Abstracts

Soaps

Edited by
M. L. SHEELY

Medicated soaps. Observations and suggestions. John Glenn. *Soap, Perfumery, Cosmetics 14,* 48-9 (1941). Salol, B-naphthol, oxyquinoline sulfate, thymol, resorcinol, $HgCl_2$ are suggested for experimentation in making antiseptic soaps. Other medicinals suggested for soaps are ichthyol for chilblains and acne, naphthalene for excessive perspiration, tannin for ringworm, turpentine for rheumatism and witchhazel for bruises. All medicated soaps should be highly colored for many of the additives tend to darken the soap.

Economic value of products derived from oleoresin. E. A. Brennan, *Savannah Wkly. Naval Stores Rev.* and *J. of Trade 50,* 51 , March 22 (1941). Pine oil is widely used today in all branches of the textile industry. It is used for the delustering of rayon, either in the manufacturing or finishing process. Another field investigated by the wood naval stores industry was the use of pine oil soap combinations where it acts as a solvent for natural soil, resulting in added whiteness to the finished laundry. There are now many proprietary cleaners that contain pine oil, such as dry cleaning soaps, scrubbing soaps, hand soaps, scouring soaps, dog soaps, mechanic soaps, medicinal soaps, shaving soaps, etc. A fine toilet soap that contains pine oil recently appeared on the market. Considerable work has been done in conjunction with agriculture experiment; stations to develop information on the adaptability of pine oil as the toxic agent in insecticides, fungicides, and germicides.

Insecticidal properties of fatty acids. E. G. Thomssen and M. H. Doner. *Soap 17,* 4, 94 (1941). It is commonly held that fatty acids are the actual toxic constituents of soaps and glycerides. Soaps are used in insecticides not so much to increase their toxicity, but to increase their spreading power.

Using emulsified free fatty acids on several species of aphids, Siegler and Popenos determined that practical toxicity begins with caproic acid and reaches the peak at or slightly above the C_{10} point. They also demonstrated that K and Na and ammonium soaps have less killing power than the corresponding free acids. Fleming and Baker showed that Na soaps have greater toxicity that K soaps on the adult Japanese beetle. Ammonium soaps are the least effective.

Previous toxicity tests on soaps have been of transitory value because the analyses were run on commercial soaps, whose water contents vary widely.

Dills and Menusan prepared K soaps of several oils in 0.50 and 1.0% concn. and showed that olive oil soap was the most toxic, coco, menhaden and c/s were equal in toxicity, and castor oil the least toxic on insects. K soaps of c/s, soybean, raw and boiled linseed oil, standard oleate, blown castor, peanut and coco were made and showed a descending order of effectiveness as listed above over the Japanese beetle.

As to the toxicity of soaps to plants, it was found that at the 1% level of active ingredient, they were unharmed, but at 2% showed some injury. Free alikali is responsible for this. Dills and Menusan show that plant injury decreases as the molecular weight of the soap molecule increases. Wool grease or degras sprays are recommended as substitutes for mineral oil in sprays.

Vegetable oils and fatty acids act as adhesive agents for binding insecticidal powders to plants. Olive oil was found to activate rotenone, vegetable oils increase the toxicity of derris, peanut oil showing the greatest increase.

Fatty acids and soap may exert a toxic action in several ways. They may form a film over an insect body and close breathing pores; they actually do penetrate the air tubes, as shown with ink, and do increase the absorption action of tissue for the insecticide.

A note on the phase rule diagram for a mixture of sodium palmitate and sodium laurate with water. J. W. McBain and S. A. Johnston. *J. Am. Chem. Soc. 63,* 875 (1941). The temperatures above which mixtures of soap and water in various proportions form isotropic solutions, T_1, and the temperatures below which they contain soap curd, T_0, have been determined for most of the single pure soaps. It is therefore of interest to see how these are affected when two such soaps are mixed. For this purpose a constant mixture of equal weights of sodium palmitate and sodium laurate has been examined with different percentages of water, using the materials and technique of previous communications.

The results are given in Fig. 1 for the mixture where also the positions of middle soap, neat soap and curd are indicated. This Fig. also compares these results with those of the separate single soaps represented by faint lines. A comparison of the curves shows that the mixture tends to follow a behavior which would be an average of the individual curves. Probably the outstanding difference is that the peak for middle soap is higher than either of the individual peaks and if anything is nearer the peak for sodium palmitate. The T_0 curve, on the other hand, adheres more closely to the curve for sodium laurate, as might be expected from previous experiments. Mixed micelles of smaller size, less orientation and greater solubility, must be produced by the occurrence of the shorter laurate molecules among the longer homologs, an example of mutual solubilization.

Soap-making from single oils and fats in terms of phase-rule diagrams. James McBain, W. J. Elford and R. Vold. *J. Soc. Chem. Ind. 59,* 243-52 (1940). In the tests reported sapon. was carried out by heating the oil with open steam and adding slowly 20% NaOH soln. after which solid NaCl was added. The graining step was carried out by continuing the blowing with steam during the addn. of the NaCl. The boiling on strength consisted of boiling with open steam and caustic added at intervals until no more was consumed and boiling continued and NaCl added until the system was sufficiently open to permit separation of lye on standing. This lye was usually alk. In the fitting and settling step the soap was again closed and boiled with open steam to adjust the relative concns. of soap, NaCl and water so that sepn. into 2 layers, nigre and neat soap, oc-

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curred on standing. The neat soap was pumped into a crutcher in which the soap was mixed thoroughly, then passed into frames and allowed to cool and solidify. Semihardened whale oil, green S olive oil, tallow, soybean oil and pressed coconut oil soaps were tested and approx. phase rule diagrams in which soap, water and NaCl are the coordinates made. In general, grained soap contained less soap and more NaCl than neat soap: this is also true of freshly fitted soap, except that the contaminating phase is nigre. The diagrams of the soaps made in these tests except coconut oil soap, are merely slight variants of the diagram for pure Na palmitate. Soybean oil soap salts out into neat soap and lye at a lower NaCl concn. than pure Na palmitate. Unsatd. soaps are more sol. in water than satd. oil soaps. (*Chem. Abs.*)

The solubilization of water-insoluble dye in dilute solutions of aqueous detergents. J. McBain, R. Merrill, Jr. and J. Vinograd. *J. Am. Chem. Soc. 63,* 670 (1941). The solubility of several water-insoluble materials, such as Yellow AB, chlorophyll and bile acids, has been critically measured from the side of both supersaturation and undersaturation using solubilities detergents, such as bile salts, soaps and commercial cation and anion-active as well as non-electrolytic detergents. The solubilization in soap solutions is greater at high temperatures than at room temperatures in spite of there being far less colloid at high temperatures. Likewise in paraffin oil methylene blue is solubilized only at higher temperatures. In every case the solutions of crystallized dye solubilized in lauryl solutions of crystallized dye solubilized in lauryl sulfonic acid were full of ultramicroscopic particles whereas the soap solution itself was clear. This solubilization has been separated and distinguished from protective action, such as emulsification or peptization, and also from the change in solvent medium brought about by substantial additions of a second solvent.

The effect of potassium oleate upon the solubility of hydrocarbon vapors in water. J. McBain and J. J. O'Connor. *J. Am. Chem. Soc. 63,* 875 (1941). The solubility of indifferent hydrocarbons, isobutane, butadiene and propylene in water and in solutions of potassium oleate have been studied. Comparing the amount of extra hydrocarbon dissolving in the presence of soap with that dissolving in an equal amount of olein, the only comparable material for which we have data, we find that the potassium oleate dissolves only about one quarter as much as would an equal weight of olein. In general, solubilization appears to involve several factors other than mere solution in hydrocarbon groups, if any. Summing up, the solubility of the hydrocarbons, propylene, isobutane and butadiene, is enhanced by the presence of potassium oleate acting as solubilizer. This is one, but only one of the important factors in detergent action.

The most modern soap factory of the world. Karl Löffl. *Seifensieder-Ztg. 68,* 13-4, 26-7, (1941). The larger details of design of a factory of capacity 32,000 kg. per day and its equipment built according to the author's plans are given. Closed kettles with mech. agitation are used. Some details of operation are given. The spray tower for soap powder is 14 ms. high. The mixt. is fed at 180° to the spray nozzles. Spraying through nozzles by air pressure is preferred over pumping to the spray nozzles and over spraying from a rotating disk. Soap is formed into bars in cooling presses, entailing 15 to 20% scrap to be reworked. The problem of satisfactory cooling is yet to be solved. (*Chem. Abs.*)

PATENTS

Crystallization of glycerine. Henry Hass (Purdue Research Foundation). *U. S. 2,233,606.* In a process for purifying impure glycerine, the steps which comprise incorporating glycerine crystals in a solution of said impure glycerine in an aliphatic alcohol (butanol), at a temperature below the freezing point of glycerine and above the freezing point of the eutectic composition of glycerine and said alcohol, the concentration of glycerine in said solution being 0.5-1.5 moles of glycerine per mole of solvent, and the temperature and concentration being such that the partial vapor pressure of the dissolved glycerine exceeds the vapor pressure of crystalline glycerine at said temperature, permitting crystalline growth to take place at said temperature, and separating the resulting crystallizine glycerine from the mother liquid.

Antifreeze substance for fuel tanks. Willett Magruder, Jr., and Alfred Korte (Carter Carburetor Corp.). *U. S. 2,229,215.* The method of preventing freezing of settled water in the lower part of a confined body of liquid hydrocarbon fuel which comprises adding to the body of fuel a quantity of antifreeze solution comprising relatively large portions by volume of a heavy alcohol having a specific gravity greater than water and selected from the group consisting of glycerine, ethylene glycol and furfuryl alcohol, a light alcohol having a specific gravity less than water and selected from the group consisting of ethyl alcohol and methyl alcohol, and a relatively small portion of water, the proportions of the ingredients of the said solutions being such that the solution is substantially immiscible with and heavier than the hydrocarbon and has a specific gravity approaching that of water, a sufficient quantity of the solution being added so that the solution will sink to the level of and readily mix with settled water and form an immiscible layer therewith, below the hydrocarbon, and lower the freezing point thereof.

Process of treating soap stock. Benjamin Clayton (Refining, Inc.). *U. S. 2,230,196.* The process of purifying soap stock from the alkali refining of glyceride oils, said soap stock containing water, a lower aliphatic alcohol and odoriferous substances from said oil, which comprises heating said soap stock to a temperature sufficiently high to break down odoriferous substances and removing vaporizable materials including said water and alcohol from said soap stock as vapors in order to produce an improved soap stock.