ited fat with an I value of 107.5. It was believed that the I values of the fats extd. from the blood and liver might offer addnl. clues as to the mechanisms involved in any changes in fat deposition. Significant differences are shown only in the liver fat acids and liver unsaponifiable fractions from the rats which received carotene in their diet. *(Chem. Abs.)*

FAT METABOLISM IN THE LUNGS. P. L. MacLachlan. *J. Biol. Chem. 146*, 45-8 (1942). Male, 3-month old, albino mice showed no significant changes from normal in the lipid content of the lungs, either during active absorption of fat from the intestine accompanied by a marked lipemia or during fasting for 1- and 2-day periods, when their are rapid mobilization and utilization of stored fat. These observations do not support the conclusion that the lungs actively participate in fat metabolism.

PATENTS

WATER SOLUBLE DISPERSIBLE PHOSPHATIDE DERIVATIVE. K. Dziengel. *Ger. 721,002 Cl. 12o.* The phosphatides are heated with neutral or acid sulfides *(Fette u. Seifen).*

PHOSPHATIDE CONTAINING BAKING CONSTITUENT. M. F. Niescher. *Ger. 719,268 Cl. 2c.* Soybean phosphatides are mixed with 10% finely powdered $NaHCO_3$ or other alkali reacting salt to form a homogenous paste. *(Fette u. Seifen).*

Abstracts

Soaps

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VEGETABLE SUBSTITUTES FOR FATS IN THE MANUFACTURE OF SOAP. Guido Rovesti. *Riv. ital. essenze, profumi piante offic., olii vegetali, saponi 22,* 346-8. A report on plants and their parts which have detergent properties. The plants tested were: Sambucus ebulus L., Pteris aquilina L., Saponaria officinalis L., Gypsophila arrestii Guss., Aesculus hippocastanum L., Arum maculatum, Sal-sola kali L., Salsola soda L., Salicornia herbacea, and Chenopodium album L. "Tergina," a product from lemon waste consisting mainly of pectin and cellulose is utilized commercially. *(Chem. Abs.)*

SALT WATER SOAP. Blanche Naylor. *Soap 18,* No. 11, 21-24, 74 (1942). Changes in Navy spec. 51D7 (INT) issued by the Bureau of Ships allows synthetic detergents, up to 20% by weight, to substitute for imported tropical oils of high lauric acid content that are no longer available. The active ingredient of the detergent should preferably be a member of the class represented by the formula $A\text{-}R\text{-}SO_3Na$ in which A is an alkyl radical (10 or more C atoms) and R is an aromatic or aliphatic grouping. Tallow is the chief fat charge although 10% of the fats may be other domestic fats or oils, or rosin. Rosin soaps are particularly suitable for salt water use as they aid lathering. Many soaps take advantage of this fact and use the maximum amount allowable by the Navy which is 4% by weight of the finished soap. Glycerine content of the revised spec. is limited to 0.7%. The principal tests to which the soap is subjected include its ability to remove soil, its ability to lather or foam, its stability, and its freedom from any tendency toward dermatitis. Advantages claimed for the new formulae are usability in cold as well as hot water; greater efficiency in washing: and insecticidal properties. Extracts from Interim Spec. 51D7 (TNT), Bureau of Ships. U. S. Navy Dept., April 15, 1942, are given.

SOAP IN THE RUBBER CRISIS. Anon. *Soap 18,* No. 11, 28-31 (1942). Synthetic rubber calls for the use of 100,000,000 pounds of tallow chip soap yearly in butadiene manufacture for use as wetting, dispersing, stabilizing, and lubricating agents. Specifications as given by the Rubber Reserve Company are listed.

X-RAY INVESTIGATION OF THE STRUCTURE OF SOAP SOLUTIONS. H. Kiessig. *Kolloid-Z. 96,* 252-5 (1941). In solid sodium oleate the soap molecules are arranged in double layers with the polar groups turned toward one another. The molecules are in an inclined position relative to the layer plane. In an 18.7% soln. the interplaner distance equals 78 A. Since the length of the molecule is 48.5 A. it must be assumed that the molecules are in an erect position in soln. and that the hydrocarbon ends are turned toward one another. In the micelles, oleate layers follow water layers in an alternate fashion and 19.4 water mols. per double mol. are found. In a 6% soln. the interplanar distance is increased to 99 A. Both water and oleate layer have the same thickness. C_6H_6 is sol. in aq. oleate soln. In a 15% aq. soln. the interplanar distance equals 84 A.; addn. of 0.4 g. C_6H_6 per g. of the oleate increases this value to 900 A. A regular sequence results: simple Na oleate mol., C_6H_6, simple oleate mol., water. The hydrocarbon ends are turned toward the C_6H_6, the polar groups toward the water. The C_6H_6 enters longitudinally between the oleate layers. In spite of the amt. of included solvent, the order is distinct. A 42% soln. of laurylpyridinium chloride in H_2O exhibits a good micellar order with an interplanar distance of 38.1 A. A 60% soln. in EtOH shows less order and gives a distance of 22 A. Polyethylene oxide in an 80% aq. soln. (20 ethylene oxide groups) gives a distance of 59 A., whereas the solid polymer gives an interference ring of 80.3 A. In this case an interpretation of the micellar structure is not possible as yet. It can be concluded from x-ray data that the micelles have a foil-like shape and are oriented by a flow gradient. *(Chem. Abs.)*

THP STRUCTURE OF SOAP SOLS. J. Stauff. *Kolloid-Z. 96,* 244-51 (1941). The structure and the properties of a soap sol can be correlated with the structure of the macromol., its interaction with the surroundings and the presence of a thermodynamic equil. The lattice energy of a crystd. soap is composed of the energy of the paraffin chain (approx. 20 kg.-cal. per mol. for 16 atoms) and the electrostatic energy of 70 kg.-cal./mol. for the double layer. From the lattice energy and the heat of soln. of Na palmitate (22 kg.-cal./mol.) the surface energy between H_2O and the paraffin (11 kg.-cal./mol.) and the hydration energy of the Na ion (99 kg.-cal./mol.) a heat of hydration for the paraffin ion of—20 kg.-cal./mol. is calcd. The various theories of the structure of soap solns. are discussed. Below a crit. concn. c_k the properties in soln. are detd. by the ionic groups. Above c_k small spherical micelles are formed. Their diam. is about 48 A. At the approx. concn. corresponding to a min. in the cond. curve the formation of large micelles must be assumed. They have a foil-like shape. The thickness is about 250 A. and the other dimensions are probably a multiple thereof. *(Chem. Abs.)*

Frothability and bubble formation. Eric Hardy. *American Perfumer & Essential Oil Review 44*, No. 11, 29 (1942). A study of the physical properties of surface films and surface tension and their influence upon colloid chemistry in the soap and essential oil industries.

The colloid chemistry of the systems: soap-cresol-water. VII. Viscosity of soap solutions in the presence of electrolyte and phenol. E. Angelescu and T. Manolescu. *Kolloid-Z, 96*, 75-85 (1941). The effect of phenol and NaCl, NaBr, NaI, $NaNO_3$, KCl, KBr, KI, KNO_3 or K palmitate, Na palmitate, K stearate, and Na stearate was detd. Phenol acts in all cases the same as cresol. In the presence of phenol the solns. of NaCl in various concns. present in a soln. of 0.2 *N* Na palmitate cause a distinct max. viscosity at 50° and 60°. The stearates behave the same as the palmitates. The alkali salts react specifically only in pure soap solns. contg. large amts. of phenol and the viscosity declines slightly on the addn. of the salts. The electrolyte retards the process of solvation. The coeff. of the distribution of phenol between the layers of water and benzine is almost independent of the electrolyte. The effect of the electrolyte on the viscosity is, therefore, not a salting-out effect; the electrolyte causes an increase of the particles capable of solvation and increases by dehydration the internal solvation by phenol. *(Chem. Abs.)*

Mechanical properties of soap solutions and their relation to structure. W. Philippoff. *Kolloid-Z. 96*, 255-61 (1941). The viscosity characteristics of micellar soap solns. are discussed. Aq. solns. of soaps and soap-like materials exhibit a discontinuity in the viscosity-concn. curve at a crit. concn. c_k. Alc. solns. with molecularly dispersed soaps, give a smooth function. Solns. of K laurate and 5 derivs. of dodecance were examd. The concn. dependence of the relative viscosity n_{rel} of the laurate in water with addn. of KOH, the flow curves of more concd. laurate solns. with and without KOH, the dependence of n_{rel} of a 0.45 *N* Na oleate soln. upon the addn. of m-cresol (log n_{rel} exhibits a distinct max. of 3% cresol) and the flow curves of these solns. allow a distinction between the following micellar formations in respect to viscosity behavior. First, small micelles exhibit neither structural viscosity, temp. dependence, double refraction of flow nor x-ray interferences. They cause a rather flat course of the n_{rel} curve. Second, large micelles give an x-ray pattern the more distinct, the higher the concn. Third, irregular aggregates at greater addition of KOH and cresol exhibit greater viscosity with a steeper curve. Strong temp. dependence, structural viscosity, streaming birefringence result. No distinct x-ray diagrams are obtained. A model is proposed for the small micelles of K laurate. It consists of double layers with hexagonal packing of rods. The double layer has a thickness of 32 and diam. of 43.5 A. The distance between two double layers in an 18% aq. soln. equals 18 A. *(Chem. Abs.)*

Investigation of the equilibrium and the surface properties in the system phenol-sodium oleate-water. N. N. Petin and K. V. Topchieva. *J. Phys. Chem. (U.S.S.R.) 15*, 198-204 (1941). Exptl. data for the relative concn., distribution coeffs., the elec. conductivities and the surface tensions on the liquid air and the interliquid phase surfaces, for various systems contg. up to 2.5% (0.56% dissolved) Na oleate and 26.7% phenol (P) are given. The surface tension on the boundary with air is a const., that for the interliquid phase surfaces increases anomalously up to the point of miscibility. The compn. of the lower P and upper H_2O phases does not tend to equalize prior to the disappearance of the latter at the crit. eutectic point. The distribution coeff. of Na oleate between the P and aq. phases begins below unity and increases to above unity for larger concns. of H_2O. *(Chem. Abs.)*

Fat and oil shortage: Germany. Anon. *Chem. & Met. Eng. 49*, No. 12, 130 (1942). The shortage of imported oils has drastically curtailed soap output and increased the use of substitute and filler materials. In addition to the one standard "Einheitsseife" there are now 1700 soap-saving materials in Germany which includes shampoos and detergents, as well as scouring agents. Hand soaps now generally consist of 80 to 95 per cent abrasives and fillers like pumice powder, kaolinite, etc. Most soaps contain less than 3% fat in the form of soap powder; hardly any natural fatty acids but substitute materials made from naphthalene or paraffine. Chestnut meal or saponin (from imported bark) are added to aid lathering. Soda and sodium silicate in large amounts are used also.

Substitute oils: Great Britain. Anon. *Chem. & Met. Eng. 49*, No. 11, 138 (1942). Groundnut and similar oils have taken the place of castor and olive oils in textile dressing. A dressing soap may consist of soap made from groundnut oil and containing a large excess of the oil. In some factories a fulling soap is made by acidifying the waste soapy water from other textile processes and distilling the fatty acids with a view to the elimination of unsaponifiable constituents.

Critical discussion of methods for determining peanut oil in oils, fats, and soaps. J. Pritzker and Rob. Jungkunz. *Mitt. Lebensm. Hyg. 33*, 75-85 (1942). Existing methods are adversely criticized; a modification of the Kreis-Roth method is found satisfactory in all cases: 10 g. of oil or fat is sapond. with KOH in 60 ml. of 70% alc.; the mixt. is treated with 60 ml. of 95% alc., 7.5 ml. of 50% AcOH and 0.5 g. of Pb acetate in 50 ml. of 95% alc.; after standing overnight the fatty Pb salts are removed and decompd. with HNO_3; the sepd. fat acids (arachidic and lignoceric) are crystd. twice from 50 ml. hot 95% alc. and weighed. The m. p. is taken; if it is 72° or over; multiplication by 200 gives approx. the amt. of peanut oil in the sample: if under 72° (even after further crystn.) the test is neg. With soaps, 9.5 g. of the sepd. fat acids is dissolved in 100 ml. of 95% alc. *(Chem. Abs.)*

The constitution of dilute soap solutions. V. The hydrolysis of sodium caproate. P. Ekwall. *Kolloid-Z, 97*, 71-80 (1941). The hydrolysis of Na caproate has been investigated qualitatively and quantitatively. In the caproate soln. two regions of cloudiness appear at 20° if an excess of capric acid is present. The substance pptd. at greater diln. consists of capric acid. The cloudiness observed at higher concns. is caused by liquid-cryst. acid caproate. In caproate solns. free of the acid only the least cloudiness is observed. The liquid-cryst. caprate (Ki) has the compn. $2NaKi \cdot IHKi \cdot 13—2OH_2O$. Suspended in its mother liquor it is transformed into the crystd. acid caproate upon cooling. This process is reversible and occurs at about 11 to 12°. The solid crystal. acid characteristic limits of concn. of caproate solns. have been detd. by means of various methods. The limiting concn. is 0.021 *N*, the intermediate one at 0.043 to 0.055 *N* and the critical one at 0.097 *N*. The region of conc. within which the equiv. cond. decreases rapidly is found between 0.095 and 0.2 *N*. The OH ion activity has been detd. with the aid of the glass electrode at 20°. Curves and tables are given. The curve of the degree of hydrolysis has several parts, each with one hydrolysis equil. The nature of these equil. is discussed. Below the limiting concn. where hydrolysis leads to the formation of free capric acid, the degree of hydrolysis decreases, as is usual, with increasing concn. After reaching the limiting concn. this decrease is less pronounced. Hydrolysis then leads to the formation of a sol. acid soap. Probably KiHKi ions are formed by the hydrolysis of Ki_2 ions. Between 0.055 *N* and 0.095 *N* the solns. contain pptd. liquid-cryst. caprate. This latter seems to be formed by hydrolysis of triple caprate ions. In this region the degree of hydrolysis increases with increasing concn. Above the crit. concn. the value increases still more rapidly in the beginning. This points to a hydrolysis of four- to six-fold caprate ions under formation of colloidal acid soap. From about 0.13 to 0.15 *N* this increase occurs more slowly. At about 0.2 *N* the degree of hydrolysis has a max. in connection with the progress of assocn. The following picture on the constitution of the soln. is obtained at 20°. Below the limiting concn. of 0.021 *N*, the caprate behaves like a normal uni-univalent electrolyte. After that assocn. sets in leading first to the formation of double ions. At 0.043 to 0.055 *N* formation of triple ions possibly occurs. It is also probable that ions of medium size are formed. However, at 0.13 *N* the large, Na-contg. ions become preponderant and the assocn. process is terminated at 0.2 *N*. *(Chem. Abs.)*

War and the soap plant. C. R. Kemp. *Soap 18*, 12, 25 (1942). A review of the changes in soap manufacture since the beginning of the war.

Rug and upholstery cleaners. C. T. Snell. *Chem. Ind. 51*, 738 (1942). Formulation and production information are given. R. Carter and V. G. W. Harrison. *World's Paper Trade Rev. 118*, TS51-2 (1942).

In a three-day paper mill run on 100% kraft-pulp paper, rosin-alum size was used on the first and third days (as control), and on the second day the rosin was replaced by soap. The expt. proved that soap can be used successfully as a sizing agent on a works scale. To obtain the same degree of sizing it is necessary to use more soap than rosin. Rosin sizing was carried out under conditions known to be favorable. The effect of variable such as pH or drying temp. on soap-sizing was not investigated so that it is possible that the soap was not used under optimum conditions.

PATENTS

Extruding soap. Harry W. K. Pears and Harry P. Slack. *British 545,116.* To form tubes, reductible to smaller form by comminution, soap (cold and in solid, plastic state, partially dried) is forced from the plodder through extrusion dies and cut transversely into lengths convenient for use.

Extruding soap. Harry W. K. Pears and Harry P. Slack. *British 545,118.* The production of soaps in form of threads of complex cross section is described.

Preserving soap. Lever Brothers and Unilever Limited. *British 544,863.* Soaps are stabilized against rancidity and discoloration by incorporation therein of a small amt. (0.1-1%) of α-stannic acid.

Soap in the beta phase. Victor Mills (Procter & Gamble Co.) *U. S. 2,293,594.* A process for the mfr. of a detergent soap similar to milled soap (contg. soap in beta phase) by chilling and agitating soap mass and extruding at temp. in which soap has pasty cohesiveness; e.g., for a floating soap introduce molten soap and air into a water-cooled chamber, scrapers remove chilled soap from sides and mix; then extrude.

Manufacture of soap. Ashton T. Scott (The Sharples Corp.). *U. S. 2,300,749.* A continuous process said to reduce soap making time from several days to 20 min.

Removal of impurities from soap nigre. Ashton T. Scott (The Sharples Corp.). *U. S. 2,302,382.* A special centrifuging procedure is described.

Soap apparatus. C. T. Walter (Industrial Patents Corp.). *U. S. 2,299,958.* This invention relates to an improved method and means for extruding and drying plastic material.

Soap and method of making. Kenneth M. Gaver (The Komel Corp). *U. S. 2,300,413.* The process of making a soap comprises the step of saponifying fat or oil with alk. metal starchate.

Soap and process for making same. Bror J. Grondal and Harry Morley Wylde (Levers Bros. Co.). *U. S. 2,300,416.* In the process for making mild soap free from skin irritating properties from fatty oils contg. low mol. wt. components there is the step of fractionating the fatty acids of said fatty oils to remove a fraction contg. fatty acids having less than 12 carbon atoms while retaining a fraction contg. the fatty acids having at least 12 carbon atoms and making soap from the latter fatty acid fraction.

Detergent. Walter M. Bruner (E. I. duPont de Nemours & Company). *U. S. 2,302,598.* In a cleaning process involving the use of a bath contg. hard water and a detergent, a step comprises introducing into the bath a Na salt of a hydroxynitrilosulfonic acid.

Wetting agent. Alexander J. Stirton, Robert F. Peterson, and Phillip H. Groggins (Henry A. Wallace). *U. S. 2,302,070.* Sulfoarylstearic acids such as sulfotolylstearic acid are used as wetting agents.

Sulphated oil composition. G. W. Fiero. *U. S. 2,300,780.* An emulsifier for salves consists essentially of a substance selected from the group consisting of sulphated hydrogenated castor oil and phosphated hydrogenated castor oil having an I value less than 11.

Process for breaking petroleum emulsions. Melvin De Groote and Bernhard Keiser (Petrolite Corp., Ltd.). *U. S. 2,300,554-6.*