A composition for dyeing keratinic fibers and particularly human hair which comprises, in aqueous solution, at least one direct dye having a poor affinity for the fiber at room temperature and an organic solvent which is inert to both the dye and the fiber, and corresponds to the formula

\[ R-(O-CH_2-CH_2)_n OH \]

in which \( R \) is selected from the group consisting of an alkyl radical having three to eight carbon atoms, \( CH_3, (CH_2)_3-CH_2 \), and \( CH_3 \), and \( n \) is a number between one and four inclusive. The invention also includes a method of making the composition.
This invention relates to a new process for dyeing animal fibers, and especially living or dead hair, and to a composition for carrying out that process. The process according to the invention makes it possible to substantially broaden the range of colorants which may be used, especially for dyeing hair, as a consequence of the fact that it assists and accelerates the coloration of the hair and the fixation of the dye while operating at the ambient temperature or at a moderate temperature (below 50°C). The invention also permits satisfactory coloring effects to be produced with dyes which do not, at the above temperatures, have any great affinity for the hair, and this is a very important practical advantage.

In U.S. Patent No. 2,983,651 patentee described the advantages which may be obtained by adding to an aqueous solution of direct dyes, an organic solvent which is chemically inert with respect to the dye and the product to be dyed and which is completely miscible in water in the proportion in which it is added, said solvent corresponding to the general formula:

\[ R \equiv (\text{CH}_2)\text{CH}_2\text{OH} \]

in which:

- \( R \) represents an aliphatic hydrocarbon which may or may not have a branched chain and comprises at most eight carbon atoms, and
- \( n \) is a number between one and four inclusive.

On the other hand, in French Patent No. 1,159,331 patentee described the advantages which may be obtained by adding to an aqueous solution of direct dyes, organic solvents other than those disclosed in said U.S. patent, which have no effect on the dye and are completely miscible in water, in the proportions used, the solvents and approximate proportion recommended in said French patent are the following:

1. Up to 5 percent butyl alcohol,
2. Up to 10 percent of a thioether alcohol, such, for example, as thioglycolic,
3. A ketonic alcohol such, for example, as diacetone alcohol (up to 10 percent),
4. An aromatic alcohol such as benzyl alcohol (up to 4 percent) or beta-phenethyl alcohol (up to 1 percent),
5. An aliphatic alcohol, which may be homomycyclic, such as cyclohexanol (up to 3 percent) or heterocyclic, such as furyl alcohol.

It has now been found that organic solvents other than those indicated in said patents may be employed to obtain analogous results, that is, to say, in order to make it possible to use a large number of dyes which, at temperatures less than 50°C, have normally very little affinity for the hair, and which have heretofore been considered substantially useless for that purpose.

The organic solvents to which the present invention is directed act in the same way as those described in said prior patents so as to materially strengthen the coloring of the hair and assist in fixing of the dyes on the hair, either at room temperatures, or at the temperatures hereinbefore specified. They may be used as components of mixtures including the solvents described in the above two patents.

This new series of organic solvents corresponds to the following formula:

\[ R \equiv (\text{CH}_2)\text{CH}_2\text{OH} \]

in which:

- \( R \) represents an alkyl radical which may have either a straight or branched chain and comprises three to eight carbon atoms, or phenyl (\( \text{C}_6\text{H}_5 \)) or benzyl (\( \text{C}_6\text{H}_4\text{CH}_2 \)) or cyclohexyl (\( \text{C}_6\text{H}_{11} \)).

- \( n \) is a number between one and four inclusive.

Specific exemplary solvents of the above class are 3-aminoxy-1,2-propanediol; 3-benzoxoxy-1,2-propanediol and 3-phenoxy-1,2-propanediol.

In the present application the term "direct dyes" is used to indicate any coloring substance capable of being fixed directly in its final color by the product being dyed, without requiring any additional chemical change such as oxidation, coupling, or mordanting of the fiber.

The direct dyes, as hereinbefore defined, may be selected from among the types of dyes described in said prior patents, to wit:

A. Nitro dyes, which may be acid, slightly basic, or strongly basic, for example:

- methyl isopicric acid,
- 1-methylamino-3-nitro-4-amino benzene
- 1-aminoethylamino-3-nitro-4-methylamino benzene

B. Disperse dyes such as those sold under the following trademarks:

- "CIBACETE" (CIBA) Color Index, 2nd Ed., 1956, p. 4,202 and 1963 Supplement S 786;
- "ACETOQUINONE LUMIERE" (CFMC) Color Index, 2nd Ed, 1956, p.4,103;
- "ARTISIL" (SANDOZ) Color Index, 2nd Ed, 1956, p. 4,136-4,137;
- "CELLITION" (B.A.S.F.) Color Index, 2nd Ed, 1956, p. 4,181-4,183;
- "FORON" (SANDOZ), Color Index, 2nd Ed, 1956, p. 4,287.

C. Pigments which are insoluble in water, or solvent dyes, such as the products sold under the following trademarks:

- "ORASOL" (CIBA) Color Index, 2nd Ed, 1956, p. 4,381;
- "ORGANOL" (CFMC) Color Index, 2nd Ed, 1956, p. 4,381-4,382;

D. Metallic dyes, such as the products sold under the trademarks:

- "IRGALANE" (GEIGY) Color Index, 2nd Ed, 1956, p. 4,324;
- "CIBALANE" (CIBA) Color Index, 2nd Ed, 1956, p. 4,203;
- "LANASYNE" (SANDOZ) Color Index, 2nd Ed, 1956, p. 4,335;
- "ISOLANE" (BAYER) Color Index, 2nd Ed, 1956, Supplement, 1963, S917;

E. Basic dyes such as certain basic anthraquinone dyes which are only slightly soluble, for example:
EXAMPLE 1

The following solution is prepared:

Acetoquinone Light Red BZ (C.I. Disperse Red 17)
Color Index, 2nd Ed, 1954, Supplement, 1963,
5676 C1 12120

3-phenoxyl-1,2-propanediol
6.2 g.

Citic acid, q.s.p. pH = 5
7.0 g.

Water, q.s.p. 100 ml.
100 ml.

This solution is applied, at room temperature, to white hair, and left in contact therewith for 15 to 20 minutes, after which the hair is shampooed and rinsed in clear water. The result is a red color.

EXAMPLE 2

The following solution is prepared:

Dye responding to the formula:

![Dye Structure]

Lauryl alcohol oxethylated with 10.8 moles of ethylene oxide

Butoxy Cellolose (ethylene glycol monobutyl ether)

Acetic acid

Water, q.s.p. 100 ml.

This solution is applied to 100 percent white hair and left in contact therewith for 15 to 20 minutes. The hair is then shampooed and rinsed in clear water. The result is a carmine red color.

The invention is not, of course, limited to the particular dyes hereinbefore described and equally good results can be obtained with other analogous dyes.

It is, moreover, obvious that instead of using only one of the above dyes at a time, two or more such dyes may be associated in identical or different proportions, in the same dyeing solution, so as to produce various desired shades, and particularly the colors of natural hair.

Conventional additives, such as foaming agents, products for making the hair more flexible, and any other products for improving the sheen, texture, or other cosmetic properties of the hair may also be incorporated into solutions according to the invention without thereby departing from the basic principles of the invention.

What is claimed is:

1. A composition for dyeing animal fibers at room temperature which comprises in aqueous solution at least one direct dye in amounts effective to dye said fibers and at least one organic solvent which is chemically inert with respect to said dye and the fiber which is to be colored, said solvent having the formula:

\[ R-(O-\text{CH}_2-\text{CH}_2)_n\text{OH} \]

\[ \text{CH}_2\text{OH} \]

in which R is selected from the group consisting of alkyl having three to eight carbon atoms, phenyl, benzyl, and cyclohexyl, and n is a number between one and four, inclusive, and being present in amounts of 1-15 weight percent of said composition.

2. A composition as claimed in claim 1 in which said at least one direct dye is selected from the group consisting of nitro dyes, disperse dyes, solvent dyes, metallic dyes and basic dyes.

3. A composition as claimed in claim 1 which comprises at least one further solvent selected from the group consisting of (a) a solvent having the formula R-(O-\text{CH}_2\text{CH}_2)_n\text{OH} wherein R represents alkyl having at most eight carbon atoms and n is a number between 1 and 4 inclusive, (b) butyl alcohol in amounts up to 5 weight percent of said composition, (c) thiodiglycol in amounts up to 10 weight percent of said composition, (d) diacetone alcohol in amounts up to 10 weight percent of said composition, (e) an aromatic alcohol selected from the group consisting of benzyl and betaphenylethyl alcohol in amounts up to 4 weight percent of said composition and (f) an alicyclic alcohol selected from the group consisting of cyclohexanol and furfuryl alcohol in amounts up to 3 weight percent of said composition.

4. The method of dyeing hair which comprises the step of applying thereto an effective amount of a composition as claimed in claim 1, for a period of at least 15 minutes, and then rinsing and drying the hair.

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