

ACIDIC HAIRDYE COMPOSITIONBACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an acidic hairdye composition that is excellent in dyeing ability but causes no color migration to the skin, clothes and the like.

2. Description of the Related Art

Hitherto, many proposals on acidic hairdyes have been made. Those that contain dyes in low concentrations and penetrants or acids in low concentrations are used mainly as hair dressings. They cause little color migration to the skin or clothes but have very poor dyeing power for hiding or making white or gray hair inconspicuous and thus are not practically effective. On the contrary, those that have high dye concentrations and high penetrant concentrations or high acid concentrations are used as a hairdye. They not only cause contamination of the skin to a high extent but also extremely cause color migration to the skin or clothes even after use. Accordingly, they have been used for special treatments in hair care and beauty care. Conventional domestic hairdyes for use in general homes are without exceptions required of careful use so as not to soil the skin or clothes and washing of excessive hairdye after use is necessary.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to solve the above-mentioned problems and provide an improved acidic hairdye composition. More particularly, the present invention is to provide an acidic hairdye composition, which is stable even in a strongly acidic region (pH 1.5 to 4.0), has high fluidity, exhibits excellent use feeling, and causes substantially no color migration such as attachment of the dye to the skin or clothes after use, is dealt with a means of increasing viscosity that needs no washing

out, and hides white or gray hair by a single treatment therewith and dyes white or gray hair by 4 or 5 treatments therewith to make the white or gray hair inconspicuous.

With a view to solving the problem mentioned above, the present inventors have made extensive study on acidic hairdye composition and as a result they have found that blending a "dye (coloring matter)", an "acid", an "aromatic alcohol", a "lower alcohol", a "thickener", and "water", which are ingredient components, in a good balance realizes an acidic hairdye composition that hides white or gray hair by a single treatment therewith, dyes white or gray hair by 4 or 5 treatments therewith to make the white or gray hair inconspicuous, causes substantially no color migration to the skin or clothes after use, and needs no washing out.

Therefore, the present invention provides an acidic hairdye composition comprising 0.01 to 1% by weight of at least one acidic dye, 0.1 to 10% by weight of an acid as a pH adjusting agent, 1 to 20% by weight of an aromatic alcohol as a penetrant, 1 to 20% by weight of a lower alcohol as a solvent, 0.01 to 5% by weight of a polymer compound as a thickener, based on the total weight of the composition and the balance water.

The acidic hairdye composition of the present invention may optionally contain ultraviolet absorbents, antioxidants, stabilizers and auxiliaries usually used in the art in addition to the above mentioned major components and the balance water.

The acidic hairdye composition of the present invention has many advantages in that it is of one-pack type so that it can be used with ease, and that because of having suitable viscosity and good drying property, it does not soil clothes unnecessarily upon using thereof. Further, the hairdye composition of the present invention is not particularly limited to use of cold color dyes such as black dye and brown dye, but can use any dye of any desired color so that it can be applied not only to hairdyeing of white or gray hair for aged persons but also to hairdyeing for young persons in accordance with fashion.

DETAILED DESCRIPTION OF THE INVENTION

In the present invention, the acidic dye which can be used includes legally defined dyes (coloring matters) generally used in oxidative hairdyes and acidic hairdyes, preferably tar dyes, for example, Red No. 2, Red No. 102, Red No. 106, Red No. 213, Red No. 215, Red No. 227, Red No. 401, Red No. 504, Yellow No. 4, Yellow No. 5, Yellow No. 203, Yellow No. 205, Green No. 3, Green No. 204, Green No. 205, Blue No. 1, Blue No. 203, Blue No. 403, Black No. 401, Violet No. 401, Orange No. 205, Brown No. 201 and the like. These dyes may be used singly or two or more of them may be used in combination.

The acidic dye may be added in an amount of 0.01 to 1% by weight, preferably 0.05 to 0.5% by weight. If the addition amount is 0.01% or less, a desired color is not reached before the dyeing is repeated 10 times or more. On the other hand, if the addition amount is 1% or more, it is difficult to dye in a favorite color.

As the acid as a pH adjusting agent, either inorganic acids or organic acids may be used. Preferably, organic acids are used. For example, mention may be made of organic acids such as citric acid, succinic acid, tartaric acid, lactic acid, malic acid, fumaric acid, maleic acid and glycolic acid, preferably, citric acid and glycolic acid; and inorganic acids such as hydrochloric acid, sulfuric acid, phosphoric acid and nitric acid. These acids may be used together with corresponding acid salts such as sodium, potassium or ammonium salts in combination in order to give buffer capacity.

These acids are selected and blended so that their blending amount is in such an amount that upon using the hairdyes, the hairdye solution is strongly acidic, for example, at a pH of about 1.5 to about 4.0, preferably at a pH of about 1.5 to about 3.5.

The aromatic alcohol as a penetrant is used to promote aid penetration of the dye into the hair and to impart hair after the dyeing smoothness, mellow touch and suitable moisture retention. For example, benzyl alcohol, phenyl ethanol and the like may be used, with benzyl alcohol being preferred.

The lower alcohol as a solvent may be those solvents usually used in hair dressings. The lower alcohol of a straight chain or a branched chain having 1 to 4 carbon atoms can be used, for example, methanol, ethanol, propanol, isopropanol, butanol, ethylene glycol, 1,3-butylene glycol and the like. Of these, ethanol is preferable. The lower alcohol is used in a blending amount that may vary depending on the other components to be blended and usually in the range of 1 to 20% by weight based on the total amount of the hairdye composition. In the blending amount of less than 1% by weight, the function as solvent is insufficient so that the solution is turbid or separation occurs whereas in the blending amount of more than 20% by weight, workability upon dyeing is decreased.

The acidic hairdye composition of the present invention uses a thickener in order to prevent the hairdye solution from being dropped upon the use thereof and also improve its handling. The polymer compound as a thickener may be any of natural and synthetic polymer compounds. For example, mention may be made of natural polymers such as Arabic gum, guar gum (guar flour, jaguar gum), carrageenan (carragheen, Irish moss extract), sodium alginate, xanthan gum, methylcellulose, CMC (carboxymethylcellulose) and cationated starch, and synthetic polymers such as poly(meth)acrylic acid, poly(meth)acrylic acid esters, and polyvinyl alcohol, higher fatty acid esters such as polyethylene glycol higher fatty acid esters. Preferably, xanthan gum and the like are used.

The acidic hairdye composition of the present invention may contain, according to the necessity, a wetting agent, scurf preventing agent, an antioxidant, an ultraviolet absorbent, a perfume, and the like used in the art.

The acidic hairdye composition of the present invention is intended to obtain a mellow intense color not by a single hairdyeing treatment but by 3 to 5 treatments with interval. Therefore, the acidic hairdye composition of the present invention does not damage hair by repeated treatments and give not adverse influence on the health and the like of the user.

Subsequent hairdyeing is preferable to be conducted after 30

minutes passed, preferably from one day to seven days (one week) after the preceding hairdyeing, for example, with interval of every three weeks. Furthermore, it is preferable to wash hair before the subsequent hairdyeing.

EXAMPLES

Hereinafter, the present invention will be described in detail by examples. However, the present invention should not be construed as being limited thereto.

Preparation Example

Xanthan gum as a thickener, glycolic acid as a pH adjusting agent, benzyl alcohol as an aromatic alcohol, ethanol as a lower alcohol, and a mixed dye composed of the dyes shown in Table 1 as an acidic dye were used.

Table 1 Mixing ratio of acidic dyes (parts by weight)

dye	Brown series	Blue series	Black series
Black No. 401	1 part	25 parts	14 parts
Violet No. 401	1 part	15 parts	14 parts
Orange No. 205	3 parts	10 parts	22 parts

The above components were blended in ratios shown in Tables 2 and 3 respectively and purified water was added to make the total amount 100. All "%" mean % by weight.

The obtained hairdyes were each tested for hairdyeing ability in EXAMPLE 1 and EXAMPLE 2.

EXAMPLE 1

Samples of Example 1 and Comparative Examples 1 to 3 of the compositions shown in Table 2 were examined for hairdyeing ability and handling property. As the mixed acid dye, the black series dye shown in Table 1 was used.

Comparative Example 1 is an example of the composition that contains more xanthan gum. Comparative Example 2 is an example that contains more benzyl alcohol. Comparative Example 3 is an example that contains more ethanol.

The compositions of Comparative examples 2 and 3 were poor in blendability of compositions themselves and were also poor in dyeing property. Hereinbelow, the hairdyeing ability of the samples of Example 1 and Comparative Examples 1 to 3 will be described.

Table 2

Composition	Example 1 (%)	Comparative Example (%)		
		1	2	3
Xanthan gum	0.5	7.0	0.5	0.5
Glycolic acid	2.0	2.0	2.0	2.0
Mixed acidic dye	0.1	0.1	0.1	0.1
Benzyl alcohol	10.0	10.0	30.0	1.0
Ethanol	12.5	10.5	12.5	22.5
Purified water	74.9	70.4	54.9	73.9
Hairdyeing ability	*1	*2	*3	*4
Dyeing ability after shampooing	Good ¹⁾	Poor ²⁾	Poor ³⁾	Poor ⁴⁾

1. Hairdyeing ability

*1: After 10 minutes from the coating the composition was dried. The hand was not soiled when rubbing the hair therewith and white hair was uniformly dyed into black, without becoming gooey but having smooth touch and very good.

*2: the composition was highly viscous and difficult to coat, making white hair black but not drying even after 30 minutes and resoiling was observed.

*3: The liquid was divided into two layers and coated on white hair after shaking and mixing but the liquid was apt to flow and was inconvenient for use. After coating, white hair is dyed into black but was still wet even after 30 minutes and soil occurred.

*4: After coating, white hair was turned into black and inconspicuous but the hair was gooey even after 30 minutes and the dye reattached and even after drying the dye reattached.

2. Dye fixing after washing hair

1) No stripping occurred after shampooing with a commercially available shampoo and white hair was uniformly dyed into black.

2) After shampooing, partial stripping by the shampooing was observed and a portion of white hair was turned black but as a whole white hair was conspicuous.

3) After shampooing, white hair portion was observed to be partially dyed into black but non-dyed portions were also observed and white hair was conspicuous.

4) After shampooing, white hair portion was observed to be stripped by the shampooing, and white hair was conspicuous and fixing of the dye was not observed.

(1) Applicability: A male with generally white hair was selected as a subject and the liquid of Example 1 was taken on a comb and the liquid was applied onto his left temporal overall. Onto the right temporal the liquid of Comparative Example 1 was applied in substantially the same amount as the liquid of Example 1.

As a result, the liquid of Example 1 tended to spread so that it successfully hid white hair uniformly of the overall applied region while the liquid of Comparative Example 1 was difficult to spread the whole liquid uniformly and it was not easy to hide the entire white hair.

(2) Reattachment: When the palm was applied to the portions coated with the liquids of Example 1 and of Comparative Example 1

immediately after the treatment, the palm was soiled in either case. However, the palm was soiled more lightly with the sample of the Example 1 than with the sample of Comparative Example 1.

After 10 minutes from the coating, the coated portions were rubbed with the palm. In the case of the sample of Comparative Example 1, the dye was felt viscous and reattached on the palm considerably whereas in the case of the sample of Example 1, the sample was quite dry and the palm was not soiled. Further when the coated portion was strongly rubbed with a white cloth, the cloth was not soiled.

(3) Dye fixing to hair: Thereafter, the head was washed with a commercially available shampoo and dried. Then the state of dyeing of hair on both sides of the head was observed. As a result, the white hair on the portion where the sample of Comparative Example 1 was used did not change substantially and observed as white hair whereas existence of white hair was not almost observed and the white hair was in a dyed state on the portion where the sample of Example 1 was used.

Thereafter, the hair was styled with commercially available hair oil and washed once every two days. This was repeated three times. As a result, no color rub-off occurred in the dyed portion. The white hair portion treated with the sample of Example 1 was quite inconspicuous as compared with the portion treated with the sample of Comparative Example 1.

The acidic hairdye composition of the present invention was dried after about 10 minutes from the treatment. It caused no soiling of palm or clothes and retained the styled state as it was. The white hair after the washing was dyed and the effect of hairdyeing was retained sufficiently even after repeated washing. The acidic hairdye composition of the present invention is free of the inconvenience that the hair must be left to stand for 30 to 40 minutes after the treatment and then be washed, as has been conventionally performed with conventional acidic hairdye compositions. The preparation of the present invention can exhibit hairdyeing effect by simply applying it to the hair and styling

the hair in that state.

EXAMPLE 2

Samples of Example 2 and Comparative Example 4 of the compositions shown in Table 3 were examined for hairdyeing ability. Also, samples of Comparative Examples 5 and 6 were examined. As the mixed acid dye, the brown series dye shown in Table 1 was used.

Comparative Example 4 is an example of the composition that contains more water. Comparative Example 5 is an example in which more benzyl alcohol and less ethanol are contained therein. Comparative Example 6 is an example in which less ethanol and more water are contained therein. The samples of these comparative examples gave unstable formulations and as a result they each exhibited poor hairdyeing ability.

Table 3

Composition	Example 2 (%)	Comparative Example (%)		
		4	5	6
Xanthan gum	0.3	0.3	0.5	0.5
Glycolic acid	2.0	2.0	2.0	2.0
Mixed acidic dye	0.2	0.2	0.2	0.2
Benzyl alcohol	10.0	0.5	30.0	12.5
Ethanol	15.0	15.5	2.5	0.5
Purified water	72.5	81.5	64.8	84.3
Hairdyeing ability	*5	*6	*7	*8
Dyeing ability after shampooing	Good ⁵⁾	Poor ⁶⁾	Poor ⁷⁾	Poor ⁸⁾

1. Hairdyeing ability

*5: After 10 minutes from the coating, hands were not soiled when

rubbing the hair therewith and white hair was uniformly dyed into brown, without becoming gooey but having smooth touch and very good.

*6: After the coating, white hair portion turned brown. Although white hair was inconspicuous, the hair was not dry even after 30 minutes or more and the dye reattached. Even after the hair was dry, the dye reattached.

*7: The liquid was divided into two layers and applied to white hair after shaking and mixing. To make the white hair inconspicuous, the shaking and mixing had to be performed many times and it was necessary to be coated with the liquid many times, which was inconvenient. The hair was still in a wet state even after 30 minutes and soiling occurred.

*8: The liquid was in a separated state. After the coating, white hair was turned into brown and inconspicuous but the hair was gooey even after 30 minutes and the dye reattached and even after drying the dye reattached.

2. Dye fixing after washing hair

5) No stripping occurred after shampooing and white hair was uniformly dyed into brown.

6) After shampooing, white hair was turned into pale brown but due to stripping by the shampooing white hair was conspicuous as a whole.

7) After shampooing, white hair portion dyed into black was observed to be partially dyed into brown and non-uniform dyeing was observed.

8) After shampooing, white hair portion was observed to be stripped by the shampooing, and white hair was conspicuous and fixing of the dye was not observed.

(1) Applicability: In the same manner as in EXAMPLE 1, a woman of 50 years old with partially white hair was selected as a subject and the liquids of EXAMPLE 2 and COMPARATIVE EXAMPLE 4 were coated on the left and right temporals, respectively.

As a result, the liquid of EXAMPLE 2 tended to spread so that

it successfully hid white hair uniformly of the overall applied region while the liquid of COMPARATIVE EXAMPLE 4 showed separation of benzyl alcohol and it was difficult to spread the whole liquid uniformly and the entire white hair could not be hidden.

(2) Reattachment: When the palm was applied to the portions coated with the liquids of EXAMPLE 2 and of COMPARATIVE EXAMPLE 4 immediately after the treatment, the palm was soiled in either case. However, the palm was soiled more lightly with the sample of the EXAMPLE 2 than with the sample of COMPARATIVE EXAMPLE 4.

After 10 minutes from the coating, the coated portions were rubbed with the palm. In the case of the sample of COMPARATIVE EXAMPLE 4, the dye was felt viscous and reattached on the palm considerably whereas in the case of the sample of EXAMPLE 2, the sample was quite dry and the palm was not soiled. Even when the coated portion was strongly rubbed with a white cloth, the cloth was not soiled.

(3) Dye fixing to hair: Thereafter, the head was washed with a commercially available shampoo and dried. Then the state of dyed hair on both sides of the head was observed. As a result, the white hair on the portion where the sample of COMPARATIVE EXAMPLE 4 was used was partially hidden, but as a whole white hair was conspicuous and observed as a white hair state. On the contrary, in the portion where the sample of EXAMPLE 2 was used, substantially no white hair was observed and white hair was in a dyed state.

Similarly to the results of EXAMPLE 1, the acidic hairdye composition of EXAMPLE 2 was dried after 10 minutes from the treatment and caused no soiling of palm or clothes and retained the styled state as it was. The white hair after the washing was dyed and the effect of hairdyeing was retained sufficiently even after repeated washing.

(4) Redyeability: The woman who dyed her hair as described above repeatedly dyed the hair for every 3 weeks and as a result uniform dyeing such that the previously dyed portion was not distinguishable from the later dyed portion was obtained. The more intense dyed color was obtained, the more the hairdyeing was repeated. Even when

used repeatedly, the hairdye composition of EXAMPLE 2 gave no setiform touch (conversion into setiform hair) nor damage to hair. The hair was in a state where it can be readily styled, giving a smooth touch.

From the results of the above-described Examples and Comparative Examples, it can be seen that the hairdye composition of the present invention well adsorbs dye and gives a favorable use feeling upon coating without causing separation of benzyl alcohol in the case where the ratio of benzyl alcohol to ethanol is 1 : 0.25 to 1 : 4.0, preferably 1 : 2.5 to 1 : 1.5 and the ratio of mixed solution of benzyl alcohol and ethanol to water is 1 : 2.3 to 1 : 41.0, preferably 1 : 2.9 to 1 : 3.4.

From these results the ratios of the respective components can be summarized as below.

	<u>Compositions of the invention</u>	<u>Preferred range</u>
Acidic dye	0.01 to 1%	0.05 to 0.5%
Acid	0.1 to 10%	1.0 to 5.0%
Aromatic alcohol	1.0 to 20%	5.0 to 15.0%
Lower alcohol	1.0 to 20%	10.0 to 15.0%
Polymer compound	0.01 to 5%	0.3 to 1.0%
Purified water	44.0 to 97.88%	59.5 to 74.45%



WHAT IS CLAIMED IS:

1. An acidic hairdye composition comprising 0.01 to 1% by weight of at least one acidic dye, 0.1 to 10% by weight of an acid as a pH adjusting agent, 1 to 20% by weight of an aromatic alcohol as a penetrant, 1 to 20% by weight of a lower alcohol as a solvent, 0.01 to 5% by weight of a polymer compound as a thickener, based on the total weight of the composition and the balance water.
2. An acidic hairdye composition according to Claim 1, wherein the composition comprises 0.05 to 0.5% by weight of an acidic dye, 1 to 5% by weight of an acid as a pH adjusting agent, 5 to 15% by weight of an aromatic alcohol, 10 to 15% by weight of a lower alcohol and 0.3 to 1% by weight of a polymer compound as a thickener.
3. An acidic hairdye composition according to Claim 1 or 2, wherein the acidic dye is a tar dye, the acid as a pH adjusting agent is glycolic acid, the aromatic alcohol is benzyl alcohol, the lower alcohol is ethanol, and the polymer compound is xanthan gum.
4. An acidic hairdye composition according to Claim 1 or 2, wherein the acidic dye is a tar dye, the acid as a pH adjusting agent is citric acid, the aromatic alcohol is benzyl alcohol, the lower alcohol is ethanol, and the polymer compound is xanthan gum.
5. An acidic hairdye composition according to Claim 1 to 4, wherein the proportion of benzyl alcohol and ethanol is 1 : 0.25 to 4.0, and the proportion of a mixture of benzyl alcohol and ethanol and water is 1 : 2.3 to 41.0.
6. Dyeing method of conducting dyeing by using a dyeing liquid of pH 1.5 to 4.0 which comprises an acidic hairdye composition described in Claims 1 to 5.



7. Dyeing method according to Claim 6, wherein dyeing to a desired color is made by 3 to 5 hairdyeing treatments with interval of at least one day or more than seven days.