

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

THE FATTY ACIDS OF CORN OIL. F. J. Baur, Jr. and J. B. Brown. *J. Am. Chem. Soc.* 67, 1899-1900 (1945). An authentic specimen of corn oil has been subjected to the ester fractionation procedure for determination of the composition of its fatty acids. The results have been compared with those previously reported by Baughman and Jamieson and by Longenecker. The acids of this specimen of oil were shown to contain over 56% linoleic acid.

PUERTO RICAN FATTY OILS. VI. THE CHARACTERISTICS AND COMPOSITION OF "MOLINILLO" SEED OIL. C. F. Asenjo, J. A. Goyco, and Z. Martinez-Pico. *J. Am. Chem. Soc.* 67, 1936-7 (1945). The glyceride composition of the oil is: linoleic 12.39, oleic 67.55, myristic 1.36, palmitic 12.57, and stearic 1.26%.

THE C₂₀ UNSATURATED ACIDS OF PIG BACK FAT. F. B. Shorland and P. B. D. De La Mare. *Biochem. J.* 39, 246-51 (1945). C₂₀ unsaturated acids of the back fat of bacon pigs fed only buttermilk during the fattening period have been isolated by crystallization of the fatty acids and fractional distillation of their methyl and ethyl esters; 11-12 eicosenoic acid has been shown to occur probably to the extent of 0.5%; milk fat is a possible source of this acid. Isomerization by alkali at 180° has been used to characterize the C₂₀ polyethenoid acids. Subject to the limitations of the method discussed in the text, evidence is presented for the presence of eicosadienoic acid and/or eicosatrienoic acid. Arachidonic acid was identified by bromination as a minor constituent of the C₂₀ unsaturated acids. No conclusive evidence for the presence of unsaturated C₂₂ acids was obtained.

THE VITAMIN D CONTENT OF SOME NEW ZEALAND FISH OILS. E. R. Weeber. *Biochem. J.* 39, 264-7 (1945). Prophylactic bone ash analysis was used to determine the vitamin D content of 3 New Zealand fish oils. The vitamin D content in i.u./g was found to be: whole body eel oil, 25; ling liver oil, 260; groper liver oil (I), 5300; groper liver oil (II), 19,000.

THE CHEMICAL DETERMINATION OF TOCOPHEROLS IN ANIMAL FATS: THE STABILITY OF HOG FATS IN RELATION TO FATTY ACID COMPOSITION AND TOCOPHEROL CONTENTS. J. R. Chipault, W. O. Lundberg, and G. O. Burr. *Arch. Biochem.* 8, 321-35 (1945). A method based on the Furter and Meyer reaction and developed by Binnington and Andrews for the determination of tocopherols in vegetable oils has been further modified to make possible the measurement of the small amounts of tocopherols in animal fats. The rather critical and detailed character of the procedure is more than offset by the high degree of specificity and sensitivity obtained. The method has been applied to the measurement of tocopherols in hog fats. Evidence was obtained that tocopherol concentrations in several fats from the same hog are quite similar, but that the contents of the same fats in different hogs may vary widely. All of the values for several fats from two hogs were considerably greater than a single value previously reported in the chemical literature. It was found that, in general, the keeping qualities of carefully processed hog fats are depend-

ent primarily on 2 factors, their linoleic acid and tocopherol contents. It is concluded that tocopherols are the only natural direct inhibitors of oxidation present appreciably in normal hogs and that the tocopherols are probably derived solely from the diet.

LUBRICATION OF METAL SURFACES BY FATTY ACIDS. F. P. Bowden, J. N. Gregory, and D. Tabor. *Nature* 156, 97-101 (1945). The nature of the substrate has considerable effect on the efficiency of fatty acids as lubricants. Metals which are reactive enough to form soaps, e.g., Zn, Cd, Cu, and Mn, are efficiently lubricated by 1% lauric acid in paraffin oil, while materials which are unreactive, e.g., Pt, Ni, Cr, and glass, are poorly lubricated. The temperature at which the transition from smooth to stick-slip motion occurs is also much higher for the active metals. This is regarded as evidence that soap formation by reaction with metallic oxides has occurred, since soaps, e.g., Cd palmitate in solution or as solid, lubricate both types of materials and show the same high transition temperatures. The transition temperature is regarded as the m.p. of a solid adsorbed soap film or its point of solution in the solvent, both of which will decrease the load-carrying capacity of the film. On the basis of these experiments and previous work, it is concluded that the function of the lubricant in boundary lubrication is to interpose a not easily penetrable layer between the moving surfaces, which reduces the area of metallic contact. Friction is then the sum of the shear strengths of the metallic junctions and of the lubricant film. (Chem. Abs. 39, 5074.)

HYDROGENATED CASTOR OIL AS AN OINTMENT BASE. VII. SULFATED PRODUCT IN ANTISEPTIC OINTMENTS. G. W. Fiero and T. A. Loomis. *J. Am. Pharm. Assoc.* 34, 218 (1945). Sulfated hydrogenated castor oil (SHCO) and an emulsified base consisting of diethylene glycol monostearate 10, SHCO 20, petrolatum 30, and H₂O 40% were substituted for the official ointment base in the following antiseptic ointments: ammoniated HgH₂BO₃, Hg₂Cl₂, colloidal Hg₂Cl₂, I, PhOH, pine tar, red HgO, yellow HgO, Whitefield, half-strength Whitefield, Proprietary A, Proprietary B. Bacteriological tests indicated that the antiseptic value of these ointments is equal to or superior to that of the official ointments. (Chem. Abs. 39, 5039.)

VARIATION IN FAT, ASCORBIC ACID, AND RIBOFLAVIN CONTENT OF GOAT'S MILK. A. D. Holmes, H. G. Lindquist, and E. K. Greenwood. *J. Dairy Sci.* 28, 853-8 (1945). Thirty-nine samples of goat's milk produced in various localities in Massachusetts were examined for their fat, ascorbic acid, and riboflavin content. The milk was produced by 4 breeds of goats. They were from 1-12 years of age, and from the tenth day to the thirty-sixth month of lactation. All were fed a grain ration and some type of hay. Fourteen samples of milk were from goats that also received grass or other herbage. The milk of the stall-fed goats contained 4.2% of fat, 15.1 mg. of ascorbic acid, and 1.24 mg. of riboflavin per liter. The other samples of milk averaged 4.5% of fat, 20 mg. of ascorbic acid, and 1.02 mg. of riboflavin per liter. In general the riboflavin was lower and the fat and ascorbic acid

content were not materially different from cow's milk. The significance of difference of the values obtained for the milk of the 4 breeds was discussed.

RELATIVE NUTRITIVE VALUES OF ANIMAL AND VEGETABLE FATS. G. R. Cowgill. *Physiol. Revs.* 25, 664-86 (1945). Edible fats, the melting points of which are not too high to prevent liquefaction in the alimentary tract, are digested and absorbed to about the same degree. Such differences as have been found are of no practical nutritional significance. Natural fats differ with respect to their content of the essential unsaturated fatty acids but the amounts needed by the organism are so small that these differences are probably of no practical nutritional significance. Natural fats have not been found to differ appreciably in their effects on the body's needs for other dietary essentials. With respect to the value of various fats for growth: evidence has been offered by one group of investigators that when lactose is the sole carbohydrate in the food, butter fat is slightly superior to margarines and various oils of plant origin, but this view has been vigorously challenged by other workers; with diets similar to the so-called mixed diets used by man such fats have essentially the same nutritive value. The lack of fat per se results in lowered milk production by the lactating animal. There is some evidence that lactation performance is not as good when the organism is fed hydrogenated coconut oil as compared with that when the natural coconut oil is fed; this difference is not obviated by supplying essential fatty acid. In a diet otherwise nutritionally satisfactory, a vegetable fat such as that contained in a margarine can serve adequately in place of butter fat for growth and reproduction, shown by experiments with 8 and more successive generations of rats.

THE UTILIZATION OF ACETIC ACID FOR THE SYNTHESIS OF FATTY ACIDS. D. Rittenberg and K. Bloch. *J. Biol. Chem.* 160, 417-24 (1945). Na acetate labeled with D and C¹³ was administered to mice and rats. The fatty acids and cholesterol were isolated separately from the livers and carcasses of the mice. Both lipids contained C¹³ and D, indicating the utilization of both C atoms of acetic acid in their formation. Degradation of the fatty acids suggests that the labeled atoms are distributed at alternate positions along the C chains. The finding that the cholesterol contains not only deuterium but also C¹³ is proof that both C atoms of acetate are utilized in the synthesis of cholesterol.

THE MECHANISM OF ACTION OF THE ANTIFATTY LIVER FACTOR OF THE PANCREAS. I. ITS RELATION TO PLASMA CHOLINE. I. L. Chaikoff, C. Entenman, and M. L. Montgomery. *J. Biol. Chem.* 160, 387-95 (1945). The concentration of plasma choline is depressed in dogs deprived of the external secretion of the pancreas and in completely depancreatized dogs maintained with insulin. This fall in plasma choline is associated with the development of fatty livers. A principle highly active in choline metabolism can be isolated from the pancreas. The daily administration of as little as 60 mg. of pancreas fraction (No. 27C) is sufficient to prevent the fall in plasma choline in depancreatized dogs, as well as to raise the level in those in which the level of plasma choline had been permitted to fall. This fraction of pancreas also prevents fatty livers in depancreatized dogs maintained with insulin. II. FREE METHIONINE PREVENTS FATTY LIVERS IN COMPLETELY DEPANCREATIZED DOGS MAINTAINED WITH IN-

SULIN AND FED A LEAN MEAT DIET. *Ibid.* 489-92. The development of fatty livers in the depancreatized dog maintained with insulin and fed a lean meat diet can be prevented by the addition of free methionine to the diet. An explanation of the action of the antifatty liver factor of the pancreas is offered.

THE EFFECT OF DIETARY PROTEINS AND AMINO ACIDS ON LIVER FAT. J. M. R. Beveridge, C. C. Lucas, and M. K. O'Grady. *J. Biol. Chem.* 160, 505-18 (1945). Discrepancies in previous attempts to account for the lipotropic effect of casein, by feeding to one group of rats a certain amount of this protein and to another group corresponding amounts of methionine and cystine as free amino acids, are accounted for by the finding that different results are obtained at different dietary levels of casein; below 22% the free amino acids exert the stronger effect; above 22% the casein diet is more lipotropic. The lipotropic effect of a diet is determined not only by its content of S-containing amino acids but also by its adequacy in other respects. The lipotropic activity of a protein is determined not only by its methionine and cystine contents, but also by the nature and quantity of the S-free essential amino acids in the protein. These amino acids do not act directly, but through their well known influence on growth and maintenance they influence the formation of new tissue, thus modifying the amount of methionine left available for lipotropic action. Some evidence is presented for the existence in casein of a lipotropic factor other than methionine. Indirect evidence suggests that tyrosine may be involved.

ACTION OF LAURYL ALCOHOL SULFATE ON GERMINATION AND GROWTH OF WHEAT. J. Balansard and F. Pelissier. *Compt. rend. soc. biol.* 138, 596-7 (1944). Wheat was soaked 24 hours in solutions of dodecyl Na sulfate. Concentrations of 1:100-1:5000 were toxic while 1:10,000-1:100,000 accelerated germination. The growth of young seedlings was retarded by a 1:100,000 solution but seemed to be unaffected by a 1:10,000 solution. (*Chem. Abs.* 39, 4916.)

PATENTS

PROCESS FOR HYDROLYZING FATS. R. C. Daniels (Procter & Gamble Co.). *U. S.* 2,387,884. The invention relates to an improvement in processes for hydrolyzing fats. This improvement comprises mixing with and dissolving in the fat, just prior to its introduction into the hydrolysis reaction chamber, an amount of water sufficient to partially or completely saturate the fat with respect to its water dissolving capacity at the temperature of hydrolysis.

PRODUCTION OF UNSATURATED COMPOUNDS. H. G. Kirchenbauer (Colgate-Palmolive-Peet Co.). *U. S.* 2,388,158. The process comprises heating ricinoleic acid, soaps of ricinoleic acid or esters involving the carboxyl group of ricinoleic acid, with an alkaline agent in the absence of air and liquid water at a temperature of about 290° to about 300° while passing a stream of an inert gas through said material.

PROCESS OF TREATING TEXTILE MATERIALS. M. A. T. Rogers (Imperial Chemical Industries, Ltd.). *U. S.* 2,386,141. Process for conferring upon textile material the properties of softness and water-repellency, comprises impregnating the material with di-octadecyl N:N-di-(N'-chloro-pyridinomethyl)-p-phenylene di-carbamate to an amount of 0.5-3% by weight of the

textile material, and then submitting the impregnated material to a heat treatment in the absence of moisture at a temperature between 100° and 175°.

PERMANENT WATERPROOFING PRODUCT AND PROCESS OF MAKING IT. R. A. Pingree (Warwick Chemical Co.). *U. S. 2,386,631*. The process of making a waterproofing composition comprises heating a montan, candelilla, carnauba or beeswax with P trichloride, P pentachloride, sulfuryl chloride or thionyl chloride, heating the reaction product with a fat acid nitrile and an aldehyde until reaction has ceased, and thereafter heating the reaction product with a tertiary amine until a water-dispersible product has been secured.

WATER-REPELLENCY AGENTS FOR TEXTILES. M. A. T. Rogers (Imperial Chemical Industries, Ltd.). *U. S. 2,386,140*. A water-repellency agent consists of substantially pure N:N-di-(N'-chloro-pyridinomethyl)-distearyldiamino-methane.

QUATERNARY AMMONIUM SALTS AND PROCESS OF MAKING THE SAME. M. A. T. Rogers (Imperial Chemical Industries, Ltd.). *U. S. 2,386,142*. Special fat acid and heterocyclic quaternary ammonium salts are used as textile water repellents.

PROCESS OF TREATING TEXTILE MATERIALS. M. A. T. Rogers (Imperial Chemical Industries, Ltd.). *U. S. 2,386,143*. A process for treating textile fiber for the purpose of imparting thereto the quality of water-repellence, comprises impregnating the fabric with an aqueous solution, of not less than 0.5% concentration, of N,N-di-(N'-chloro-pyridinomethyl)-distearyldiamino-methane, and then submitting the impregnated fiber to a dry heat treatment at a temperature between 100° and 175°.

HIGH FREE ROSIN SIZE DISPERSIONS. F. L. Chappell, Jr. (Hercules Powder Co.). *U. S. 2,385,794*. A method of making a high free rosin size dispersion comprises treating an aqueous dispersion comprising saponified rosin, said rosin having been saponified by means of an alkali metal alkali, with terpinene-maleic anhydride, said terpinene-maleic anhydride being employed in an amount insufficient to reduce the pH of the dispersion below about 6.

BREAKING PETROLEUM EMULSIONS. M. DeGroot and B. Keiser (Petrolite Corp., Ltd.). *U. S. 2,385,969-70*. Special derivatives of castor oil fat acids are prepared for use as demulsifiers.

PETROLEUM DEMULSIFIER. M. DeGroot and B. Keiser (Petrolite Corp., Ltd.). *U. S. 2,386,936-7*. The

new composition consists of a quaternary compound of the pyridine series. Most of the derivatives mentioned contain fat acid radicals.

DEMULSIFIER. M. DeGroot and B. Keiser (Petrolite Corp., Ltd.). *U. S. 2,386,445-6*. The demulsifiers are special derivatives prepared from fat alcohols, polybasic organic acid, sulfo compounds, and amines.

CUTTING OILS. E. C. Hughes (The Standard Oil Co.). *U. S. 2,386,952*. A process of making a cutting oil comprises reacting P pentasulphide with a mineral oil in atmosphere of inert gas, at a temperature of 200-450° F. for at least about an hour, then incorporating a small amount of fatty oil to clear up residual P pentasulphide and subjecting to reaction temperature.

TREATING WOOL. W. P. Heintz and W. H. Zillessen (E. I. du Pont de Nemours & Co.). *U. S. 2,387,510*. In this method of processing wool to the final textile, the fibers are treated with petroleum oil and petroleum sulfonates for the purpose of lubrication, softening and easy removal of the treating agent.

PRINTING INK. E. F. Carman and W. Reil (Interchemical Corp.). *U. S. 2,385,793*. A printing ink consists of pigment dispersed in a vehicle comprising from 20-30% of tall oil, 8-15% of triethanolamine, and from 45-60% of water.

RUBBER MOLD LUBRICANT. H. H. Jones (Hugh Jones Products Co.). *U. S. 2,388,153*. A lubricant mixture for molds used in molding rubber comprises Na₂PO₄ 1-4, turkey red oil 1.2-2.1, a mixture of pine oil and an alkali metal water soluble soap in the proportions of approximately 3 parts pine oil to one part of soap 0.4-1.2%, gum arabic mucilage 0.1-0.4%, and the remainder water.

LUBRICANT. G. D. Davis and E. J. Barth (National Oil Products Co.). *U. S. 2,385,912*. The new lubricant composition in sulphurized glyceryl esters of tall oil.

ANTIFREEZE COMPOSITION. F. R. Balcar (U. S. Industrial Chemicals, Inc.). *U. S. 2,386,182-3*. Glycol antifreeze is rendered less corrosive by addition of glycerol monoricinoleate. Alkali metal nitrate may also be added.

ESTERS. F. Dee Snell and A. F. Guiteras (Chemsearch Corp.). *U. S. 2,385,849*. This invention relates to new organic compounds and particularly to esters of higher aliphatic alcohols and higher fatty acids having properties similar to those of certain natural waxes.

Abstracts

Drying Oils

Edited by
HOWARD M. TEETER

OCCURRENCE OF HEXADECATRIENOIC ACID IN THE GLYCERIDES OF RAPE (BRASSICA NAPUS L.) LEAF. F. B. Shorland. *Nature* 156, 269-70 (1945). Abnormally high iodine values of the C₁₆ fraction were found in the course of ester fractionation analyses of rape-leaf glycerides. Crystallization of the methyl esters from methanol, distillation at 0.1 mm., crystallization of the lithium salts from acetone, reconversion to methyl esters, and distillation at 0.1 mm. yielded a fraction

with saponification value, iodine value, and bromine absorption close to the theoretical for methyl hexadecatrienoate. Hydrogenation yielded methyl palmitate. Compositions of two samples of rape fatty acids from lipides soluble in acetone at 0° are given. (*Chem. Abs.* 39, 5515.)

COURSE OF AUTOXIDATION REACTIONS IN POLYISOPRENES AND ALLIED COMPOUNDS. IX. THE PRIMARY THERMAL OXIDATION PRODUCT OF ETHYL LINOLEATE.