slightly poor: 2" when the average value was 1.6 points or more and less than 2.6 points, and "poor: 1" when the average value was 1 point or more and less than 1.6 points. The results are shown in Tables 1A to 1D.

[0064]

<Tints>

As for the tints, the saturation and color intensity were evaluated comprehensively. The tints of the tufts of human hair after treatment with the oxidative hair dye compositions was visually observed by 10 panelists under a standard light source and scored by five-grade evaluation of excellent (5 points), good (4 points), acceptable (3 points), slightly poor (2 points), and poor (1 point). The average value of results of scoring by the panelists was calculated, and the evaluation results were determined as "excellent: 5" when the average value was 4.6 points or more, "good: 4" when the average value was 3.6 points or more and less than 4.6, "acceptable: 3" when the average value was 2.6 points or more and less than 3.6 points, "slightly poor: 2" when

the average value was 1.6 points or more and less than 2.6 points, and "poor: 1" when the average value was 1 point or more and less than 1.6 points. The results are shown in Tables 1A to 1D.

[0065]

[Table 1A]

Component		Example 1	Example 2	Example 3	Example 4	Example 5	Example 6
(C)	Xylitol (C5)	1				1	1
	Sorbitol (C6)		1				
	Erythritol (C4)			1			
	Mannitol (C6)				1		
c	1,2-Pentanediol						
c	Glucose						
c	Concentrated glycerin						
(A)	Ammonium bicarbonate	2	2	2	2	2	2
	Sodium bicarbonate						
(B)	Dye intermediate	Para-phenylenediamine	0.06	0.06	0.06		0.09
		Toluene-2,5-diamine sulfate				0.07	
	Coupler P	p-Aminophenol	0.5	0.5	0.5		1.1
		5-Amino-o-cresol	0.3	0.3	0.3		
		2,4-Diaminophenoxyethanol hydrochloride				0.03	
		5-(2-Hydroxyethylamino)-2-methylphenol					0.4
		α -Naphthol	0.4	0.4	0.4		0.6
		2,6-Diaminopyridine					
	Coupler Q	Resorcin	0.05	0.05	0.05		
		m-Aminophenol				0.02	
		1,5-Dihydroxynaphthalene					
		Cetostearyl alcohol	8	8	8	8	8
		Polyethylene glycol 1000	4	4	4	4	4
		Vaseline	3	3	3	3	3
		Paraffin	1	1	1	1	1
		Polyoxyethylene stearyl ether	3	3	3	3	3
		Polyoxyethylene cetyl ether	3	3	3	3	3
		Alkyltrimethylammonium chloride	1	1	1	1	1
		Trisodium ethylenediaminehydroxyethyltriacetate dihydrate	0.25	0.25	0.25	0.25	0.25
		Anhydrous sodium sulfite	0.1	0.1	0.1	0.1	0.1
		Ascorbic acid	0.3	0.3	0.3	0.3	0.3
		28% Ammonia water	4.5	4.5	4.5	4.5	4.5
		Purified water	Appropriate amount	Appropriate amount	Appropriate amount	Appropriate amount	Appropriate amount
	Total	100	100	100	100	100	100
Total mass (% by mass) of component (A) at the time of mixing		1	1	1	1	1	1
Total mass (% by mass) of component (B) at the time of mixing		0.655	0.655	0.655	0.655	0.06	1.095
Total mass (% by mass) of coupler P at the time of mixing		0.35	0.35	0.35	0.35	0.015	0.5
Ratio of total mass of coupler P to total mass of component (B)		0.53	0.53	0.53	0.53	0.25	0.46
Total mass (% by mass) of component (C) at the time of mixing		0.5	0.5	0.5	0.5	0.5	0.5
Evaluation	Irritant property	5	5	5	5	5	5
	Brightness	5	5	5	5	5	5
	Tints	5	5	5	5	5	4

[Table 1B]

Component		Example 7	Example 8	Example 9	Example 10	Example 11
(C)	Xylitol (C5)	1	1	1	5	0.1
	Sorbitol (C6)					
	Erythritol (C4)					
	Mannitol (C6)					
c	1,2-Pentanediol					
c	Glucose					
c	Concentrated glycerin					
(A)	Ammonium bicarbonate	2	4		2	2
	Sodium bicarbonate			2		
(B)	Dye intermediate	Para-phenylenediamine	0.04	0.06		0.06
		Toluene-2,5-diamine sulfate			0.08	
	Coupler P	p-Aminophenol		0.5		0.5
		5-Amino-o-cresol		0.3		0.3
		2,4-Diaminophenoxyethanol hydrochloride			0.12	
		5-(2-Hydroxyethylamino)-2-methylphenol				
		α -Naphthol		0.4	0.04	0.4
		2,6-Diaminopyridine	0.04			
	Coupler Q	Resorcin		0.05	0.05	0.05
		m-Aminophenol				
		1,5-Dihydroxynaphthalene	0.05			
		Cetostearyl alcohol	8	8	8	8
		Polyethylene glycol 1000	4	4	4	4
		Vaseline	3	3	3	3
		Paraffin	1	1	1	1
		Polyoxyethylene stearyl ether	3	3	3	3
		Polyoxyethylene cetyl ether	3	3	3	3
		Alkyltrimethylammonium chloride	1	1	1	1
		Trisodium ethylenediaminehydroxyethyltriacetate dihydrate	0.25	0.25	0.25	0.25
		Anhydrous sodium sulfite	0.1	0.1	0.1	0.1
		Ascorbic acid	0.3	0.3	0.3	0.3
		28% Ammonia water	4.5	4.5	4.5	4.5
		Purified water	Appropriate amount	Appropriate amount	Appropriate amount	Appropriate amount
	Total	100	100	100	100	100
Total mass (% by mass) of component (A) at the time of mixing		1	2	1	1	1
Total mass (% by mass) of component (B) at the time of mixing		0.065	0.655	0.145	0.655	0.655
Total mass (% by mass) of coupler P at the time of mixing		0.02	0.35	0.08	0.35	0.35
Ratio of total mass of coupler P to total mass of component (B)		0.31	0.53	0.55	0.53	0.53
Total mass (% by mass) of component (C) at the time of mixing		0.5	0.5	0.5	2.5	0.05
Evaluation	Irritant property	5	5	5	5	5
	Brightness	5	5	5	5	5
	Tints	4	5	5	5	5

[Table 1C]

Component		Example 12	Example 13	Example 14	Example 15	Example 16
(C)	Xylitol (C5)	0.05	1	1	1	1
	Sorbitol (C6)					
	Erythritol (C4)					
	Mannitol (C6)					
c	1,2-Pentanediol					
c	Glucose					
c	Concentrated glycerin					
(A)	Ammonium bicarbonate	2	2	2	2	2
	Sodium bicarbonate					
(B)	Dye intermediate	Para-phenylenediamine	0.06	0.07	0.2	
		Toluene-2,5-diamine sulfate				0.24
		p-Aminophenol	0.5			0.15
		5-Amino-o-cresol	0.3	0.1		
	Coupler P	2,4-Diaminophenoxyethanol hydrochloride			0.06	
		5-(2-Hydroxyethylamino)-2-methylphenol		0.1		
		α -Naphthol	0.4	0.05		
		2,6-Diaminopyridine			0.04	
	Coupler Q	Resorcin	0.05		0.4	0.5
		m-Aminophenol			0.03	0.04
		1,5-Dihydroxynaphthalene			0.05	
	Cetostearyl alcohol		8	8	8	8
	Polyethylene glycol 1000		4	4	4	4
	Vaseline		3	3	3	3
	Paraffin		1	1	1	1
	Polyoxyethylene stearyl ether		3	3	3	3
	Polyoxyethylene cetyl ether		3	3	3	3
	Alkyltrimethylammonium chloride		1	1	1	1
	Trisodium ethylenediaminehydroxyethyltriacetate dihydrate		0.25	0.25	0.25	0.25
	Anhydrous sodium sulfite		0.1	0.1	0.1	0.1
	Ascorbic acid		0.3	0.3	0.3	0.3
	28% Ammonia water		4.5	4.5	4.5	4.5
	Purified water		Appropriate amount	Appropriate amount	Appropriate amount	Appropriate amount
	Total		100	100	100	100
Total mass (% by mass) of component (A) at the time of mixing		1	1	1	1	1
Total mass (% by mass) of component (B) at the time of mixing		0.655	0.16	0.17	0.32	0.465
Total mass (% by mass) of coupler P at the time of mixing		0.35	0.125	0.03	0.02	0
Ratio of total mass of coupler P to total mass of component (B)		0.53	0.78	0.18	0.06	0.00
Total mass (% by mass) of component (C) at the time of mixing		0.025	0.5	0.5	0.5	0.5
Evaluation	Irritant property		5	5	5	5
	Brightness		5	5	5	5
	Tints		4	5	5	4

[Table 1D]

Component		Comparative Example 1	Comparative Example 2	Comparative Example 3	Comparative Example 4	Comparative Example 5
(C)	Xylitol (C5)	-	1			
	Sorbitol (C6)					
	Erythritol (C4)					
	Mannitol (C6)					
c	1,2-Pentanediol			1		
c	Glucose				1	
c	Concentrated glycerin					1
(A)	Ammonium bicarbonate	2	-	2	2	2
	Sodium bicarbonate					
(B)	Dye intermediate	Para-phenylenediamine	0.06	0.06	0.06	0.06
		Toluene-2,5-diamine sulfate				
	Coupler P	p-Aminophenol	0.5	0.5	0.5	0.5
		5-Amino-o-cresol	0.3	0.3	0.3	0.3
		2,4-Diaminophenoxyethanol hydrochloride				
		5-(2-Hydroxyethylamino)-2-methylphenol				
		α -Naphthol	0.4	0.4	0.4	0.4
		2,6-Diaminopyridine				
	Coupler Q	Resorcin	0.05	0.05	0.05	0.05
		m-Aminophenol				
		1,5-Dihydroxynaphthalene				
		Cetostearyl alcohol	8	8	8	8
		Polyethylene glycol 1000	4	4	4	4
		Vaseline	3	3	3	3
		Paraffin	1	1	1	1
		Polyoxyethylene stearyl ether	3	3	3	3
		Polyoxyethylene cetyl ether	3	3	3	3
		Alkyltrimethylammonium chloride	1	1	1	1
		Trisodium ethylenediaminehydroxyethyltriacetate dihydrate	0.25	0.25	0.25	0.25
		Anhydrous sodium sulfite	0.1	0.1	0.1	0.1
		Ascorbic acid	0.3	0.3	0.3	0.3
		28% Ammonia water	4.5	4.5	4.5	4.5
		Purified water	Appropriate amount	Appropriate amount	Appropriate amount	Appropriate amount
		Total	100	100	100	100
Total mass (% by mass) of component (A) at the time of mixing		1	0	1	1	1
Total mass (% by mass) of component (B) at the time of mixing		0.655	0.655	0.655	0.655	0.655
Total mass (% by mass) of coupler P at the time of mixing		0.35	0.35	0.35	0.35	0.35
Ratio of total mass of coupler P to total mass of component (B)		0.53	0.53	0.53	0.53	0.53
Total mass (% by mass) of component (C) at the time of mixing		0	0.5	0	0	0
Evaluation	Irritant property	5	2	5	5	5
	Brightness	5	1	5	5	5
	Tints	1	5	1	1	1

[0066]

[Table 2]

<Second agent>	
35% Hydrogen peroxide	16.5
Hydroxyethane diphosphonic acid	0.1
Tetrasodium hydroxyethane diphosphonate	0.2
Phenoxyethanol	0.1
EDTA	0.3
Cetanol	3.0
Lanolin	1.0
Polyoxyethylene stearyl ether	1.0
Alkyltrimethylammonium chloride	0.5
Purified water	Balance
Total amount	100

As shown in Tables 1A to 1D, it was found that the ratings of the irritant property, brightness, and tints of the oxidative hair dye composition of each example were higher than those of the comparative examples. In addition, from the results of Examples 1 to 4, the difference in advantageous effects due to the difference in the number of carbon atoms of the sugar alcohol and the difference of the isomer was not observed. Mannitol is an isomer of sorbitol. [0067]

As shown in Table 1D, it was found that the rating of the tints of Comparative Example 1, which did not contain (C) a sugar alcohol, was lower than the examples. It was found that the ratings of the irritant property and brightness of Comparative Example 2, which did not contain (A) a carbonate, were lower than the examples. It was found that the ratings of the tints of Comparative Example 3 containing 1,2-pentanediol as a polyhydric alcohol in place of the sugar alcohol (C) of Example 1, Comparative Example 4 containing glucose as a monosaccharide, and Comparative Example 5 containing glycerin having three carbon atoms, were lower than the examples. [0068]

When the second agent in which 1% by mass of xylitol was further compounded as a sugar alcohol in the

constitution of the second agent of Example 1 was combined with the first agent of Comparative Example 1 and applied, the evaluation results similar to those for Example 1 were obtained.

[0069]

It is to be noted that an oxidative hair dye composition containing ammonia as an alkaline agent in the proportion of 5 to 60% by mass of the whole alkaline agent may be prepared. In this case, the brightness after hair-dyeing treatment can be further improved.

CLAIMS

1. An oxidative hair dye composition comprising an alkaline agent and an oxidant, wherein the oxidative hair dye composition comprises: (A) a carbonate; (B) an oxidative dye; and (C) at least one sugar alcohol selected from the group consisting of sugar alcohols having 4 or more carbon atoms.
2. The oxidative hair dye composition according to claim 1, wherein the sugar alcohol (C) is an alditol.
3. The oxidative hair dye composition according to claim 1 or claim 2, wherein the oxidative dye (B) comprises at least one coupler selected from 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, α -naphthol, and salts thereof.
4. The oxidative hair dye composition according to claim 1 or claim 2, wherein the oxidative dye (B) comprises at least one coupler selected from 2,4-diaminophenoxyethanol hydrochloride, 5-amino-o-cresol, and salts thereof.
5. The oxidative hair dye composition according to claim 3 or claim 4, wherein a mass ratio of a total content of the at least one coupler selected from 2,4-diaminophenoxyethanol, 5-amino-o-cresol, 2,6-diaminopyridine, 5-(2-hydroxyethylamino)-2-methylphenol, α -naphthol, and salts thereof to a total content of the oxidative dye (B) in the oxidative hair dye composition is 0.01 to 0.9.