HAIR COLORING COMPRISING A BASIC DYE, A GLYCOL AND AN AMPHOTERIC SURFACTANT


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4 Claims. Cl. 167—86

This invention relates to a composition of matter and more particularly, to new and novel compositions especially useful for coloring human hair, and to methods for their use.

This application is a continuation-in-part of copending application Serial No. 65,580 filed October 28, 1960, now abandoned.

Compositions for coloring the human hair have been known and widely used for many years. The first compositions which were developed for this purpose were those which utilized dyes which acted to dye the hair in the presence of certain auxiliary agents, such as oxidizing agents, dye precipitating agents and the like. When such compositions are applied to the hair, the dye becomes permanently absorbed in the hair structure and should the user become dissatisfied with the particular color employed little can be done except to subject the hair to a very strenuous bleaching treatment and then re-dye the hair. The other alternative is to permit the hair to grow out, cutting the dyed portions from time to time until only the natural hair remains. Not only are strenuous bleaching compositions irritating to the skin but they tend to alter and embrittle the hair structure.

It was later found that compositions comprising water soluble basic dyes in combination with nonionic surface active agents imparted a desirable color to the hair which could, if desired, be removed by merely shampooing several times which served to solve many of the problems associated with the old permanent type compositions. Compositions of this type of transient hair coloring are disclosed in U.S. Patent No. 2,763,269.

These improved compositions, however, have certain disadvantages. It has been found that the human hair does not tend to absorb or "take" these basic dyes to a satisfactory degree in the presence of significant quantities of nonionic surface active agents. Thus, to produce a color take on the hair to the desired depth the dye concentration in the product must be raised to a point at which the compositions frequently caused objectionable and unsightly staining of the hands and scalp of the person applying the composition. Aerosol spray application has been well accepted by consumers in recent years and compositions for coloring the hair have been packaged in this form. There has, furthermore, long been a need for an aqueous hair coloring composition with a high degree of dye utilization which may be conveniently packaged in the form of an aerosol. Since the latter are normally packaged in metal cans, it is of importance that these compositions be noncorrosive in order to insure long shelf life when packaged in such containers.

Recently issued U.S. Patent No. 3,092,555 describes a forming composition for carrying hair coloring materials. While such a composition does represent an improvement, it is still far from satisfactory for use in hair coloring procedures. Thus, for example, when a dye is incorporated into such a composition and applied to human hair, upon evaporation of the foam a uniform film containing entrapped dyes is deposited on the hair. It is quite obvious that a mere deposit of the dye trapped in a film deposited on the hair can be easily rubbed off on linens or clothing or, if the colored hair is wetted, the dye will dissolve and will streak the face, the clothes and so on.

It is, therefore, an important object of this invention to provide a hair coloring composition exhibiting a high and efficient degree of dye take or utilization.

It is a further object of this invention to provide a hair coloring composition which when applied to hair has sufficient permanency to withstand change under the normal environmental conditions yet may be easily removed by shampooing.

It is a further object of this invention to provide a hair coloring composition suitable for application in aerosol form and noncorrosive when packaged in metal cans.

Other objects and advantages of the present invention will become apparent from the following detailed description.

I have found quite unexpectedly that the aforesaid objects and advantages are attained with hair coloring compositions which are formulated by combining water soluble basic dyes with a particular class of amphoter in surface active agents and adding from about 2 to about 15 percent by weight of a hexylene glycol to the composition.

The term "hexylene glycol" as used in the specification and in the claims refers to saturated compounds having 6 carbon atoms in a straight or branched chain structure and further substituted with 2 hydroxyl groups. Such compounds have the empirical formula C₆H₄(OH)₂. Examples of such compounds are 2-methyl-2,4-pentanediol, 2,3-hexanediol, 2,4-hexanediol, 2,5-hexanediol, 2-ethyl-2,4-butanediol, 2-methyl-2,3-pentanediol and the like.

The dyes employed in said improved hair coloring composition are of the water soluble basic type, the exact dye or combination of dyes employed being governed by the desired shade to be imparted to the hair by the composition. Typical water soluble basic dyes which are useful in formulating hair coloring compositions according to this invention are Acridine Orange, Color Index #46005, Methylene Blue, Calcozine Orange RS, Color Index #11720, Safranine T, Color Index #50240, Basic Blue, Color Index #62140 and the like. The total dye concentration in the composition will normally be between about 0.04 percent and about 1.5 percent by weight. It has been found that by formulating said hair coloring composition by employing the combination of an amphoter in surface active agent with a hexylene glycol, the concentration of water soluble basic dyes necessary in compositions of this invention is at least 25 percent less than is necessary in similar compositions for a comparable "take" on the hair utilizing said water soluble basic dyes but which do not include this combination of amphoter in surface active agent with hexylene glycol.

The surface active agent used in the compositions are amphoter ic and contain both acidic and basic functional groups. I have found that the straight chain amphoter ic surface active agent of the formula:

R-N-A-COOH

H

wherein R₁ is an alkyl radical containing 8 to 20 carbon atoms, and A is an alkylene radical, of either a straight or branched chain structure, containing 1 to 8 carbon atoms, and the alkyl metal and triethanolamine salt thereof are particularly advantageous because they do not leave a film on the hair after rinsing and evaporation. The dye, therefore, not being entrapped in a film has a better chance to combine with the hair structure and, in fact, the dye is actually absorbed on the hair.

The R₂ substituent may derive either from purified carboxylic acids having the desired number of carbon atoms
or, alternately, may be the mixed alkyl radicals derived from the fatty acids of such natural materials as coconut oil, tallow and the like. Exemplary of such straight chain amphoteric surface active agents are those identified by the trademark "Deriphat" of General Mills, Inc., Kankakee, Ill., including "Deriphat 151" which is the sodium salt of N-coco beta amino propionate, "Deriphat 170" which is the sodium salt of N-lauryl beta amino propionate and "Deriphat 170B" which is the triethanolamine salt of N-lauryl beta amino propionate.

The compositions of this invention preferably contain about 2 to about 15 percent by weight of amphoteric surface active agent and have a pH between about 6 and about 7.

The presence of hexylene glycol in the composition in an amount of about 2 to about 15 percent by weight serves to aid solubilization of the basic dye in the system.

The resulting compositions are stable, possess an optimum degree of dye utilization on the hair and are substantially noncorrosive, a property of particular advantage when the composition is packaged under pressure in a metal can for aerosol application. Such a package will also contain suitable liquefied gaseous propellants, that is, one or more of the chlorofluorocarbons conventionally used for such purposes. The compositions of this invention may also include conventional perfumes, preservatives and hair-conditioning agents. In use, the consumer selects the desired shade and then shampoos her hair with the composition. When the hair has been washed and dried, the hair assumes the color of the selected shade. The color will resist normal handling, i.e., it will not rub off or will not discolor in the presence of moisture.

The following examples are included in order further to illustrate the present invention:

**Example 1**

A hair coloring composition adapted to impart a blond color to the hair is formulated at a pH of 6.5 to contain:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Parts by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deriphat 151*</td>
<td>3.0</td>
</tr>
<tr>
<td>2-methyl-2,4-pentanediol</td>
<td>3.0</td>
</tr>
<tr>
<td>Acridine Orange</td>
<td>0.05</td>
</tr>
<tr>
<td>Methylene Blue</td>
<td>0.001</td>
</tr>
<tr>
<td>Preservative</td>
<td>0.01</td>
</tr>
<tr>
<td>Perfume</td>
<td>0.10</td>
</tr>
<tr>
<td>Distilled water</td>
<td>93.839</td>
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* General Mills, Inc., Kankakee, Ill. The sodium salt of N-coco beta amino propionate.

**Example 2**

The composition of Example 1 is prepared, with the substitution of 4.5 parts of dichlorodifluoromethane (Freon 12) and 3.0 parts of 1,2-dichloro-1,2,2-tetrafluoroethane for 7.5 parts of distilled water.

It is understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. A composition for coloring human hair which comprises an aqueous solution containing between about 2 and about 15 percent by weight of a surface active agent selected from the group consisting of compounds of the formula:

\[
R_1-\text{NH-}A-\text{COOH}
\]

wherein \(R_1\) is alkyl of 8 to 20 carbon atoms and \(A\) is alkylens of 1 to 8 carbon atoms and the alkali metal and triethanolamine salts thereof, between about 0.04 and about 1.5 percent by weight of a water soluble basic hair dye, and from about 2 to about 15 percent by weight of a glycol having the formula \(C_6H_{12}(OH)_2\).

2. A composition according to claim 1 wherein said surface active agent is the sodium salt of N-coco-beta amino propionate.

3. A composition according to claim 1 wherein said glycol is a member of the group consisting of 2-methyl-2,4-pentanediol, 2,3-hexanediol, 2,4-hexanediol, 2,5-hexanediol, 2-ethyl-2,4-butanediol, and 2-methyl-2,3-pentanediol.

4. A method for coloring hair which comprises shampooing the hair, with a composition as defined in claim 1, rinsing the shampooed hair with water until the water runs clear and allowing the hair to dry.

**References Cited by the Examiner**

**UNITED STATES PATENTS**

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Date</th>
<th>Inventor(s)</th>
</tr>
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<tbody>
<tr>
<td>2,763,269</td>
<td>8/56</td>
<td>Den Beste</td>
</tr>
<tr>
<td>3,092,555</td>
<td>6/63</td>
<td>Horn</td>
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</table>

**OTHER REFERENCES**


JULIAN S. LEVITT, Primary Examiner.