This invention relates to soaps in general, and more especially to salt water soaps and the process of making such salt water soaps.

Among the objects of the present invention it is aimed to provide an improved salt water soap and an improved process for making salt water soap.

Hereinafter it has been common practice when a soap was desired that could produce suds in so-called hard water, water having a high calcium and/or magnesium content, or ordinary sea water, to use cocoanut oil for producing the detergent agent. With the dwindling supply of cocoanut oil, particularly aggravated by the loss of sources of supply and the increasing demand for salt water soap by the armed forces in the island warfare, as well as on the high seas, brought on by the present war, there resulted an intensive research and study for an artificial substitute or synthetic substitute for the cocoanut oil. It is, therefore, an aim of the present invention not only to provide a soap that dispenses with the use of cocoanut oil, but to provide a soap which will fully satisfy the exacting requirements of the United States Government as to the cleansing qualities of this soap, and as to the ability of this soap to produce copious and permanent suds in any water, including double strength sea water.

More specifically, it is an object of the present invention to produce a soap which includes a sulphonated synthetic detergent that will effectively produce suds in any water, including sea water.

It is still another object of the present invention to produce a soap which is produced in part from a sulphonated synthetic detergent derived primarily from lauryl alcohol and naphthalene that will effectively produce suds in any water, including sea water.

In the production of quantities approximating one thousand pounds, excellent results have been achieved when there was used about 40 parts by weight of the synthetic agent, hereinafter to be described more in detail, 22 parts by weight of corn starch, 28 parts by weight of anhydrous soap, and 12 parts by weight of water, or sufficient water to form a 32 per cent volatile material.

These percentages may vary without departing from the general spirit of the invention. As an instance, the starch may be materially reduced or eliminated entirely when, however, the percentages of anhydrous soap and water would be increased to make up for the reduction or elimination of the starch. When the starch is entirely eliminated, excellent results have been achieved when the percentages are substantially, 40 parts by weight of the synthetic agent, 50 parts by weight of the anhydrous soap, and 10 parts by weight of water.

The production of the detergent is characterized by four steps, the sulphonation step, the reaction step, the neutralization step, and the final step.

In the sulphonation step or process, excellent results have been achieved when the ingredients approximated 5.55 parts by weight of naphthalene (C\textsubscript{10}H\textsubscript{8}) 128.06 M. Wt., 15.45 parts by weight of lauryl alcohol (CH\textsubscript{3}(CH\textsubscript{2})\textsubscript{10}CH\textsubscript{2}OH) M. Wt. 228.22, and 20.40 parts by weight of a 20 per cent solution of oleum or fuming sulphuric acid (H\textsubscript{2}SO\textsubscript{4} plus about 20 per cent SO\textsubscript{3}). The naphthalene and lauryl alcohol is initially supplied to a conventional acid resisting tank, lead lined, composed of stainless steel or the like, and either provided with coils to receive a cooling or heating medium or jacket to receive either a cooling or heating medium, all according to conventional practice. After the naphthalene and lauryl alcohol is supplied to this tank, it is there heated to a temperature of about 40° C. when a slurry is formed. When a slurry is formed, the same is cooled to a temperature of about 20° C.

Thereupon the oleum is added at a slow rate with continued circulation of refrigerant either in the coils or in the jacket to maintain a temperature close to 20° C., care being exercised that the temperature does not exceed 25° C. While the oleum is so added, the slurry is continually stirred. The time required to add this oleum would vary, depending upon the size of the batch. Ordinarily for a batch not to exceed one thousand pounds, two or three hours should be sufficient. This would complete the first step, or sulphonation step.

When all the oleum has been added, the temperature of the resulting mass should be raised to 30° C. and maintained at this temperature for about three hours. This constitutes the second or reaction step.

Thereupon the resulting mixture or mix is allowed slowly to drop into a second tank or vat containing the caustic soda, stirring well in order to insure good neutralization. The second tank may be similar in construction to the first tank, all according to conventional practice. Excellent results have been achieved when the second batch finally contains about 54.85 parts by weight of 50° Baumé caustic soda, as compared to the mixture received after the completion of the reaction step.
When the sulphonated mass has been effectively neutralized, tests should be made for the pH content, and either caustic soda or sulphuric acid added to adjust for a pH of 7.5 to 8.0. This part of the neutralization step ordinarily requires from two to three hours.

When the bentonite is added in the second container and stirred until the mass becomes homogeneous, constituting the fourth or final step in the production of the detergent.

In place of the caustic soda, any suitable like reacting alkaline solution may be used, such as a potash solution.

After the detergent has been produced as aforesaid, the product contains about 50 per cent water. If an anhydrous product is desired, the material is then sent to a drier, either of the tray drier type or of the continuous type similar to that used in drying soap. When all the water has been removed the dry powders contain about 50 per cent active ingredients and 50 per cent salts.

If on the other hand, a soap is desired, before drying, the detergent containing about 50 per cent water is then mixed with anhydrous soap and cooked in the conventional soap crucher. Excellent results have been achieved when the mixing kettle or soap crucher in this step contains 40 parts by weight of the detergent agent resulting from the first few steps aforesaid, 22 parts by weight of corn starch, 26 parts by weight of anhydrous soap, 12 parts by weight of water or sufficient water for 32 per cent volatile material.

Excellent results have been achieved when the mass in the soap crucher is heated for one hour at a temperature of 60° C. to 65° C., then allowed to cool for two or three hours and drawn off as a stable form retaining substance at a temperature of about 50° C. to 60° C. and then in the conventional way cut into bars.

The percentages above set forth, of course, may be changed without departing from the general spirit of the invention. As an instance, the corn starch and bentonite may be materially reduced or even entirely eliminated. When entirely eliminated, as aforesaid, the anhydrous soap content should be materially increased. Excellent results have been produced when the detergent agent remained the same, that is, amounted to about 40 parts by weight, the amount of anhydrous soap was increased to 50 parts by weight, and the amount of water was decreased to about 10 parts by weight.

According to the formula, when the corn starch is included, the resulting soap will be characterized in content by about 40 parts by weight of neutralized sulphonated naphthalene and lauryl alcohol, 22 parts by weight of corn starch, 26 parts by weight of anhydrous soap and 12 parts by weight of water, or sufficient for a content of 32 percent volatile material in the finished soap.

When the starch and bentonite is materially reduced or entirely eliminated, the anhydrous soap would be materially increased as already set forth, and the resulting soap will be characterized in content by about 40 parts by weight of neutralized sulphonated naphthalene and lauryl alcohol, 50 parts by weight of anhydrous soap, and 10 parts by weight of water, or sufficient for a content of 32 percent volatile material in the finished soap.

It is obvious that the several steps in the process may be varied and that the quantities of the ingredients of the resulting soap may be varied without departing from the general spirit of the invention as set forth in the appended claims.

I claim:

1. The process of making a salt water soap consisting in heating a mixture of substantially 5.55 parts by weight of naphthalene and of substantially 15.45 parts by weight of lauryl alcohol at a temperature of about 40° C. when a slurry is formed, thereupon cooling the resulting slurry to a temperature of about 20° C., thereupon slowly adding about 20.4 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25° C. to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 40° C. when a slurry is formed, thereupon cooling the resulting slurry to a temperature of about 20° C., thereupon slowly adding about 20.4 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25° C., to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 30° C. and holding at this temperature for about 3 hours, thereafter mixing the resulting liquid with an aqueous alkali metal hydroxide solution to substantially neutralize the same, thereupon mixing said substantially neutral sulphonated mass with about sixty per cent by weight of body forming substances consisting principally of anhydrous soap and water and cooking until a suitable form retaining substance is produced.

2. The process of making a salt water soap consisting in heating a mixture of substantially 5.55 parts by weight of naphthalene and of substantially 15.45 parts by weight of lauryl alcohol at a temperature of about 40° C. when a slurry is formed, thereupon cooling the resulting slurry to a temperature of about 20° C., thereupon slowly adding about 20.4 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25° C. to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 30° C. and holding at this temperature for about 3 hours, thereafter mixing the resulting liquid with an aqueous alkali metal hydroxide solution to substantially neutralize the same, thereupon mixing said substantially neutral sulphonated mass with about sixty per cent by weight of body forming substances consisting of corn starch, anhydrous soap and water in which the water does not exceed twelve parts by weight and cooking until a suitable congealed mass is produced.

3. The process of making a salt water soap consisting in heating a mixture of substantially 5.55 parts by weight of naphthalene and of substantially 15.45 parts by weight of lauryl alcohol at a temperature of about 40° C. when a slurry is formed, thereupon cooling the resulting slurry to a temperature of about 20° C., thereupon slowly adding about 20.4 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25° C. to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 30° C. and holding at this temperature for about 3 hours, thereafter mixing the resulting liquid with an aqueous alkali metal hydroxide solution to substantially neutralize the same, thereupon adding bentonite until the mass has become homogeneous, thereupon mixing said substantially neutral sulphonated mass and bentonite mixture with about fifty parts by weight of anhydrous soap and about ten parts by weight of water and cooking until a suitable congealed mass is produced.

4. The process of making a salt water soap consisting in heating a mixture of substantially 5.55 parts by weight of naphthalene and of substantially 15.45 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25° C. to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 30° C. and holding at this temperature for about 3 hours, thereupon mixing the resulting liquid with an aqueous alkali metal hydroxide solution to substantially neutralize the same, thereupon adding bentonite until the mass has become homogeneous, thereupon mixing said substantially neutral sulphonated mass and bentonite mixture with about fifty parts by weight of anhydrous soap and about ten parts by weight of water and cooking until a suitable congealed mass is produced.
adding about 20.4 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25°C, to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 30°C. and holding at this temperature for about 3 hours, thereupon mixing the resulting liquid with an aqueous alkali metal hydroxide solution to substantially neutralize the same, thereupon mixing said substantially neutral sulphonated mass with fifty parts by weight of anhydrous soap and ten parts by weight of water, and cooking until a suitable form retaining mass is produced.

5. The process of making a salt water soap consisting in heating a mixture of substantially 5.55 parts by weight of naphthalene and of substantially 15.45 parts by weight of lauryl alcohol at a temperature of about 40°C, when a slurry is formed, thereupon cooling the resulting slurry to a temperature of about 20°C, thereupon slowly adding about 20.4 parts by weight of fuming sulphuric acid while maintaining the temperature below about 25°C, to form a sulphonated mass of naphthalene and lauryl alcohol, then raising the temperature to about 30°C. and holding at this temperature for about 3 hours, thereupon mixing the resulting liquid with an aqueous alkali metal hydroxide solution to substantially neutralize the same, thereupon mixing said substantially neutral sulphonated mass with fifty parts by weight of anhydrous soap and ten parts by weight of water, and cooking until a suitable form retaining mass is produced.