United States Patent

Reiss et al.

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[54] DYEING HAIR WITH AN AQUEOUS FILM-FORMING RESIN COMPOSITION

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[21] Appl. No.: **39,540**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 470,920, July 9, 1965, abandoned, Continuation-in-part of Ser. No. 264,747, Mar. 13, 1963, abandoned.

[52] **U.S. Cl.** **8/10**, 8/85, 8/87, 8/93

[51] **Int. Cl.** **D06p 5/00**

[58] **Field of Search** 8/10, 54, 93, 85, 87

[56] **References Cited**

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[57] **ABSTRACT**

Temporarily dyeing hair with a composition including an aqueous solution of a non-ionic water-soluble film-forming resin, benzyl alcohol, and an anionic dyestuff having an affinity for hair fibers dispersed therein, there being sufficient benzyl alcohol in the solution to render the dyestuff substantially equally adsorbed on more damaged and less damaged hair sections.

2 Claims, No Drawings

DYEING HAIR WITH AN AQUEOUS FILM-FORMING RESIN COMPOSITION

This is a continuation-in-part of our copending application Ser. No. 470,920 filed July 9, 1965, now abandoned and application Ser. No. 264,747, filed Mar. 13, 1963, now abandoned.

This invention relates to an improvement in the dyeing of hair and more particularly to temporary dyes which can be removed from the hair by washing.

When human hair has been repeatedly bleached or damaged at and near the hair ends, dyes which can be washed from the hair tend to preferentially dye the bleached or damaged ends or otherwise irregularly dye the hair. An object of this invention is to provide a composition and method for dyeing human hair with a temporary hair coloring which does not tend to preferentially dye either damaged or undamaged hair portions but dyes both damaged and undamaged hair portions equally.

A further object of this invention is to provide a method of and composition for dyeing hair using an aqueous medium which includes a substance such as benzyl alcohol which decreases the amount of dye adsorbed on repeatedly bleached or damaged portions of hair while increasing the dye adsorbed on normal hair.

Ordinarily, dyes which can be removed from the hair by washing, i.e., temporary hair colors, are very impermanent and rub off of the hair on clothing, pillow cases, and other articles which may touch the hair. A further object of this invention is to provide a new hair dyeing composition and a method for dyeing hair with a temporary hair coloring in which the tendency to rub off is reduced.

A further object of this invention is to provide such a temporary hair coloring in which a resin is applied with the hair coloring and in which the hair coloring is deposited on the hair first so that the resin overlies the dye to protect the dye.

A further object of this invention is to provide a method of dyeing hair in which a composition is used in which is suspended a dyestuff having a strong affinity for hair fibers and in which, in addition, a water-soluble resin is dissolved so that, when the composition is combed or brushed through the hair, the dyestuff adheres to the hair while the aqueous solution of the resin remains on the hair, and, as the aqueous solution dries, the resin is deposited on the hair surrounding the dyestuff to coat and protect the dyestuff.

According to our new method, we use an anionic dyestuff and a cationic surface active agent to form a water dispersion of the dyestuff and add benzyl alcohol which increases the dye adsorption by normal hair or hair which is slightly damaged, while decreasing the dye adsorption by repeatedly bleached or more damaged hair. Preferably, we also add a non-ionic water-soluble film-forming resin such as polyvinyl pyrrolidone or dimethyl hydantoin formaldehyde resin and, ordinarily, a non-ionic water-soluble thickener and stabilizer such as hydroxyethyl cellulose or methyl cellulose or the like. The thickening agent and the film-forming agent should be non-ionic to prevent reaction with the dyestuff. To the solution is added a sufficient amount of a cationic surface active agent to be equivalent to the dyestuff. A preferred cationic surface active agent can be stearyl dimethyl benzyl ammonium chloride or a tertiary amine or the like. The cationic surface active agent produces a two-phase system including a practically colorless solution together with insoluble colored dye complex. A sufficient amount of the surface active agent is used to produce a stable uniform dispersion of the dye complex. The color complexes formed in this manner have been found to have a strong affinity for the hair fibers but to preferentially dye repeatedly bleached or damaged portions of the hair or otherwise irregularly dye the hair. Sufficient benzyl alcohol is used so that both natural or lightly pre-bleached or less damaged portions of the hair and heavily bleached or more damaged portions of the hair are uniformly colored. The cationic surface active agent serves not only to form the insoluble colored complex but also as a dispersing agent, and preferably the minimum excess is added that gives a smooth

dispersion of the complex particles. The hair is not rinsed at this point, but the remaining solution is permitted to remain on the hair and to dry, and, as the solution dries, the resin therein forms a coating on the dyed hair which protects the dye. However, when desired, the resin and the dyestuff can be removed from the hair by shampooing.

The following examples are given to illustrate the invention in greater detail, but it is to be understood that the examples are given primarily by way of example rather than by way of limitation, except as set forth in the claims. In the following examples and in the remainder hereof, all parts or percentages are given by weight.

EXAMPLE I. A dye composition was formed having the following composition:

Benzyl alcohol	2.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	1.160
Glyceryl monostearate	0.116
Alizarine Violet R dyestuff	0.200
Deionized water	95.258
Total:	100.000 parts

In a kettle, the benzoic acid was dispersed in 50 parts of the water at room temperature. The hydroxy ethyl cellulose and the dimethyl hydantoin formaldehyde resin were added as the water in the kettle was heated to approximately 175° F. and the contents of the kettle were stirred.

In another vessel, the dyestuff was added to 5 parts of water and mixed at room temperature. The contents of the other vessel were added to the kettle, and the other vessel was washed with 5 more parts of the water, the wash water being added to the kettle. The contents of the kettle were heated to 175° F. and agitated for 15 minutes at that temperature. Then the stearyl dimethyl benzyl ammonium chloride was added to disperse the dyestuff, and the contents of the kettle were agitated for another 15 minutes. The glyceryl monostearate was added and the contents of the kettle were agitated for another 15 minutes. The contents of the kettle were allowed to cool while 30 more parts of the water at room temperature were added, and the temperature of the contents of the kettle was reduced to 95° F. The benzyl alcohol and the remaining water were added with stirring. The pH of the batch in the kettle was adjusted to 4.5 with hydroxy acetic acid to form a dye composition.

Hair was pre-bleached using a commercial bleach for four hours. Half of each lock of the hair was further bleached for an additional 4 hours making a total of 8 hours using a commercial bleach. The dye composition was combed through a sample of the hair until the hair was uniformly saturated. The hair was set and dried using a dryer which evaporated water from the hair. The hair was uniformly colored a bluish violet, was lustrous, and easily controlled. The color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE II. A dye composition was formed having the following composition:

Benzyl alcohol	1.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	1.160
Glyceryl monostearate	0.116
Alizarine Violet R dyestuff	0.200
Deionized water	96.258
Total:	100.000 parts

This dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example I until the hair was uniformly saturated with the dye composition.

The hair was set and dried, using a dryer which evaporated water from the hair. The hair was bluish violet and was lustrous but the portion of the hair which had been bleached for 8 hours was more strongly colored than the remainder of the hair. The color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE III. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	1.160
Glyceryl monostearate	0.116
Alizarine Violet R dyestuff	0.200
Deionized water	94.258
Total:	100.000 parts

The dye composition was formed in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example I until the hair was uniformly saturated with the dye composition by combing the dye solution therethrough until uniformly saturated. The hair was set and dried using a dryer which evaporated water from the hair. The hair was colored a bluish violet but the portion of the hair which had been bleached for four hours was more darkly colored than the portion which had been bleached for eight hours. The color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE IV. A dye composition was formed having the following composition:

Benzyl alcohol	4.00
Stearyl dimethyl benzyl ammonium chloride	1.80
Direct Black E dyestuff	0.50
Deionized water	93.70
Total:	100.00 parts

The dyestuff was added to 5 parts of the water in a vessel at room temperature and mixed therewith. The contents of the vessel were added to a kettle containing 50 parts of water and 5 more parts of the water were used to wash the vessel, the washing being added to the kettle. The contents of the kettle were heated to 175° F. and agitated for 15 minutes at that temperature. Then the stearyl dimethyl benzyl chloride was added to disperse the dyestuff, and the contents of the kettle were agitated for another 15 minutes. The contents of the kettle were allowed to cool while 30 more parts of the water at room temperature were added, and the temperature of the contents of the kettle was reduced to 95° F. The benzyl alcohol and the remaining water were added with stirring. The pH of the batch in the kettle was adjusted to 4.5 with hydroxy acetic acid to form a dye composition. The dye composition was combed through another sample of the hair of Example I until the hair was uniformly saturated. The hair was set and dried. The hair was colored a lustrous dark blue-black color and was easily controlled. The color was uniform throughout the length of the hair. The color was readily removed by shampooing.

EXAMPLE V. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	0.300
Glyceryl monostearate	0.030
Kiton Yellow T 125% (acid yellow 23 C.I. 19140)	0.100
Deionized water	95.304
Total:	100.000 parts

The dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through a sample of virgin blonde hair, the distal end of which had been bleached for 4 hours using a commercial bleach, until the hair was uniformly saturated with the dye composition. The hair was set and dried with a dryer which evaporated water from the hair. The hair was a uniform light yellow. This color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE VI. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	0.500
Glyceryl monostearate	0.050
Kiton Black 2 B Conc. (Acid Black 1, C.I. 20470)	0.250
Deionized water	94.934
Total:	100.000 parts

The dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example V until the hair was uniformly saturated with the dye composition. The hair was set and dried with a dryer which evaporated water from the hair. The hair was a uniform blue-black. This color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE VII. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	0.200
Glyceryl monostearate	0.020
Kiton Red 2G (Acid Red 1, C.I. 18050)	0.100
Deionized water	95.414
Total:	100.000 parts

The dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example V until the hair was uniformly saturated with the dye composition. The hair was set and dried with a dryer which evaporated water from the hair. The hair was a uniform reddish-pink. This color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE VIII. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	0.400
Glyceryl monostearate	0.040
Kiton Fast Blue C B Conc. (Acid Blue 45, C.I. 63010)	0.100
Deionized water	95.194
Total:	100.000 parts

The dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example V until the hair was uniformly saturated with the dye composition. The hair was set and dried with a dryer which evaporated water from the hair. The hair was a uniform light blue. This color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE IX. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	0.400
Glyceryl monostearate	0.040
Kiton Violet 4 BNS Ex. Conc. (Acid Violet 49, C.I. 42640)	0.100
Deionized water	95.194
Total	100.000 parts

The dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example V until the hair was uniformly saturated with the dye composition. The hair was set and dried with a dryer which evaporated water from the hair. The hair was a uniform violet. This color was not easily rubbed off but was readily removed by shampooing.

EXAMPLE X. A dye composition was formed having the following composition:

Benzyl alcohol	3.000
Hydroxy ethyl cellulose	0.250
Dimethyl hydantoin formaldehyde resin	1.000
Benzoic acid	0.016
Stearyl dimethyl benzyl ammonium chloride	0.100
Glyceryl monostearate	0.010
Kiton Eosine G C (Acid Res 4, C.I. 14710)	0.100
Deionized water	95.524
Total:	100.000 parts

The dye composition was prepared in the same manner as the dye composition of Example I. This dye composition was combed through another sample of the hair of Example V until the hair was uniformly saturated with the dye composition. The hair was set and dried with a dryer which evaporated water from the hair. The hair was a uniform light pink. This color was not easily rubbed off but was readily removed by shampooing.

The dyestuffs used in the examples are typical of common anionic dyestuffs used in temporarily coloring hair. The dyestuff identified as Alizarine Violet R is also known as Acid Violet 43 and by No. 60730 from The Color Index, 2nd Edition. The dyestuff referred to as Direct Black E is also known as Direct Black 38 and is further identified by the No. 30235 from The Color Index, 2nd Edition.

The amount of benzyl alcohol required for best results can vary with the dyestuff used and with the degree of prebleaching and damage to the hair. Approximately 2 percent of benzyl alcohol can give good results with Alizarin Violet R, while with Direct Black 28, approximately 4 percent of benzyl alcohol can give good results. With other dyestuffs approximately 3 percent of benzyl alcohol gives good results. In general, approximately 1 to 4 per cent benzyl alcohol gives beneficial results. In most of the examples, dimethyl hydantoin formaldehyde resin is shown. The resin used had a molecular weight of 240–300. A 75 percent by weight solution thereof in water was used. Other non-ionic non-toxic water-soluble film-forming resins can similarly be used, such as polyvinyl pyrrolidone resin. A suitable polyvinyl pyrrolidone resin has an average molecular weight of 40,000. The hydroxy ethyl cellulose can be the commercial product having a Hoeppler viscosity of 325 to 400 c.p.s. at 20° C.

The dye compositions can be used as shown in the examples or two or more compositions can be mixed together to give colors not shown in the examples.

The dye compositions and method of applying same are subject to variations within the scope of the appended claims.

What is claimed is:

1. A method of temporarily dyeing hair of which a part has been damaged more than another part which comprises applying to the hair a dyeing composition which consists essentially of an aqueous solution of a non-ionic water-soluble film-forming resin selected from the group consisting of dimethyl hydantoin formaldehyde resin and polyvinyl pyrollidone resin and benzyl alcohol, an anionic dyestuff having an affinity for hair fibres dispersed in the solution, and an amount of a cationic surfactant equivalent to the anionic dyestuff, the surfactant and the dyestuff forming a smoothly dispersed complex whereby the dyestuff dyes the hair, there being one to four percent by weight benzyl alcohol in the composition to render the dyestuff substantially equally adsorbed on more damaged and less damaged hair sections, the solution having a pH of approximately 4.5, the film-forming resin being approximately one percent by weight of the composition, and permitting the water of the solution to evaporate from the hair to deposit the dissolved resin on the dyestuff to cover and protect the dyestuff.

2. A method as in claim 1 wherein the benzyl alcohol is approximately 3 percent of the composition.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,653,797 Dated April 4, 1972

Inventor(s) Carroll R. Reiss, Arthur W. Forbriger, and Kanu I. Patel

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Title page, after the paragraph entitled "Inventors"

add

- -[73] Assignee: Revlon-Realistic Professional Products, Inc., an Ohio corporation - -

Signed and sealed this 3rd day of October 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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