as cottonseed oil extraction solvents. 3-Methylpentane was rated as the best of the isohexane group. The normal paraffins, highly-branched isohexanes, cycloparaffins, and aromatics were ranked below methylpentanes in order of decreasing solvent efficiency. On the basis of these tentative ratings, specifications for a "tailor-made" solvent for the extraction of cottonseeds should exclude aromatic hydrocarbons, have definite low limits on cycloparaffin content, and consist largely of normal and isoparaffin hydrocarbons. Methylpentane concentrates having maximum purity commensurate with competitive price levels appear especially interesting.

REFERENCES

1. Official and Tentative Methods of the American Oil Chemists' Society, 2nd Edition (1946), A.O.C.S.
2. Brodie, R. K., Oil Fat Industry *4*, 181 and 190 (1927).

☆ ☆ ☆ ABSTRACTS ☆ ☆ ☆

Oils and Fats

Edited by
M. M. PISKUR and MARIANNE KEATING

THE TALLOW ACIDS. John R. Skeen (Foster D. Snell, Inc., Brooklyn, N. Y.). *Soap Sanit. Chemicals 24*, No. 8, 45, 151 (1948). Historical review of development of the industry, and statistics on production, use, export, and import are given.

LIPIDES OF THE COTTONSEED. SAPONIFICATION NUMBER. V. L. Frampton and G. N. Martin (Cotton Res. Comm. of Texas, Univ. of Texas, Austin, Texas). Anal. Chem. *20*, 661-3 (1948). The saponification number with crude cottonseed oils may be determined by carrying out the hydrolysis in an isopropyl alcoholic KOH solution, adding ethylene or propylene glycol to give a 50-50 mxture of alcohol and glycol, and back-titrating with an alcohol-glycol solution of hydrochloric acid, using aniline blue as the indicator.

THE GLYCERIDE COMPOSITION OF MILK FAT. C. P. Anantakrishnan, V. R. Bhalerao, and T. M. Paul (Indian Dairy Research Institute, Bangalore, India). *Arch. Biochem. 18*, 35-40 (1948). Cottonseed, sesame, hydrogenated cocoanut, and ground nut oils were fed to Sindhi cows at 1.5 lb. per head per day along with basal ration. The general analytical constants of the butter fat were affected by the ingestion of the oils. The Reichert value was reduced and the iodine values, butyrorefractometer readings, and saponification values increased. Except when hydrogenated cocoanut oil was fed, there was a reduction in the total amount of lower acids up to C_{14}. Ingestion of cottonseed, sesame, and hydrogenated groundnut oils led to an increase in the oleoglycerides of the resulting milk fat. Unlike oleic acid, a high percentage of linoleic acid in the ration did not increase the amount of this constituent in the milk fat.

THE CONFIGURATION OF NATURALLY OCCURRING MIXED GLYCERIDES. PART IV. THE CONFIGURATION OF THE MAJOR COMPONENT GLYCERIDES OF PALM OIL. M. L. Meara (Univ. Liverpool). *J. Chem. Soc.* 722-6 (1948). Palm oil has been separated by exhaustive fractional crystallization into fractions consisting of fully saturated, mono-unsaturated di-saturated, and mono-saturated di-unsaturated glycerides respectively. Component fatty acid analyses considered in conjunction with thermal data obtained for individual glycerides isolated from crystallization of the fully hydrogenated derivatives of each fraction indicate the presence of both α- and β-oleodipalmitin (in approximately equal amounts) in the mono-unsaturated di-saturated portion of the oil, whereas α-palmitodioleins and α-palmito-oleolinoleins greatly predominate over the accompanying β-isomers in the mono-saturated di-unsaturated fractions.

DETERMINATION OF THE ACIDITY OF OLIVE OIL WITH LIME WATER. M. F. Peral (Lab. ensayos ind. y quim. tec., Zaragoza). *Inform. quim. anal.* (Madrid) *2*, 2-4 (1948). The acidity of olive oil is determined conveniently by titration with saturated aqueous $Ca(OH)_2$ solution. Standardization is not necessary because the concentration of saturated solutions at different temperatures can be taken from tables. (*Chem. Abs. 42*, 5243-4.)

COLORIMETRIC DETERMINATION OF PHOSPHORUS IN OILS AND LECITHINS. J. Molines and P. Desnuelle (Faculte Sci., Marseille). *Bull. mens. ITERG 1948*, No. 2, 1-3. A method is given by which as little as 0.01 mg. of P can be determined. Treat 50-260 mg. of a sample with 2 ml. HNO_3 and 2.6 ml. concentrated H_2SO_4 according to Kjeldahl practice. Rinse the perfectly clear solution into an Erlenmeyer flask with 23 ml. of water, add 5 ml. of molybdate reagent (10 g. NH_4 molybdate, 340 ml. of cold water, 10 ml. H_2SO_4 of d. 1.84) and, after heating for 15 minutes on a boiling water bath, add 5 ml. of the following reagent: dissolve 40 g. $NaHSO_3$, 1 g. Na_2SO_3, 0.2 g. metol (also called genol or rhodol) in 100 ml. of water, filter, and store in a brown bottle. This reagent produces Mo blue with the PO_4^{---}. Measure the color in a Bonet-Mary (Juan) photoelectric colorimeter, filter No. 15 (Wratten No. 27). Extinction coefficients vary between 54 and 386 for P contents between 0.01 and 0.07 mg. (expressed as Na_2HPO_4). (*Chem. Abs. 42*, 4493.)

THE POLYMORPHISM OF THE MIXED TRIGLYCERIDES OF PALMITIC AND STEARIC ACIDS. E. S. Lutton, F. L. Jackson, and O. T. Quimby (Procter and Gamble Co.). *J. Am. Chem. Soc. 70*, 2441-5 (1948). As compared with the great similarity in polymorphic behavior of the single fatty acid saturated triglycerides, the mixed palmitic-stearic triglycerides show a remarkable individuality. Many of the conclusions here reached with regard to their behavior are at variance with those of Malkin and co-workers. The symmetrical isomers show a high degree of crystallinity; the unsymmetrical compounds are microcrystalline. All 4 compounds exhibit a lowest melting alpha form—unusually stable in the case of 2-palmityldistearin and unusually labile in the case of 2-stearyldipalmitin. Occurrence of forms other than alpha can be briefly tabulated:

Glyceride	Forms beside *alpha*
2-Palmityldistearin	Only beta.
2-Stearyldipalmitin	Only beta prime.
1-Palmityldistearin	Only beta prime from melt, prime and beta equally beta from solvent (beta stable).
1-Stearyldipalmitin	Beta prime and beta (beta stable).

A given form of a given glyceride may vary several degrees in melting point depending on its degree of stabilization. This variation may account for the fact that previous workers have reported more characteristic thermal points for a given glyceride than can be substantiated by X-ray diffraction patterns.

THE POLYMORPHISM OF *l*-MONOSTEARIN AND *l*-MONOPALMITIN. E. S. Lutton and F. L. Jackson (Procter & Gamble Co.). *J. Am. Chem. Soc. 70*, 2445-9 (1948). While largely confirming the work of Malkin, a reexamination of the polymorphic behavior of *l*-monostearin and *l*-monopalmitin has resulted in new information which differs in important aspects from earlier findings. These monoglycerides have 4 forms—subalpha, alpha, beta prime, and beta. The last 3 have melting points increasing in the order named. Beta alone is thermodynamically stable. Beta prime has been obtained only from solvent. There is a reversible alpha-subalpha transformation about 25° below the alpha m.p. but above room temperature. All forms for a given monoglyceride have very nearly the same long spacing and appear to be tilted double-chain-length structures. The forms are readily distinguished by means of short spacings except for subalpha and beta prime, which, in spite of notable differences in thermal behavior, show only minor differences in diffraction pattern.

THE EXPERIMENTAL AND TECHNICAL PREPARATION OF THE HIGHER FATTY ALCOHOLS—THEIR SULFONATION. G. B. Martinenghi. *Olearia* 309-19 (1947). Review on preparation (extraction from spermaceti, synthesis by hydrogenation of glycerides or fatty acids, synthesis by addition of CO to olefins from Fischer-Tropsch process and subsequent hydrogenation, reduction of glycerides or other fatty acid esters with metallic Na) and sulfonation of higher fatty alcohols. (*Chem. Abs. 42*, 4371.)

CHEMICAL PROCESSES UNDERLYING THE DETERIORATION OF THE FLAVOR OF BUTTER IN COLD STORAGE. M. van der Waarden (Bataafsche Petroleum Maatschappij, Amsterdam). *Research in Holland* 155-206 (1947). Fishy and train-oily off-flavors often developing in cold-storage butter made from acid cream are not due to microbiological processes, biacetyl, $(CH_3)_3N$, nor in any considerable degree to 20 probable oxidation products of fatty acids, nor to seal oil. Salting acid cream butter increases peroxide formation on storage; increases in peroxide content parallel off-flavor formation. Mol. O_2 is important in the formation of off-flavors in stored butter. Use of strong O-consuming bacteria in ripening culture is therefore recommended. At low-temperature storage flavoring substances are formed at a much slower rate in butterfat than in butter. Decomposition (oxidation) reactions seem to occur at the plasma-butterfat interface. The more Cu bound to the phosphatides, the worse the off-flavors developed. Only a small percentage of Cu is so bound at the pH of sweet-cream butters. Addition of NaCl usually increases the Cu so bound. At pH 7 most of the Cu and all of the Fe are bound by the protein. (*Chem. Abs. 42*, 5129.)

VEGETABLE LECITHIN. *Food Manufr. 23*, 330-2 (1948). The principal sources of lecithin are the yolk of egg, oilseeds, and nuts. Although maize oil and cottonseed oil have been considered by some authorities as superior to the soya bean in some of the properties usually attributed to lecithin, it is soya bean lecithin which is chiefly used in the food and other industries. Properties and uses are reviewed.

EFFECT OF TEMPERATURE ON ADSORPTION AT INTERFACES. CASE OF PARAFFIN OIL ACTIVATED BY STEARIC ACID. J. J. Trillat and J. Brigonnet. *Compt. rend. 225*, 1005-7 (1947). The effect of temperature on the interfacial tension of a 1/6000 solution of stearic acid in pure paraffin oil was studied between 20° and 65° by means of a modified du Nouy interfacial tensiometer. The curve of interfacial tension *vs.* time at several temperatures was interpreted as follows: the rapid initial decrease of the interfacial tension is due to the rapid formation of a transition layer of polar stearic acid molecules oriented at the interface; in addition, a part of these molecules is desorbed by thermal agitation, the slope of the curve diminishing. Finally, these 2 opposite phenomena come to an equilibrium (horizontal curve), which is characterized by a relative lowering of the interfacial tension. As the temperature is raised, thermal agitation becomes more pronounced and displaces the equilibrium to a lower concentration of stearic acid in the transition layer and to a higher interfacial tension. Considerable attention is paid to the effect of temperature on the final equilibrium state, which is interpreted by means of curves of the relation between the temperature and the time necessary for obtaining equilibrium and between the temperature and the relative lowering of the interfacial tension at equilibrium. (*Chem. Abs.*, *42*, 4020.)

PREPARATION OF WATER-IN-OIL EMULSIONS IN PRESENCE OF ETHANOL. J. Rzymskowski and J. Reitstotter (Inst. Ernahrung, Berlin-Dahlem). *Pharmazie 2*, 509-10 (1947). Compounds with hydrophilic groups on terminal carbons were ineffective as emulsifiers, whereas internal hydrophilic groups (carboxyl, sulfo, or sulfuric acid ester groups) were effective. The nature of the hydrophobic hydrocarbon residue is not essential, it must only be sufficiently long and have a double bond. (*Chem. Abs. 42*, 4372-3.)

FACTORS INFLUENCING OIL CONTENT OF POTATO CHIPS. R. E. Stutz and R. H. Burris (Univ. Wisconsin, Madison). *Food Indus. 30*, 1146-49, 1243-46. Freshly harvested potatoes produce chips of high oil content. Treatment with hot water before frying lightens color but increases oil uptake. Pretreatment with NaCl solution greatly reduces oil uptake.

AIR, WATER VAPOR, AND CARBON DIOXIDE AS LEAVENING GASES IN CAKES MADE WITH DIFFERENT TYPES OF FATS. M. P. Hood (Univ. Georgia, Athens), and B. Lowe. *Cereal Chem. 25*, 244-54 (1948). The relative increase in cake volume over batter volume attributable to air, water vapor, and carbon dioxide was investigated. The major increase in cake volume was produced by CO_2, followed by water vapor and air, in the order given. The effectiveness of water vapor in the presence of air in leavening cakes varied with the type of fat used, being greatest with oil, intermediate with butter, and least with hydrogenated lard. Conversely, the effectiveness of CO_2 was greatest in the hydrogenated lard and least in the oil cake. Air-evacuated batters showed very little increase in cake volume, indicating that the effectiveness of water vapor as a leavening agent depended on the presence and distribution of air in the batter. The cakes from the air-evacuated batters were considered unpalatable, whereas those leavened by air and water vapor and by CO_2, air, and water vapor were acceptable. Viscosity of the batters was affected by the mobility of the fats used and by the incorporation of gas in the batter. It was not always a good criterion of cake quality.

Fat and fat metabolism. K. Thomas and G. Weitzel (Univ. Leipzig, Ger.). *Fiat Rev. German Sci., Biochemistry Pt. I,* 1939-46 1-57. A review, with 492 references, of the German literature covering the period 1939-1946. (*Chem. Abs. 42,* 4769.)

Fat in nutrition. H. C. Eckstein, Ph.D. (Ann Arbor, Mich. *J. Am. Med. Assn., 137,* 1220-6(1948). A review.

Observations on a mobile arctic force. The health, physical fitness and nutrition of exercise "musk ox," February-May, 1945. R. M. Kark (Army Med. Nutrition Lab., Chicago, Ill.), *et al. J. Applied Physiol. 1,* 73-92(1948). "Musk Ox" troops did eat snacks when able and did voluntarily take 40% of their calories in fat. On the other hand, they developed no craving for fat, thus agreeing in their tastes with Canadian and American troops the world over. It is doubtful whether a ration containing much more than 40% of calories in fat would be acceptable even in the Arctic. Indisputably, however, the voluntary caloric intake is increased as the environment becomes colder and Operation "Musk Ox" is a good example of this generalization.

Effect of resection of mesenteric lymph nodes on intestinal fat absorption in the dog. B. G. Clarke, A. C. Ivy, and D. Goodman (Univ. Illinois). *Am. J. Physiol. 153,* 264-7(1948). Observations were made to determine whether intestinal fat absorption might be impaired or fat excretion increased by experimental interruption of the mesenteric lymph drainage. Resection of the mesenteric lymph nodes in 10 dogs did not alter fecal fat and nitrogen excretion. In each, there was rapid re-establishment of anatomic and functional continuity of the interrupted mesenteric lymphatics. In 6 animals, partial regeneration of the nodes occurred. Alimentary lipemia was studied in 4 animals, 3 of which showed normal values 6-12 days after operation.

Lipids of the fasting mouse. V. Liver phospholipid, lecithin, and cephalin. H. C. Hodge, P. L. MacLachlan, W. R. Bloor, E. Welch, S. L. Kornberg, and M. Falkenheim (Univ. of Rochester, Rochester, N. Y.). *Proc. Soc. Exptl. Biol. & Med. 68,* 332-4 (1948). Young, adult, male albino mice lost almost half the liver total phospholipid during a 5-day fast. The liver weight also decreased in such a fashion that the phospholipid concentration remained approximately constant. The amounts of lecithin and cephalin decreased in proportion. The % radio active P (P32) dose per mg. of phospholipid increased markedly during fasting and, although the % P32 dose per mg. lecithin is normally higher than that of cephalin, during fasting the values increased markedly for both fractions.

Behavior of essential fatty acids in the animal body. V. Lipase and cholinesterase activity (in rats) on a fat-free and on a vitamin E-deficient diet. W. Hess and G. Viollier. *Helv. Chim. Acta 31,* 381-6(1948). Lipase activity (tributyrin hydrolysis) of the plasma of male rats on a fat-free diet diminishes to approximately 50% of the normal level, whereas the cholinesterase activity remains unchanged. Administration of 12 drops of sun flowerseed oil per week to these animals caused a return towards normal of plasma lipase activity. In E-avitaminotic female rats, both lipase and cholinesterase activities were below normal. VI. Choline oxidase activity in B_2-avitaminosis. G. Viollier. *Ibid.,* 387-9. As compared to the liver choline oxidase activity of control animals receiving 70γ lactoflavin each week, the B_2-deficient rat livers show a reduced activity (approximately 20-30% of control levels). (*Chem. Abs. 42,* 4650.)

Effect of bile diversion on fecal fat and nitrogen excretion. J. R. Heersma and J. H. Annegers (Northwestern Univ. Med. School, Chicago, Ill.). *Am. J. Physiol. 153,* 143-7(1948). Fecal fat and nitrogen excretions were determined in dogs before and after cholecystonephrostomy when the mixed diet contained from 0 to 51 grams fat per day and 0 to 12 grams crude fiber per day. Tests were of five days' duration. In 6 normal dogs daily total fat and the percentage of free fatty acids excreted in the feces remained constant and independent of fat or fiber intake. In 9 bile fistula dogs, daily fecal fat excretion increased in linear fashion as dietary fat was increased. The mathematical relationship between fat intake and fecal fat excretion was interpreted as indicating that fecal fat consists of a constant amount of fat equal to that excreted on a fat-free diet plus 58% of the dietary fat. The ratio of free fatty acid to total fecal fat was significantly higher in bile fistula dogs than in normal dogs at dietary fat levels of 0 to 51 grams per day. Daily fecal nitrogen excretion was related to the amount of crude fiber in the diet in normal and in bile fistula dogs and was independent of dietary fat, protein, or of bile diversion.

Oleic acid toxicity and fat embolism. N. C. Jefferson and H. Necheles (Michael Reese and Provident Hospitals, Chicago, Ill.). *Proc. Soc. Exptl. Biol. & Med. 68,* 248-50(1948). Oleic acid does not seem to produce massive edema of the lungs by embolism, but by toxic effects on the capillaries of the lungs. Caution must be used in the preparation of fat emulsions for intravenous alimentation, in order to exclude fatty acids and soaps. Fat embolism *per se* may not be so dangerous unless fatty acids are released in or into the circulation.

Some clinical problems concerning fatty liver and methylation processes. P. Astrup (Rigshosp., Copenhagen). *Acta. Med. Scand. 130,* 12-19 (1948). Subjects with acute hepatitis apparently do not differ from normal subjects in their ability to methylate glycocyamine to creatine, and methionine excretion in the urine is the same in both. (*Chem. Abs. 42,* 5107.)

Favorable influence of fats and lipides on glycogen metabolism of the liver. I. Abelin (Univ. Bern, Switz.). *Helv. Physiol. et Pharmacol. Acta 5,* 412-21(1947). Rats were fed a large number of different diets and their liver glycogen contents were determined. The addition of 10-15% of a natural edible fat or oil to the diet caused a significant increase in liver glycogen. Hydrogenated oils were a little less effective. (*Chem. Abs. 42,* 4253.)

PATENTS

Amino fatty derivatives. D. Swern and T. W. Findley (U.S.A.). *U. S. 2,445,892.* This invention refers to stearic acid and octadecanol-1 substituted on the ninth and tenth carbon atoms by a hydroxyl group and a substituted or an unsubstituted amino group.

Solvent fractionation of tall oil. L. O. Cummings and H. A. Vogel (Pittsburgh Plate Glass Co.). *U. S. 2,444,730.* A process of fractionating crude tall oil into useful fractions comprises selectively subjecting the fatty acids in tall oil to esterification with an open chain alcohol of 1- to 5-carbon atom content and extracting the resultant mixture of fatty acid esters and rosin acids with a mutually immiscible nitroalkane containing 1- to 4-carbon atoms in the alkane nucleus and a liquid paraffin hydrocarbon as selective solvents to obtain a nitroalkane phase and a hydrocarbon phase, separating the phases evaporating the solvents from the phases to obtain a concentrate of fatty acid esters and a concentrate of rosin acids, and then distilling off a portion of the rosin acids from the rosin acid concentrâte to obtain a clear rosin-like product.

Stabilized lecithin. W. J. Fitzpatrick (W. J. Fitzpatrick Co., Chicago, Ill.). *U. S. 2,444,984.* Invention comprises a stabilized lecithin product of high emulsifying power adapted to remain free from rancidity for long periods of time consisting essentially of finely divided granules of water soluble food material, each having a thin film of lecithin thereon to form a dry free-pouring powder free from any tendency to cake or pack.

Drying Oils

Edited by
ROBERT E. BEAL

The chemistry of the dehydration of castor oil. C. P. A. Kappelmeier, W. R. van Goor, and R. van Helden (Kunsthersfabriek Synthese, Sassenheim, Holland). *Paint Technol. 13,* 261-4(1948). See *J. Am. Oil Chem. Soc. 25,* 150(1948).

Genus garcia vahl, a potential source of superior, hard, quick-drying oil. C. L. Lundell. *Wrightia 1,* 1-12(1941). The seeds of *Garcia nutans* contain 53-56% of oil in the kernel of *n* 1.5254-1.5260, density 0.9420, saponification number 189.2-192.4, acid number 1.1, unsaponifiable matter 0.76%, I number 176.8-177.9, diene number 81.5, and drying time less than 18 hours. Known sources of Garcia would yield less than 10 tons of seeds annually. (*Chem. Abs. 42,* 4367.)

Drying properties of fractions of colza oil obtained by extraction with selective solvents. E. Gordon (Lab. Chevreul, Paris). *Bull. mens. ITERG 1948,* No. 2, 31-3. The first seven fractions obtained by extraction of colza oil with hot methanol dried in 6 days but were not perfectly hard after 12 days. The first five fractions obtained by furfural extraction dried within 3 days and were perfectly hard after 6 days indicating that they are suitable as a substitute for linseed oil. Colza fatty acids could not be solvent fractionated successfully. (*Chem. Abs. 42,* 4767.)

Ultraviolet light absorption of standoils. M. Pestemer and J. Tschinkel. (Translated from *Fette u Seifen 50,* 153-8, 1943.) *Paint, Oil, Chem. Rev. 111,* No. 18, 14-21(1948). Samples removed at two-hour intervals during the bodying of refined linseed oil at 285°, 5-10 mm. were examined for viscosity. I number, specific gravity, refractive index, and ultraviolet light absorption. During the first half of the bodying process the iodine value and specific refraction decreased sharply and the % diene and triene conjugation increased to a maximum, while the viscosity increased only slightly. The last half of the heating period was characterized by a large increase in viscosity and but small changes in other values. From a consideration of I and molecular refraction values it is calculated that two double bonds per triglyceride molecule disappear during the first half of the process and a total of about three double bonds disappear during the entire heating period. The reaction consists at first largely of intramolecular polymerization followed by intermolecular polymerization, interesterification, and a correspondingly large increase in viscosity.

Macromolecular chemistry and progress in the paint and varnish industry. G. Champetier. (Translated from a paper presented at the First International Congress of the Paint and Allied Industries, Paris, France.) *Official Digest Federation Paint & Varnish Production Clubs 283,* 578-95(1948). Mono, bi, and tridimensional polymers are represented in the protective coating industry although the latter type is predominant. Plastification of polymeric molecules may be attained by molecular combination which alters the character of the intermolecular polar attractions or by the insertion of plasticizer molecules which decreases the polar attraction by increasing intermolecular spacing. The nature of the covalent bonds which cause cross-linking in tridimensional drying oil macromolecules, the frequency of cross-linking, and the nature of the individual molecules which enter into the reaction determines the properties of the drying oil film. It is shown how materials now utilized as hard plastics might be chemically modified to make them suitable for use in the surface coating industry.

The inhibition of the oxidation of linseed oil. A. C. Gupta and N. J. Chatterji (H. B. Technol. Inst., Kaupur, India). *Paint Manuf. 18,* 171-4(1948). Sulfuric acid refining may destroy the oxidation inhibitors in linseed oil depending upon the nature of the inhibitors and the strength of the acid used. Daylight and presence of iron accelerates the breakdown of inhibitors. (*Chem. Abs. 42,* 5237.)

The theory and practice of formation of stand oils. A. Vian and L. Yzu. *Ion 7,* 749-62(1947). Samples of linseed oil removed hourly during polymerization under CO_2 at 290°, and samples removed during the silent electric discharge polymerization of the same oil under CO_2 at 25-40°, 5-mm. pressure were examined for viscosity, refractive index, acid number, extinction coefficient, surface tension, and saponification number. Polymerization by electrical discharge is thought to occur by cyclization reactions and by the formation of radicals followed by coupling reactions. The electrical discharge process creates a greater amount of isomerization than the thermal process. (*Chem. Abs. 42,* 5238.)

POLYMER FRACTIONATION OF HEAT POLYMERIZED NONCONJUGATED VEGETABLE OILS. I. M. Bernstein (H. D. Roosen Co., Brooklyn, N. Y.). *J. Phys. & Colloid Chem. 52,* 613-61 (1948). Linseed and soybean oils were heat-polymerized at 307° and samples at intervals until gelation occurred. The samples were then exhaustively extracted under N_2 successively with alcohols from propanol to dodecanol. The monomers remain predominantly in propanol, the dimers in butanol, the trimers in penthanol, etc. Linseed oil yielded 2 fractions on reaching 307°, 10 after 4 hours, and 29 after 8 hours; soybean oil yielded 1, 3, 7, 10, 13, and 29 fractions after 0, 1, 5, 8, 12, and 17 hours at 307°. The extracted high polymers tended to gel at 26° under N_2, but not at 4°. Contact with monomers and lower polymers appears to inhibit the gelation of the higher polymers. The decrease in iodine number because of dimerization is 55.9 for linseed oil and 35.8 for soybean oil indicating that the dimerization of linolenic acid consumes 2 double bonds while only one disappears in the case of linoleic or oleic acids. It is estimated that linolenic acid dimerizes twice as rapidly as linoleic acid. Tables are given showing the distribution and properties of the polymers for several fractionations. (*Chem. Abs. 42,* 4769.)

PATENTS

DRYING OIL COMPOSITION AND METHOD OF MAKING SAME. E. Hazlehurst (Congoleum-Nairn, Inc.). *U. S. 2,446,652.* An oxidizable oil such as linseed oil, soybean oil, fish oil, or perilla oil is aerated with an oxygen-containing gas at 200-300° until the oxygen content of the oil is between 16.2 and 17.4% and its viscosity is between 800 and 4,000 centipoises at 77° F. Aeration is promoted by dispersing the oxygen-containing gas through the oil in the form of small bubbles by means of suitable mechanical agitation and by passing the gas through the oil 2-7 times per minute while maintaining the concentration of oxygen at about 5%.

COATING COMPOSITION COMPRISING A DRYING OIL, A RESIN, AND A ACYCLIC TERPENE SOLVENT. A. L. Rummelsburg (Hercules Powder Co., Wilmington, Del.). *U. S. 2,445,637.* A varnish composition comprises a drying oil, a phenol-formaldehyde resin, and a solvent containing at least about 10% of allo-ocimene.

FLEXILIZER (FOR WRINKLE VARNISH). Wm. A. Waldie (New Wrinkle, Inc.). *U. S. 2,437,369.* A mixture of a drying oil having one or more conjugated double bonds, a nondrying oil, and a drier such as Co, Pb, or Mn acetate or oxide added to a wrinkle varnish (3-9 parts) produces a flexible varnish suitable for oilcloth. (*Chem. Abs. 42,* 4371.)

Soap

Edited by
LENORE PETCHAFT

PARTIAL HYDROLYSIS OF GLYCERIDES BY SOAPS. P. Desnuelle, M. Naudet, and J. Rouzier (Faculte sci., Marseille, France). *Bull. mens. ITERG 1947,* No. 7, 28. Development of acidity in soap stocks after the usual treatment with salt water is attributed to a partial hydrolysis of the triglycerides caused by the soap present. The liberated glycerol reacts with the triglycerides and forms mono- and diglycerides. To test this theory a stock treated with salt water for 30 min. was dissolved in dilute EtOH and extracted with petroleum ether. The residue after evaporation of the petroleum ether shows a hydrolysis no. of 22.4. It was neutralized, dissolved in $CHCl_3$, and separated chromatographically over alumina according to the method of Kaufmann. The last fraction eluted with alcohol showed a hydroxyl no. of 130; this indicates the presence of monoglyceride. (*Chem. Abs. 42,* 6137.)

VELOCITY OF SAPONIFICATION OF GLYCERIDES AND METHYL ESTERS. O. Micaelli, M. Naudet, and P. Desneulle (Faculte sci., Marseille, France). *Bull. mens. ITERG 1948,* No. 4, 36. Peanut oil and its Me esters were saponified in exactly the same conditions at different temperatures with soda lye of 25° Bé. (10% excess) under vigorous stirring controlled by a tachymeter. In all experiments the saponification proceeded more quickly with the Me esters, but the most definite differences were observed at 80 and 100°, at these temperatures the Me esters are saponified in a few minutes, whereas the glyceride resists saponification for over 5 hours. (*Chem. Abs. 42,* 6137.)

THE EFFECT OF CALCIUM SOAP ON THE FLEXIBILITY OF FABRICS. Oskar Oldenroth (Kaiser Wilhelm-Inst. Bast Fibers, Sorau). *Melliand Textilber. 28,* 27-8 (1947). The deposition of Ca salts on fabrics is discussed and it is shown that Ca soap has the effect of lubricating the fabric and increasing its resistance to failure by flexing. The unwashed, but desized, control fabric failed after 2062 flexings. After deposition of $CaCO_3$ on the fabric, failure occurred at an average value of 850. After converting carbonate to a soap by 5 washings in a soap solution, the flexing failure was raised to 3000. (*Chem. Abs. 42,* 5681.)

SOME ASPECTS OF WETTING AND DETERGENCY. C. A. Norris (Imp. Chem. Inds. Dyehouse Lab., Manchester, Eng.). *J. Textile Inst. 39,* P125-31(1948). Mineral-oiled worsteds require neutral scouring at 100-150°F. in nonionic detergents (I) with 0.5% NaCl, and give grease figures of only 0.15-0.3%. Woolens oiled with olein should be first scoured by soda ash, but I with NaCl and reduced soda ash can be used in the second bowl. Raw wool can be treated similarly without soda ash in bowl 2, and successful results have been obtained by increasing the temperature of bowl 1 to 170°F. and omitting soda ash. The modified technic shows less cost, uses nonfatty detergents, saves soda ash, and produces better wool. (*Chem. Abs. 42,* 5681.)

STUDIES ON THE UTILIZATION OF SOAP IN LAUNDERING WITH SOAP AND ALKALI IN HARD AND PARTLY SOFTENED WATER. Kristen Bo. *Tids. Textiltek 6,* 74-6 (1948). Stearin, tallow, fat, peanut oil, and coconut oil soaps mixed with soda were subjected to washing tests, and their soap utilization was determined in hard and partly softened water: 78.7, 81.6, 60.8, 87.5, 48.6, 87.7, 25.9, 98.2, 46.6, 88.0%, respectively. Silicate-containing tallow soap and 5 different wash powders with a SiO_2 content ranging from 0.55 to 3.51% showed soap utilizations ranging from 17.1 to 65.4% used directly in hard tap water. (*Chem. Abs. 42,* 6143.)

BOUND AND FREE ACID IN ALUMINUM SOAP PREPARED BY PRECIPITATION. Richard H. Coe, Karol J. Mysels, and Gerould H. Smith (Stanford University, Palo Alto, Calif.). *J. Colloid Sci. 3,* 293-302 (1948). In aluminum stearate precipitated from aqueous solution there are present: (1) Free fatty acid, readily dissolved to form solutions of concentration up to that of the saturated solution of the fatty acid itself. (2) Loosely bound or sorbed fatty acid, amounting to about 0.6 mole/g.-at. of aluminum which may without difficulty be dissolved out of the soap to form solutions of concentration below that of the fully saturated solution of the fatty acid. (3) Firmly bound fatty acid, resistant to solvent, amounting to approximately 2 moles/g.-at. of aluminum, leaving the composition of the distearate (Al(OH)Str_2. Hydrolysis of aluminum soap by moist acetone may be repressed by the presence of dissolved fatty acid.

POLYMORPHIC TRANSFORMATIONS OF CALCIUM STEARATE AND CALCIUM STEARATE MONOHYDRATE. Robert D. Vold, Joseph D. Grandine, 2nd, and Marjorie J. Vold. *J. Colloid Sci. 3,* 339-61(1948). Anhydrous calcium stearate undergoes transformations at 65, 86, 123, 150, and 195°C. It melts with decomposition at 350°C. The substance can be obtained at room temperature either as a stable crystal, an unstable crystal, or a vitreous form. Differential heating and cooling curves and X-ray diffraction patterns of quenched samples at room temperature are presented. The set of transformations is partially analogous to that for sodium stearate, the resemblance being greater at low temperatures and less marked at high temperatures where, with the hydrocarbon chains irregularly packed and relatively mobile, the difference in binding power between sodium and calcium ions becomes important. Calcium stearate forms a monohydrate whose decomposition temperature at atmospheric pressure is about 110°C. Calcium stearates of technical quality resemble the pure material but tend to assume the vitreous form more readily and to crystallize completely only with difficulty. 23 references.

LIQUID SOAPS AND LIQUID SHAMPOOS. H. C. V. Cardew. *Soap, Perfumery, & Cosmetics 21,* 692-5(1948). Directions for preparing liquid shaving soaps, liquid soap shampoos, and miscellaneous products are given, including formulations.

THE USE AND BEHAVIOUR OF PERFUMES IN SOAPS. E. Gorokhoff (Laboratories V. Mane Fils, Asnieres, Seine). *Soap, Perfumery, & Cosmetics 21,* 700-3 (1948). Tests were run to determine the resistance to alkalis (or soap) of various perfumes. Fully boiled white soap containing 0.02 per cent free alkali and a cold process cocoa soap were used as test soaps. Perfumes tested included alcohols such as citronellol, geraniol and cinnamic alcohol, aldehydes, ketones, phenols, phenol ethers, lactones, musks, some essential oils and resinoids, and results with the various types are given. It was found that most of the synthetic perfumes volatilize rapidly, but there is no connection between this property and resistance to free alkalis.

NEW ABRASIVE FOR HAND SOAPS. T. F. Clark (Northern Regional Research Lab., Peoria, Ill.). *Soap Sanit. Chemicals 24,* No. 8, 41, 149-50(1948). It has been found that the grits of white corncobs may replace corn meal as an abrasive in powdered skin cleansers. Factors to be considered include particle size and shape, color, water-solubles and extractives, bulk, and the ability of the material to act as an abrasive and to soften in water. The grit particles should range in size from 20- to 30-mesh and should have color, brightness, and bulk comparable to that of the corn meal. The processing of these grits from the cobs is described. Other residues such as ground pecan or filbert shells may also be used in hand soaps.

DETECTION AND DETERMINATION OF SMALL QUANTITIES OF SOAP IN REFINED OILS. Jean P. Wolff. *Oleagineux 3,* 197-8(1948). A blue color in the upper layer of a mixture of 40 g. oil (acid no. less than 1), 50 cc. acetone (containing 2% H_2O) and bromophenol blue indicates the presence of soap which can be titrated to a yellow end point with 0.01 N HCl in H_2O-acetone solution. (*Chem. Abs. 42,* 6143.)

PATENTS

NEUTRAL, STABLE POTASSIUM SOAP. Marie Joseph Hubert Edmond Hustinx. *British 601,651.* Stable and neutral potassium soaps with improved transparency are prepared by saponifying fat base under normal or superatmospheric pressure with KOH containing little or no K_2CO_3 and adding a small amount of a partial ester of a polyvalent aliphatic alcohol.

CATION-ACTIVE COMPOUND. D. W. Jayne and H. M. Day (American Cyanamid Co.). *Canadian 448,976.* A higher fatty-acid ester of ethylene chlorohydrin is heated with a mixture of diethylene triamine, triethylene tetramine, and tetraethylene pentamine to give a cation-active compound. (*Soap 24,* No. 8, 87, 1948.)

POLYPHOSPHATES. C. F. Bonnet and R. B. Booth (American Cyanamid Co.). *Canadian 448,973.* Polyphosphate compositions are obtained by fusing an alkali metal phosphate with P_2O_5 at a temperature of approximately 1900°F. The composition corresponds to the formula $Me_9P_7O_{22}$. (*Soap 24,* No. 8, 87, 1948.)

SYNTHETIC BAR DETERGENTS. Novag Aktiengesellschaft, Zurich. *British 583,028.* A non-alkaline detergent bar contains a mixture of a wetting agent such as lauryl sulphate, a waxy substance such as paraffin wax to increase wear resistance and improve appearance, and an albumin such as milk casein which improves solidity of the bar.

SUDSING AGENT. N. B. Tucker (Procter & Gamble Co. of Canada). *Canadian 448,167.* A detergent and sudsing agent has the general formula $RCOOR'SO_3$ Me where RCO is the acyl radical of a fatty acid, R' is an alkylene or hydroxy alkylene radical of 2-4 carbon atoms, and Me is a metal forming a water-soluble salt. For example, a fatty acid salt such as sodium coconut-oil soap is condensed with monochlorohydrin sodium sulfonate. (*Soap 24,* No. 8, 87, 1948.)

SOAP ANTIOXIDANTS. E. D. Cook (American Cyanamid Co.). *British 591,836.* Soap is protected from discoloration and rancidity by addition of 0.01 to 0.5% of biguanide para-tert-amyl phenyl phosphate. (*Soap 24,* No. 8, 87, 1948.)