

OXIDATION TYPE HAIR DYE COMPOSITION

【TECHNICAL FIELD】

[CROSS-REFERENCE TO RELATED APPLICATION(S)]

This application claims the benefit of priority from Korean Patent Application No. 10-2017-0140821 filed on October 27, 2017 with the Korean Intellectual Property Office, the entire content of which is hereby incorporated by reference in its entirety.

The present disclosure relates to a hair dye composition, and more particularly, to an oxidation-type hair dye composition for keratin fibers, comprising: a first agent containing an oxidative dye precursor, a coupler, and an alkaline agent; and a second agent containing an oxidant, wherein the first agent contains ammonia, and optionally, monoethanolamine, as an alkaline agent; and at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate, and tromethamine, as a pH buffer; and thus the hair dye composition has leads to reduced scalp irritation and hair damage and improved dyeing durability and levelness.

【BACKGROUND ART】

In a general oxidation-type hair dye composition for keratin fiber containing hair, the oxidative dye precursor and coupler infiltrate into the hair and are coupled with each other via an oxidative condensation, thereby exhibiting color development. During such color development, the alkaline agent contained in the first agent accelerates the formation of perhydroxy anions when used

together with the second agent containing an oxidant, and the perhydroxy anions cause the oxidation of a dye and melanin decomposition, thereby exhibiting the effect of color development and discoloration.

In addition, the alkaline agent inhibits the internal bonds of the hair, i.e., ionic bonds and hydrogen bonds, which causes swelling of the hair, thereby efficiently enhancing infiltration of a dye into the hair. However, an increase in pH due to the alkaline agent accelerates the hydrolysis of the hair proteins or simultaneously causes the oxidation of proteins, and thus, hair damage is induced.

Therefore, as the alkaline agent to be used, ammonia, which is a small molecule and thus can be easily infiltrated into the hair, has a relatively low pH as an alkaline agent, causes less hair damage compared to other alkaline agents, and exhibits excellent color development and discoloration effects, is generally used. However, the ammonia has disadvantages in that it may lead to scalp irritation due to a high pH, since a high ammonia content is required in the case of bright colors, and it has a high volatility, which may cause strong irritation to the eyes or nose when the hair is dyed. In order to solve the problem of irritation to the eyes or nose, monoethanolamine is usually used alone or in combination with ammonia as an alkaline agent so that the mixing amount of ammonia can be reduced, thereby alleviating irritation caused by ammonia.

The mixing amount of monoethanolamine may vary depending on the request from the products. For example, when targeting a hair dye having no pungent smell, monoethanolamine is used alone as the only alkaline agent without ammonia. In a salon where dyeing power is considered as the most important factor, monoethanolamine and ammonia are used together, nevertheless, ammonia having a relatively

excellent dyeing effect is used with a higher degree of dependency.

Although the use of monoethanolamine as an alkaline agent can reduce pungent smell, the monoethanolamine increases the pH of the hair dye composition, resulting in more severe scalp irritation and hair damage compared to using only ammonia as an alkaline agent.

In order to reduce such irritation or the like, Korean Patent Laid-Open Publication No. 2003-0015654 discloses a skin external preparation composition containing a raspberry leaf or fruit extract having a skin irritation and inflammation-alleviating effect, and Korean Laid-Open Patent Publication No. 2006-0070847 discloses an external preparation composition for reducing scalp irritation containing raspberry leaf or fruit extract. In this regard, attempts have been made to alleviate skin or scalp irritation caused by hair dyes by mainly containing natural plant extracts.

In addition, the alkaline agent contained in the first agent can realize color development through an oxidation reaction when used together with the second agent containing an oxidant. When the pH of the mixed content exceeds 9.8, in particular 10.0, the oxidation reaction of the dye is accelerated, so that the dye is developed outside the hair surface rather than being infiltrated into the hair, thereby deteriorating dyeing durability. In addition, under the condition of premature graying of hair, in which dyed hair and white hair are mixed, excessive color development proceeds in the dyed hair compared to the white hair which causes a reduction in levelness of dyeing.

[Prior Art Documents]

[Patent Documents]

1. Korean Patent Laid-Open No. 2010-0079278 (published on July

8, 2010)

2. Korean Patent Laid-Open No. 2011-0060201 (published on June 8, 2011)

【DETAILED DESCRIPTION OF THE INVENTION】

【Technical Problem】

Therefore, the present inventors have attempted to find out a combination of ingredients that can further improve the sense of scalp irritation and hair damage, which are an endemic problem of hair dye products, and simultaneously, further improve dyeing durability and the quality of levelness between dyed hair and white hair. As a result, they have found that the above-mentioned problem can be solved by combining an alkaline agent mainly used in the conventional oxidation-type hair dye compositions with tromethamine; and ammonium carbonate or ammonium bicarbonate.

Therefore, it is one object of the present disclosure is to provide a composition having reduced scalp irritation and hair damage and improved dyeing levelness, in an oxidation-type hair dye composition using ammonia as an alkaline agent.

【Technical Solution】

In order to achieve the object above, one aspect of the present disclosure provides an oxidation-type hair dye composition, including: a first agent containing an oxidative dye precursor, a coupler, and an alkaline agent; and a second agent containing an oxidant,

wherein the first agent contains ammonia, as an alkaline agent; and at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate, and tromethamine, as a pH buffer.

Another aspect of the present disclosure provides the

combination of at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate; and tromethamine, as a pH buffer for reducing scalp irritation and hair damage and improving dyeing durability and levelness, and uses thereof, in the oxidation-type hair dye composition, which includes a first agent containing an oxidative dye precursor, a coupler, and an alkaline agent; and a second agent containing an oxidant, and uses ammonia as an alkaline agent.

【ADVANTAGEOUS EFFECTS】

The oxidation-type hair dye composition according to the present disclosure can, in the oxidation-type hair dye composition using ammonia as an alkaline agent, not only greatly reduce scalp irritation and hair damage, but also improve dyeing durability and levelness by controlling the oxidation reaction rate of the dye.

【DETAILED DESCRIPTION OF THE EMBODIMENTS】

The oxidation-type hair dye composition of the present disclosure includes a first agent containing an oxidative dye precursor, a coupler, and an alkaline agent; and a second agent containing an oxidant, wherein the first agent contains ammonia and, as an alkaline agent; and least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate, and tromethamine, as a pH buffer.

In addition, the oxidation-type hair dye composition of the present disclosure may further include monoethanolamine as an alkaline agent in the first agent. Specifically, in the oxidation-type hair dye composition of the present disclosure, ammonia can be partially replaced by monoethanolamine.

Tromethamine, which is used as a type of pH buffer in the present disclosure, has no volatile irritation, such as ammonia, and causes less hair damage since it has a pH lower than that of other organic amine-based alkaline agents such as monoethanolamine, aminomethylpropanol, isopropanolamine, and the like, which are most commonly used as ammonia substitutes. Thus, when tromethamine is used together with ammonia or monoethanolamine, hair damage may be no longer severe, while maintaining a desired level of color development and discoloration, and also, it is possible to alleviate irritation and pungent smell caused by ammonia by sufficiently lowering the amount of ammonia mixed in the composition.

The oxidation-type hair dye composition according to the present disclosure contains tromethamine in an amount of 0.01 to 20% by weight, preferably 0.1 to 10% by weight, more preferably 0.1 to 5% by weight, based on the total weight of the first agent composition. If the content of tromethamine is less than 0.01% by weight, the mixing amount of ammonia may not be effectively reduced to the extent that the irritation caused by ammonia can be suppressed while maintaining sufficient color development and decolorization effects. If the content exceeds 20% by weight, no further improvement in color developing capacity may be expected, and the hair damage may only get severe. Therefore, it is preferable to use tromethamine within the above range.

The oxidation-type hair dye composition according to the present disclosure contains ammonia in an amount of 0.02 to 10% by weight, preferably 0.05 to 8% by weight or 0.1 to 6% by weight based on the total weight of the first agent composition. In addition, the oxidation-type hair dye composition according to the present disclosure contains monoethanolamine in an amount of 0.05 to 15% by

weight, preferably 0.1 to 15% by weight based on the total weight of the first agent composition.

In the oxidation-type hair dye composition according to the present disclosure, the combination ratio of ammonia and monoethanolamine is not particularly limited, but may be preferably 3:1 to 10:1, more preferably 3:1 to 5:1 in terms of the weight ratio. If the weight ratio is less than 3:1, the degree of dyeing durability and levelness may be greatly reduced. If the weight ratio exceeds 10: 1, although the degree of dyeing durability and levelness may be maintained at a preferable level, the degree of reducing ammonia odor may be insignificant, and thus, there may be no substantial effect of replacing ammonia with monoethanolamine.

In the oxidation-type hair dye composition according to the present disclosure, the combination ratio of ammonia and tromethamine is not particularly limited, but may be 2:1 to 6:1, more preferably 2:1 to 4:1 in terms of the weight ratio.

In the oxidation-type hair dye composition of the present disclosure, the pH may be preferably in the range of 7.0 to 10.0, which falls within the neutral to weak alkali range, and in particular, the pH may be preferably in the range of 9.0 to 9.8 considering the color developing capacity. If the pH is less than the pH range, the decomposition of the oxidant contained in the second agent may not be facilitated, which widens the cuticle of the hair, and the treatment agent may not be effectively infiltrated into the hair. If the pH exceeds the pH range, the oxidation reaction of the dye may be accelerated, so that the dye may undergoes color development on the outside of the hair surface rather than being infiltrated into the hair, thereby deteriorating dyeing durability.

Acid or pH buffers may be used as a means to lower the pH raised

by the use of alkaline agents. In the present disclosure, at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate is used as the pH buffer. When an organic acid generally used in cosmetics is used besides the ammonium carbonate or ammonium bicarbonate in order to lower the pH, the dyeing power may be greatly reduced, which is not preferable.

In the present disclosure, in particular, when at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate is used as a pH buffer in combination with tromethamine, the effect of further improving dyeing durability and levelness may be obtained.

The oxidation-type hair dye composition according to the present disclosure may contain at least one member selected from the group consisting of ammonium carbonate and ammonium bicarbonate in an amount of 0.01 to 20% by weight, preferably 0.1 to 10% by weight based on the total weight of the first agent composition, but these ingredients may be contained in a content range that prevents the pH of the mixed composition after mixing of the hair dye composition from exceeding 10.0, preferably 9.8.

In particular, in the present disclosure, the combination ratio of at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate, and tromethamine is not particularly limited, but may be preferably 1:1 to 3:1 in terms of the weight ratio.

The oxidation-type hair dye composition of the present disclosure contains a conventional oxidative dye precursor and a coupler in the first agent, preferably contains two or more oxidative dye precursors and a coupler, and most of the known oxidative dye precursors and couplers may be used.

The type of oxidative dye precursor is not particularly limited, but may include o-aminophenol, p-aminophenol, m-aminophenol, p-phenylenediamine, toluene-2,5-diamine hydrochloride, p-phenylenediamine hydrochloride, toluene-2,5-diamine, p-phenylenediamine sulfate, p-methylaminophenol sulfate, o-aminophenol sulfate, p-aminophenol sulfate, toluene-2,5-diamine sulfate, and the like. The oxidative dye precursor may be used in an amount of 0.001 to 5.0% by weight based on the total weight of the first agent composition.

In addition, as the coupler, 2-methyl-5-hydroxyethyl aminophenol, p-amino-o-cresol, m-aminophenol, 2,4-diaminophenoxyethanol hydrochloride, m-phenylenediamine hydrochloride, m-phenylenediamine, α -naphthol, resorcinol, 2-methylresorcinol, and the like may be used, and the coupler may be used in an amount of 0.001 to 5.0% by weight based on the total weight of the first agent composition. Further, the coupler may provide various color tones to hair when used in combination with the oxidative dye precursor.

In addition, the oxidation-type hair dye composition of the present disclosure may further include a conventionally used direct dye within a range that does not impair the purpose of the present disclosure. Examples of such a direct dye includes Arianol dye, p-nitro-o-phenylenediamine, nitro-p-phenylenediamine, 2-amino-4-nitrophenol, 2-amino-5-nitrophenol, nitro-p-phenylenediamine hydrochloride, picramic acid and other vegetable dyes such as Henna.

In addition, the oxidation-type hair dye composition of the present disclosure may further include other ingredients used conventionally in hair-dyeing agents within a range that does not

impair the effect of the present disclosure. For example, an antioxidizing agent, a metal ion sequestering agent, a solvent, a surfactant, a thickening agent, a fragrance, and a conditioning agent may be used, and examples thereof include those used conventionally in hair-dyeing agents without particular limitation.

The metal ion sequestering agent should not be contained or contained in very small amounts in the composition of the present disclosure as it will decrease the reactivity of the metal salts. Examples of the metal ion sequestering agent may include EDTA, disodium EDTA, tetrasodium EDTA, pentasodium pentetate, etidronic acid and their salts, and the like.

Examples of the antioxidizing agent may include ascorbic acid, erythorbic acid, cysteine hydrochloride, sodium sulfite, thioglycolic acid, and the like. Examples of the solvent may include ethanol, propyl alcohol, isopropyl alcohol, propylene glycol, hexylene glycol, diethylene glycol, and the like. Examples of the surfactant may include cationic surfactants, anionic surfactants, or nonionic surfactants. Examples of the thickening agent may include C₁₄-C₂₂ higher alcohols alone or mixtures thereof, non-ionic polymers, anionic polymers, paraffin, light liquid isoparaffin, and the like. Examples of the conditioning agent may include cationic polymers, quaternary ammonium salts, silicone and the like.

Next, the ingredients of the second agent of the oxidation-type hair dye composition of the present disclosure will be described.

The second agent contains an oxidant. The oxidant that is used conventionally in the oxidation-type hair dye compositions may be at least one selected from among hydrogen peroxide, urea iodine peroxide, alkali metal bromate, ferricyanide, perborate, and persulfate. In particular, hydrogen peroxide is preferably used.

The oxidant may be generally used in an amount of 0.1 to 10.0% by weight based on the total weight of the second agent composition, for example, it may be used in an amount of 0.3 to 30.0% by weight when using 35% by weight of a hydrogen peroxide solution.

Further, the second agent of the present disclosure may contain ingredients used conventionally in hair-dyeing agents within a range that does not impair the effect of the present disclosure. Examples thereof may include emulsifiers such as paraffin, light liquid isoparaffin, higher fatty alcohols, and higher fatty acid esters, cationic or non-ionic surfactants, stabilizers such as phenacetin, pH adjusters such as phosphoric acid, and the like.

In addition, the first agent and second agent in the hair dye composition according to the present disclosure generally contain, in addition to the above-described ingredients, water. As the water, purified water such as ion-exchanged water or distilled water may be preferably used. Further, the content of water is not specifically limited and may be contained an amount capable of sufficiently dissolving or dispersing the ingredients that are used in the hair dye composition.

Immediately before application of the hair dye composition of the present disclosure to hair, the first agent and the second agent are mixed to be used. In particular, the first agent and the second agent are generally mixed in a weight ratio of 1:1 to 1:2 to be used, but is not specifically limited thereto.

If the ratio of the first agent decreases during mixing, the amount of dye may decrease, which in turns decreases the amount of dye infiltrating into the hair, thereby deteriorating color developing capacity. If the ratio of the second agent increases, the reaction rate may rapidly increase, thereby causing additional

reactions, whereas the ratio decreases, the reaction rate may decrease.

In addition, as a method for dyeing hair using the hair dye composition according to the present disclosure, a conventional dyeing method, in which the first agent is mixed with the second agent to prepare an oxidative hair dye agent, the oxidative hair dye agent is applied to hair, and the hair is washed after the lapse of a predetermined time, may be included.

【MODE FOR CARRYING OUT THE INVENTION】

The present disclosure will be described in more detail by way of Examples and Comparative Examples. However, the scope of the present disclosure is not limited by these examples.

[Reference Example] Preparation of Hair Dye Compositions

The first and second agents of the hair dye compositions of Examples 1 to 7 and Comparative Examples 1 to 8 were prepared using the compositions shown in in following Tables 1 (Comparative Examples), 2 (Examples), and Table 3.

[Table 1]

First Agent of Hair Dye Composition (unit: wt%)

	Comparative Examples							
	1	2	3	4	5	6	7	8
Disodium EDTA	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Erythorbic acid	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sodium Pyrosulfite	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
p-phenylenediami	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

ne								
m-aminophenol	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Resorcinol	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Cetearyl Alcohol	10	10	10	10	10	10	10	10
Polyoxyethylene Stearyl Ether	3	3	3	3	3	3	3	3
Behentrimonium Chloride	1	1	1	1	1	1	1	1
Ammonia Water (28%)	6	6	6	6	7	6	2	5.75
Tromethamine	–	2	2	6	1	1	1	2
Ammonium Bicarbonate	3	–	–	3	1	4	3	–
Ammonium Carbonate	–	–	–	–	–	–	–	3
Monoethanolamine	–	–	–	–	–	–	4	0.25
Lactic acid	–	–	5	–	–	–	–	–
Combined Fragrance	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
Purified water	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100
Total	100	100	100	100	100	100	100	100
pH of First Agent	9.65	10.16	9.68	9.61	9.89	9.52	10.29	9.75

[Table 2]

First Agent of Hair Dye Composition (unit: wt%)

	Examples
--	----------

	1	2	3	4	5	6	7
Disodium EDTA	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Erythorbic acid	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Sodium Pyrosulfite	0.5	0.5	0.5	0.5	0.5	0.5	0.5
p-phenylenediamine	0.5	0.5	0.5	0.5	0.5	0.5	0.5
m-aminophenol	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Resorcinol	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Cetearyl Alcohol	10	10	10	10	10	10	10
Polyoxyethylene Stearyl Ether	3	3	3	3	3	3	3
Behentrimonium Chloride	1	1	1	1	1	1	1
Ammonia Water (28%)	6	6	6	6	4.5	5.25	5
Tromethamine	2	2	3	1	2	2	2
Ammonium Bicarbonate	1.5	–	3	3	3	3	3
Ammonium Carbonate	1.5	3	–	–	–	–	–
Monoethanolamine	–	–	–	–	1.5	0.75	1
Lactic acid	–	–	–	–	–	–	–
Combined Fragrance	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.

Purified water	to 100	to 100	to 100	to 100	to 100	to 100	to 100
Total	100	100	100	100	100	100	100
pH of First Agent	9.65	9.72	9.55	9.62	9.82	9.74	9.73

According to the composition ratios described in Tables 1 and 2 above, as aqueous phase, purified water, disodium EDTA, antioxidizing agent (erythorbic acid), reducing agent (sodium pyrosulfite), oxidative dye precursor (p-phenylenediamine, m-aminophenol), and coupler (resorcinol) were added, warmed to 75°C and dissolved. As oil phase, cetearyl alcohol, polyoxyethylene stearyl ether, behentrimonium chloride were added, warmed to 75°C and dissolved. The oil phase and the aqueous phase were mixed and emulsified, then cooled to 55°C, and uniformly mixed with an alkali agent, a pH adjusting agent, and a combined fragrance to prepare the first agent of the hair dye composition.

[Table 3]

Second Agent of Hair Dye Composition (unit: wt%)

Second Agent	
Cetearyl alcohol	5
Mineral oil	3
Polyoxyethylene Stearyl Ether	1
Disodium EDTA	0.2
Phosphoric Acid	q.s.
Hydrogen peroxide (35%)	17
Purified water	to 100

For the second agent (oxidant) of the hair dye composition, according to the composition ratio shown in Table 3, as oil phase, cetearyl alcohol, mineral oil and polyoxyethylene stearyl ether were

warmed to 75°C and dissolved, and as aqueous phase, disodium EDTA and purified water were warmed to 75°C and dissolved. The oil phase and the aqueous phase were mixed and emulsified at the same temperature, then cooled to 55°C, and uniformly mixed with phosphoric acid and hydrogen peroxide (35%) to prepare the second agent.

The hair dye compositions were prepared by mixing the first agent and the second agent prepared as described above in a weight ratio of 1:1, and the thus-prepared hair dye compositions had a pH value shown in Table 4 below.

[Table 4]

	Comparative Example								Example						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
pH	9.4	9.8	9.4	9.4	9.7	9.3	9.9	9.5	9.4	9.5	9.4	9.4	9.6	9.5	9.5
	6	4	4	7	1	4	8	9	8	5	1	4	2	7	6

[Test Example 1] Sensory Evaluation of sense of scalp irritation

The hair dye compositions prepared in the Reference Example were applied to the upper arm and left for 30 minutes, which is a typical hair dyeing time, to evaluate the sense of irritation. The sense of irritation was evaluated by 10 panelists according to the criteria of ◎ no irritation/○ moderate/△ irritation/× severe irritation, and the results are shown in Table 5 below.

[Table 5]

	Comparative Example								Example						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Sense of scalp irrit	○	×	△	○	△	○	○	○	○	○	○	○	○	○	○

ation															
-------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

As shown in FIG. 5, it was found that the scalp irritation was severe in Comparative Example 2, which did not contain a component for adjusting the pH of the hair dye composition, and the scalp irritation was still observed even in the case of Comparative Example 3, in which lactic acid, an organic acid, was used to lower the pH of the hair dye composition. In addition, it can be seen that the scalp irritation was still observed even in the case of Comparative Example 5, in which the combination ratio of ammonia and tromethamine was outside of the appropriate range.

Meanwhile, in the case of Examples 1 to 7 in which ammonium carbonate or ammonium bicarbonate was combined with an appropriate amount of tromethamine, it was confirmed that the irritation was much reduced.

[Test Example 2] Sensory Evaluation of Hair Damage

The hair dye compositions prepared in the Reference Example were applied to experimental human hair tress and left for 30 minutes, which is a typical hair dyeing time, followed by shampooing and drying. The texture after drying was evaluated by 10 professional panels according to the criteria of ◎ very soft/○ soft/△ moderate/× rough, and the results are shown in Table 6 below.

[Table 6]

	Comparative Example								Example						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Hair damage	○	×	△	○	△	○	○	○	○	○	○	○	○	○	○

As shown in FIG. 6, it was found that the hair damage was severe

in Comparative Example 2, which did not contain a component for adjusting the pH of the hair dye composition, and the hair damage was still observed even in the case of Comparative Example 3, in which lactic acid, an organic acid, was used to lower the pH of the hair dye composition. In addition, it can be seen that the hair damage was still observed even in the case of Comparative Example 5, in which the content of ammonia exceeded the appropriate range, and the combination ratio of ammonia and tromethamine was outside of the appropriate range.

Meanwhile, in the case of Examples 1 to 7 in which ammonium carbonate or ammonium bicarbonate was combined with an appropriate amount of tromethamine, it was confirmed that the hair damage was much reduced.

[Test Example 3] Evaluation of Dyeing durability

The hair dye compositions prepared in the Reference Example were applied to experimental human white hair tress and left for 30 minutes, which is a typical hair dyeing time, followed by shampooing and drying. The dried tress was added back into the shampoo solution, shaken at a speed of 200 rpm for 10 minutes using a shaker, and then rinsed with running water for 1 minute and dried. After drying, the L value was measured using a colorimeter (HunterLab Labscan XE), and the color persistence was evaluated using the dL value, which is a difference from the L value before the drainage test. The smaller dL value indicates excellent color persistence, and the results are shown in Table 7 below.

[Table 7]

	Comparative Example								Example						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7

dL(p ersi sten ce)	2.8	3.8	3.6	3.0	3.4	2.9	7.3	2.2	2.0	2.1	1.0	2.5	2.4	2.2	2.2
	6	2	5	2	8	5	2	2	2	8	3	8	9	7	4

As shown in FIG. 7, it was found that the color persistence was reduced as the oxidation reaction of the dye was accelerated in Comparative Example 2, which did not contain a component for adjusting the pH of the hair dye composition, and the color persistence was greatly reduced even in the case of Comparative Example 3, in which lactic acid, an organic acid, was used. In addition, it was found that the color persistence was reduced in the case of Comparative Examples 4 to 7, in which the combination ratio of ammonia, and tromethamine or monoethanolamine was outside of the appropriate range. In particular, it was found that the color persistence was greatly reduced in Comparative Example 7, in which the combination ratio of ammonia and monoethanolamine was 1:2, which was outside of the appropriate combination ratio.

Meanwhile, in the case of Examples 1 to 7 in which ammonia and tromethamine, and tromethamine and at least one of ammonium carbonate and ammonium bicarbonate, or monoethanolamine were mixed in an appropriate ratio according to the present disclosure, the color persistence was greatly improved compared to Comparative Examples 1 to 7.

[Test Example 4] Evaluation of Levelness

The hair dye compositions prepared in the Reference Example were applied to experimental human dyed hair tress and white-hair tress and left for 30 minutes, which is a typical hair dyeing time, followed by shampooing and drying. After drying, the L value of the dyed hair

tress and white-hair tress was measured using a colorimeter (HunterLab Labscan XE), and the difference in the L value between the dyed hair tress and the white hair tress was calculated, and the results are shown in Table 8 below. The measurement of color difference was repeated for 10 times for each value, and the average value was recorded. The smaller value indicates excellent color levelness.

[Table 8]

	Comparative Example								Example						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
dL (Black hair-white hair)	5.4	8.5	6.7	6.6	7.0	6.5	7.8	4.8	4.5	4.8	3.1	5.0	4.9	4.9	4.9
	9	5	8	4	2	7	2	9	8	2	8	8	8	1	2

As shown in FIG. 8, it was found that in Comparative Example 2, which showed a high pH of the hair dye composition because it did not contain a component for adjusting the pH of the hair dye composition, uniform dyeing did not occur as excessive color development was carried out in the dyed hair, and the improvement in levelness could not be confirmed even in the case of Comparative Example 3, in which lactic acid, an organic acid, was used. In addition, it was found that the levelness was reduced in the case of Comparative Examples 4 to 7, in which the combination ratio of ammonia, and tromethamine or monoethanolamine was outside of the appropriate range. In particular, it was found that the levelness was greatly reduced in Comparative Example 7, in which the combination of ammonia and monoethanolamine was 1:2, which was outside of the appropriate combination ratio.

Meanwhile in the case of Examples 1 to 7 in which ammonia and

tromethamine, and tromethamine and at least one of ammonium carbonate and ammonium bicarbonate, or monoethanolamine were mixed in an appropriate ratio according to the present disclosure, the levelness was greatly improved compared to Comparative Examples 1 to 7.

[Test Example 5] Evaluation of Pungent Smell

The hair dye compositions prepared in the Reference Example were applied to experimental human white hair tress and left for 30 minutes, which is a typical hair dyeing time, to evaluate the sense of pungent smell. The pungent smell was evaluated by 10 panelists according to the criteria of ◎ no pungent smell/o Moderate/△ pungent smell/x severe pungent smell, and the results are shown in Table 9 below.

[Table 9]

	Comparative Example								Example						
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7
Pungent Smell	o	o	o	o	△	o	◎	o	o	o	o	o	◎	o	◎

Since the amount of ammonia water contained in the hair dye compositions prepared in the Reference Example was the same except for Comparative Example 5, a similar level of pungent smell was observed in most cases. However, in the case of Comparative Example 7 and Examples 5 and 7, a considerable amount of ammonia was replaced by monoethanolamine and thus no pungent smell caused by ammonia was observed. In the case of Example 6, in which the combination ratio of ammonia and monoethanolamine was 7:1, a slight pungent smell caused by ammonia was observed as compared to Examples 5 and 7. In addition, in the case of Comparative Example 8, in which the combination ratio of ammonia and monoethanolamine exceeded the appropriate ratio, it

can be found that there was almost no effect of reducing the pungent smell caused by ammonia by replacing ammonia with monoethanolamine.

CLAIMS

【Claim 1】

An oxidation-type hair dye composition comprising: a first agent containing an oxidative dye precursor, a coupler, and an alkaline agent; and a second agent containing an oxidant,

wherein the first agent contains ammonia, as an alkaline agent; and at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate, and tromethamine, as a pH buffer.

【Claim 2】

The composition of claim 1, wherein the first agent further comprises monoethanolamine.

【Claim 3】

The composition of claim 1, wherein the ammonia is contained in an amount of 0.02 to 10% by weight based on the total amount of the first agent composition.

【Claim 4】

The composition of claim 1, wherein the tromethamine is contained in an amount of 0.01 to 20% by weight based on the total weight of the first agent composition.

【Claim 5】

The composition of claim 2, wherein the monoethanolamine is contained in an amount of 0.05 to 15% by weight based on the total weight of the first agent composition.

【Claim 6】

The composition of claim 1, wherein the combination ratio of the ammonia and tromethamine is 2:1 to 6:1 in terms of the weight ratio.

【Claim 7】

The composition of claim 1, wherein the combination ratio of

the ammonia and monoethanolamine is 3:1 to 10:1 in terms of the weight ratio.

【Claim 8】

The composition of claim 1, wherein the at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate is contained in an amount of 0.01 to 20% by weight based on the total weight of the first agent composition.

【Claim 9】

The composition of claim 1, wherein the at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate is contained in an amount so that the pH of the hair dye composition is adjusted to the range of 7.0 to 10.0.

【Claim 10】

The composition of claim 1, wherein the combination ratio of the at least one selected from the group consisting of ammonium carbonate and ammonium bicarbonate, and tromethamine is 1:1 to 3:1 in terms of the weight ratio.

【Claim 11】

The composition of claim 1, wherein the hair dye composition reduces the scalp irritation and hair damage.

【Claim 12】

The composition of claim 1, wherein the hair dye composition improves dyeing durability.

【Claim 13】

The composition of claim 1, wherein the hair dye composition improves levelness.