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Oils and Fats

Edited by
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OIL INDUSTRY IN ARGENTINA. A. Ferrara. *Olearia 1,* 21-5 (1947).

INDUSTRIAL EXTRACTION OF RAISIN SEED OIL. G. B. Martinenghi. *Olearia 1,* 84-9 (1947).

VEGETABLE FAT AND OIL PRODUCTION IN BRITISH AFRICAN COLONIES. B. A. Keen, C. E. Rooke, J. McFadyen, and R. S. Mallinson. *Oleagineux 2,* 475-92 (1947). The paper is in four parts that deal successively with agricultural questions, with production and its development, with commercial and economic considerations, and lastly with the problems of transport. It is completed by 17 appendices that provide all the statistical data for the understanding of the text.

FATS AND OILS MAGIC. J. P. Harris (Ind. Chem. Sales Div., West Virginia Pulp and Paper Co.). *Nat'l Provisioner 17,* 10-12, 23 (1947). Second article of 2 reviewing technical advances in the fats and oils field and explaining what they mean for the packer.

REPORT ON CRUDE FAT OR ETHER EXTRACT. J. J. Taylor (Dept. Agr., Tallahassee, Fla.). *J. Assoc. Official Ag. Chem. 30,* 597-9 (1947). Petroleum ether of a suitable grade is a more suitable solvent than Et ether for determining fat or ether extract, where non-protein nitrogen is present in the feed mixture.

REPORT ON FAT IN FISH MEAL. M. E. Stansby (Seattle Tech. Lab., U. S. Fish and Wildlife Service, Washington). *J. Assoc. Official Ag. Chem. 30,* 595-7 (1947). The binary azeotropic mixture of benzene and methanol gives higher fat content values for fish than does acetone or other solvents previously investigated. Further investigation is required to determine whether "purification" of the gross mixed solvent extract (removal of mixed solvent and separation of oil soluble in Et ether) is necessary. This procedure is very difficult to carry out with the mixed solvent and unless it can be eliminated the method does not lend itself to routine analyses.

THE DETERMINATION OF FAT AND ITS RELATION TO THE CALCULATED CALORIC VALUE OF DIETS. O. Mickelsen, E. v. O. Miller, A. Keys, and H. H. Mitchell (Univ. Minnesota, Minneapolis). *J. Am. Dietetic Assoc. 23,* 952-6 (1947).

NEW METHODS FOR THE DETERMINATION OF IODINE NUMBERS BY REVERSIBLE OXIDATION-REDUCTION INDICATORS. J. Kottasz (Chem. Food Investigating Inst., Budapest, Hungary). *Magyar Kem. Lapja 2,* 208-12 (1947). The method of Kaufmann-Funke was modified. The excess Br is bound by uncolored excess solution of arsenious acid and the excess of the latter is back-titrated by K bromate. Selenious acid, p-ethoxychrysoidine, or Me orange is used as indicator. Instead of the solution proposed by Kaufmann a solution of NaOBr and, instead of expensive MeOH, NaOH are also suitable. NaOBr can be replaced by NaOCl, but the latter must be kept in a normal amount. Preparation of hypochlorites is tedious; therefore the use of chloramine is proposed, but this must also be kept in the dark and in a normal amount. The results affirm the suitability of this method in analyzing castor oil, sunflower oil, aged linseed oil, hog fat, etc. (*Chem. Abs. 41,* 7776.)

THE RE-EXAMINATION OF HALIBUT-LIVER OIL. RELATION BETWEEN BIOLOGICAL POTENCY AND ULTRAVIOLET ABSORPTION DUE TO VITAMIN A. R. A. Morton and A. L. Stubbs (Univ. Liverpool). *Biochem. J. 41,* 525-9 (1947). A re-examination of the 2 halibut-liver oils used in the co-operative assays of 1936 has been carried out by photo-electric spectrophotometry. The results show that the original spectroscopic data required some correction for absorption at 328 mμ by constituents other than vitamin A. When such a correction is applied, the conversion factor relating $E^{1\%}_{1\text{cm.}}$ 328 mμ to potency in i.u./g. is raised from 1570-1830, which agrees well with the values of 1770 obtained for crystalline vitamin A β-naphthoate and 1820 for cod-liver oil, and justifies a round figure of 1800.

ULTRAVIOLET ABSORPTION CURVES FOR VITAMIN A USING TUNGSTEN AND HYDROGEN DISCHARGE LIGHT SOURCES. G. Ivor Jones (Fishery Tech. Lab., Seattle, Wash.). *Com. Fisheries Rev. 9,* No. 8, 22-6 (1947). The spectrophotometric method for determining vitamin A potency has geen generally adopted by the vitamin liver oil industry. The practice of using a tungsten light source for making measurements at certain wave lengths in the ultraviolet region, however, has not been considered reliable by the instrument manufacturer. To check on this, a series of experiments were conducted with two types of light sources. From the data obtained, it was concluded that reliable results may be obtained by use of the tungsten lamp.

UTILIZATION OF VITAMIN A IN WATER EMULSION. G. R. Halpern, J. Biely, and F. Hardy (Univ. Brit. Columbia, Vancouver, Can.). *Science 106,* 40-1 (1947). Two samples of grayfish-liver oil, one freshly prepared and the other oxidized to a peroxide value of 16.7, were assayed for vitamin A potency by feeding to chicks. Average growth responses after 7 weeks indicated that fresh liver oil is superior to oxidized liver oil, whether fed in oil or in water, as a source of vitamin A. Also, grayfish-liver oils in water emulsions showed greater vitamin A activity than the same quantities of liver oils fed in sunflower seed oil solution. (*Chem. Abs. 41,* 7653-4.)

THE MODE OF ACTION OF LIPOTROPIC AGENTS. PROOF OF THE IN VIVO INCORPORATION OF TRIETHYL-β-HYDROXYETHYLAMMONIUM HYDROXIDE INTO THE PHOSPHOLIPID MOLECULE. C. S. McArthur, C. C. Lucas, and C. H. Best (Univ. Toronto). *Biochem. J. 41,* 612-18 (1947). A significant difference between the microchemical and microbiological assays for choline in the hydrolysates of the phospholipids, isolated from the livers of rats fed triethyl-β-hydroxyethylammonium chloride, suggested that appreciable amounts of an unnatural base had been incorporated into the liver phospholipids. Fractionation procedures were devised which led to chemical proof that the triethyl homologue of choline had been incorporated into the phospholipids. This finding provides further proof that the lipotropic effect of choline is associated with the intact molecule rather than its Me groups.

THE EFFECT OF REMOVAL OF LIPIDS BY SOLVENT EXTRACTION ON THE FEEDING VALUE OF COTTONSEED AND SOYBEAN MEALS. R. Reiser (Texas Agr. Exper. Sta.). *Misc. Publ. No. 10,* 7 pp. (1947). The present discussion has brought out that fat extraction has no effect on the biological value of the proteins or on egg production. Considered individually the loss of essential fatty acids, reduced need for thiamin, effect on calcium metabolism, satiety value, decreased fat tolerance and effect on growth may be ignored in considering the relative feeding value of solvent and press extracted meals. Some effects were shown to be two-edged, thus in storage the fat may become rancid or it may prevent loss in biological value of the protein, and the tocopherol may act as antioxidant. In general, however, the conclusion that "nearly all experiment has shown that the inclusion of fresh palatable and digestible natural fats improves the diet in some way" is inescapable. Not only does fat have functions *per se*, such as energy value and possibly lactation and growth, but it aids other dietary factors in the performance of their functions. In many cases, the substitution in the ration of solvent extracted soybean or cottonseed meals for the press extracted meals reduces the total fat intake sufficiently to have measurable effects unless other sources of the fat are substituted. 46 references.

Binding of fatty acids by serum albumin, a protective growth factor in bacteriological media. B. D. Davis and R. J. Dubos (Rockefeller Inst. Med. Research, New York). *J. Exptl. Med. 86*, 215-28 (1947). Serum albumin is a protective bacterial growth factor; by binding traces of fatty acid in the media, it permits initiation of growth by the smallest possible inocula of tubercle bacilli. Each molecule of albumin binds 3-6 molecules of oleic acid (1-2% of the weight of the albumin) tightly enough to prevent bacteriostasis and 9 molecules of oleic acid in equilibrium with a saturated neutral solution. The property requires undenatured albumin. Crystalline β-lactoglobulin has a smaller capacity, and a number of other proteins no perceptible capacity to bind oleic acid. The inhibitory effect of the commercial product Tween 80 (polyoxyethylene sorbitan monoöleate) on the growth of small inocula of tubercle bacilli in liquid media is caused by its content of unesterified oleic acid (0.6% by weight). Purified Tween 80, freed of this contaminating fatty acid, not only permits growth of small inocula but protects against small quantities of added oleic acid. The implications of the binding capacity of albumin for its possible physiological significance in the animal body (transport; protection against cytotoxins) and for the structure of the proteins are briefly discussed. (*Chem.* Abs. *41*, 7715.)

Preparation of nitriles from fats. M. Reutenauer and M. Lacombe (Lab. Chevreul, I.T.E.R.G.). *Oleagineux 2*, 500-3 (1947). The authors demonstrated that it is possible to manufacture nitriles as has been described previously using fats and oils instead of the free acids as the raw material. The experimental yields were lower, but several advantages could be gained in commercial operations. The possible reactions that occur are reviewed and discussed.

Some new aspects of pour-depressant treated oils. C. E. Hodges and D. T. Rogers (Standard Oil Co. of New Jersey, Bayonne). *Oil Gas J. 46*, No. 22, 89-93, 99 (1947). A report of field test and the resulting development of improved laboratory tests to identify the factors of importance to pour stability and improved pour depressants. The data confirm the belief that widely fluctuating temperature often causes more pour instability than continued long cold spells. High-cloud-point oils are relatively more of a pour stability problem than others and the effectiveness of depressants was found to vary with different types of oils. Three time-temperature cycles have been worked out for laboratory investigations which give results agreeing with the field tests. *Abs. 41*, 7715.)

PATENTS

Chlorite bleaching of wax and oil esters. Ernest Stossel and Ernest Zerner (Mathieson Alkali Works, Inc., N. Y.). *U. S. 2,431,842.* The process of bleaching ester-type oil comprises the steps of melting said wax; adding a small amount of an aqueous sodium chlorite solution thus obtaining an unacidified wax-sodium chlorite mixture; stirring the mixture until the wax is bleached to the desired extent; and treating with an acid, thereby destroying the emulsion formed during bleaching.

Antioxidant stabilized material. Abraham Taub and Rose Mary Simone. *U. S. 2,432,698.* An oxidizable vitamin-containing fish liver oil is preserved with an anti-oxidant which is a co-inhibitor combination comprising both a nicotinic acid nucleus compound and an unsaponifiable fraction of vegetable oil.

Vitamin recovery. Walter Russel Trent (Colgate-Palmolive-Peet Co.). *U. S. 2,432,181.* A process for the recovery of vitamins, sterols, and other valuable constituents from fats comprises the steps of reacting a fat with a monohydric alcohol having 1-6 C atoms per molecule in the presence of an alkaline alcoholysis catalyst, adjusting the pH of the reaction product to about 5, flash distilling the reaction product to vaporize and remove unreacted alcohol, glycerol and esters of fatty acids and the alcohol having a boiling point substantially lower than the vitamins, sterols, and other valuable constituents, and recovering valuable constituents from the residue of the flash distillation.

Vitamin A carotenoids from palm oil. Herbert B. Larner (M. W. Kellogg Co., New Jersey). *U. S. 2,432,021.* The improved method involves in general the treatment of the fatty oil at moderate or low temperatures by means of a selective solvent under conditions effective to maintain the solvent in a liquid condition and under which the solvent and oil form solvent and oil phases between which the oil is distributed. The phases are separated and the oil component of the oil phase is recovered as vitamin A carotenoid concentrate.

Increasing the rosin-to-fatty acid ratio in mixtures of rosin and fatty acids. Robert C. Palmer. *U. S. 2,432,333.* A special chromatographic method is described.

Process of facilitating the separation of rosin from tall oil. Robert C. Palmer. *U. S. 2,432,332.* By increasing the polarity of the fatty acids present in the tall oil, as by esterifying the fatty acids with polyhydric alcohols to produce hydroxy compounds, without substantial esterification of the rosin acids, the selective absorption efficiency in separating rosin acids from the mixture is greatly improved. The conversion of the tall oil fatty acids into compounds having hydroxy groups may be suitably carried out by reaction with glycerol or one of the glycols, preferably so as to form the monoester of the polyhydric alcohol used.

Drying Oils

Edited by
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AFRICAN DRYING OILS. I. THE SEED OILS OF TETRACARPIDIUM CONOPHORUM. F. D. Gunstone, T. P. Hilditch, and J. P. Riley (Univ. Liverpool). *J. Soc. Chem. Ind. 66,* 293-6 (1947). The seed fat of *Tetracarpidium conophorum* from Nigeria is a drying oil with an iodine number of 198-206. The component acids are linolenic 64-68, linoleic 10-12, oleic 10-11, and saturated acids 10-12%. About 75% of the glycerides contain two or three linolenic radicals. Some tests show that the oil will dry a smooth hard film faster than linseed oil. The fresh nuts contain a lipase which must be inactivated by heating to 100° soon after the harvest.

A COMPARATIVE STUDY OF THE METHODS FOR DETERMINING UNSATURATION IN DRYING OILS. L. L. Carrick, S. M. DasGupta, and R. C. DasGupta. *Am. Paint J. 32,* No. 11, 72, 74, 76 (1947). Data are presented showing iodine numbers of various commercial drying oils as determined by the Wijs, Hoffmann and Green, Kaufmann, and Woburn methods. It is concluded that the Woburn method may be employed as a standard method for the determination of double bonds, especially in tung and dehydrated castor oils. Artificially made conjugated oils were found to give low maleic anhydride numbers.

A STUDY OF SOY-TUNG OIL COMBINATIONS. Pittsburgh Club (Fed. Paint Varnish Production Clubs). *Am. Paint J. 32,* No. 7-B, 16-23 (1947). Mixtures of soya and tung oils can be bodied to produce properties equal to those of bodied linseed oil. The soya and tung oils can also be bodied separately and then mixed, but films from the mixture soften on ageing, whereas combinations bodied together show increased hardness.

SOYBEAN OIL IN PROTECTIVE AND DECORATIVE COATINGS. R. L. Terrill and F. Mitchell (Soybean Research Council). *Am. Paint J. 32,* No. 8, 94, 96 (1947). A review.

FRACTIONATION OF THE REACTION PRODUCT OF LINSEED OIL AND GLYCEROL. J. G. Breckenridge and J. H. E. Herbst (Univ. of Toronto). *Can. J. Research 25B,* 420-22 (1947). Partial esters were obtained by heating alkali-refined linseed oil with various amounts of glycerol in the presence of calcium acetate monohydrate. These esters were separated into fractions of low and high iodine value by fractional crystallization.

APPLICATIONS OF THE SPECTROGRAPHIC METHOD FOR STUDYING THE RESIN BODYING OF DRYING OILS. E. A. Hauser and F. J. Kolb (Massachusetts Institute of Technology). *Am. Paint J. 32,* No. 7-A 34-36 (1947). Absorption spectra were determined for a number of varnish materials over a wide spectral range. It is shown that ultraviolet absorption measurements are not useful in following the resin bodying of oils, but that infrared absorption spectra at sufficient resolution should be satisfactory. Raman spectra were not useful because strong continuous fluorescence was encountered.

PATENTS

PROCESS FOR THE PREPARATION OF SICCATIVE OILS. M. Dussollier (Establissements Robbe Freres, France). *U. S. 2,433,077.* A drying oil is prepared by heating castor oil to a temperature between 140°C. and 280° C., and passing a stream of sulfur dioxide gas through the heated oil thereby agitating and catalytically dehydrating the oil.

POLYMERIZATION NUCLEUS FOR WRINKLING OILS. G. M. Williams (New Wrinkle, Inc.). *U. S. 2,431,357.* An untreated, normally non-wrinkling oil is converted into a wrinkling oil by heating the oil in an inert ambient atmosphere at a maximum temperature of 200°C. with ethyl cesium.

Soap and Perfume

Edited by
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GERMAN SYNTHETIC DETERGENTS. G. R. Perdue (British Launderers' Research Assoc.). *Soap, Perfumery, Cosmetics 20,* 1088-9 (1947). The various types of detergents developed in Germany are reviewed. These include the sulfonated fatty alcohols, the Igepons, Nekals, Igepals, and Mersolats. The Mersolats, although not the best detergent, were produced in the largest quantity from the Fischer-Tropsch reaction. The use of Tylose HBR, a cellulose derivative, in combination with various synthetic detergents is described.

FAT CHEMISTRY PROCESSES AND THEIR ECONOMIC STATUS. VIII. NATURAL FATS OR SYNTHETIC FATTY ACIDS IN THE SOAP AND DETERGENT INDUSTRY. Kurt Lindner. *Fette u. Seifen 51,* 143-5 (1944). The influence of the length of the C chain of the fatty acid and that of the double bonds are explained on the basis of the literature. (*Chem. Abs. 41,* 7775.)

NONIONIC DETERGENTS IN THE SCOURING OF RAW WOOL. H. C. Borghetty. *Am. Dyestuff Reptr. 36,* 676-8 (1947). The non-ionics consisting of such types as Carbowax, Tweens, Emulphors, Igepals, and Peregals are excellent detergents for wool-scouring because of their neutrality, extreme solubility, stability to alkali, stability to hard water, rinsibility in cold water, non-substantivity for wool, and stability to heat, oxidation, and rancidity. The problems involved in wool-scouring due to the types of impurities inherent in the wool are reviewed. The methods of scouring, using a series of bowls, is outlined.

VOLUMETRIC ANALYSIS OF COLLOIDAL ELECTROLYTES BY TURBIDITY TITRATION. Joseph M. Lambert (General Aniline & Film Corp., Easton, Pa.). *J. Colloid Sci. 2,* 479-93 (1947). The concentration of most surface-active agents classified as colloidal electrolytes can be determined in dilute solutions by a new titrimetric method. An anionic agent is titrated with a cationic agent (or vice versa) so that a colloidal precipitate is produced near the equivalence-point and solubilized or coagulated by a small excess of reagent. The end-point of the titration is indicated by the maximum turbidity of the solution, which is easily detected with a conventional colorimeter. The test measures the total amount of ionic surface-active materials in solution, and is therefore not specific for a particular surface-active agent. Examples of preparations tested include Dreft, Igepon TD, Nacconol NR, Aerosol OT, and Nekal BX titrated with Cetyl Pyridinium Chloride and Hyamine 1622, Zephiran Chloride titrated with Igepon TD.

INVESTIGATIONS OF THE ACTION OF VARIOUS SYNTHETIC DETERGENTS ON HYDROGEN PEROXIDES. O. Uhl. *Fette u. Seifen 51,* 64-6 (1944). Laboratory and practical experiments have shown that in neutral solutions Sulfonate D and H and Tylose have a slight stabilizing effect. This action was different for the combination sulfonate + fatty alcohol sulfonate and for the combination sulfonate + fatty acid condensation product. While the sulfonate product had a stabilizing effect, the condensation product produced a more vigorous and more rapid splitting off of O_2. In all experiments a considerably more vigorous decomposition of H_2O_2 was observed in alkaline solution. Water glass and Mg silicate had a stabilizing action on all the detergents used, even in Cu washing machines. (*Chem. Abs. 41*, 7779.)

Behavior of some alkali soap systems in organic solvents. Mata Prasad, G. S. Hattiangdi, and B. K. Wagle (Royal Institute of Science, Bombay, India). *J. Colloid Sci. 2*, 467-76 (1947). The behavior of Na oleate, Na stearate, and Na palmitate toward 40 different organic solvents including hydrocarbons, hydroxy compounds, halogenated hydrocarbons, ethers, esters, aldehydes, ketones, nitro, amino, and other compounds has been examined. It is found that the soaps do not dissolve in most of the solvents at room temperature, but swell on heating and give clear mobile solutions near the boiling point of the solvent. On cooling these solutions, the soap may remain in solution, it may crystallize out, may form a pseudo-gel or true gel depending upon the nature of the soap-solvent system. The amount of the gel-like material obtained increases with the boiling point of the solvent. If the soap content is low, crystallization occurs when the hot soap-solvent system is cooled. With an increase in the concentration of the soap, a pseudo-gel is obtained first, and a true gel is formed only when an optimum concentration of the soap is reached. The transitions between the various stages are effected by very gentle gradations in the concentrations of the soap in the system.

Detergents for dairy plants and methods of their evaluation. H. G. Harding and H. A. Trebler (Natl. Dairy Research Labs., Inc., Baltimore, Md.). *Food Technol. 1*, 478-93 (1947). The purpose of the experiments was to determine what requirements should be taken into consideration in formulating a cleansing agent for specific uses in the dairy industry and what tests of the cleanser would be most indicative of the performance of the cleaning agent under actual conditions. The authors concluded that the most effective cleansing agent contained sufficient polyphosphates to keep hardness-producing salts in solution, a synthetic wetting agent for ease of contact, and adequate active alkalinity to dissolve denatured protein. Tests for pH, alkalinity, surface tension, and turbidity-preventing power were most informative with regard to the probable performance of a cleansing agent under actual conditions. The minimal amounts of various commercial polyphosphates required to prevent turbidity at different levels of hardness are presented. Various commercial cleaners and component wetting agents, detergents, and alkalies were evaluated. (*Chem. Abs. 41*, 7779.)

Studies in soiling and detergency. J. R. Clark and V. B. Holland (Cannon Mills Co., Kannapolis, N. C.). *Am. Dyestuff Reptr. 36*, 734-47 (1947). This investigation covered the development and study of a standard soil and its relationship to certain aspects of detergency evaluation. The literature on various soiling techniques is reviewed. Four general types of soils were tested. These were: A. Aqueous solutions—starch or gum paste, mineral oil emulsions; pulverized carbon color agents. B. Stoddard solvent solutions—petroleum jelly or heavy mineral oil solutes; pulverized carbon color agents. C. Stoddard solvent solution—organic oils or petroleum jelly solutes; oil soluble dyes, color agents. D. Stoddard standard solvent solutions containing OILDAG (colloidal graphite in oil), and water solutions containing AQUADAG (colloidal graphite in water). Several formulas of each general type were made up and tested. The most satisfactory general soil was found to be Solution No. 6 in type D consisting of 2.0% OILDAG, 2.25% ALKANOL WXN, 8.0% 3F Fibre spray oil and, 89.75% Stoddard solvent. Other factors of detergency evaluation treated included age of soiled samples, effect of size of sample area, influence of length of washing, relation of temperature to soil removal and affinity of the standard soil for various types of fabrics. Four test synthetic detergents were selected and subjected to the above evaluations. Results are graphed.

Action of soap on the skin. IV. Action of a soap containing little or no lauric or oleic acid. C. Guy Lane and I. H. Blank. *Arch. Derm. & Syph. 56*, 419-24 (1947). Patch tests of the effect on the skin of various free fatty acids, fatty acid sodium soaps, and the soaps at various pH values are reviewed. Skin irritation decreased with increasing molecular weight of fatty acid even when the pH is increased. Unsaturated fatty acids are more irritating than saturated acids. Thus, a soap made from palmitic and stearic acids would be very satisfactory from a dermatological standpoint, but would not lather and would clean poorly. Tests made on highly sulfated oleic acid sulfato-octadecanoic acid) showed that it was non-irritating and possessed excellent detergent properties. A new solid lathering cake detergent—"Dermolate"—consisting of palmitic, stearic, and sulfato-octadecanoic acids adjusted to a pH of 8.5 has been clinically investigated and observed to be non-irritating.

PATENTS

Detergents for dishes. Harold Crewdson Wilson (Ruth Davis Marshall). *Brit. 591,035.* A detergent containing an inert non-alcoholic organic solvent, at least one of which is insoluble in water, and a mononuclear alkyl aryl sulfonate, the solvent being dispersed in water.

Milled toilet soap. John Holmberg. *Brit. Patent Spec. 36582/46.* Fatty acid esters of lower alcohols are saponified with caustic in the presence of water and at regulated temperatures so that the resulting soap possesses the right consistency for milling without further treatment.

Detergent creams and pastes of uniform consistency. Robert Henry Marriott. *Brit. 590,839.* Detergent creams and pastes of uniform consistency are prepared from sulphuric esters of higher fatty alcohols, a hydrophilic colloid such as cellulose ethers or salts of cellulose glycollic acid and a neutral salt such as sodium chloride or sulphate which are instrumental in maintaining the consistency.

Soap substitute from seaweed. Joaquin de La Vega Samper. *Brit. Patent Spec. 1080/47.* Seaweed mucilage is saponified with caustic, then resin is added in proportions necessary to make soap paste, liquid, or solid as desired.