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**DIHYDROXYACETONE COMPOSITIONS FOR TANNING THE HUMAN EPIDERMIS**

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This invention relates to cosmetic compositions; and more particularly, concerns compositions and preparations which are applicable to the human epidermis for imparting thereto a simulated tan such as would be normally acquired by exposure to the sun.

This application is a continuation in part of application Ser. No. 797,840, filed March 9, 1959.

Many individuals have a skin complexion which does not tan readily on exposure to the sun. Others achieve a tan only with great discomfort and possibly adverse effects to the skin due to exposure to the sun's rays. Yet the attainment by such individuals of a tan is highly desired for cosmetic and other reasons; providing this may be accomplished without the usual exposure to the sun.

In other instances, individuals who tan without difficulty, may desire to extend the normal life of a naturally acquired tan, without reexposure to the sun. Also, a skin tan may be desired when weather or other conditions do not permit the usual exposure to the sun in order to acquire the conventional sun tan.

While sun lamps are used extensively to produce a tan on the human skin; such lamps are expensive and must be used for extended periods of time to attain the desired intensity of coloration. The inherent inconvenience and expense, has limited the use of sun lamps for the purpose indicated.

Accordingly, one object of this invention is to provide a cosmetic preparation applicable to the human skin which is effective to produce a simulated tan effect thereon.

Another object of this invention is to provide an improved composition which may be applied to the human skin to produce a simulated tan effect of regulated intensity; the resultant tan being resistant to removal by water or detergents.

Still another object of this invention is to provide a composition containing an active agent which is effective to produce a tan coloration on the human skin which is substantially indistinguishable from a tan accruing from exposure to the sun; such agent being physiologically inert and without adverse effects on the skin or organs of the human body.

Yet another object of this invention is to provide a composition applicable to the human body for producing a skin tan within a relatively short time after such application; the tan effect being maintained for from 4 to 6 days.

It has been found that dihydroxyacetone may be applied to the human skin by way of a suitable vehicle or base; with a resultant modification of the normal appearance of the skin to give a simulated tan. The darkening of the human epidermis takes place within approximately 2 to 24 hours after application of a suitable composition containing the dihydroxyacetone as the active agent, the actual time varying with the individual and the extent of the application.

The intensity of the simulated tan achieved may be regulated by the concentration of the active agent in a single application; or may be achieved by repeated ap-

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lications of the composition at closely spaced time intervals. The maximum intensity of the colorant effect is achieved within 2 to 24 hours after application; the intensity of the color thereafter progressively decreasing, in a manner similar to that of a natural, sun induced tan.

It has been found that the use of the cosmetic preparation of the instant invention will provide a tan coloration for the skin which may last from 4 to 6 days and will be proof against removal by the application of water or detergents during such period. The epidermis will be unharmed during the period of tan and will be unaffected after the tan period.

The active agent dihydroxyacetone may be carried or suspended in various cosmetic bases suitable for external application directly to the human skin. For external application, such base may take the form of liquid or cream lotions, ointments, dusting powders and the like. The active agent may be used in varying proportions ranging from about 0.05 to about 90.0% by weight of the composition, with a preferred range of from about 0.1 to about 25.0%.

Thus a skin lotion was prepared by mixing 50% alcohol, 1% acetone, 45% water, and about 4% dihydroxyacetone, together with a small amount of perfume and vitamin D in amounts of about 500 units per ounce of composition. The proportions indicated are by weight.

It was found that such tanning lotions also provided an excellent vehicle for sun screening agents, whereby tanning of the skin took place concurrently with protection of the skin from the effects of injurious radiations in the sun's rays. Thus, a 4% dihydroxyacetone lotion was made up in accordance with the formulation indicated above, with an addition of about 2% of glyceryl p-aminobenzoate, a well known sun screening agent, and a corresponding reduction of the water content of the lotion.

In the skin lotion formulation noted above, the acetone has the effect of substantially reducing the normal tackiness of the lotion. In lieu of an alcohol-water vehicle, the dihydroxyacetone may be admixed with other vehicles to provide lotions and creams, including glycerine, vegetable oils such as castor or almond oil and the like, mineral oil, petrolatum and other cosmetic bases known in the art.

The dihydroxyacetone may also be incorporated in an ointment base, as by mixing, by weight, 10.0 parts of glycerol monostearate, 10.0 parts of cetyl alcohol, 30 parts of spermacetti, 10.0 parts of Span 20 (sorbitan monolaurate), 10.0 parts of Tween 20 (polyoxyalkylene derivative of sorbitan monolaurate); 12.5 parts of glycerin and 100 parts of water. The resultant ointment base was compounded with 0.5% by weight of the base of dihydroxyacetone, on an anhydrous basis. A thin coating of the ointment was applied to the skin and within 3 hours a uniform tan developed. A second application of the same ointment, approximately 1 hour after the first application, had the effect of increasing the intensity of the final tan.

A dusting powder was prepared from equal amounts by weight of talc and chalk, with minor additions of colorant. About 1.0% by weight of dihydroxyacetone was added to the powder. Application of the dusting powder to the skin produced a tan within several hours after application.

A skin cream was prepared by melting together 85 g. stearin, 5 g. lanolin and 10 g. cetyl alcohol. A mixture of 36 g. glycerine, 5 cc. triethanolamine and 250 cc. water, with a small amount of perfume, was slowly added to the molten mass with stirring until cold. Dihydroxyacetone in amounts ranging from 0.2 to 4.0% was added to several portions of the cream, respectively, followed by thorough admixture of the active agent with the cream base.

It is understood that various known sun screening agents may be compounded with the dihydroxyacetone, in a selected cosmetic base, including homomenthyl salicylate; butyl benzal acetone oxalate; acetanilide; benzyl salicylate; oxynaphthoic acid; dimethyl aminobenzoic acid; phenyl salicylate and the like, all of which function to filter out the actinic rays from the sun.

It is further understood that the cosmetic base, in lotion, cream, ointment or powder form, may be variously compounded in accordance with the knowledge of the pertinent art, to provide a suitable carrier or vehicle for the active agent dihydroxyacetone.

As various changes might be made in the embodiments herein disclosed, without departing from the spirit of the invention, it is understood that the examples herein are illustrative and not limiting except as set forth in the appended claims.

Having thus disclosed our invention, we claim as new and desire to protect by Letters Patent:

1. A composition applicable to the human epidermis for imparting a tan thereto, said composition comprising a cosmetic base and dihydroxyacetone distributed through said base, said base comprising an oleaginous material.

2. A method of tanning the human epidermis comprising applying to the epidermis a composition comprising a cosmetic base and dihydroxyacetone distributed through said base.

3. A method of tanning the human epidermis comprising applying to the epidermis a composition comprising a liquid cosmetic base and dihydroxyacetone distributed through said base.

4. A cosmetic composition for imparting a tan effect to the human epidermis, said composition comprising a

cosmetic powdered inert base and dihydroxyacetone distributed through said base.

5. A cosmetic preparation applicable to the human epidermis for imparting a tan effect thereto within 2 to 24 hours after application thereto, said composition comprising by weight about 50% ethyl alcohol, about 45% water, about 4% dihydroxyacetone, and about 1% acetone.

6. A cosmetic preparation applicable to the human epidermis for imparting a tan effect thereto, said preparation comprising a cosmetic base and a mixture of dihydroxyacetone and a sun screening agent distributed through said base.

7. A cosmetic preparation applicable to the human epidermis for imparting a tan effect thereto, said preparation comprising a cosmetic base and a mixture of dihydroxyacetone and an anti-tackiness agent comprising acetone distributed through said base.

8. A composition applicable to the human epidermis for imparting a tan thereto, said composition comprising a cosmetic base, dihydroxyacetone and acetone distributed through said base, said base comprising a mixture of ethyl alcohol and water, and said dihydroxyacetone amounts to from about 0.1 to about 25.0% by weight of said composition.

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