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DYEING METHOD AND BATH

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The present invention is a continuation in part of that disclosed in my application Ser. No. 577,866, filed November 28, 1931.

The invention aims to provide an improved dye bath and method of dyeing which makes it possible to rapidly dye various materials, such as animal or vegetable fibers and cellulose acetates.

In the use of the improved method and bath, the dyeing operation is greatly expedited, requiring under my invention a matter of minutes, where heretofore hours had been required, other conditions remaining the same.

A further feature of the invention is the securing of an immediate fixation of the dye in the articles whereby they can be withdrawn from the bath and compared for correct color without waiting, as required with the methods and baths heretofore generally used.

It has long been the aim of textile and dye organizations to develop a cold water dye, that is, a dye which could be mixed with cold water so as to immediately form a bath, which could be immediately used for dyeing purposes. They have also sought such a dye which would fix itself instantly in the fabric upon a simple immersion of the article in the bath of short duration. It has also been sought to produce a dye or dyeing preparation which would enable the quick drying of the dyed article followed immediately by ironing and other handling, the color having become fixed during the drying. It is apparent that a dye preparation such as set out above would effect an enormous saving in dyeing operations.

In the preparation of my improved dye bath, the operator merely mixes ingredients, herein-after described, and immediately dips the article to be dyed into the bath and then removes the same. No rinsing is required and as soon as the fabric is dry it will be found that the color is fast against light, hot water, the effects of ironing, and other influences.

It has been shown in laundries, that it was possible to iron dyed linens and curtains immediately upon removing these articles from the extractor, and that no streaking or loss of color was noted.

It will be observed that the feature of the invention providing fixation of the color immediately upon drying enables the comparison of the dried article with samples of the desired color immediately upon removing the article from the bath, making it unnecessary to delay to ascertain the matching of the desired colors.

Up to the present time there has not been found a satisfactory quick acting dye for such materials as sequin material, various types of cellulose acetate material, felt, velvet, straw, silk and the like, but the extraordinary action of the dye bath of my invention enables it to act satisfactorily and with great speed in dyeing these and other fabrics.

I have discovered that by adding to the dye bath a substantial quantity of cellosolve (ethylene glycol monoethyl ether), it is possible to completely dissolve normally insoluble dyes and particularly dyes such as have been used on cellulose acetate and other organic derivatives of cellulose, which dyes are insoluble, but miscible in water. Better results are obtained if acetone is also used in the bath, but the use of acetone is not essential.

As one modification of the invention, suitable for use in dyeing organic derivatives of cellulose, I may incorporate in the bath, as disclosed in my prior application, a preparation having approximately the following composition: $\frac{1}{4}$ ounce of a coloring material, such as a basic or acid dye; 4 ounces of a dye solvent preferably "Cellosolve" (ethylene glycol monoethyl ether); 3 ounces of distilled water; 1 ounce of acetic acid; 1 ounce of powdered alum; and 8 ounces of a dye solvent, preferably acetone. The above preparation may be added to a dye bath in any suitable proportion depending upon the depth of color which is desired. The quantity of the preparation which is to be added to the dye bath may be determined by immersing and withdrawing a sample of the material to be dyed.

The acetic acid and the powdered alum perform the function of setting the color rapidly in the article being dyed, and the large proportion of acetone lends great penetrability to the dye solution or bath, and the "Cellosolve" (ethylene glycol monoethyl ether) evenly distributes the dye and its coloring effect upon the article being dyed.

The acetone acts as a retarding agent to eliminate over dyeing and as a leveling agent to insure an even dyeing or color effect on the material treated. The "Cellosolve" (ethylene glycol monoethyl ether) when used acts as a solvent for the dye and as a softener for the material. Thus the instantaneous character of the operations of the dyeing preparation and the uniformity of improved results secured are rendered possible and efficient.

In preparing the above mentioned ingredients to form the dye bath, the "Cellosolve" (ethylene

glycol monoethyl ether) and powdered alum are mixed with distilled water and brought to the boiling point; the dye, acid and acetone are then added. The dye preparation thus produced is mixed with approximately equal parts of water to form the dye bath which, it will be seen, contains a predominant amount of water. The dye bath itself need not be brought to the boiling point and in fact the dyeing operations are effectively carried on in a relatively cold bath.

My invention pertains particularly to the use of a dye which is normally insoluble and immiscible in water or a dye such as is used for dyeing artificial silks, such as cellulose acetate, and which is normally insoluble, but miscible with water. Such dyes are made soluble in water by the addition to the dye bath of cellosolve (ethylene glycol monoethyl ether). For dyeing many materials I may merely add acetone to the bath and do not require "Cellosolve" (ethylene glycol monoethyl ether), but in such cases I have found that the amount of acetone used must be equal to substantially 10% of the amount of water. Such a bath would be suitable for dyeing materials such as silk, wool, felt (such as that used in felt hats), and the like. To the bath I may add any suitable mordants, such as acetic acid in dyeing silk, or sulfuric acid or Glauber's salt when dyeing wool. The piece goods or other article dyed is merely immersed in a relatively cold bath and then immediately withdrawn and allowed to dry. Such cold immersion and dyeing greatly reduces or practically eliminates the shrinkage hazard which invariably follows in the case of dyeing operations involving the boiling of material dyed.

In dyeing cellulose acetates, such as artificial taffetas and celanese with a dye which is normally insoluble in water, I regard it of importance to include in the bath of dye water an amount of acetone equal to about 10% of the amount of water, and an amount of "Cellosolve" (ethylene glycol monoethyl ether) which would be substantially greater than the amount of acetone, a suitable mordant or fixing agent such as Glauber's salt being included in the bath as above. For materials other than cellulose acetates the amount of "Cellosolve" (ethylene glycol monoethyl ether) in the bath will range from 10% to 90% of the amount of acetone. The proportion of "Cellosolve" (ethylene glycol monoethyl ether) used will thus depend somewhat on the character of the dye material, the color desired and the weight of material.

While ordinarily in dyeing according to my improved method and with my improved dye baths, boiling is not required, it is to be understood that it is also within my invention to carry out the dyeing operation in which a boiling bath is used. All pastel colors can be obtained without boiling. For dark shades, a boiling dye bath may be used, but when so used according to my method, the time of immersion of the goods in the bath is materially lessened as compared with prior practice. In old methods where it re-

quires from one to two hours; I can secure satisfactory results by immersion in the bath for an interval of approximately ten or fifteen minutes. Practically all materials can be dyed by my method within half an hour. Shrinkage of the material is thus effectively prevented.

Experience with the method and the dye bath disclosed herein has demonstrated that the use of approximately 10% of acetone in the water bath results in effecting great economy. Tests have shown that where such proportion of acetone is used "over dyeing" is avoided and an enormous amount of material can be dyed without depleting the bath of the dye; whereas, other conditions remaining the same, but without such percentage of acetone, the bath is quickly rendered unfit for further use without addition of dye stuff. Moreover, by the incorporation of acetone and "Cellosolve" (ethylene glycol monoethyl ether) in the bath streaky and spotty dyeing is avoided and fast colors of uniform shade are consistently secured.

While I have described with great particularity certain specific embodiments of the invention, it is to be understood that the details given are to be interpreted as an illustrative rather than in a limiting sense, since various modifications in detail may be made by those skilled in the art without departing from the invention as defined in the appended claims.

What I claim is:

1. An aqueous dye bath comprising a normally water insoluble dye, a monoalkyl ether of ethylene glycol, and acetone.

2. An aqueous dye bath comprising a normally water insoluble dye, ethylene glycol monoethyl ether, acetone and water.

3. The process of dyeing comprising treating the material or article to be dyed in an aqueous dye bath containing a dye normally insoluble in water, a monoalkyl ether of ethylene glycol in amount sufficient to make the dye soluble in water, and a predominant amount of water.

4. The process of dyeing comprising treating the material or article to be dyed in an aqueous dye bath containing a dye normally insoluble in water, ethylene glycol monoethyl ether in amount sufficient to make the dye soluble in water, and a predominant amount of water.

5. The process of dyeing comprising treating the material or article to be dyed in an aqueous dye bath containing a dye adapted for use on organic derivatives of cellulose and normally insoluble in water, a monoalkyl ether of ethylene glycol in amount sufficient to make the dye soluble in water, and a predominant amount of water.

6. The process of dyeing comprising treating the material or article to be dyed in an aqueous dye bath containing a dye adapted for use on organic derivatives of cellulose and normally insoluble in water, ethylene glycol monoethyl ether in amount sufficient to make the dye soluble in water, and a predominant amount of water.

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