PROPOSED CHANGES IN THE SOAPS OF THE PHARMACOPOEIA.*

BY E. V. KYSER.

The purpose for which a soap is to be used should determine its composition.

The ingredients used in the soaps of the Pharmacopoeia and the methods of manufacture directed are not economical to use and do not produce the best finished product.

1. SAPO—SOAP.

The official soap of the U. S. P. IX, familiarly known as Castile soap, is made from olive oil and sodium hydroxide. The term "Castile Soap" which signifies a pure olive oil soap, means very little to-day, because this once highly recommended soap has been replaced by other soaps which are superior in quality and can be produced more economically. While olive oil is a non-drying oil, it is composed of a large proportion of unsaturated glycerides, as evidenced by its high iodine value, which is undesirable for soap-making purposes. Olive oil soaps as well as other soaps made from unsaturated oils are readily decomposed and quickly become rancid.

In the manufacture of soaps for the toilet the use of corn, cotton seed, soya, peanut or any other oil of low titer and high iodine value is objectionable because the resultant soaps become rancid very readily, yet olive oil which is similar in chemical composition to the oils named is used and recognized by the Pharmacopoeia. This preference for olive oil soap no doubt originally arose from the fact that olive oil was the only oil suitable for soap making which was obtainable in suitable quantity and quality when the manufacture of soap was in its infancy. After the industry was established, this preference was, of course, fostered by interested manufacturers for their own profit. The general public has long since been won away from the preference for olive oil soap by the substitution of other and better soaps, but the conservatism of the Pharmacopoeia makers has prevented any change in this authority.

Olive oil soaps are neither chemically nor physically adapted for general use. They have a disagreeable odor, are unsightly in appearance, do not produce a good lather and have less value as detergents than soaps made from other oils and fats. Moreover, they are generally made by the semi-boiling method which, at times, fails to insure complete saponification. This process is also open to the objection that any impurities present in olive oil are retained in the finished soap. Olive oil soaps also contain a high proportion of water, the Pharmacopoeia allowing 36 percent of moisture in the soap in bars and 10 percent in the powdered soap.

The Pharmacopoeia is the only place where olive soap is given the preference. In all the purchases of soap made by the United States Government, the State and the Municipal governments, except in the cases where the U. S. P. soap is named, the specifications stipulate that the soap shall be a milled soap with 80 percent tallow and 20 percent coconut oil as a base. I propose that the Pharmacopoeia shall

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New York meeting, 1919.

abandon its antiquated and impracticable standards and shall recognize the progress that has been made in the manufacture of soap and shall adopt standards in conformity with the best modern practice in soap making. I append a set of specifications for the consideration of the Committee of Revision of the Pharmacopoeia.

Sapo.—A milled soap, made by the settled or grained process, consisting of 80 percent tallow and 20 percent coconut oil in conjunction with sodium hydroxide as the saponifying agent. The tallow employed shall be prime tallow with less than 3 percent free acid, and the coconut oil shall be Cochin grade, water white and under 5 percent free acid. Said soap shall be of a cream color and comply with the following standards:

Volatile matter at 105° C. shall not exceed 15 percent.

Free alkali, calculated as NaOH, shall not exceed 0.25 percent.

Alkali, alkaline salts calculated as sodium carbonate (Na_2CO_3), shall not exceed 0.3 percent. Not more than one-half of the alkali as alkaline salts shall be sodium silicate. (The term "Alkaline Salts" here includes carbonates, borates, and silicates.)

Sulphate, calculated as sodium sulphate (Na_2SO_4), shall not exceed 0.1 percent.

Chloride calculated as sodium chloride (NaCl), shall not exceed 0.3 percent.

Matter insoluble in water shall not exceed 0.1 percent.

Unsaponified saponifiable matter shall not exceed 0.1 percent.

Rosin, sugar, and foreign matter shall not be present.

Titer and acid number of the mixed fatty acids prepared from the soap must be, respectively, not less than 37° and not less than 203 nor more than 212.

The specifications set forth above are those adopted by the U. S. Government and by state and municipal authorities generally. These specifications can be met by all American manufacturers of toilet soaps and the product will prove much more satisfactory for all purposes than the olive oil soap now recognized. The only objections to the change will come from the European manufacturers, the sale of whose soap will be affected. These standards are recognized by the U. S. Government and in the state as well as city specifications generally.

Soap made in compliance with these standards constitute the general methods of all American soap manufacturers of toilet soap. Such soaps are ideal in their composition. They are stable, lather freely in hot or cold water, are readily soluble, mild, emollient and free from deleterious matter.

Soap occurs as a white or whitish solid in the form of bars, hard yet easily cut when fresh, or as a fine yellowish white powder, having a faint peculiar odor, free from rancidity, and a slightly alkaline taste. It is soluble in water or alcohol, dissolving more readily, however, with the aid of heat. Its aqueous solution is alkaline to litmus.

METHODS OF TESTING.

Such a soap as is indicated by the preceding specifications will conform to the requirements formulated by the U. S. Bureau of Standards. This Bureau has issued a circular of *Specifications for and Methods of Testing Soaps*. Copies of this pamphlet can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for five cents each.

II. SAPO MOLLIS—SOFT SOAP.

Soft soap which will meet every requirement of the Pharmacopoeia can be successfully made from the oils of cotton seed, corn, soya bean, peanut and various other vegetable oils and with the substitution of soda for potash.

Sodium soaps, while not as soft nor as soluble as potash soaps, are sufficiently soluble for the uses of the Pharmacopoeia and their detergent and lathering properties are fully as good.

The fifty mils of alcohol, used in the Pharmacopoeia formula, is completely lost as it is volatilized during the process of making.

The method usually pursued for making soft soap is as follows:

The oil to be saponified is run into kettles equipped with agitators and heated to a temperature of 160–170° F. (71–77° C.). The calculated amount of alkali is added to the total amount of water to be used and is now slowly added to the oil and the whole is boiled, with stirring, until saponification is complete. The soap is allowed to cool sufficiently and then run into containers. The same procedure may be followed on a small scale, or the alkali may be stronger and the soap hydrated after saponification; this eliminates the difficulties met with in the pharmacopoeial method.

The method for analysis given by the Pharmacopoeia is inadequate, in fact, a soap made of the above ingredients would conform with the pharmacopoeial requirements.

I propose that the same methods of analysis proposed for soap be adopted for soft soap with the necessary changes as to moisture, titer, iodine value, acid number, etc.

III. LINIMENTUM SAPONIS—SOAP LINIMENT.

This preparation should be made in accordance with the present formula and method except that the dried soap used can be supplanted by the addition of 120 Gm. of Sapo Mollis.

IV. LINIMENTUM SAPONIS MOLLIS—LINIMENT OF SOFT SOAP.

This should be made by the present method and formula with the substitution of the proposed soft soap.

V. LINIMENTUM CHLOROFORMI—CHLOROFORM LINIMENT.

This should be made by the present formula and method with the substitution of the proposed soap liniment.

VI. LINIMENTUM CALCIS—LIME LINIMENT.

Lime liniment or carron oil is not a true soap as it is an emulsion of oil with water formed by the presence of a small amount of calcium soap. There is no particular advantage in the use of linseed oil, any other oil could be used as well. The medicinal properties of the liniment are due entirely to the bland and emollient character of the product, and any other oil would give the same results.

I would advise the substitution of soya bean oil for linseed oil in this liniment.

VII. LIQUOR CRESOLIS COMPOSITUS—COMPOUND SOLUTION OF CRESOL.

The only use of soap in this preparation is for the purpose of rendering cresol miscible with water. Any soap which accomplishes this purpose can be substituted for the expensive linseed oil, potash soap. The alcohol used in the formula is not necessary and does not serve any useful purpose. I propose that Liquor Cresolis Compositus be made from equal parts by weight of Sapo Mollis and cresol.

Solution of cresol made by this formula mixes clear with water in any proportion. It gives a light colored solution and affords a method of making that should meet with the approval of pharmacists. Cresol is an excellent solvent for soaps and the soft soaps can readily be dissolved in the cresol at a low temperature.

I respectfully suggest that this paper be referred by the Section to the Committee of Revision of the U. S. Pharmacopoeia. I submit samples which may also be turned over to the committee.

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USE OF HYDROGENATED OILS AND FATS IN PHARMACY.*

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Hydrogenation is the process of applying latent hydrogen to organic compounds which are unsaturated or, in other words, having free bonds which are capable of taking up additional hydrogen, oxygen, or any of the halogens.

Hydrogenation, however, does not confine itself to oils alone, but at the present time we are interested in this special field, the hydrogenation of oils and fats, in an endeavor to procure a substance which will prove an efficacious substitute for lard as an ointment base.

There are many methods of hydrogenation proposed, as well as in practice. The early work on hydrogenation of oils and fats was (while somewhat crude and non-applicable to quantity production) sufficient to show the feasibility of converting unsaturated glycerides of higher fatty acids into saturated compounds.

Primarily, the object sought was to convert olein or oleic acid into stearin or stearic acid which is largely used in the manufacture of candles.

The difficulty in manipulation of the earlier processes was the sluggishness or inactivity of hydrogen, and it is only within the last decade that this has been overcome by the use of catalyzers which accelerate the combining power of hydrogen and unsaturated oils.

There are many proposed catalytic agents and methods of preparation. Among these are various salts of nickel, palladium, iron; zinc and copper, as well as other metals.

In quite a number of instances these catalysts are supported by carriers or vehicles in the form of porous substances such as fullers' earth, pumice stone and kieselguhr, which have a tendency to finely divide the particles of catalyzers

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