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ANTI-PERSPIRANT STICK

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This invention relates to a perspiration inhibiting material and more particularly to such material in the form of a soap gel stick which consists of a sodium stearate, aqueous alcoholic gel base having distributed therein sodium zirconium lactate as the perspiration inhibiting substance.

Sodium stearate soap gel sticks have heretofore been known for various cosmetic purposes. These sticks are stable at normal atmospheric temperature ranges within certain known proportions of sodium stearate, alcohol and water. They are extremely desirable inasmuch as on contact with the skin, they have a pleasant cooling effect and do not leave a greasy or waxy residue.

However, the sticks are extremely sensitive to chemical reaction. The provision of a metal ion in a form free to react with sodium stearate to produce another metallic stearate will render the stick unstable if that ion is present in any substantial quantity.

Because of this consideration, it has heretofore been considered impossible to produce an anti-perspirant soap gel stick since all of the known anti-perspirant chemicals, include an ionizable form of a polyvalent metal, as for example, aluminum chloride.

The introduction of such a material into a soap gel stick of the form heretofore described results within a comparatively short time in a breakdown of the stick. This breakdown normally involves a loss of the stick form either by the forming of a mush or by formation of a multiphase system.

One known anti-perspirant material is sodium zirconium lactate. This material in usual aqueous concentrations reacts rapidly with sodium stearate to form a zirconium stearate which cannot be embodied into a soap gel stick. It has been discovered however, that in spite of the normal ionic availability of the zirconium in this compound when incorporated in a sodium stearate soap gel stick, it loses the property of such reaction and the stick is stable.

The precise reason for this lack of reaction is not known. It is presumably due to an ionization-depressing effect produced by the high concentrations of alcohol in the stick. It is not solely due to that factor, however, since other ingredients of the stick also appear to effect or add to this ionization depression. That is, the proportions of sodium stearate and alcohol and water and the sodium zirconium lactate are all inter-related in this ionization depression.

One of the remarkable facts is, however, that so far as has been ascertained, the proportions of ingredients which will produce a stable sodium stearate stick coincide with the proportions which will sufficiently depress ionization to permit incorporation of sodium zirconium lactate as the anti-perspirant ingredient.

Sodium zirconium lactate is available in the market in the form of a 43% solution in water. Tests on such solution reveal that it has a pH of 7.55. Tests performed on a series of samples of such solution progressively diluted with water show progressively increasing acidity.

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For example, one part (by volume) of such 43% solution diluted with one part of water has a pH of 7.15 and with ten parts of water a pH of 6.75. With twenty parts of water the solution has a pH of 6.45. With one hundred parts of water the solution has a pH of 6.15 and with one thousand parts of water a pH of 5.80. The gradually increasing acidity upon dilution would further suggest that this substance is incompatible with soap and from this it might logically be concluded that it would be incompatible with a soap gel of the type hereinabove described. Nevertheless, it has been discovered that in the practice of the present invention no harmful incompatibility is exhibited either upon mixing of the ingredients or after substantial periods of time. In this connection it might be pointed out that a soap gel stick prepared in accordance with the preferred example and incorporating sodium zirconium lactate has a pH of 8.5 while the same stick without the sodium zirconium lactate has a pH of 9.3.

It is recognized, of course, that the term "sodium stearate" is used commercially to apply to the sodium salt of a mixture of fatty acids of which stearic acid and palmitic acid predominate with relatively small proportions of closely related fatty acids. The term is used here in its commercial sense. The alcohol referred to is absolute alcohol and preferably is an ethyl alcohol or isopropyl alcohol.

The following table shows the indicated limits of the primary constituents of the sodium stearate soap gel stick.

TABLE I

Sodium zirconium lactate (43.95% sol.) stick

	Min., Percent	Max., Percent
Alcohol.....	17.65	75
Added Water.....	4	14
Sodium Stearate.....	2	7
Sodium Zirconium Lactate (43.95%) Sol.....	5	75

In the practice of the present invention a typical soap gel may be formed and melted and a useful quantity of sodium zirconium lactate in aqueous solution may then be stirred into the melted gel. The resulting product, upon cooling, is stable when stored in a closed container and at normal room temperature. Also, as set forth hereinbelow in a preferred example, the typical ingredients for a soap gel may be mixed together at an elevated temperature and useful quantities of an aqueous solution of sodium zirconium lactate may thereafter be distributed therein. Upon cooling the soap gel will solidify apparently without any adverse effects flowing from the presence of the sodium zirconium lactate. The resulting product is similarly stable. Also the composition may have incorporated therein moisture retaining substances and perfumes. Furthermore, in accordance with another preferred example set forth hereinbelow, a composition may be prepared with a soap gel and sodium zirconium lactate in useful quantities to serve as anti-perspirant and in addition, there may be incorporated recognized deodorant materials, for example a dihydroxy halogenated diphenyl methane, such as the widely used hexachlorophene. The resultant stick-type product is similarly stable and exhibits unusual qualities for the reduction in quantity of perspiration as well as preventing the development of odor.

The preferred examples referred to above will now be set forth. Ethyl alcohol is preferred because of its acceptance in products of this general type. It is important for the product of this invention that the soap gel consist primarily of soap and alcohol and it will be so described in the claims. The relative proportions be-

tween quantities of soap, alcohol and water, if the latter is used, are merely so chosen as to provide a final stick product having firmness and cooling effect within relatively wide ranges of personal preference. The specified quantities of optional additives such as perfumes, deodorant materials or moisture retention agents of which Carbitol (diethyleneglycol ethylether) is an example, although preferred for practical reasons and suitable for the particular materials named, are not critical to the present invention.

In the following examples typical useful quantities of sodium zirconium lactate will be set forth. It is believed that the range of quantity in which this substance may be added is limited only by practicality. That is to say, if only one-half part by weight per hundred of the final product consists of a 43% solution of sodium zirconium lactate, the anti-perspirant qualities would be very slight. However, useful anti-perspirant qualities are exhibited with as little as two parts per hundred and an exceedingly effective product is achieved by the use of about ten parts per hundred. Increase in quantity above ten parts per hundred to about twenty parts per hundred does not sensibly increase the desired anti-perspirant effect although it should be stated that such larger quantities bring about no unfavorable reaction upon the stability of the end product. Accordingly, in the claims the quantity of sodium zirconium lactate will not necessarily be stated in terms of precise proportions.

EXAMPLE I

An anti-perspirant stick is prepared from the following ingredients. Relative proportions are set forth as parts per hundred by weight.

Alcohol (95%)	Parts
Sodium stearate	69.00
Water	6.90
Carbitol	12.80
Sodium zirconium lactate (43% solution in water)	1.40
Perfume	9.20
Hexachlorophene	0.45
	0.25

The water, alcohol, hexachlorophene, Carbitol and sodium stearate may be mixed, heated to 70° C. and maintained at 70° C. until the sodium stearate is completely dissolved. The sodium zirconium lactate solution may then be added and thoroughly mixed. The perfume is added just before pouring into molds. The final mixture is poured at a temperature of from 65° C. to 67° C. into cold (room temperature) molds. Preferably the molds are of size and shape to form a plurality of individual sticks which may be removed from the molds when cooled and packaged for sale. For example the individual sticks may be cylindrical in form and of a size suitable for convenient use. Furthermore, the product may be poured into molds consisting of elements of the package in which the product is to be sold as disclosed in copending application Serial No. 477,312 filed December 23, 1954, by Bernhardt and Teller.

In any event the product of the present example will harden upon cooling slightly below the pouring temperature due to solidification of the soap gel base. The finished product is stable and needs only to be packaged in an airtight fashion to prevent evaporation of the alcohol and water to have adequate shelf life for normal channels of distribution. The finished product has been subjected to extensive tests which amply demonstrate highly desirable anti-perspirant and deodorant qualities.

EXAMPLE II

An anti-perspirant stick may be made from the ingredient set forth in Example I except that the deodorant material (hexachlorophene) may be omitted. The pro-

cedure may be the same as therein set forth. The final product has highly desirable anti-perspirant qualities.

EXAMPLE III

An anti-perspirant stick may be prepared from the following ingredients:

Alcohol (95%)	Parts
Sodium stearate	81.8
Carbitol	6.90
Sodium zirconium lactate (43% solution in water)	1.40
Perfume	9.20
Hexachlorophene	0.45
	0.25

The ingredients may be mixed as in Example I except that the proportionately larger quantity of alcohol is used instead of the alcohol and water set forth in Example I. The final product is fully comparable with that of Example I except that a greater cooling effect will be apparent upon application to the body. The product of this Example III also may be prepared without including the hexachlorophene in the event the additional deodorant qualities imparted by hexachlorophene are not desired.

EXAMPLE IV

The particular order of addition of the ingredients set forth in any of Examples I, II or III may be varied without apparent effect on the final product. Thus according to this Example IV any of the products of Examples I, II or III may be prepared by mixing the sodium stearate with the sodium zirconium lactate solution and thereafter adding such mixture to the alcohol and water of Example I or to the alcohol of Example III. The optional ingredients such as moisture retention agents, deodorants and perfumes may be added in any order although it is preferred for economical reasons to add the perfume just before pouring.

This application is a continuation-in-part of my copending application Serial No. 480,999 filed January 10, 1955, now abandoned.

I claim:

1. A stable anti-perspirant stick having a base comprising a sodium stearate-aqueous alcohol gel and having dispersed therein within said base as an active anti-perspirant agent sodium zirconium lactate.

2. An anti-perspirant stick having a base comprising a sodium stearate soap in a quantity by weight representing about seven parts per one hundred of the finished product, and alcohol about seventy to eighty parts per one hundred, and containing as an active anti-perspirant agent sodium zirconium lactate in a quantity equivalent to at least about two parts by weight of a 43% aqueous solution for each one hundred parts of finished product.

3. An anti-perspirant stick having a base comprising a sodium stearate soap in a quantity by weight representing about seven parts per one hundred of the finished product, alcohol about seventy to eighty parts per one hundred and water up to fifteen parts per one hundred, and containing as an active anti-perspirant agent sodium zirconium lactate in a quantity equivalent to from about two parts to about twenty parts by weight of a 43% aqueous solution for each one hundred parts of finished product.

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