

Abstracts

Oils and Fats

Edited by
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FATS AND OILS IN POSTWAR PERIOD. C. E. Lund. *Chemurgic Dig.* 3, 199-200 (1944).

USE OF SECONDARY FLUORESCENCE IN TESTING LARD AND BACON FOR DECOMPOSITION. F. Schönberg. *Z. Fleisch- u. Milchhyg.* 53, 91-3 (1943); *Chem. Zentr.* 1943, I, 2740. S. illustrated with colored cuts the detn. of decompn. products with water soln. of neutral red. A secondary fluorescence in ultraviolet light is as suitable for testing lards as the characteristic fluorescence. (*Chem. Abs.*)

PURE AND MIXED MONOLAYERS OF DILAURYL MALEATE AND FUMARATE. J. L. Shereshefsky and A. A. Wall. *J. Am. Chem. Soc.* 66, 1072-1076 (1944). The surface pressure-area relationships of dilauryl maleate and dilauryl fumarate films were detd. at different temps.

THE SPECTROPHOTOMETRIC ANALYSIS OF FATS. II. R. Kraybill and B. W. Beadle. *J. Am. Chem. Soc.* 66, 1232 (1944).

ADSORPTION OF FATTY ACID BY THE LINEAR COMPONENT OF CORN STARCH. T. J. Schoch and C. B. Williams. *J. Am. Chem. Soc.* 66, 1232-1233 (1944).

ADSORPTION ANALYSIS OF COLORLESS COMPOUNDS: METHOD AND APPLICATION TO THE RESOLUTION OF STEARIC AND OLEIC ACIDS. H. J. Dutton. *J. Phys. Chem.* 48, 179-86 (1944). A method for the adsorption analysis of colorless compds. is described which employs a highly sensitive differential refractometer modified for measurement of changes in the refractive index of percolates from adsorption columns during continuous flow. The resolution of stearic and oleic acids has been studied as an example of the application of this general method. Advantages and limitations of the method are discussed.

THE ISOLATION AND PROPERTIES OF SOME NATURALLY OCCURRING OCTADECENOIC (OLEIC) ACIDS. R. C. Millican and J. B. Brown. *J. Biol. Chem.* 154, 437-50 (1944). Octadecenoic acids have been isolated by low temp. crystallization of the C_{18} Me esters of a number of fats and oils and lipids of animal and vegetable origin. These octadecenoic acids have been compared with oleic acid, made by similar methods from olive oil. The octadecenoic acids of chicken fat, and of peanut, cottonseed, corn, and linseed oils appear to be identical with the oleic acid of olive oil. On the other hand, the octadecenoic acids of lard, beef, tallow, beef adrenal phosphatides, pork liver lipids, human fat, and, to a somewhat lesser extent, soy bean and rape-seed oils appear to be mixts. of oleic acid with other isomeric octadecenoic acids, oleic acid being the principal component of these mixts. So far as beef fat and lard are concerned, these results appear to confirm the previously reported presence of vaccenic acid in these fats. Our results and those previously reported point to the likelihood of a rather general occurrence of octadecenoic acids other than oleic in fats and other lipids of animal origin.

RELATIONSHIPS ON RANCIDIFICATION OF FATS. Thure Sundberg and Stig O. Hultberg. *Iva* 1942, 243-57; *Chem. Zentr.* 1943, I, 2158. The spoilage changes in fats were studied by detns. of the acid no., sapon. no., n , peroxide (I) no., aldehydes (epihydrin-aldehyde) and Me ketone. I was the best criterion for studying

the tendency toward rancidity. Values obtained by the Lea method were low, the error being greater with higher fat concns. A $Ti_2(SO_4)_3$ method was unsuitable because the results were too low. Detn. of aldehydes (II) with fuschin-sulfurous acid soln. per Schmalfusz presented difficulties because of emulsion formation. Fuschin compds. of II with less than 7 C atoms are sol. in water; with more than 7 C atoms the soly. is greater in petr. ether-fat mixts. The Lea method errors are greatest with samples of low II content; the method being unsuitable for samples contg. less than 0.1 mg. of II per g. of fat. The min. of 0.0037 mg. of heptaldehyde in presence of 0.037 g. of butter was necessary to give a pos. test. Detn. of epihydrin-II was by the Aas procedure, in which the sample is shaken with HCl and alc.-phloroglucinol soln., the fat removed with ether and the color intensity measured. Results from the Tüffel method were too low. The I and II content of a fat in diffused daylight at room temp. as well as in the dark at 37° became appreciable only after an induction period. In the latter case the I becomes especially high. During like periods in a dark room at room temp. these values remain low. Decompn. products develop quickly in sunlight. I appears first; in the dark epihydrin-II is detected later; but in direct sunlight it appears quickly. Ketones develop in samples stored at high temps. or exposed to direct sunlight. A sample held several months near a south window became bleached, and developed a higher n and acid no. as well as I, II, and ketones. The O_2 uptake of butterfat depended on the amt. of light irradiation. In time O_2 absorption decreases to yield an S-shaped absorption curve. The O_2 uptake was 2% instead of being equiv. to the unsatn. Between 58 and 86% could be accounted for in I, II, and acids; the rest went into the formation of volatile products and was also partially due to errors in I no. detns. In a brown stoppered bottle the vol. of volatile substances produced overbalanced the O_2 consumption. The removal of O_2 from fat in closed containers aided in the protection against the accelerating effect of visible and ultraviolet light. Röntgen (10,000 r) and Ra (48,000 r) rays did not have a detectable effect on olive oil. Mol. wt. investigations on rancid samples for studying the amt. of decompn. products formed indicated that polymerization as a cause of tallowiness of butterfat could not be ruled out. Butterfat for detn. of peroxide no. should not be melted; it must be extd. with suitable solvents. (*Chem. Abs.*)

FURTHER OBSERVATIONS ON PHYSIOLOGICAL ANTIOXIDANTS. P. György and R. M. Tomarelli. *J. Biol. Chem.* 154, 317-24 (1944). N, N-Dimethylaminoazobenzene (butter yellow) possesses considerable activity in retarding the autoxidation of linoleic acid. Butter yellow acts synergistically in enhancing the antioxidant activity of rice bran ext. or hydroquinone but is ineffective with α -tocopherol. Of a no. of antioxidants tested only α -tocopherol exerted any appreciable inhibition to the oxidation of linoleic acid (and carotene) catalyzed by the enzyme soy bean lipoxidase. Diphenylamine displayed a slight action,

while hydroquinone, methyl and benzyl ethers of hydroquinone, diphenyl ethers, and butter yellow gave no inhibitory effect.

DETERMINATION OF GALLIC ACID ADDED TO FATS AND OILS. K. F. Mattil and L. J. Filer, Jr. *Ind. Eng. Chem. Anal. Ed. 16*, 427-9 (1944). Two methods have been developed for the quant. detn. of gallic acid added as an antioxidant to fats and oils. A spectrophotometric study of gallic acid in dilute solns. of acid and alkali is reported. A colorimetric method based on the color produced at pH 7 by a ferrous tartrate reagent has been established for use with a photoelectric colorimeter.

DETERMINATION OF FATTY ACID MONOESTERS OF L-ASCORBIC AND D-ISOASCORBIC ACIDS IN FATS AND OILS. J. Turer and R. M. Speck. *Ind. Eng. Chem. Anal. Ed. 16*, 464-5 (1944). The 2,6-dichlorophenolindophenol reagent in acetone can be successfully used for the detn. of the fatty acid monoesters of L-ascorbic and D-isoascorbic acids in fat and oil substrates.

QUANTITATIVE DETERMINATION OF HIGH MOLECULAR WEIGHT PRIMARY ALIPHATIC AMINES. A. S. Ralston and C. W. Hoerr. *Ind. Eng. Chem. Anal. Ed. 16*, 459-60 (1944). A simple, rapid, and accurate method for quantitative detn. of primary aliphatic amines contg. 12 to 18 C atoms in the presence of their corresponding secondary amines is based upon the separation of the primary amines by distn. It can also be employed for the analysis of lower mol. wt. primary amines and their salts in the absence of secondary amines.

STUDIES ON THE COMPARATIVE NUTRITIVE VALUE OF FATS. IV. THE NEGATIVE EFFECT OF DIFFERENT FATS ON FERTILITY AND LACTATION IN THE RAT. H. J. Deuel, Jr., E. Movitt, and L. F. Hallman. *J. Nutr. 27*, 509-513 (1944). No differences were found in the fertility of male or female rats which from 21 days of age had received diets of mineralized skimmed milk powder fortified with the necessary fat-sol. vitamins and various fats, irrespective of whether the lipid was butter, a margarine, corn, cotton-seed, olive, peanut, or soybean oil. Moreover, such diets were equally efficient in promoting lactation as judged by the wts. of the rats when weaned at 14 or 21 days of age.

FAT METABOLISM. H. M. Fienblatt. *Am. J. Dig. Dis. 11*, 260-1 (1944). There is no difference in fat digestion in the thin and obese individual. The blood fat curve in the obese individual rises after fat ingestion, this rise being essentially cholesterol, and starts to fall after three hours. In the thin individual the rise in blood fat is in the non-cholesterol lipids. This rise is sustained for over six hours. These findings indicate that cholesterol is a utility substance and an intermediate stage of fat metabolism rather than a waste product.

RANCID FAT IN EXPERIMENTAL DIETS. O. Garth Fitzhugh, A. A. Nelson, and H. O. Calvery. *Proc. Soc. Exptl. Biol. Med. 56*, 129-31 (1944). Studies on the deleterious effects of rancid lard in an experimental diet indicate that it is important to choose fats that will supply the necessary nutrients and not introduce other complicating factors. Rats on diets contg. 6% rancid lard developed pathological lesions similar to those found in vitamin E deficiency. The observations are of particular importance in chronic toxicity studies in which animals are maintained on experimental diets for long periods of time.

SPECTROSCOPIC STUDY OF FISH LIVER OILS IN RELATION TO VITAMIN A. F. P. Zscheile and R. L. Henry. *Ind. Eng. Chem. Anal. Ed. 16*, 436-7 (1944). Eight fish liver oils and 3 samples of U.S.P. reference oil were studied spectroscopically and conversion factors calcd. from the biological potencies of these oils. Characteristic curves were studied and it was emphasized that measurement at a single ultraviolet wave length is insufficient for a proper spectroscopic evaluation of vitamin A content. The stability of the reference oils were studied at intervals during 6 months.

EFFECT OF LOW FAT DIET ON LIPIDS OF ERYTHROCYTES, PLASMA, SERUM, AND WHOLE BLOOD OF DOGS. E. V. O. Miller and A. E. Hansen. *Proc. Soc. Exptl. Biol. Med. 56*, 244-6 (1944). From our studies of the fatty acids in the corpuscular and fluid portions of the blood, it appears that dogs on the low fat diet used in these experiments are able to synthesize sufficient fat to maintain a normal fat level in both the cells and the plasma but are unable to synthesize the highly unsaturated fatty acids necessary to maintain the degree of unsaturation normally found in both these portions.

ASSOCIATIVE DYNAMIC EFFECTS OF PROTEIN, CARBOHYDRATE AND FAT. E. B. Forbes and R. W. Swift. *J. Nutr. 27*, 453-68 (1944). The supplementary feeding of protein, of carbohydrate or of fat increased the production of heat from the kind of nutriment fed. Cerelese spared protein and fat; beef protein spared carbohydrate and fat; while lard spared only protein. Of the mixed supplements, cerelese and beef protein increased heat production from carbohydrate and protein, and spared fat; cerelese and lard increased heat production from carbohydrate, and spared protein and fat; beef protein and lard increased heat production from protein, and spared carbohydrate and fat; while cerelese, beef protein, and lard increased heat production from protein and carbohydrate, and spared fat. All mixed supplements, regardless of compn., spared fat.

NUTRITION AND ABSORPTION. S. Donhoffer. *Arch. ges. Physiol. (Pflügers) 246*, 92-7 (1942). The most dominant nutrient in the diet of rats causes an increased absorption of its components. Rats kept on a high-carbohydrate diet (66% wheat starch) for 3 weeks absorb glucose most readily. Rats on a high-protein diet (66% casein) absorb glycine, and rats on a high-fat diet (66% lard) absorb oleic acid most readily. (*Chem. Abs.*)

THE LIVER AND ITS RELATION TO PATHOLOGICAL FAT METABOLISM. C. S. Shapiro. *Med. Woman's J. 51*, No. 2, 23-6, 41 (1944). In obesity and leanness of the "essential" type the impairment of the fat-metabolizing functions of the liver is the primary cause of the condition. In obesity and leanness of the "glandular" type the disturbed fat metabolism arises indirectly through unbalanced effect of the diseased endocrine gland on the liver. Therefore, the "glandular" type of disturbed metabolism can also be regarded as a result of improper functioning of the liver as a secondary cause. (*Chem. Abs.*)

INFLUENCE OF SOME SULFUR-CONTAINING COMPOUNDS ON LIVER LIPID CONTENT OF YOUNG WHITE RATS. E. Roberts and H. C. Eckstein. *J. Biol. Chem. 154*, 367-75 (1944). The intraperitoneal administration of inorg. sulfide (17 to 32 mg. of Na₂S during an expl.

period of approximately 3 wks.) does not cause an accumulation of addnl. amts. of "fat" in the livers of young male rats fed a basal diet which produces fatty liver. Dimethyl sulfide, dimethyl disulfide, S-

methylisothiurea, and methylxanthogenate all exert a lipotropic effect when administered intraperitoneally to young male rats on a basal diet which produces fatty livers.

Abstracts

Soaps

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SODIUM ALCOHOL SULFATES—PROPERTIES INVOLVING SURFACE ACTIVITY. E. E. Dreger, G. I. Keim, G. D. Miles, Leo Shedlovsky, and John Ross. *Ind. Eng. Chem.* 37, 610-17 (1944). The preparation and properties are described for alternate members of a homologous and of an isomeric series of purified sodium salts of secondary alcohol sulfates, containing from 11 to 19 carbon atoms, and for a straight hydrocarbon chain with the sulfate group in various positions. The purified sodium salts of the primary alcohol sulfates with 10, 12, 14, and 16 carbon atoms are also examined. Measurements have been made of the surface tension and foaming, wetting, and detergent properties of solutions of these compounds in water and with added electrolytes. Solubilities of sodium salts of the secondary and primary alcohol sulfates studied are reported at 5° intervals from 20° to 40° C. The data are discussed from the point of view of correlating changes in the properties involving surface activity when the structure and molecular weight of the compound are changed.

SYNTHETIC WASHING AGENTS. C. H. Keymer Jones. *Soap, Perfumery & Cosmetics* 17, 419-20 (1944). Soap has two weaknesses: sensitivity to acids and low resistance to the hardness-forming elements of water. Soap substitutes have attempted to overcome these faults. Turkey red oil was the first substance to improve upon soap. This was due to the introduction of SO_3H into the fatty acid molecule, making a fatty sulphuric acid ester. True fatty sulphonic acids were the next improvement having a protective colloid action on lime soaps. Further progress was made by the introduction into the fatty molecule of an aromatic hydrocarbon of the simple or polynuclear type, to which the SO_3H group was again attached for solubilizing purposes. The fatty acids were also converted to long chain alcohols with the SO_3H at the end. Other synthetics were made by blocking the sensitive COOH group with an aliphatic residue and attaching the solubilizing group on to this. In some cases the fatty acid is esterified with an aliphatic hydroxy-sulphonic acid, in others by an aminosulphonic acid. These are probably the most important synthetics produced. They are superior to soap in regard to wetting power, and superior to the sulphonated alcohols in that their lime salts are easy to dissolve in water. The latest class of synthetic washing agents is a fatty condensation product in which the solubilizing component introduced is not the SO_3H group but decomposition products of the proteins, consisting chiefly of amino-acids.

SOAP IN MEDICINE. Milton A. Lesser. *Soap* 20, No. 7, 29-32, 74 (1944). A review is given of the medicinal uses of soap based on its virtues as a detergent and its ability to lower surface tension efficiently. Among the many uses listed are: use of soap in inactivating the virus of epidemic influenza, soap as a means of pre-

venting hydrophobia resulting from rabid dogs, role of soap in presurgical scrubbing, soap in the dressing of wounds and in first aid work. Tests have shown that in addition to esthetic reasons, cleanliness is important for the efficient functioning of the disinfecting power of the skin, and in the prevention of industrial dermatoses and infection.

WETTING AGENTS. *Chem. & Met. Eng.* 51, No. 7, 137 (1944). Several types of wetting agents and detergents, called Tritons, have useful application in compounding rubber latices and in the textile and leather industries. Triton 770, an aqueous solution containing 20 percent of an aralkyl ether sulphate, is stable in neutral and alkaline solutions even when heated, and in acid solutions, unless heated at a pH below 3.5. It will emulsify oils and greases and suspend solid particles. Although Triton 770 foams readily, it does not form a heavy lather and can be used in many places where ordinary soap cannot. Its spreading properties are reported to be good. Tests showed marked lowering of surface and interfacial tension. Triton K-60, an aqueous dispersion of a quaternary ammonium salt, is supplied as a paste at 25 percent solids. A cation-active compound, it is stable in solutions of strong acids and is not precipitated in hard water or by water-proofing agents. It retains its activity in concentrated acids and salts.

MEMBRANE AND POROUS STONE FILTERS AS IMPORTANT AIDS FOR THE DETERMINATION OF FAT ACIDS IN FILLED SOAPS. H. Ankerst. *Fette u. Seifen* 50, 354-6 (1943).

Quant. and more rapid removal of fillers in filled soaps when detg. their fat acid content is obtained when a membrane or porous stone filter is used. Soaps contg. 7% or less of fillers can be dissolved and filtered directly. More highly filled soaps should be split out before sepg. the fillers from the ether-extd. fat acid and solvent. These recommendations are based on expts. The time required is about half that of the method with paper as the filter medium. The app. is described in 2 diagrams showing the use of both the membrane and porous stone filters. (*Chem. Abs.*)

BORON BODIES IN SOAP. *Perfumery & Essential Oil Record* 35, 172-3 (1944). A new detergent composition includes a water-soluble ionizable anionic active surface-active compound stable in alkaline solution and a material containing sodium oxide and boron trioxide in the proportion of one to three mols of Na_2O to one mol of B_2O_3 . Good results in detergency are obtained when the material as made is dried to a moisture content not substantially above 50 per cent. Tests made on the borated soap showed that the borate material will stand more unfavorable conditions of use without losing its effectiveness than will any other known soap builder. Several ways of preparing the detergent are described.