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DEXTRAN COMPOUND COATED BODY POWDER

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The present invention relates to a cosmetic preparation such as may be used to provide a powdered surface coating for various surface areas of the skin. More particularly, this invention is concerned with a new cosmetic preparation which may take the form of a dry powder or of a liquid powder, including a mixture of powder and water or other liquid which evaporates on application of the mixture to leave a firmly adherent powder layer on and in intimate contact with the skin.

It is known to provide cosmetic preparations of this type and compounded to provide a final powdered surface coating of a desired tint on the skin, the preparation being tinted in accordance with the particular area of the skin to be coated, the tinting being different, usually, for preparations to be applied to the face than for preparations intended for use in leg make-up or the like.

The known preparations have not been wholly satisfactory. For the most part, the powder has not adhered firmly to the skin. Thus, when most of the prior preparations have been used for coating the legs to simulate seamless stockings, as is a common practice in warm weather, the powder is readily marred by contact with various objects, as for instance by contact with chairs and the edges of desks, so that the powder is stripped off or roughened at the point of contact and the good appearance of the coating is spoiled. Moreover, general use of preparations of the prior art has been hampered because such preparations not infrequently comprise substances to which many people are allergic, which have irritating effects on the skin, or which cause damage if they are brought into contact with lesions or open cuts.

One object of this invention is to provide a new cosmetic preparation of the type indicated and which, when applied to the skin, provides it with a surface finish or coating which is smooth and firmly adherent.

Another object of the invention is to provide such a preparation which, on application to the skin, provides it with a coating or finish which is resistant to streaking, stripping off or roughening.

A further object of the invention is to provide a cosmetic preparation which may be compounded for use as a dry powder, as a liquid powder, in dry or moist cake form, or in the form of a paste or cream.

A further object is to provide a cosmetic preparation of the type mentioned and comprising finely divided particles of body powder having a coating or enveloping film of a stabilizing and protective material thereon.

An additional object is to provide a preparation comprising the coated or protected powder particles and in which the protective coating consists of a bland, non-toxic material which is non-irritating to the skin and which does not cause harmful effects if it comes in contact with lesions or open cuts.

These and other objects are attained by this invention in accordance with which there is provided a cosmetic preparation comprising particles of body powder carrying a protective film of dextran which produces a powder preparation of substantial adhesiveness and which provides a film coating over the entire powdered surface area so that, in effect, the powdered area is provided with a continuous, protective dextran coating.

The dextrans are high molecular weight, branched polysaccharides comprising anhydroglucopyranosidic units joined by molecular structural repeating linkages some, and apparently at least 50% of which are alpha-1,6 linkages. The properties of the dextrans, including the extent of branching (the number and distribution of side groups or chains), the molecular weight, the molecular structural repeating alpha-1,6 to alpha-non-1,6 linkages ratios, and the water-sensitivity may vary.

The dextrans used in practicing this invention may have a molecular weight between 5,000 and 50×10^6 as determined by light scattering measurements.

The dextrans may be obtained in various ways. For example, they may be obtained by inoculating a nutrient medium containing sucrose, particular nitrogenous compounds and certain inorganic salts with an appropriate microorganism, such as those of the *Leuconostoc mesenteroides* and *L. Dextranicum* types, incubating the culture at the temperature most favorable to the growth of the particular microorganism, precipitating the dextran from the fermentate, by means of a lower aliphatic alcohol such as methyl, ethyl, isopropyl etc., purifying it and reducing it to a powder for example by spray-drying or by lyophilizing.

The dextran may be soluble in water or substantially water-insoluble at ordinary temperatures but soluble in water at elevated, e. g., boiling temperatures.

Thus, it may be a water-soluble so-called "native" dextran obtained by the use of microorganisms bearing the following NRRL (Northern Region Research Laboratory) classifications: *Leuconostoc mesenteroides* B–512, B–119, B–1146 and B–1190; or it may be a "native" dextran which is substantially water-insoluble at ordinary temperatures, such as is obtained using the microorganisms (NRRL) *Leuconostoc mesenteroides* B–742, B–1191, B–1196, B–1208, B–1216, B–1120, B–1144, and B523; *Streptobacterium dextranicum* B–1254 and *Betabacterium vermiforme* B–1139. These "native" dextrans usually have high molecular weights calculated to be in the millions. They may be used as such, after suitable purification to free them from bacteria, bacterial decompositon products, enzyme and other contaminants which occur therewith in the fermentate, or they may be hydrolyzed to products of lower molecular weight in any suitable way, as by means of acid or enzymatically, and the hydrolysis may be followed by a fractionation procedure to obtain a fraction of uniform or more nearly uniform molecular weight, which fraction may, if desired, be treated by known methods for the removal of pyrogens and coloring materials. The dextran may be a so-called "clinical" dextran such as is used as a blood plasma extender.

The dextran used as the film-forming protective agent for the powder particles of the cosmetic preparation is not limited to those obtained under any particular set of conditions, including the microorganism used. It may be produced enzymatically, in the substantial absence of bacteria, by cultivating an appropriate microorganism, for example, *Leuconostoc mesenteroides* B–512, to obtain a dextran-producing enzyme, separating the enzyme from the medium in which it is produced, and introducing the enzyme into a sucrose-bearing medium in which the sucrose is converted to dextran by the action of the enzyme. Also, the dextran may be obtained by bacterial conversion of 1,4 linkages of dextrin to 1,6 linkages of dextran or in any other practical manner.

In compounding the cosmetic preparation of the invention, the dextran is dissolved in water, if necessary with the application of heat, for example, by boiling. To the

resulting solution, after appropriate dilution with water if it has been boiled, is then added the desired amount of body powder, which may be any form of powder adapted for use in a cosmetic preparation, such as talc or a mixture of talc with other inert powders such as are used for facial or other skin make-up. The extent of dilution of the dextran solution and the amount of powder added to it may be varied depending on the absorption capacity of the powder and the thickness of the film which it is desired to provide on the powder particles.

The dextran solution containing the powder is then dried or dehydrated. The resulting product comprises a mass of powder particles carrying a dextran coating. It may be packaged and shipped as is, and used as a powder which clings to the skin as a result of the effect of the moisture of the skin in developing the inherent adhesiveness of the dextran. Or the powder may be mixed with water or other liquids and/or with other adjuvants to obtain a broad range of cosmetic products. In use, the powder may be picked up from its container by means of a damp puff, sponge, cloth, absorbent cotton or the like, for moist application to the skin. The amount of water added to the dry powder preferably does not exceed in bulk the amount of powder mixed therewith.

Add mixture of water with the powder, at whatever time such mixing takes place, results in partial or complete dissolution of the dextran film on the powder particles. When the mixture is applied to the skin and the water is allowed to evaporate, there remains on the skin a uniformly distributed, continuous film which is adhesive and adheres tenaciously to the skin, and which serves as a durable, long-lasting powdered coating resistant to streaking and marring and which may be inconspicuous.

Products to be used as dry powders may be prepared by mixing the powder particles with a concentrated dextran solution and, preferably, reducing the particles to smaller size, as by granulation or in any other convenient way such that the water contained therein is evaporated through natural or mechanical drying. The product thus obtained then may be reduced to a fine powder by sifting or the like for direct use on any part of the body. Preferably, however, this fine powder is taken up from its container by means of a damp sponge, etc., and applied to the body in moist or semi-liquid condition. The powder may be placed in a suitable container and mixed with a small amount of water to produce a product of creamy consistency.

The powder may also be compacted and formed as a wet or dry "cake" to be picked up and applied to the surface of the body by means of a wet puff or the like. A small amount of water may be added to the compressed mass or cake to render it of paste-like consistency and capable of being picked up by the fingers and smoothed over the area of the skin to be coated. The cosmetic may also be packaged in the form of a paste. In cakes or the like, the dextran functions as a binding agent for the powder particles.

It is conventional to include a plasticizing agent in cosmetic preparations of this general type and such materials as propylene glycol, glycerine, glucose, sorbitol, etc. have been used as the plasticizer. The present preparations in which dextran is the film-former do not require the addition of special plasticizing materials. However, any suitable plasticizer, including the substances mentioned above, may be incorporated in the preparation, if desired.

Facial powders may be prepared by combining the talc with one or more of the other powders which are suitable for such use, e. g., zinc oxide, calcium carbonate, or titanium dioxide, and then mixing the blended powders with the dextran solution. Powders tinted to various shades may be prepared for use in imparting a desired coloration to the skin. Thus, preparations suitable for application to the legs to simulate stockings or suntan may be prepared, as may be obtained, also, products useful as a cheek rouge.

In a modification of the invention, the dextran is combined with a filler such as bentonite to provide the powder particles with a bentonite-dextran film. In making these last-mentioned preparations, an aqueous suspension of the desired quantity of bentonite may be prepared and mixed with the dextran solution, the powder being then added to the mixture.

The following examples will illustrate specific embodiments of the invention.

Example I

About 5.0 ounces of a pure dextran having an average molecular weight of about 70,000 to 85,000 is dissolved in water. About 10 ounces of a mixture of approximately equal parts of talc, zinc oxide and calcium carbonate are blended with the dextran solution. The mixture is then dried and granulated to obtain a mass of fine particles which carry a film or coating of the dextran. The mass is compressed in the usual way to obtain a preparation of the so-called "pancake" make-up type, adapted to be moistened, picked up on a sponge and applied to the face to provide it with a firmly adherent, mat-like protective and concealing finish.

Example II

About 5 ounces of the dextran are dissolved in water to obtain a solution weighing 130 ounces. About 15 ounces of powdered bentonite are separately mixed with water to obtain a suspension having a total weight of about 135 ounces. About 75 ounces of the bentonite suspension are mixed with 5 to 20 ounces of the dextran solution and the mixture is reduced with 10 ounces of water. About 5 ounces of tinted body powder are added, and the mixture is dried. Suitable portions of this dried mixture are then mixed with equal parts of water for application to the skin.

The dextrans are especially effective for use as the film-forming and binding agent in these cosmetic preparations. They are bland, non-toxic, non-irritating materials which do not induce allergic reactions and, in addition, they are characterized by a substantial inherent adhesiveness which insures that, in contact with the skin, they will adhere firmly over a long period of time.

Although the cosmetic preparations have been discussed and exemplified as comprising dextrans, it is within the scope of this invention to replace the dextrans, in whole or in part, with dextran derivatives which can be dissolved in water such as low-substituted dextran alkyl ethers of the type of methyl dextran, ethyl dextran, etc., or with other film-forming derivatives or conversion products of dextran such as carboxymethyl dextran, hydroxyethyl dextran, etc. The dextran derivatives may be used in amounts corresponding generally to the dextrans and give the same results.

It will be understood that while there have been described herein certain specific embodiments of this invention, it is not intended thereby to limit or circumscribe it by the details given, in view of the fact that this invention is susceptible of various modifications and changes which come within the spirit and scope of this disclosure and of the appended claims.

I claim:

1. A cosmetic preparation comprising finely divided discrete particles of body powder having a surface film of a water-soluble substance selected from the group consisting of dextran, methyl dextran, ethyl dextran, carboxymethyl dextran and hydroxyethyl dextran.

2. A cosmetic preparation comprising finely divided discrete particles of body powder having a surface film of water-soluble dextran.

3. A cosmetic preparation comprising finely divided discrete particles of body powder having a surface film of water-soluble carboxymethyl dextran.

4. A cosmetic preparation comprising finely divided discrete particles of body powder having a surface film of water-soluble hydroxyethyl dextran.

5. A cosmetic preparation comprising finely divided discrete particles of body powder having a surface film of water-soluble methyl dextran.

6. A cosmetic preparation comprising finely divided discrete particles of body powder having a surface film of water-soluble ethyl dextran.

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