Abstracts

Oils and Fats

Edited by
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SOUTH AFRICAN FISH PRODUCTS. XIX. THE SOUTH AFRICAN SEAL FISHERY. M. M. Black, W. S. Rapson, H. M. Schwartz, and N. J. Van Rensburg. *J. Soc. Chem. Ind. 64,* 326-31 (1945). Oil production in much improved quality and in almost quantitative yield was obtained by alkali digestion of the blubber followed by separation of the oil by centrifuging. Seal livers have been shown to be a valuable source of vitamin A. They yield from 1-11% of oil by alkali digestion. The oil contains from 0.053-1.75% of vitamin A. The vitamin A content of the livers was found to be influenced both by the locality from which the seals were obtained and by their age, the pup livers being less potent than those of the adult bulls. The vitamin D content of seal liver oils varied from 98-900 I. U. per g.

LIPID PRODUCTION BY A SOIL YEAST. R. L. Starkey. *J. Bact. 51,* 33-50 (1946). Growth and lipid production were good in aerated glucose solutions containing small amounts of yeast extract as the N source. Under favorable conditions, 20-25% of the consumed glucose was converted to yeast cells which contained 50-63% lipid. From 10-14% of the consumed glucose was recovered as lipid. The lipid content of the cells decreased as the N content of the medium increased.

MICRODETERMINATION OF THE SAPONIFICATION NUMBER OF FATS AND OILS. DECIGRAM, CENTIGRAM, AND MILLIGRAM PROCEDURES. K. Marcali and W. Rieman, III. *Ind. Eng. Chem. Anal. Ed. 18,* 144-5 (1946). Methods are described for determination of the saponification number of fats and oils with samples of about 500, 50, and 5 mg.

NEW RAPID METHOD FOR THE DETERMINATION OF "FREE" GOSSYPOL IN COTTONSEEDS, OIL CAKE AND MEAL, AND UNALTERED GOSSYPOL IN OIL. M. Z. Podol'skaya. *J. Applied Chem. U.S.S.R. 17,* 657-8 (1944). The method is based on the ability of gossypol to quantitatively reduce the Cu of Fehling solution. Extract 2 g. of finely divided cottonseed 10-11 hrs. in a Soxhlet apparatus, filter, and evaporate solvent. If residue is turbid add 7-8 ml. of refined oil that does not contain reducing substances. Add 10 ml. 1.2% NaOH solution and 20 ml. each of the Fehling solutions. Heat at such a rate that boiling begins in 3-3.5 minutes and boil 3 minutes. Determine amount of Cu precipitated by the usual methods. For other material, sample weight should be: cake or meal 10-30 g., oil 1-1.5 g. The relationships of quantity of gossypol to Cu in mg. were, respectively: 5, 4.8; 10, 9.5; 15, 14.7; 20, 21.3; 25, 30.5; 30, 33.4; 35, 42.8; and 40, 51.3. The method compares well with the aniline-pyridine method. P. considers the new method superior for samples of low gossypol content and samples which have been heated.

DIFFRACTION OF X-RAYS BY AQUEOUS SOLUTIONS OF HEXANOLAMINE OLEATE. S. Ross and J. W. McBain. *J. Am. Chem. Soc. 68,* 296-9 (1946). Transparent aqueous systems of hexanolamine oleate have been examined by X-ray diffraction over the wide range of concentration from 30-92% soap. The more dilute systems exhibit a waterhalo. All exhibit a well-marked halo with the Bragg spacing of 4.5-4.6 A., as well as a long spacing often in two orders. This confirms similar results from Germany and this country, which have uniformly been interpreted as proving the presence of lamellar micelles in aqueous solutions of colloidal electrolytes. The lamellar micelles consist of alternate layers of soap and of water. The soap molecules are packed side by side (giving rise to the side spacing) and end to end, the long spacings being due to the alternate layers of water and soap.

X-RAY INVESTIGATION OF GLYCERIDES. III. DIFFRACTION ANALYSES OF SYMMETRICAL MONOOLEYL-DISATURATED TRIGLYCERIDES. L. J. Filer, S. S. Sidhu, B. F. Daubert and H. E. Longenecker. *J. Am. Chem. Soc. 68,* 167-71 (1946). The long-ordered arrangement of 2-oleyl-1,3-distearin has been found to be different from the long-ordered arrangement of tristearin. From the X-ray diffraction data of 2-oleyl-1,3-distearin and related homologs, it was possible to propose an arrangement of glyceride molecules such that the lowered melting points of these compounds could be explained. The crystallization of 2-oleyl-1,3-dimyristin from solvent was found to yield the β'-phase. This phase is apparently associated with the highest melting form of this compound. The fatty acid configuration of an oleyldistearin isolated from the seed fat of *Garcinia Indica* (Kokum butter) was definitely established by comparison of its X-ray diffraction data with the data obtained upon a synthetic 2-oleyl-1,3-distearin.

DETERMINATION OF GEOMETRIC ISOMER COMPOSITION BY METHOXYMERCURATION. OLEIC AND ELAIDIC ESTERS. T. Conner and G. F. Wright. *J. Am. Chem. Soc. 68,* 256-8 (1946). The cis isomer, in addition reactions involving the double bond, usually reacts faster than than the trans form. It occurred to the authors that methoxymercuration might serve as an analytical tool for determination of cis:trans ratios in mixtures of compounds such as Et oleate and Et elaidinate. The methoxymercuration analysis for cis:trans ratios in geometric isomer mixtures is accurate within 4%, since the relationship of one-third reaction life to compositions is linear within this error.

THE DISTRIBUTION PATTERN OF FATTY ACIDS IN GLYCERIDES OF MILK FAT. E. L. Jack, J. L. Henderson, and E. B. Hinshaw. *J. Biol. Chem. 162,* 119-28 (1946). Data are presented showing the fatty acid composition, the percentage of fully saturated glycerides, and the fatty acid composition of the fully saturated glycerides of milk fat fractions separated from the solvent. The mole percentage of fully saturated glycerides found is as follows: —7° precipitate 75.4%, —13° precipitate 40.5%, —23° precipitate 40.3%, —53° precipitate 25.8%, —53° filtrate 4.6%, and original milk fat 31.3%. It is proposed that the fatty acids in milk fat tend to be distributed among the glycerides as widely as possible. Patterns for the distribution of the fatty acids among the glycerides in the different fractions are postulated, based on the proposition that the fatty acids are distributed as widely as possible. The hypothetical patterns are compared with the experimental data.

THE ADSORPTION OF FATTY ACIDS ON NICKEL AND PLATINUM CATALYSTS. H. A. Smith and J. F. Fuzek. *J. Am. Chem. Soc. 68,* 229-31 (1946). The adsorption

of normal fatty acids containing from 10-22 C atoms has been studied on Raney nickel and Adams platinum catalysts. The results can be explained on the assumption that the acids are adsorbed on the metal in an oriented unimolecular film in a manner similar to that found in a compressed fatty acid film on a water surface. The specific surface of the catalyst can be calculated on the basis of this assumption, and is found to agree with values calculated by the Brunauer-Emmett-Teller method.

STORAGE OF HENDECANOIC ACID IN THE WHITE RAT. F. E. Visscher. *J. Biol. Chem. 162,* 129-32 (1946). Hendecanoic (C_{11}) acid may be stored by the rat to the extent of 24% of the depot fatty acids.

FAT AND SUGAR INTOLERANCE AS CAUSE OF GASTROINTESTINAL SYMPTOMS. L. Tuft and H. J. Tumen. *J. Am. Med. Assoc. 130,* 624-7 (1946). Although the mechanism of the intolerance to these foods is not understood some defect in their absorption probably exists. Intolerance to fats and sugars may be a more frequent cause of gastrointestinal symptoms than is usually suspected.

THE EFFECT OF FAT ON THE UTILIZATION OF GALACTOSE BY THE ALBINO RAT. R. P. Geyer, R. K. Boutwell, C. A. Elvehjem, and E. B. Hart. *J. Biol. Chem. 162,* 251-9 (1946). Fat increases the utilization of galactose by the rat when either lactose or galactose is ingested. This phenomenon occurs on milk or synthetic type rations. The per cent of the ingested galactose lost in the urine is independent of the actual amount of galactose ingested, but is dependent on the per cent of galactose in the ration.

THE SYNTHESIS AND PROPERTIES OF THE ACYL PHOSPHATES OF SOME HIGHER FATTY ACIDS. A. L. Lehninger. *J. Biol. Chem. 162,* 333-42 (1946). Monopalmitylphosphoric acid and monooctanoylphosphoric acid (mixed anhydrides of phosphoric acid and the fatty acid) have been synthesized by the reaction of the proper acyl chloride with monosilver phosphate. The methods developed may be used in the synthesis of other higher fatty acid phosphates. Phosphatases present in mammalian tissues quickly hydrolyze the fatty acid phosphates. The adenylic acid system is not an obligatory phosphate acceptor in the dephosphorylation of the fatty acid phosphates.

DIETARY FACTORS IN THE REGULATION OF LIVER LIPID CONCENTRATION. P. Handler. *J. Biol. Chem. 162,* 77-85 (1946). The administration of biotin plus a basal B vitamin supplement to rats which had previously been fed a low protein diet with no B vitamins resulted in fatty livers despite the presence of adequate amounts of dietary choline. This was accompanied by a considerable increase in food consumption and growth. The further addition of folic acid accentuated these phenomena, although folic acid without biotin did not produce these effects. Inositol prevented the accumulation of liver fat without affecting either appetite or the growth rate. When a relatively high fat diet plus the basal B vitamin supplement was given to previously depleted rats, inositol was again found necessary to maintain normal liver lipid concentrations even in the absence of supplementary biotin, folic acid, or liver extract, and the effects of biotin plus folic acid were even more pronounced on this diet. However, if the experiments were continued for 24 days, choline alone sufficed to provide normal liver fat concentrations, as the food consumption and growth rate declined after the first week with a consequent decrease in the demand for dietary lipotropic factors to a level at which the supply of inositol from synthesis by the intestinal flora was sufficient to meet the inositol requirement. The inhibition of the lipotropic action of inositol by unsaturated fatty acids was confirmed and suggestive evidence was obtained for a synergistic activity of inositol and tocopherol in this system, although tocopherol of itself exerted no apparent lipotropic activity. The significance of these findings is discussed.

THE INFLUENCE OF INGESTED CHOLINE UPON CHOLINE-CONTAINING AND NON-CHOLINE-CONTAINING PHOSPHOLIPIDS OF THE LIVER AS MEASURED BY RADIOACTIVE PHOSPHORUS. C. Entenman, I. L. Chaikoff, and H. D. Friedlander. *J. Biol. Chem. 162,* 111-18 (1946). Dogs were injected with radioactive P, and the specific activities of the choline-containing and non-choline-containing phospholipids of their livers were measured. The "specific activity-time" curves of the choline-containing and the non-choline-containing phospholipid P of the liver are quite similar in untreated dogs. A single ingestion of 300 mg. of choline per kilo of body weight greatly increases the specific activities of choline-containing phospholipid P of the liver. Ingested choline decreases the specific activities of the non-choline-containing phospholipid P of the liver.

PATENTS

"NON-BREAK" VEGETABLE OILS. P. L. Julian and H. T. Iveson (Glidden Co.). *U. S. 2,392,390.* The process comprises treating phosphatide containing vegetable oil miscella with acid clay having a pH less than 5, removing the solvent from the miscella, making an aqueous emulsion of the phosphatides, and separating the aqueous emulsion from the oil, and recovering the phosphatides from the emulsion.

PROCESS OF SEPARATING AND RECOVERING CONSTITUENTS OF WASTE LIQUOR FROM THE SODA AND SULPHATE PROCESSING OF CONIFEROUS WOODS. J. J. Lovas and P. F. Bruins. *U. S. 2,395,284.* This scheme of refining tall oil comprises alkylization of the fat acids, saponifying the rosin acids and removing the fat acid esters by liquid-liquid extraction.

COMMINUTED SHORTENING. E. K. Chapin (Beatrice Creamery Co.). *U. S. 2,392,833.* A dry, comminuted, siftable, readily water dispersable shortening is composed of finely divided discrete particles of an edible fat, each of the particles being provided with a coating including milk solids and an algin containing substance or lecithin in amount effective to accelerate release of milk solids from the fat in the presence of water.

POWDERED SHORTENING. G. C. North, A. J. Alton, and L. Little (Beatrice Creamery Co.). *U. S. 2,392,-994-5.* The finely divided shortening particles are encased in a carrier comprising lecithin and milk solids or soybean protein.

MANUFACTURE OF SALAD OIL. L. C. Brown (Industrial Patents Corp.). *U. S. 2,393,744.* The process of winterizing a vegetable oil comprises adding at least .05% of phosphatides to the refined oil, chilling the oil containing the phosphatides, and separating the solid constituents crystallized from the oil.

VITAMIN CONCENTRATION. L. J. Van Orden (M. W. Kellogg Co.). *U. S. 2,394,968.* This is a liquid-liquid

fractionating process for concentrating vitamin fractions from oils.

RECOVERY OF FATTY SUBSTANCES. I. A. Parfentjev. *U. S. 2,395,790.* A process of recovering a high-grade shark liver oil comprises subjecting shark liver to the action of pepsin at a pH of about 1.5 and at temperatures not exceeding 100° F. until liver oil is separated, and removing the liver oil directly from the acid digestion mixture.

STABILIZATION OF VITAMIN A AND VITAMIN A-CONTAINING MATERIAL. J. Korner and H. P. Loomis (Silmo Chemical Corp.). *U. S. 2,394,456.* A mixture of propyl gallate and β-amino-Et alcohol bound to glycerophosphoric radical is used to stabilize vitamin medicinal oils.

PROCESS FOR DEHYDRATING OIL. I. M. Colbeth (Baker Castor Oil Co.). *U. S. 2,392,119.* The process of dehydroxylating glyceride oils comprises introducing the oil into the lower end of an inclined space of such shape that the oil is in a thin layer, and applying sufficient heat to the oil to vaporize it.

TALL OIL PROCESSING. J. J. Lovas and P. F. Bruins. *U. S. 2,395,282-3.* The present inventions arise from the discovery by the inventors that the constituents of mixtures of fatty acid and rosin acid Na salts can be separated by the selective solvent action of certain ketone-water mixtures, such as acetone-water mixtures and Me Et ketone-water mixtures; also that fatty acid soaps may be separated by the same means from mixtures thereof with rosin soap and unsaponifiable material, including sterols.

METHOD OF OBTAINING STEROL AND THE LIKE FROM TALL OIL. J. D. Jenkins (Pittsburgh Plate Glass Co.). *U. S. 2,394,615.* The process is based on removing the fat acid components, treating the residue with anhydrides of dibasic acids to form a half ester with the sterols, neutralizing the half ester with alkali solution, extracting nonesterified components with organic solvents, and liberating the sterols from the ester by boiling with alkali.

VALVE LUBRICANTS. J. D. Morgan and R. E. Lowe (Cities Service Oil Co.). *U. S. 2,393,800.* A lubricant for valves consists essentially of a mixture of stearamide and glyceryl mono ricinoleate in a ratio by weight of from about 1:4 to about 2:3.

HIGH-TEMPERATURE GREASES. J. D. Morgan (Cities Service Oil Co.). *U. S. 2,393,797.* A high temperature lubricant consists of petrolatum having dispersed therein 8-14% by weight of Li stearate based on the weight of the grease.

PLASTICIZERS. D. Price and R. Griffith (National Oil Products Co.). *U. S. 2,392,100.* The invention relates to a process for preparing halo-alkoxy derivatives of fat acids.

EXTRACTION OF GLYCERIN FROM FERMENTATION RESIDUES. F. R. Balcar (U. S. Industrial Chemicals, Inc.). *U. S. 2,392,569.* The method of recovering glycerin from concentrated distillery slop comprises subjecting a liquid slop containing 30-50% by weight of material other than glycerin, non-volatile at 100-105° to countercurrent extraction with aqueous acetone containing 50-90% acetone by volume.

Abstracts

Drying Oils

Edited by
HOWARD M. TEETER

THE FUTURE OF THE SOYBEAN INDUSTRY IN THE UNITED STATES. W. H. Eastman. *Am. Paint J. 30,* No. 22, 26-30 (1946).

EXAMINATION OF THE RESULTS OF ACID AND SAPONIFICATION VALUE DETERMINATIONS. (Notes by N. Strafford on Cooperative Research of the Association.) *J. Oil Colour Chem. Assoc. 28,* 97-100 (1943). The results of the cooperative research indicate that acid and saponification value determinations are not as straightforward as commonly supposed. In 40 determinations of acid value (without standardization of techniques), the mean value was 16.8, the standard deviation 0.96 and the coefficient of variation 5.7%. Thus, 95% of the tests would be between 14.9 and 18.7. A study of the variables involved in determining the acid number of linseed stand oil gave no clue to the large deviation in the results of the cooperative research. One possibility is the tendency of the end-point to "drag." Potentiometric titration gives the same end-point as phenolphthalein except in the case of very heavily bodied oils. In 43 determinations of saponification values (without standardization of techniques), the mean value was 192.4, the standard deviation 3.8 and the coefficient of variation 2.0%. Thus, 95% of the tests would lie between 184.8 and 200.0. Tests in the author's laboratory indicated that conditions for saponification value determinations are not very critical. To overcome the variations observed in the cooperative research it is suggested that rigidly standardized methods be used. Proposed methods for the two determinations are given.

CROTONIC ACID, A NEW RAW MATERIAL. P. W. Blaylock. *Paint Manuf. 15,* 367-370 (1945). A review of the applications of crotonic acid in the fields of surface coatings, drying oils, modified alkyd resins, polymerization reactions, cellulose compounds, plasticizers, solvents, etc. Thirty-three references.

IS MARCITA OIL A COMMERCIAL POSSIBILITY? Anon. *Paint Manuf. 15,* 356 (1945). Marcita oil is expressed from the kernels of the fruit of the tree *Parinarium laurinum,* a native plant of several areas in the Pacific, including New Guinea and the Caroline Islands. The kernels contain 12% of oil, which is a buff-colored liquid of soft consistency (m.p. 37°-50° C.). Having an iodine number 203-214, it oxidizes readily in air. The oil contains parinaric acid, a conjugated tetraunsaturated fatty acid.

PATENTS

PLASTICIZERS. E. A. Rodman (E. I. du Pont de Nemours and Co., Inc.). *U. S. 2,396,129.* Blown corn oil with a viscosity of 35-50 seconds on the Gardner-Holdt Scale is reacted with a dibasic acid or anhydride such as phthalic or maleic. The reaction product is used to plasticize nitrocellulose.

COATING COMPOSITIONS. W. T. Walton and J. W. Eysenbach (The Sherwin-Williams Company). *U. S.*