ment paints, the soybean synthetics produced greater tensile strength than G Bodied Soybean, while in the single pigment paints there was in several cases no difference. The paints made with Soybean Maleic Pentaerythritol and the two polypentaerythritol esters had tensile strengths which were much superior to those of the paints made with natural oils. Conjugated Soybean did not have any tensile strength in either formulation. Abrasion resistance was not determined on the single pigment paints because they were too soft. Abrasion resistance of paints made with the various oils showed only that most of the synthetics were better than the corresponding natural oils. Conjugated Soybean, however, had less abrasion resistance than G Bodied Soybean. In most cases the shear and Sward hardnesses of the paints made with synthetic oils were greater than those of the paints made with the natural oils. Soybean Maleic Pentaerythritol and the two polypentaerythritol esters produced particularly hard films. Gloss measurements on the paint films show no particular trends.

Daylight reflectance is a measure of the whiteness of the paints and also shows no particular trends.

In a following paper it is intended to present a method whereby the experimental data gathered under this evaluation scheme may be condensed and correlated for convenience in reference and comparison.

Acknowledgment

The authors wish to acknowledge the assistance of those members of the National Lead Company Research Laboratories who performed many of the tests reported.

REFERENCE

1. Bolley, Don S., and Gallagher, E. C., J. Am. Oil Chem. Soc. *24*, 146 (1947).

☆ ☆ ☆ ABSTRACTS ☆ ☆ ☆

Oils and Fats

Edited by
M. M. PISKUR

CHEMICAL TREATMENTS OF SEEDS TO PREVENT HEATING AND DETERIORATION DURING STORAGE. A. M. Altschul (So. Reg. Res. Lab., New Orleans, La.). *Cotton Gin & Oil Mill Press,* Jan. 8, 1949. Forty-eight chemicals which inhibit heating and deterioration of seeds during storage are recorded. Mixtures of 2 chemicals were more efficient than either one used alone.

SOLVENT EXTRACTION OF SOYBEAN OIL BY MIXTURES OF TRICHLOROETHYLENE AND ETHYLENE ALCOHOL. S. G. Measmer, O. R. Sweeney, and L. K. Arnold. *Proc. Iowa Acad. Sci. 54,* 189-97(1947). A solvent consisting of denatured alcohol mixed with trichloroethylene to give a specific gravity of 0.910 can be used successfully in a continuous extraction plant to remove oil from soybeans. The extraction is carried out at 70° and the miscella cooled to cause it to separate into two phases. The lower phase can be separated and stripped to remove the solvent while the upper phase can be returned to the system without evaporation to extract more oil. The moisture content in the solvent will not build up if beans having less than 6% moisture are used and the drying is done with 10-lb. per square inch steam pressure on the drier. (*Chem. Abs. 43,* 1999.)

PYROLYSIS OF PALM OIL WASTE. R. Francois. *Oleagineux 3,* 602-6(1948). The possibility of manufacture of coke, tar, gas, fertilizer, oil, etc. from palm oil cake and pulp is discussed from laboratory tests on the subject.

ALCOHOLS BY SODIUM REDUCTION. A STAFF-INDUSTRY COLLABORATIVE REPORT. M. L. Kastens and H. Peddicord. *Ind. & Eng. Chem. 41,* 438-46(1949).

UNSATURATED LONG-CHAIN ALIPHATIC ESTERS. CATALYTIC OXIDATION. T. M. Patrick and W. S. Emerson (Monsanto Chem. Co., Dayton, Ohio). *Ind. Eng. Chem. 41,* 636-41(1949). The liquid-phase air oxidation of the Me esters of tall oil fatty acids is described. In order to develop a technic for the method, oxidation of Et oleate and of oleic acid was studied in some detail. Oxidative scission was expected to take place at or near the double bonds to yield mono- and dicarboxylic acids. Large amounts of high molecular weight by-products, in addition to the expected scission products, were formed in these oxidations. The identified products comprised most of the members of the homologous series from caproic to palmitic acid and from suberic to undecanedioic acid, inclusive.

THE NITROGENOUS CONSTITUENTS OF THE TISSUE LIPIDES. I. THE EXTRACTION, PURIFICATION, AND HYDROLYSIS OF TISSUE LIPIDES. J. M. McKibbin and W. E. Taylor (Syracuse Univ. College Med.). *J. Biol. Chem. 178,* 17-27(1949). A technic for the determination of total lipide nitrogen is described. The amounts of nitrogen, phosphorus, and choline present in lipide extracts of 9 tissues from several dogs are presented.

THE NITROGENOUS CONSTITUENTS OF THE TISSUE LIPIDES. II. THE DETERMINATION OF SPHINGOSINE IN TISSUE LIPIDE EXTRACTS. J. M. McKibbin and W. E. Taylor (Syracuse Univ.). *J. Biol. Chem. 178,* 29-35 (1949). A method is described for an approximate determination of sphingosine in whole lipide extracts which have been freed of non-lipide impurities. The method is based on a chloroform extraction of the aqueous lipide hydrolysate which is both specific and relatively quantitative for sphingosine. Sphingosine is then determined on the chloroform extract as nitrogen.

TESTING EMULSIONS OF VEGETABLE OILS BY MEANS OF ULTRASONIC WAVES. A. Audouin and G. Levavasseur. *Oleagineux 4,* 95-100(1949). The authors treat the influence of the frequency of sound waves in the production and rupture of water-in-oil and oil-in-water emulsions.

OXIDATION OF ESTERS OF LINOLEIC ACID BY OXYGEN. W. O. Lundberg (Hormel Inst., Austin, Minnesota). *Oleagineux 4,* 86-93(1949).

AN OXIDATION-REDUCTION CYCLE IN EMULSION POLYMERIZATION SYSTEMS. F. T. Wall and T. J. Swoboda (Univ. Illinois). *J. Am. Chem. Soc. 71,* 919-24(1949).

Ferrous Fe, solubilized in the oil phase as the stearate, promotes the decomposition of benzoyl peroxide into free radicals which are capable of initiating polymerization. In this process the ferrous Fe is oxidized to the ferric form which is subsequently transferred to the aqueous phase where it exists as a pyrophosphate complex. The ferric iron is then reduced by an appropriate water soluble reducing agent such as sorbose. Sodium stearate is used as an emulsifying agent, but it does more than promote emulsification since it also renders the Fe salts oil soluble. Omitting any of the reagents mentioned above or replacing the soap by a cationic emulsifying agent which is incapable of solubilizing the Fe in oil, disrupts the smooth operation of the cycle.

Additional reactions of higher ethylenic fatty acids and their analytical application. B. Hoi and D-Xuong. *Bull. soc. chim. France 1948,* 751-4. The isolation of branched or straight-chain saturated fatty acids in a mixture of lipides containing saturated and ethylenic acids of similar boiling point was studied. The substituting addition procedure of Alder, Pascher, and Schmitz failed because the addition reaction did not go to completion and the temperatures required were too high. Satisfactory results were obtained by arylating the double bonds with aromatic hydrocarbons. (*Chem. Abs. 43,* 565-6.)

Action of formaldehyde upon fatty acids in aqueous solution at high temperatures. C. Paquot and R. Perron. *Bull. soc. chim. France 1948,* 855-7. A 30% solution of CH_2O (400 cc.) with 200 g. palmitic acid (I), heated in an autoclave at 300°, 5 hrs., in the absence of catalyst and the resulting fatty matter extracted with ether and distilled *in vacuo* yielded 37% Me and 16% Et palmitate (calculated for I); the residual gases consisted mainly of CO_2. (*Chem. Abs. 43,* 567.)

Further studies on lipide stimulation of *Lactobacillus casei.* II. V. R. Williams and E. A. Fieger (Louisiana State Univ., Baton Rouge). *J. Biol. Chem.* 739-44(1949). Rice polish lipides having biotin activity for *Lactobacillus casei* and *Lactobacillus arabinosus* did not substitute for biotin in the nutrition of the white Leghorn chick. The lag periods previously observed in the growth stimulation of *Lactobacillus casei* by oleic acid and linoleic acid completely disappeared on the addition of sterile, biotin-free, bovine serum albumin to the biotin-free culture media containing the fatty acids. In the early stages of growth of the microorganism, the rate exceeded that observed in the tubes containing biotin. Of the non-fatty acid surface-active agents thus examined, several of which are non-ionic and non-inhibitory, none has been found which will stimulate the growth of *Lactobacillus casei* in the absence of biotin.

The relative rates of absorption of different oils and fats. V. R. B. Rao, D. Venkatappiah, and C. P. Anantakrishman. *Indian J. Vet. Sci. 17,* 221-4 (1947). By using the method of Irwin, Steenbock, and Templin the relative rate of absorption of fat was determined 4 hours after feeding; 1.5 cc. sesame and coconut oils were absorbed at the same rate as cow butterfat (45.7 ± 2.58%) of buffalo butterfat (45.6 ± 2.48%). Sheep butterfat and safflower, groundnut, and cottonseed oils were absorbed slower, but not significantly so. Body fats and hydrogenated oils were significantly less absorbed, 30-40%. The absorption was slower in the more highly hydrogenated oils. By comparing the properties of the unabsorbed oil with the original, it was found that the short-chain and the unsaturated fat acids were most readily absorbed. (*Chem. Abs. 43,* 1842.)

Intestinal absorption of vitamin A from aqueous and oily menstrum. H. Popper and B. W. Volk. *Proc. Soc. Expl. Biol. Med. 68,* 562-4(1948). Histological studies showed that vitamin A dispersed in water with the aid of a sorbitan laurate derivative was absorbed by the intestinal mucosa of the rat about 3 times as fast as when dissolved in corn oil. (*Chem. Abs. 43,* 734.)

Changes in fat metabolism in people existing at high elevations. G. E. Vladimirov, I. M. Dedyulin, L. I. Ostrogorskaya, and I. I. Fedorov. *Fiziol. Zhur. U.S.S.R. 34,* 381-8(1948). Experiments conducted on the disturbances of fat metabolism at high elevations in Caucasian mountains confirmed the earlier reports that the blood level of total acetone and its elimination in the urine are increased over the normal. After acclimatization, usually achieved after several days, the fat loading does not lead to substantial disturbances in fat metabolism. (*Chem. Abs. 43,* 291.)

Role of the kidney in fat metabolism. C. Kimenez Diaz and H. Castro-Mendoza. *Bull. Inst. Med. Res., Univ. Madrid 1,* 1-5(1948). After removal of both kidneys in dogs, all fractions of blood lipides increased gradually until death. Daily injection of a small amount of pig kidney extract prevented this rise in lipides but had no influence on the increase in uremia. It is postulated that the kidney contains an active agent, "nephrolipin," which inhibits lipide mobilization. (*Chem. Abs. 43,* 295.)

Effect of thyroxine and thiouracil on the rate of phospholipid turnover in the liver of the rat. E. V. Flock, J. L. Bollman, J. Berkson (Mayo Clinic). *Am. J. Physiol. 155,* 402-8 (1948). Calculations based on this assumption indicate that the rate of phospholipid turnover in the liver is increased in rats which have received thyroxine and decreased in rats which have been treated with thiouracil. The rate of turnover of the phospholipids of the plasma also appears to be greater than normal in thyroxine-treated rats and less than normal in those receiving thiouracil. The rate of phospholipid turnover in the liver of young rats is essentially the same as that of mature rats but, since the relative size of the liver is greater in young rats, more phospholipid is formed in proportion to body weight than in the adult.

Hypercholesteremia in the rat after intravenous administration of cholesterol. S. O. Byers and M. Friedman (Mt. Zion Hospital, San Francisco). *J. Biol. Chem. 177,* 841-6(1949). An immediate marked rise in plasma-free cholesterol and a gradual fall lasting over 48 hours followed each injection. Cholesterol esters rose moderately while the free cholesterol concentration was falling. Within 36 hours following the injection, however, the cholesterol ester content of plasma had returned approximately to the preinjection level.

Blood and tissue lipids in the chick fed cholesterol in various forms. J. Stamler, C. Bolene, E. Levinson, M. Dudley, and L. N. Katz (Michael Reese Hospital, Chicago, Ill.). *Am. J. Physiol. 155,* 470 (1949). Groups a, b, and c (cholesterol without oil) responded similarly, developing a progressive moderate hypercholesterolemia and hyperlipemia. Group d (cholesterol with oil) developed a far more marked and rapidly progressing hypercholesterolemia and hyperlipemia. In all groups the plasma-free cholesterol ratio remained unchanged. The percentage increase in plasma cholesterol in all cholesterol-fed groups exceeded significantly the percentage rise in phospholipid and neutral fat. Early atherosclerosis of the aorta and other great vessels was noted grossly in all cholesterol-fed groups, its extent and severity being significantly greater in group d. Tissue cholesterol analyses reveals an organ lipoidosis in all cholesterol-fed groups, which can be generally related to the blood cholesterol levels. The increase in lipid in the various tissues was not uniform, being much greater in the aorta and liver.

Preparation of partial esters of polyalcohols and fat acids. P. Savary. *Bull. soc. chim. France* 361-4(1948). A study of the solubility of esters in glycerol and of glycerol in esters, and also of the influence of temperature on the (OH) index. From the experimental data the author concludes that higher temperature favors monoglyceride formation contrary to the report of Hilditch and Rigg. Solubility experiments show that the 2 phases formed at lower temperatures (180°) of esters in glycerol and of glycerol in esters disappear at 250-85° in the case of lauric acid and glycerol. .In the case of stearic acid this does not occur. Triglycerides dissolve glycerol only very slightly. (*Chem. Abs. 43,* 137.)

Fats and cholesterolemia in thromboangiitis obliterans. E. Pagliarid and F. Marossero. *Minerva med. 39,* I, 461-4(1948). The cholesterol (I) content of the blood of patients with thromboangiitis obliterans was 161-253, while that of normal subjects was 96-136 mg. %. Similarly, phospholipides (II) were 294-470 mg. % in these patients and 275-350 in normal cases. Neutral fats and fat acids did not show such variations. Emphasis is put on the role of the adrenal cortex as a regulator for both I and II in the explanation and treatment of the disease. (*Chem. Abs. 43,* 299.)

PATENTS

Solvent extraction as step in milling process. W. R. Lloyd and G. H. Schafer (Charles A. Krause). *U. S. 2,460,389.* This is a factory scheme for dry milling corn.

Organic acids from coal. M. Kiebler (Carnegie Inst. Tech.). *U. S. 2,461,740.*

Purification of glyceride oils. B. H. Thurman (Benjamin Clayton). *U. S. 2,462,923.* The time and concentration of lye in a continuous refining process was adjusted to inhibit stratification before the mixture enters the centrifical separator.

Method of treating animal and vegetable oils. F. C. Bersworth. *U. S. 2,463,015.* The method of treating animal and vegetable oils to free the same from metallic impurities comprises agitating the oil with an aqueous solution containing an alkali metal salt of ethylene diamine tetra-acetic acid having at least 2 and not over 3 of its carboxylic groups neutralized by an alkali metal ion.

Recovery of rosin acids. A. G. Houpt (American Cyanamid Co.). *U. S. 2,463,274.* The talloel is dissolved in a suitable solvent, such as secondary amyl alcohol. Either before or after solution the talloel is partly neutralized with NaOH or the like in an amount sufficient to combine with the fatty acids as soaps while leaving the rosin acid free. The fatty acid soaps are separated from the solvent solution of free rosin acids by dehydrating the mixture.

Solidifying oleic acid compounds. M. Bourdiol (to Centre Nationale de la Recherche Scientifique). *Fr. 864,987.* Olein, arachidic oil, cotton oil, etc., are heated at 195-215° under an inert gas in the presence of 1-4 parts of Se per thousand of oil. (*Chem. Abs. 43,* 1202.)

Stabilization of oleaginous materials. F. A. Norris (General Mills, Inc.). *U. S. 2,462,664.* A process of stabilizing an oleaginous material of animal origin which comprises incorporating therein not substantially in excess of 0.1% of each of l-ascorbic acid and gallic acid.

Stabilization of fatty materials. L. O. Buxton and C. E. Dryden (Nopco Chem. Co.). *U. S. 2,461,-807-8.* The efficiency of natural antioxidants is improved by treatment with ammonia.

Stabilization of oleaginous materials. F. A. Norris (General Mills, Inc.). *U. S. 2,462,663.* The antioxidant is a mixture of ascorbic acid, *p*-aminobenzoic acid and caffeic acid.

Antioxidant for animal feed. M. F. Gribbins (E. I. du Pont de Nemours & Co.). *U. S. 2,462,633.* From 0.01-1% of acids or esters containing a beta-mercaptopropionyl group.

Carotenoid concentrates from palm oil. E. E. Eckey (The Procter and Gamble Co.). *U. S. 2,460,-796.* The glycerides of the oil are interesterified with methyl alcohol, the resulting esters are distilled off, leaving a high concentrate of carotenoids as a residue.

Sesame extract synergized insecticides. W. A. Simanton (Gulf Res. & Development Co.). *U. S. 2,-463,324.* A synergist for pyrethrin insecticides is made by submitting a 6-10% methanol extract of sesame oil to thermal decomposition.

Phosphatides. R. A. Marmor and W. W. Moyer (A. E. Staley Mfg. Co.). *U. S. 2,461,750-1.* An oil is extracted with organic solvent, decolorized, the solvent volatilized at temperatures below 50°, water is added, and the coagulated phosphatides are removed.

Fractionation of unsaturated glyceride oils. E. M. James (Lever Bros. Co.). *U. S. 2,459,820.* The patent describes details for a method of fractionating soybean oil by crystallization from nonpolar solvent solution.

Purifying nitriles. A. W. Ralston, S. T. Crews, and E. W. Colt (Armour & Co.). *U. S. Re. 23,084.* The process for purifying an unconjugated fatty acid nitrile contains the step of heating the nitrile to a temperature of about 100°C.-200°C. but below the boiling point of the nitrile, in the presence of maleic anhydride.

Oleonitrile. L. A. Stegemeyer (Emery Inds., Inc.). *U. S. 2,460.772.* Ammonia and oleic acid are reacted at 100-150 lb./sq. in. pressure for 2.5-3.5 hrs. at 310-340°. The product is used as an assistant in the manufacture of rayon.

Methods for the treatment of regenerated cellulose thread. C. Schlatter and C. V. Holmberg (American Viscose Corp.). *U. S. 2,460,400.* In a method of manufacturing regenerated cellulose thread from viscose is the step of treating a moisture-laden wound package of the thread, after washing and before any prior drying, which comprises continuously passing through all parts of the package a solution comprising Stoddard's solvent and 5% by weight of polyethylene glycol distearate containing

20 ethylene oxide groups, the treatment being performed at a temperature of about 70°C., and continuously removing water carried by the thread in a blended, single phase system with the hydrocarbon dry cleaning solvent and polyhydric alcohol derivative.

PREVENTION OF FOAMING IN STEAM GENERATION. L. O. Gunderson (Dearborn Chem. Co.). *U. S. Re. 23,085.* The method of generating steam from a boiler water having a tendency to foam on boiling comprises dispersing the dipalmito amide of ethylene diamine into the water and heating the resulting aqueous dispersion to the boiling point.

METHOD OF INHIBITING FOAM FORMATION IN AN AQUEOUS GAS-LIQUID SYSTEM. L. O. Gunderson (Dearborn Chem. Co.). *U. S. 2,461,730.* Condensation products of fatty acids and aliphatic polyamines are used as defoamers.

INSULATING MATERIAL. E. L. Schulman and R. D. Jerabeck (Westinghouse Electric Corp.). *U. S. 2,462,228.* The binder for the insulating material contains castor oil, wood pitch, and solvent.

ASPHALT WITH IMPROVED ADHESION PROPERTIES FOR AGGREGATES. H. G. M. Fischer (Standard Catalytic Co.). *U. S. 2,461,971.* An improved bonding bituminous material comprises an asphalt containing 0.1%-0.4% of aliphatic amine and 0.1%-1.6% of higher fatty acid.

ALPHA, ALPHA, THIODIFATTY ACIDS. M. P. Kleinholz (Sinclair Refy. Co.). *U. S. 2,462,200.* The products are used as rust inhibitors in turbine and hydraulic oils.

LUBRICATING OIL COMPOSITION. J. G. McNab and J. H. Bartlett (Standard Oil Development Co.). *U. S. 2,460,025.* A mineral lubricating oil contains dissolved therein a small quantity, sufficient to stabilize said oil against deterioration by oxidation, of a metal salt of a fatty acid phenol sulfide.

Drying Oils

Edited by
ROBERT E. BEAL

STYRENATED ALKYDS. W. C. Norris (American Cyanamid Co., Stamford, Conn.). *Am. Paint J. 33,* No. 26, 66, 68, 72, 74(1949). A discussion of practical aspects.

THERMAL POLYMERIZATION OF ESTERS OF DRYING OIL ACIDS. T. F. Bradley and R. W. Tess (Shell Development Co., Emeryville, Calif.). *Ind. Eng. Chem. 41,* 310-319(1949). Analogies are drawn between the polymerization reactions of 1,3-butadiene, 1,4-pentadiene, 1,3,5-hexatriene and other hydrocarbons of low molecular weight, and the drying oil acids. The effect of temperature, the presence of oxidation products, and other factors, on the course of the reactions are emphasized. However, the importance of ester linkages in determining the complexity of the drying oil molecule is equal to that of the double bond linkages. 45 references.

ISOMERIZATION REACTIONS OF DRYING OILS. J. C. Cowan (Northern Regional Research Laboratory, Peoria, Ill.). *Ind. Eng. Chem. 41,* 294-304(1949). Attempts to prepare replacement oils for tung and oiticica oils by isomerization of soybean and linseed oils have not been entirely successful. However, the isomerized oils are in general superior to the oils from which they were derived in all respects except film-hardness after drying. Lack of film-hardness is believed to be due to the presence of elaidinized derivatives of oleic acid in the oil. The study of methods of achieving conjugation is complicated principally by the large number of conjugated isomers which may be formed and the lack of methods of studying these isomers. 69 references.

CORRECTION: *J. Am. Oil Chemists' Soc. 25,* 464. THE SYNTHESIS OF LALLEMANTIA OIL. J. D. von Mikusch. *Farbe u. Lack 1948,* 23-24. Lallemantia oil obtained from the seeds of *Lallemantia iberica* in 30% yield had acid no. 5.6, saponification value 188.7, specific gravity (20°) 0.9259, *n* 1.4802, I *no.* 179.4. Kaufmann obtained the following analyses using the (SCN) no.: linolenic 35.1, linoleic 24.8, oleic 19.7, oxyacids 6.7, saturated acids 8.4, unsaponifiable matter 0.9, glycerides 4.4%. Using American (SCN) no. data the following analyses are obtained: linolenic 41.0, linoleic 12.3, oleic 26.3, oxyacids 6.7, saturated acids 8.4, unsaponifiable matter 0.9, glycerides 4.4%. The oil is expected to compare favorably with linseed oil.

MECHANISM OF THE OXIDATION OF DRYING OILS. P. O. Powers (Battelle Memorial Institute, Columbus, Ohio). *Ind. Eng. Chem. 41,* 304-309(1949). The stages of the oxidation process are discussed as an induction period, and a period of peroxide formation followed by peroxide decomposition and polymerization. The structure and point of addition of the peroxide is influenced by the conditions of oxidation and support exists for each of several structures. Peroxide decomposition may occur by dehydration, reduction, rearrangement to a hydroxyl structure, or by chain rupture, while polymerization is not well understood but appears to be connected with dehydration of peroxides. 41 references.

INFRARED ABSORPTION OF HYDROXY COMPOUNDS IN AUTOXIDIZING LINSEED OIL. F. J. Honn, I. I. Begman, and B. F. Daubert (Mellon Institute and University of Pittsburgh, Pittsburgh, Pa.). *J. Am. Chem. Soc. 71,* 812-16(1949). Absorption at 2.9 μ by (-OH) groups is determined by subtracting (-OOH) and (-COOH) absorption. Specific absorption coefficients, determined for the latter two groups by measurements with pure compounds, allow calculation of their total absorption from iodometric and acidimetric determinations. ROH content may then be calculated from its specific absorption coefficient. Examination of linseed oil, autoxidized at 85° indicates that increasing OH absorption during the induction period is essentially due to hydroperoxide formation. Further oxidation results in an increase in (-COOH) groups and a rapid increase in (-OH) groups.

SYNTHETIC DRYING OILS. D. S. Bolley (National Lead Co., Brooklyn, N. Y.). *Ind. Eng. Chem. 41,* 287-293(1949). A review of the dehydration of castor oil, methods of increasing unsaturation as by chlorination followed by dehydrochlorination, reaction of maleic anhydride with drying oils, preparation of tetrahydroxy and higher alcohol oils, copolymerization of drying oils with unsaturated organic compounds, and the properties of petroleum drying oils are presented. Information from extensive tests with linseed and soybean pentaerythritol oils is tabulated. 46 references.

CURRENT WORK AT THE UNIVERSITY OF LIVERPOOL ON POTENTIAL SOURCES OF DRYING OILS. T. P. Hilditch. *J. Oil & Colour Chemists' Assoc. 32,* 5-23(1949). Conophor oil (I value 205) and rubber seed oil of low free fatty acid content may be obtained if the nuts or seeds are properly heat-treated immediately after they are picked. Rubber seed oil obtained by extracting the seeds with acetone is free of the small amount of rubber matter usually found in the oil. Samples of niger, safflower, and sunflower seed oils were analyzed for fatty acid content and it was concluded that the growing location had a greater effect than seed variety in determining the linoleic acid content of the oil. The linoleic content was also found to be more significant than the I number in determining the drying properties of the oil. The presence of a conjugated decadienoic acid was discovered in stillingia oil. This is believed to account for the high saponification value and excellent drying properties of the oil. Results are given of an extensive fractionation and fatty acid analysis of Argentine linseed oil and the glyceride composition is computed on a basis of even fatty acid distribution.

Drying oils. C. W. A. Mundy. *Oil Colour Trades J. 114,* 1277-8, 1284(1949). Linseed, stillingia, tung, dehydrated castor oil, rubber seed, and tobacco-seed oils are discussed. Linseed oil will probably remain the most important drying oil but oil from *Aleurites montana* is similar to tung oil and English needs may be met by this oil in ten years. (*Chem. Abs. 43,* 1197).

Dehydration and polymerization of castor oil. M. J. da Rosa, R. B. Machado, A. T. B. de Castro, and M. J. G. de Menezes. *Bol. divulgação inst. óleos* No. *1,* 16-27, 70-105(1944); *Rev. quím. ind.* (Rio de Janeiro) *15,* No. 169, 16-20(1946). Oil of good drying properties is produced by dehydrating castor oil in an iron retort at 250-265°. The reaction is catalyzed by the iron. Neutralization of the oil with Ca$(OH)_2$ improves its color. Other dehydration methods are reviewed. (*Chem. Abs. 43,* 872.)

Dehydrated castor oil. II. Properties of varnishes prepared with dehydrated castor oil; properties of putties prepared with dehydrated castor oil. R. Dooper and F. H. Hermann. *Centraal Inst. Materiaal Onderzoek, Afdel. Verf, Circ.,* No. *51,* 16 pp. (1948). Data on cooking times and conditions are given for a series of long and short oil varnishes based on tung, linseed, and dehydrated castor oils. Certain properties of the varnishes are discussed. (*Chem. Abs. 43,* 872.)

Dehydration of castor oil and its application in paints and varnishes. I. Dehydration of castor oil. O. Prokash, T. R. Sharma, and D. Y. Athawale. *J. Indian Chem. Soc. Ind. & News Ed. 10,* 89-100 (1947). Methods of dehydrating castor oil, determination of induced unsaturation, and use of several catalysts are discussed. Maximum efficiency was obtained with 1% $NaHSO_4$ at 250°. II. Application in paints and varnishes. *Ibid.* 101-6. Blending dehydrated castor oil with up to 50% of linseed oil improves drying speed while largely retaining water resistance. Hard resins are used to obtain the best drying properties. (*Chem. Abs. 43,* 872.)

The importance of chemistry in the development of the modern varnish industry. C. P. A. Kappelmeier. *Verfkroniek 21,* 230-5(1948). The reactivity of drying oils is reviewed. (*Chem. Abs. 43,* 873.)

Candlenut oil. A. S. Neto. Inst. pesquisas tecnol. (São Paulo), *Separata* No. *196,* 99-104(1947). Paints prepared from the oil (I number 162-3) of seeds from *Aleurites moluccana* compared favorably with linseed oil paints in drying ability and resistance to hot and cold water and dry heat but were slightly less resistant to weathering. (*Chem. Abs. 43,* 872.)

PATENTS

Synthetic drying oils and coating compositions. E. I. du Pont de Nemours & Co. *Brit. 574,680; 574,681,* and *574,682.* Drying oils consisting of glycerol mixed esters of one or more monofunctional α, β-ethylenic, β-aryl mono carboxylic acids, and at least one other monofunctional aliphatic monocarboxylic acid of different structure form fast-drying films. (*Chem. Abs. 43,* 877.)

Reactions of inorganic polyisocyanates and polyisothiocyanates. H. C. Miller and B. C. Pratt (E. I. du Pont de Nemours & Co., Wilmington, Del.). *U. S. 2,449,613.* Unsaturated glyceride oils of certain products derived therefrom are modified with 0.5-10% of an inorganic polyisocyanate or polyisothiocyanate preferably of Si or Ti. The modified products dry faster and harder, gel slower, and are more water resistant than the original oil. (*Chem. Abs. 43,* 908.)

Alkylation of phenol by alkyl halides catalyzed by finely divided gels of certain drying oils. C. J. Plank and J. F. Socolofsky (Socony-Vacuum Oil Co., New York). *U. S. 2,460,793.* Equimolar portions of phenol and a tertiary alkyl halide are refluxed in the presence of a finely divided gel such as BF_3—bodied China wood oil gel, BF_3—bodied oiticica oil gel, or heat bodied China wood oil gel.

Resinous esters of higher fatty acids with pentaerythritols and the method of making. J. A. Wyler (Trojan Powder Co., Allentown, Pa.). *U. S. 2,462,046.* Fatty acids obtained from linseed or soybean oil, an aromatic polycarboxylic acid or anhydride, and a polyhydric alcohol such as pentaerythritol, tripentaerythritol, or polypentaerythritol are heated in an SO_2 atmosphere at esterification temperatures until the reaction is complete. The proportions of reactants are such that the fatty acid carboxyl groups are equivalent to the polyhydric alcohol hydroxyl group and the polycarboxylic acid is one-half by weight of the fatty acid. The product dries to a wrinkle finish when applied as a coating film.

Adhesive and coating composition. F. G. Speyer (Shellmar Products Corp., Mt. Vernon, Ohio). *U. S. 2,461,704.* A pressure sensitive greaseproof laminant composition includes polymerized linseed oil as a principal ingredient.

Flexible wrinkle coated material and method of producing same. N. T. Beynon (New Wrinkle, Inc., Wilmington, Del.). *U. S. 2,460,485.* Flexible, wrinkle-coating materials are prepared by mixing 100 parts of drying oil, a varnish solvent, and 10-50 parts polyvinyl chloride at room temperature, applying the mixture to a base material and allowing it to dry.

Process of preparing oil-acid modified alkyd material. C. G. Moore (The Glidden Co., Cleveland, Ohio). *U. S. 2,461,564.* Equimolecular proportions of glycerine and drying or semi-drying oil fatty acids are dispersed in a drying or semi-drying oil and reacted with heat and agitation until the reaction is at least 54% complete as shown by the acid number. Maleic anhydride is then added in equimolecular quantity to the glycerine employed.

PROCESS OF PREPARING OIL ACID MODIFIED ALKYD MATERIAL. C. G. Moore (The Glidden Co., Cleveland, Ohio). *U. S. 2,459,176.* Equimolecular proportions of a drying or semi-drying oil monoglyceride having an acid number not over 20, and maleic anhydride are mixed at a temperature below which substantial reaction takes place, then quickly heated to 450° F. and held until the product has an acid number less than 80 and quickly cooled below the polymerization temperature to form a usable material.

COMMINUTED DRYING OIL RESIDUES. W. F. Schaufelberger (Irvington Varnish and Insulator Co., New Jersey). *U. S. 2,459,342.* A substantially non-conjugated drying oil having an iodine value in excess of 120 is heated at 610-700° F. and less than 5 inches mercury pressure with agitation until 10-13% of the original material has distilled to obtain a comminuted, infusible residue.

WATER DISPERSIBLE COATING VEHICLE. G. E. Eilerman (Pittsburgh Plate Glass Co., Pittsburgh, Pa.). *U. S. 2,462,618.* The anhydride linkage of the addendum reaction product of maleic anhydride and a drying oil modified alkyd resin is hydrolyzed and neutralized with a mixture of alkali metal silicate and a water-soluble basic N_2 compound such as NH_3 to form a water-emulsifiable, air-drying coating composition.

PLASTIC COMPOSITION. A. C. Buechele (Gen'l Mills, Inc., Minneapolis, Minn.). *U. S. 2,462,053.* The composition comprises a polyamide derived from a polyfunctional acid from polymerized drying oil acids and a polyfunctional amine, and 2-70% of a polymerized resin.

Soap

Edited by
LENORE PETCHAFT

RELATION BETWEEN CHEMICAL STRUCTURE AND PERFORMANCE OF DETERGENTS. W. D. Scott and D. S. P. Roebuck. *Chemistry & Industry 1948*, 627-31. Review and analytical treatment correlating the simpler physical phenomena associated with detergency with the chemical structure of a number of compounds known to possess detergent properties. (*Chem. Abs. 43*, 2002.)

THE MONSAVON CONTINUOUS SOAPMAKING PROCESS. E. T. Webb. *Soap, Perfumery & Cosmetics. 22*, 150-3 (1949). The French continuous Monsavon soap process is described. Outstanding features of the process are outlined. The soap produced by this method is claimed to be of a better color than soap made by the open pan method and free from many organic and inorganic impurities. The claims made for the Monsavon plant are as follows: considerable reduction in consumption of steam per ton of soap produced; saving in steam because of the smaller volume of spent lyes produced per ton of soap made; saving in space per ton of soap; glycerol recovery of 90-95%; and reduction in amount of nigre produced.

ANALYSIS OF TEXTILE AUXILIARY PRODUCTS. J. A. Van der Hoeve (Laboratory of Nico ter Kuile and Sons, NV. Enschede, Netherlands). *Rec. trav. chim. 67*, 649-64 (1948). A system for the qualitative analysis of detergents, wetting and emulsifying agents, etc. is outlined. Previous literature is reviewed. Separation of anionic and cationic agents is described and identification tests for various products are given. Schematic systems for analysis of such products as polyethylene oxide products, alkyl and alkyl aryl sulphonates, fatty acid products, soaps, etc. are detailed.

THE EFFECT OF CERTAIN IMPURITIES ON THE SURFACE AND INTERFACIAL TENSION OF AQUEOUS SOLUTIONS OF SODIUM DODECYL SULFONATE. Leo Shedlovsky, John Ross, and Conrad W. Jakob (Colgate-Palmolive-Peet Co., Jersey City, N. J.). *J. Colloid Sci 4*, 25-33 (1949). The surface tension-concentration curves of sodium dodecyl sulfonate at 27° C. and 40° C. and the interfacial tension-concentration curve (water/benzene) at 25° C. have been determined. For purified materials, these curves do not show minima, indicating that minima previously reported can be attributed to certain impurities. The minima in surface tension-concentration and interfacial tension-concentration curves for sodium dodecyl sulfonate solutions containing impurities may be eliminated by selective adsorption of these impurities by foam extraction or emulsion extraction at concentrations of detergent at or near the minimum in the corresponding surface tension or interfacial tension curves.

SILICATE OF SODA AS DETERGENT—EFFECT OF SINGLE SOAPS AND COMMON BUILDERS ON SUDS FORMATION IN HARD WATER. Charles H. Dedrick and John H. Wills (Philadelphia Quartz Company, Philadelphia, Pa). *Ind. Eng. Chem. 41*, 575-81 (1949). A series of permanent suds tests were run using sodium oleate, stearate, palmitate, laurate, myristate, and kettle soap at 48.8° C., and alkalies such as various silicates, phosphates, polyphosphates, sodium hydroxide, sodium carbonate and borax. Of the alkalies tested, all except borax decreased the amount of soap required to form permanent suds in hard water when the carbon chain was greater than C_{14}. Some silicates were very advantageous with high molecular weight soaps, while only the polyphosphate gave any reduction with low molecular weights. Both silicates and phosphates may be employed to prevent the formation of hard lime-soap curds. The adverse effect of caustic soda and soda ash was not as evident with soaps of lower molecular weight.

SOLUBILIZATION OF POLAR-NON-POLAR SUBSTANCES IN SOLUTIONS OF LONG CHAIN ELECTROLYTES. William D. Harkins and Hans Oppenheimer (University of Chicago, Chicago, Ill.). *J. Am. Chem. Soc. 71*, 808-11 (1949). The solubility relations exhibited by polar-non-polar long chain substances in solutions of long chain electrolytes are found to be different from those with non-polar compounds. The former are in general more soluble than the latter. Curves which relate polar-non-polar solubility are given for all of the ordinary soaps of from 7 to 14 C atoms and for all of the *n*-primary alcohols of from 7 to 11 C atoms. A general increase in the solubility of alcohols with chain length of the soap has been found.

SOLUBILIZATION OF DIMETHYLAMINOAZOBENZENE IN SOLUTIONS OF DETERGENTS. II. I. M. Kolthoff and W. Stricks (University of Minnesota, Minneapolis, Minn.). *J. Phys. & Colloid Chem. 53*, 424-53 (1949). Solubilization of dimethylaminoazobenzene (DMAB) and in a few instances of Orange OT and trans-azobenzene have been measured at 30° C. and 50° C. in solutions of pure and technical detergents in the absence and presence of strong electrolytes. The critical concentration of various detergents in the presence of electrolytes is tabulated and compared with the values of the critical concentrations without electrolytes. The solubilizing power of the detergents in the presence of electrolytes is tabulated and compared with that of pure detergents. The effect of electrolytes on the solubilizing power varies with the kind and concentration of detergent and electrolyte, with the kind of solubilized compound, and with the temperature. Thus, the solubilizing power of laurate with regard to DMAB is slightly decreased in the presence of salts in concentrations lower than 0.5 *N*, while the solubilizing power of caprate with regard to DMAB increases in the presence of electrolytes. The solubilizing power of dodecylamine hydrochloride for the three azo compounds investigated increases in the presence of electrolytes at 30° C. and 50° C.

SURFACE-ACTIVE AGENTS. APPLICATIONS IN NONFERROUS METAL TECHNOLOGY. J. Koerner. *Metal Ind. (London) 73,* 452-3 (1948). Surface-active agents are described and their applications for soldering, welding, electroplating, and flotation of minerals are discussed. (*Chem. Abs. 43,* 1707.)

SURFACE ACTIVE CHEMICALS IN THE PULP AND PAPER INDUSTRY. Anon. *Tech. Bull. 5,* No. 1, 44-8 (1949). Structure and types of various surface active agents are reviewed. Uses in the paper industry are outlined. In the manufacture of pulp, they are added to the digesters to promote penetration of the cooking liquor into the chips. In the paper mill they are used in wetting out bales of hard dry pulp. They are used as emulsifying agents for paper sizes. Their detergent properties are advantageous in felt washing, rag cooking, and in processing waste paper. Cationic types of agents are more effective in beater applications. Anionic types are used as lubricants for coating formulations, and as plasticizers for the coating adhesive.

ACIDIMETRIC PROPERTIES OF SOAPS. J. P. Wolff. *Oleagineux 4,* 141-4 (1949). An extensive theoretical study of the acidimetric properties of soap has been made. As a result of these studies it has been found that the pH of soap solutions depend on their concentration and in a sufficiently concentrated solution on the nature of the constituent fatty acids. If the soap solutions have definite buffering properties towards acids they do not exhibit these properties towards strong bases. Only the soaps of weak bases (if the bases are not too weak) can buffer solutions against exterior alkaline agents, particularly caustic alkali soaps. All these phenomena can be explained by the hydrolysis theory. The equations that have been proposed may be used to calculate the pH of all solutions without recourse to complicated theoretical considerations.

STUDIES ON ALUMINUM SOAPS. II. THE COMPOSITION, STRUCTURE, AND GELLING PROPERTIES OF ALUMINUM SOAPS. V. R. Gray and A. E. Alexander (Cambridge University, Cambridge, England). *J. Phys. & Colloid Chem. 53,* 23-39 (1949). Soaps were prepared by reaction between aluminum alkoxides and fatty acids under a variety of conditions. The heat of reaction, measured as a function of fatty acid added, showed that not more than 2 fatty acid groups combine per aluminum atom. These results were confirmed by analysis for aluminum and fatty acid in soap free from uncombined fatty acid. It is shown that the product of aqueous metathesis of an alkali soap and an aluminum salt is an adsorption complex of fatty acid on alumina. Combination occurs during the drying process. 32 references.

PATENTS

ETHYLENE OXIDE CONDENSATION PRODUCTS WITH IMPROVED DETERGENT PROPERTIES. William Baird, Edryd Gwylfa Parry, and Thomas Edward Thompson (Imperial Chemical Industries, Ltd.). *Brit. 611,683.* Detergent properties of ethylene oxide condensations with fatty acids or alcohols are improved by the addition of monohydroxyethylamides of fatty acids.

ANTISEPTIC SOAP. L. Givaudan & Cie. (Soc. anon.). *Swiss 223,543.* A soap possessing antiseptic properties, especially toward *Staph. aureus* can be prepared by incorporating a halogenated 2,2′-dihydroxy-diphenylmethane or its salts in the soap.. The halogenated compounds made the usual way are white crystalline compounds without odor or taste. (*Chem. Abs. 43,* 1587.)

COFFEE-OIL SOAP FOR RECOVERY OF CHOLESTEROL FROM WOOL FAT. Ladislaus Szucs. *Swiss 223,076.* A wool fat-soap-cholesterol emulsion is added to an equal quantity (basis fat acids) of a coffee-oil soap, the mixture diluted with an equal quantity of water, heated to 90°, and salt dissolved in the soap glue just short of the point of separation. Upon standing a short time, the unsaponifiable matter separates and is skimmed off. The remaining soap glue of coffee-oil and wool-fat soaps is worked in known manner. Palm-oil and coconut-oil soaps may be used with the coffee-oil soap. (*Chem. Abs. 43,* 1202.)

SOAP. G. Hanssens and R. Hanssens. *Belg. 470,610.* Sulfate of Na, K, or a higher alkyl base is added to a soap consisting of a mixture of alkali salts and fatty acids (more particularly palmitic, stearic, or oleic). (*Chem. Abs. 43,* 1202.)

DETERGENT AND DISINFECTANT PRODUCT. In.-Co-Ra. *Swiss 223,433.* An easily soluble powder giving off nascent O can be prepared by mixing 30% H_2O_2 which is stabilized with urea, thiourea, hexamethylene tetramine, etc., with a long chain aliphatic detergent. Sulfonates can also be incorporated. (*Chem. Abs. 43,* 1587.)

NON-IRRITATING SOAP. Emil E. Dreger and John Ross (Colgate-Palmolive-Peet Co.). *U. S. 2,462,831.* A non-irritating soap is produced by removing (by well-known means) from soap making oils such as coconut and palm, the low-molecular weight fatty acids which produce the irritation.

SYNTHETIC DETERGENTS WITH ORGANIC BUILDERS. John David Malkemus (Colgate-Palmolive-Peet Co.). *U. S. 2,462,758.* A synthetic detergent composition having improved stable foams is prepared by adding to organic sulphates or sulphonates commonly used as detergents, from 0.1 to 20% by weight of an organic builder such as the lower monohydric alcohol and glycol esters of higher fatty acids.

SOAP PRODUCT CONTAINING GUANIDINE STEARATE. Lloyd F. Henderson (Lever Brothers Co.). *U. S. 2,459,818.* The addition of from 1 to 15% by weight of guanidine stearate to an unfilled, milled, white soap product results in improved solubility, detergent action, and mildness.

NEW WETTING AGENTS. Soc. pour l'ind. chim. a Bale. *Swiss 230,841.* A new wetting agent for textiles is obtained by treating stearic acid hydrazide with maltose in presence of a solvent like glacial AcOH or alcohol at 60-80°. It is a white powder, which dissolves in water to a foaming solution. On boiling with mineral acids it decomposes. (*Chem. Abs. 43,* 2452.)

NEW WETTING AGENTS. Soc. pour l'ind. chim. a Bale. *Swiss 230,843.* A new condensation product is obtained by treating stearic acid hydrazide with fructose in glacial AcOH or alcoholic solution at 60-80°. The new product is a yellowish powder, soluble in warm water to a slightly cloudy solution, which decomposes on boiling with mineral acids. It is useful as a wetting agent for textiles. (*Chem. Abs. 43*, 2452.)

DETERGENT. "Novag" Akt.-Ges. *Swiss 228,769.* Soap substitutes, such as fatty alcohol sulfonates are said to withdraw fat from the skin in use and are claimed to disintegrate easily from their original cake form. Two examples characterize the composition of the detergents covered in this patent. (I) Paraffin, 15 g. is melted and mixed with Na dodecyl sulfonate 10, kaolin (colloidal) 15, bentonite 10, starch 25, a 10% gum tragacanth solution 20, milk casein 7 g., and some perfume, then extruded and pressed in cake form. (II) In similar manner, paraffin 6, carnauba wax 4, and beeswax 2 g. are melted and mixed with triethanolamine 1, sulfonated albumin-fatty acid condensate 10, sodium stearylsulfonate 7, bentonite 22, starch 28, 10% solution of methylcellulose 15, and soluble casein 5 g. Such products cannot be differentiated from toilet soap, have beneficial effects upon the skin and have good and economic keeping properties. (*Chem. Abs. 43*, 2452.)

SYNTHETIC SOAP. "Chimiotechnic" Union chimique du Norde et du Rhone, Soc. anon. *Fr. 868,793.* A detergent, such as the Na salt of the sulfate of lauric amide, is mixed with clay and (or) kaolin with or without glycerol and Na_2CO_3, Na_2SO_4, or Na_2SiO_3. (*Chem. Abs. 43*, 2004.)

Letter to the Editor.

On the Use of Sodium Carboxymethyl Cellulose as a Detergent, Especially as Combined with Fatty Acid Soap

DEAR SIR:

My letter to you, dated August 1948, which was published under the above title on pages 51 and 52 of the February 1949 issue of your Journal, may have given an undesirable and unfavorable impression of the usefulness of synthetic detergents in laundry practice in general and of one synthetic detergent in particular. I wanted to point out that, under the circumstances then prevailing in the Netherlands, the available synthetics could not compete on a price basis with fatty acid soap or with combinations of fatty acid soap and Na-CMC.

Since August 1948 several changes have occurred. At Arnhem a third factory producing Na-CMC has come into production. The prices quoted in the original letter no longer hold so that from this point of view the situation has become more favorable for the synthetics. Further research has shown that in washing white work with synthetics the deposition of inorganic calcium salts noted previously can be kept within reasonable limits if the composition of the washing liquor is suitably chosen. Later experiments have also shown that for the same performance one part of soap can be replaced by ⅓ to ⅔ parts of synthetic detergent on an active matter basis, dependent on the washing conditions chosen and on the presence of Na-CMC.

A full report on laundry trials with mixtures of a synthetic detergent, fatty acid soap, and Na-CMC will be published later.

K. J. NIEUWENHUIS
Experimental Station for Laundering
Delft, The Netherlands.

April 1, 1949