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NONEFFLORESCING BAR SOAP

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This invention relates to an improved soap in bar form and more particularly to a soap bar containing alkaline soap builders, which bar of soap is substantially non-efflorescing. This application is a continuation-in-part of the Heald U. S. application Serial Number 69,527, filed March 18, 1936.

Household bar soaps usually comprise fatty acid soaps and an alkaline soap builder such as sodium carbonate. Yellow laundry bar soaps also contain a rosin soap which serves to reduce the cost, stabilize the soap and improve its efficiency for most purposes. To illustrate, a general method of making yellow laundry bar soap is to prepare a soap base consisting of about ⅔ ordinary soap produced from fats or oils such as tallow, and about ⅓ rosin soap. Such soap bases contain from 30 to 35% water. This soap base, in a relatively hot, liquid condition, is admixed in a crutcher with from 15 to 25% of a concentrated solution of alkaline salts such as sodium silicate and sodium carbonate. The alkaline salts are added to improve the physical properties as well as the detergent properties of the soap. If sodium silicate alone is used as the alkaline salt, the resulting bar may not be sufficiently hard for ordinary purposes. It has usually been necessary, therefore, to add sodium carbonate in relatively small proportions in addition to sodium silicate to increase the hardness of the soap. While the addition of sodium carbonate imparts a desirable hardness to the soap bar, it also imparts to the bar a tendency to turn white or to "bloom" on the surface, due, it is believed, to the efflorescing of crystallized sodium carbonate. This efflorescence or bloom, which results in an objectionable appearance in the soap bar, apparently depends to a major extent upon the relative humidity of the surrounding atmosphere, usually developing very rapidly in cold dry weather, very often within 24 hours. It also occurs in warm weather, but somewhat more slowly because of the high humidity usually common to the summer months. This objectionable bloom or efflorescence occurs in bars both with white laundry soap and yellow laundry soap, although it is more objectionable in bars of yellow laundry soap, as it is more apparent.

The present invention provides a soap in bar form suitable for laundry and other household purposes which contains alkaline soap builders, as well as possesses a desirable hardness, but which is substantially free from objectionable efflorescence or bloom on standing. The invention is applicable to both white laundry bar soap and yellow laundry bar soap, but inasmuch as the objection which it is designed to overcome is more apparent with yellow laundry soap than in bars of white soap, it is particularly advantageous for use in making bars of yellow laundry soap.

In accordance with the present invention, improved bars of laundry soaps are produced by adding to the soap a solution of alkaline salts in a suitable manner. The solution of alkaline salts which is used contains, in addition to sodium carbonate, a proportion of sodium phosphate, preferably trisodium phosphate, and may contain sodium silicate. By the addition of sodium phosphate to the soap composition it is possible to produce a bar which has the desired degree of hardness and which does not form a bloom on the surface caused by crystallization or efflorescence of sodium carbonate. The sodium phosphate, in addition to preventing the efflorescence or blooming, has a tendency to make the soap more translucent, tougher, more elastic, and less brittle.

Various sodium phosphates, such as trisodium phosphate, disodium phosphate, or sodium pyrophosphate, or mixtures of these, may be used, however, trisodium phosphate is somewhat more effective and is cheaper than the other sodium phosphates. The bars of the present invention are preferably prepared by producing a soap base and crutching into it a sodium silicate, soda ash, and trisodium phosphate, preferably as a mixed solution. This alkaline solution, for yellow soap, preferably contains from 2½ to 7½% soda ash and 30 to 10% hydrated trisodium phosphate, the balance being a sodium silicate solution containing about 35 to 40% solids. The proportions and amounts of the alkaline salts may be widely varied, however, as more or less sodium phosphate, and more or less sodium carbonate may be used, if desired. The sodium phosphate in the alkaline solution may be varied from about 35% to about 5%, and the sodium carbonate content may be as high as 10% or higher. In preparing filled, yellow soap in bars according to the present invention, it is preferred to use the solution in proportions ranging from between about 15% to about 25% of the final mixture. Instead of trisodium phosphate, other sodium phosphates may be used, or, a mixture of other sodium phosphates and caustic soda, such as a mixture of disodium phosphate and caustic soda, may be used. In effect, using a solution of disodium phosphate and caustic soda gives a solution of trisodium phosphate fully equivalent to a solu-

tion produced by dissolving trisodium phosphate in water. Other alkali salts of these acids such as those of potassium may be similarly employed.

The following examples are given for the purpose of illustration and are not intended to be limiting on the scope of the present invention.

Example I

20 parts of an aqueous alkaline solution containing about 7½% of soda ash, 10% hydrated trisodium phosphate, and 82½% of aqueous sodium silicate having a Na_2O/SiO_2 ratio of 1/3.9 and a solids content of about 38% is thoroughly admixed with 80 parts of a hot liquid soap base containing about ⅔ ordinary fatty acid soap and ⅓ rosin soap (dry basis) and containing about 31% of water. The liquid soap mass containing the alkaline builder is poured into forms and allowed to solidify by cooling. The resulting solidified soap is then converted into bars in the usual fashion. The bar soap so produced is firm and shows substantially no tendency to effloresce or bloom.

Example II

The procedure of Example I is followed but substituting for the aqueous alkaline solution 20 parts of the following mixture: 2½% soda ash, 25% hydrated trisodium phosphate, and 72½% of the sodium silicate solution.

The following compositions represent other operative combinations which may be produced as indicated in Example I. In the Examples III through XI the same type yellow soap base containing rosin soap is employed.

Example III

	Alkaline builder composition	Percent total composition
Soda ash	7.5	1.4
Hydrated trisodium phosphate	12.4	2.3
Sodium silicate solution (35 to 40 % solids)	80.1	14.9
Alkaline builder solution	100.0	18.6
Yellow soap base		81.4
		100.0

Example IV

Soda ash	5.0	1.0
Hydrated trisodium phosphate	15.0	3.0
Sodium silicate solution (35 to 40% solids)	80.0	16.0
Alkaline builder solution	100.0	20.0
Yellow soap base		80.0
		100.0

Example V

Soda ash	7.5	1.5
Hydrated trisodium phosphate	10.0	2.0
Sodium silicate solution (35 to 40% solids)	82.5	16.5
Alkaline builder solution	100.0	20.0
Perfume		0.1
Yellow soap base		79.9
		100.0

Example VI

Soda ash	7.5	1.5
Hydrated trisodium phosphate	15.0	3.0
Sodium silicate solution (35 to 40% solids)	77.5	15.5
Alkaline builder solution	100.0	20.0
Yellow soap base		80.0
		100.0

Example VII

	Alkaline builder composition	Percent total composition
Sodium pyrophosphate	12.5	2.0
Water	25.0	4.0
Sodium silicate solution (35 to 40% solids)	62.5	10.0
Alkaline builder solution	100.0	16.0
Sodium metasilicate (powder)		4.0
Yellow soap base		80.0
		100.0

Example VIII

Disodium phosphate	5.5	1.0
Sodium silicate solution (35 to 40% solids)	79.7	14.5
Water	14.8	2.7
Alkaline builder solution	100.0	18.2
Yellow soap base		81.8
		100.0

Example IX

Soda ash	14.3	2.5
Hydrated trisodium phosphate	51.4	9.0
Water	34.3	6.0
Alkaline builder solution	100.0	17.5
Yellow soap base		82.5
		100.0

Example X

Hydrated trisodium phosphate	10.0	1.8
Sodium silicate solution (35 to 40% solids)	90.0	16.3
Alkaline builder solution	100.0	18.1
Yellow soap base		81.9
		100.0

Example XI

Hydrated trisoldium phosphate	35.0	7.8
Sodium silicate solution (35 to 40% solids)	65.0	14.5
Alkaline builder solution	100.0	22.3
Yellow soap base		77.7
		100.0

The following examples illustrate compositions for the preparation of white soap in bars substantially free from rosin soaps and containing alkaline soap builders, which soap is substantially free from a tendency to effloresce.

Example XII

	Alkaline builder composition	Percent total composition
Soda ash	0.5	0.2
Hydrated trisodium phosphate	4.7	2.0
Sodium silicate solution (35 to 40% solids)	85.0	35.7
Caustic soda solution 50° Bé	6.2	2.6
Caustic soda solution 40° Bé	3.6	1.5
Alkaline builder solution	100.0	42.0
White soap base		58.0
		100.0

Example XIII

Hydrated trisodium phosphate	4.7	1.8
Sodium silicate solution (35 to 40% solids)	91.1	34.6
Caustic soda solution 40° Bé	4.2	1.6
Alkaline builder solution	100.0	38.0
White soap base		62.0
		100.0

It should be noted that these bar soap compositions on a dry basis comprise a major proportion of a soap base and a minor proportion of alkaline salts. On a wet basis the soap base preferably is at least 55% and the alkaline builder solution not more than 45% of the final composition. These alkaline salts include sodium phosphate in a proportion sufficient to substantially prevent objectionable efflorescence. The proportion of sodium phosphate may be in excess of the minimum required to prevent efflorescence in order to obtain the desired degree of hardness in the final bar product. The maximum quantity of hydrated trisodium phosphate used should preferably not exceed about 9% of the finished soap. The alkaline salts preferably also include sodium carbonate in order to obtain an efficient soap at a lower cost by a saving on the quantity of sodium phosphate necessary to obtain the desired hardness. It is advantageous not to use more than about 2½% of sodium carbonate in the finished soap since it is difficult to control the efflorescence of soap containing a materially greater percentage of this salt and still obtain a soap of optimum hardness. Although sodium silicate is not essential, it is preferred also to include this material as part of the alkaline salts since this material economically improves the physical properties and washing characteristics of the finished soaps.

Soap bars may be prepared by any of the common soap-making procedures from materials such as tallow, palm oil, coconut oil, olive oil, hydrogenated whale oil, hydrogenated fish oils, certain grades of cottonseed oil, garbage grease, oxidized mineral oils, tall oil, and wool fat, waxes, resins, the corresponding acids of said oils, fats, waxes and resins, or mixtures of any of the foregoing. One of the preferred methods for preparing soaps suitable for use in this invention from low-grade materials is that described in the U. S. Patent No. 1,918,603 to Martin Hill Ittner. It is possible when employing the process of this patent to incorporate the alkaline salts before, during, or immediately after the manufacture of the soap, thus avoiding the subsequent crutching step normally employed.

The new soap compositions may also contain any of the common auxiliary agents used in soap and detergent compositions. Suitable addition agents are other emulsifying agents including long-chain alcohol sulphate salts, monoglyceride monosulphate salts, salts of sulphonated mineral oil extracts, Turkey red oil, lecithin, ethanolamine soaps; other alkaline soap builders such as borax; the water-soluble, water-softening phosphorous compounds of the type of tetraphosphoric, pyrophosphoric or hexametaphosphoric acid and their alkali metal, ammonia, and certain amine salts or alkyl esters; methyl and ethyl cellulose; coloring matter such as dyes, lakes, pigments; abrasives and fillers such as silica, pumice, feldspar, precipitated chalk, infusorial earth, bentonite, talc, starch, and air; liquids including carbon tetrachloride, perchlorethylene, trichlorethylene, glycerine, ethyl alcohol, glycol, tetrahydrofurfuryl alcohol, phenol, cyclohexanol, water, Tetralin, Decalin, pine oil, mineral oil, mineral oil extracts, and naphtha; perfumes and deodorants; fats, oils, fatty acids, monoglycerides, waxes, gums, glue and resins; germicides, such as phenol and organic or inorganic mercury compounds; any of the common water-soluble alkali metal or ammonium salts, and various mixtures thereof. The type of addition agent to be used, will depend, of course, on the ultimate use of the new soap composition. The various ingredients may be mixed with the soap by any of the common methods such as milling, stirring, kneading, crutching, fusing, and forming mixed solutions.

It will thus be seen that the present invention includes all common laundry soaps, both white and yellow, which include, in addition to the usual soap ingredients, alkaline salts for improving the detergent qualities of the soap, including sodium silicate and sodium phosphate. The bars of soap so produced are hard, relatively tough and elastic, and show no substantial tendency to effloresce or bloom.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the applicant does not limit himself to the specific proportions or embodiments thereof except as defined in the following claims.

I claim:

1. A non-efflorescing laundry bar soap containing from 75 to 85 parts of a soap base comprising about ⅔ fatty acid soap and ⅓ resin soap, dry basis, and about 31% of water, and 25 to 15 parts of an aqueous alkaline solution containing up to 10% of sodium carbonate and 35 to 5% of hydrated trisodium phosphate, the balance of said solution consisting of a sodium silicate containing from about 35 to about 40% solids.

2. A non-efflorescing laundry bar soap containing from 75 to 85 parts of a soap base comprising about ⅔ fatty acid soap and ⅓ resin soap, dry basis, and about 31% of water, and 25 to 15 parts of an aqueous alkaline solution containing 2½% to 7½% of sodium carbonate and 30 to 10% of hydrated trisodium phosphate, the balance of said solution consisting of a sodium silicate containing from about 35% to about 40% solids.

3. A substantially non-efflorescing laundry bar soap containing from 75 to 85 parts of a soap base comprising about ⅔ soap from fats and oils and ⅓ resin soap, dry basis, and about 30 to 35% water, and 25 to 15 parts of an aqueous alkaline solution containing up to 10% of sodium carbonate and 35 to 5% of a sodium phosphate, the balance of said solution consisting of a sodium silicate containing from about 35 to about 40% solids.

4. A substantially non-efflorescing laundry bar soap comprised of 75 to 85 parts of a soap base containing about ⅔ fatty acid soap and ⅓ resin soap, dry basis, and with about 30–35% of water in said soap base, and 25 to 15 parts of an aqueous alkaline solution containing 2½% to 7½% of sodium carbonate and 30 to 10% of hydrated trisodium phosphate, the balance of said solution consisting of a sodium silicate containing from about 35% to about 40% solids.

5. Bar soap comprising water, and, on a dry basis, a major proportion of a soap base and a minor proportion of sodium carbonate, sodium silicate and an alkaline sodium phosphate, the amount of sodium carbonate being sufficient to cause objectionable efflorescence in the absence of the sodium phosphate and the amount of sodium phosphate, ranging up to about 9% of the total composition, being sufficient to substantially prevent such efflorescence.

6. A laundry bar soap comprising water, and, on a dry basis, a major proportion of a white soap base and a minor proportion of sodium carbonate, sodium silicate and an alkaline sodium phosphate, the amount of sodium carbon-

ate ranging up to about 2½% and being sufficient to cause objectionable efflorescence in the absence of the sodium phosphate and the amount of sodium phosphate being sufficient to prevent substantially such efflorescence and ranging up to about 9% of the total composition to give desired hardness.

7. Bar soap comprising at least about 55 parts of a soap base and not more than about 45 parts of an aqueous alkaline solution containing sodium carbonate and sodium silicate together with a sodium phosphate, the amount of sodium carbonate being sufficient to cause objectionable efflorescence in the absence of the sodium phosphate and the amount of sodium phosphate, ranging up to about 9% of the total composition to give desired hardness, being sufficient to prevent substantially such efflorescence.

8. Bar soap comprising a major proportion of a soap base, sodium carbonate in amount ranging up to about 2½% and sufficient to cause objectionable efflorescence in the absence of sodium phosphate, and an alkaline sodium phosphate in amount ranging up to about 9% to give desired hardness and sufficient to prevent substantially such efflorescence.

9. Bar soap comprising a major proportion of a soap base, sodium carbonate in amount sufficient to cause objectionable efflorescence in the absence of alkali phosphate, and a water-soluble alkali phosphate in amount ranging up to about 9% and sufficient to prevent substantially such efflorescence.

10. A substantially non-blooming laundry bar soap containing a major proportion of soap and a mixture of alkaline soap builders comprising sodium carbonate and hydrated trisodium phosphate, the proportion of sodium carbonate to hydrated trisodium phosphate being not less than 1 to 12 and not more than 3 to 4, the amount of hydrated trisodium phosphate not exceeding 9% of the total bar, and the amount of sodium carbonate being sufficient to cause blooming in the absence of the hydrated trisodium phosphate.

11. The method of making bar soap which has substantially no tendency to effloresce which comprises mixing sodium carbonate and trisodium phosphate with a water-soluble soap and forming the mixture into bars, the amount of sodium carbonate being sufficient to cause objectionable efflorescence in the absence of the trisodium phosphate and the amount of trisodium phosphate being sufficient to substantially prevent efflorescence and not exceeding about 9% of the finished product.

12. The method of making bar soap which has substantially no tendency to effloresce which comprises mixing sodium carbonate and an alkaline sodium phosphate with a water-soluble soap and forming the mixture into bars, the amount of sodium carbonate being sufficient to cause objectionable efflorescence in the absence of the alkaline sodium phosphate and the amount of the alkaline sodium phosphate being sufficient to substantially prevent efflorescence and not exceeding about 9% of the finished product.

13. The method of making bar soap which has substantially no tendency to effloresce which comprises mixing sodium carbonate and a water-soluble alkali phosphate with a water-soluble soap and forming the mixture into bars, the amount of sodium carbonate being sufficient to cause objectionable efflorescence in the absence of the water-soluble alkali phosphate and the amount of the water-soluble alkali phosphate being sufficient to substantially prevent efflorescence and not exceeding about 9% of the finished product.

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