Abstracts

Oils and Fats

Edited by
M. M. PISKUR

BUTTER AS A FLAVORING AND SHORTENING MATERIAL. *The Bakers Digest 15,* 193-196 (1941).

SUGAR RENDERING OF LARD INCREASES STABILITY. Sleeter Bull. Food Ind., *13,* No. 4, 48-9, 97 (1941). The addition of small amounts of dextrose to pork fat during open steam-kettle rendering materially increased the stability of the lard but imparted a slightly dark color and a slight odor and flavor of caramel to the lard. Bleached sugar-rendered lard was white, it was less stable than the unbleached sugar-rendered lard, and it was more stable than untreated lard. Both the bleached and unbleached sugar-rendered lards were used to make cakes and pie crusts of satisfactory quality. The articles mention the use of the Swift stability app.

DETERMINATION OF FAT ACIDS IN FATS AND SOAPS. J. Grossfeld. *Z Untersuch Lebensm. 81,* 1-21 (1941). With a fat acid detn. method in which a standard amt. of benzine was shaken with the acidified soap and the fat acid content was calcd. from the wt. present in an aliquot there was a considerable loss when applied to fat acids. The losses for the fat acids were butyric 84, caproic 14, caprylic and capric mixt. 3-5 and capric 0.4%. With fats the av. losses were cocofat 2 and butter fat 3%. Loss with butter fat can be reduced to an av. of 2.2% and with cocofat to practicaly nil by removing the alc. that was used in the sapon. step. The method was applicable to butter with the correction 0.18 (B_1-B_2) where B_1 was the butyric acid value of the fat calcd. on the basis of the fat acids and B_2 the I for the extd. fat acids. With cacao fat the sample should be less than 5g. or there would be a loss owing to stearic acid crystg. out of the benzine soln. In samples contg. oxy-acids the method was successfully applied when a H_2O-satd. 1:1 benzine-ether solvent was used. Ether satd. with water gave results that were too high. With soaps filled with clay the soap was first extd. 6 hr with 95% alc. Soaps contg. carbohydrates were treated thus: 2g. soap was refluxed with 10 cc. of 25% HCl for 10 min.; the mixt. was shaken wtih 25 cc. alc. and 50 cc. of benzine; then 20 cc. of H_2O was added and the mixt. was shaken vigorously. Fat acids were detd. on a 25 cc. aliquot of the benzine layer. There are 53 references. (*Chem. Abs.*)

THE SIGNIFICANCE OF FLUORESCENCE ANALYSES. Anon. *Seifensieder-Ztg. 68,* 71 (1941). The examn. of fats and oils by ultraviolet light and the colors shown by various oils from different localities are described. Initial stage of oxidation may be detected before it is evident otherwise. By use of d. c. iron arcs and of a. c. Hg arcs, impurities such as zinc white in white lead can be detected. (*Chem. Abs.*)

DETERMINATION OF BROMINE ADDITION NUMBER. K. Uhrig and H. Levin. *Ind. & Eng. Chem., Anal. ed. 13,* 90-2 (1941). A method is described for indicating degree of unsatn. quickly by direct titration of sample dissolved in chloroform with a standard soln. of Br in glacial HOAc, using the color of the Br itself as indicator. It has given correct results when applied to pure hydrocarbons. The method may also find utility in fat analysis.

ANTIOXIDANTS AND THE AUTOXIDATION OF FATS. XII. THE ANTIOXIDANT PROPERTIES OF TOCOPHEROLS, HYDROXYCHROMANS, HYDROXYCOUMARANS AND RELATED COMPOUNDS. Calvin Columbia. *J. Am. Chem. Soc. 63,* 1142 (1941). The stabilizing action of hydroquinones and benzoquinones is decreased and finally lost with progressive nuclear methylation. Trimethyl- and tetramethyl-hydroquinones, their corresponding quionones, the tocohydroquinones and tocoquinones are all inactive. In contrast, nuclear methylation of the 6-hydroxy chroman series, although it progressively lessens, does not destroy the antioxygenic action; the heterocyclic ring tends to nullify the effect of nuclear alkylation. α-Tocopherol is less effective than the dimethyltocols; the antioxygenic action of the dimethyltocols; the antioxygenic action of the dimethyltocols and dimethylhydroquinones varies with the position of the substituent methyl groups.

THE ANTIOXIDANT PROPERTIES OF ANTIHEMORRHAGIC COMPOUNDS. Calvin Golumbic. *J. Am. Chem. Soc. 63,* 1163-4 (1941). As was to be expected compounds in the β-naphthoquinone series possess greater antioxygenic activity than the analogous α-naphthoquinones but they are less active than corresponding benzoquinones. Thus, β-lapachone is only about one-fifth as effective as the pyrano-o-quinone derived from α-tocopherol. Since β-lapachone is much less effective than α-naphthoquinone, it is doubtful that the chroman ring of the former contributed to its antioxygenic action; in the benzone series the presence of a chroman ring markedly increases antioxygenic activity. Obviously, no relation exists between antihemorrhagic and antioxygenic activity.

THE GEOMETRIC ISOMERISM OF THE LINOLENIC ACIDS. ELAIDOLINOLENIC ACID. J. P. Kass, J. Nichols and G. O. Burr. *J. Am. Chem. Soc. 63,* 1060-63 (1941). Elaidolinolenic acid, m.p. 29-30°, a geometric isomer of alpha linolenic acid, was isolated from the selenium-elaidinized fatty acids of linseed oil by way of its hexabromide, m.p. 169-170°. The existence of beta linolenic acid was questioned. Some problems in the isomerism of the linolenic acids were discussed.

EFFECT OF PRO-OXIDANTS UPON REPRODUCTION IN RATS. F. E. Deatherage, K. P. McConnell and H. A. Mattill, *Proc. Soc. Exptl. Biol. & Med. 46,* 399-402 (1941). It has not been possible to interfere with the process of reproduction in female rats on an adequate diet by administering various oxidation products of fats, by mouth, subcutaneously, or intraperitoneally. These products included rancid animal fats, their volatile oxidation products with extremely high peroxide content, the unsaponifiable portion of irradiated fats and some aldehydes. Mortality of the young was very great. Unlike mice, rats were not susceptible to the damaging effect of heptaldehyde on reproduction; unless the mothers succumbed to systemic intoxication they bore litters even with serious lesions at the site of injection. An adequate stock diet (Purina dog chow, finely ground) treated with ethereal ferric chloride supported reproduction in the second generation, indicating that the coupled oxidation of tocopherol in the presence of rancid fats requires adequate contact for an adequate time.

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THE RATE OF ABSORPTION OF VARIOUS FATTY ACIDS BY THE RAT. H. J. Deuel, Jr., L. Hallman and A. Reifman. *J. Nutr. 21,* 373-82 (1941). A comparison has been made in the rate of absorption of the fatty acids by the rat from acetic to tridecylic acids inclusive. The distillable fatty acids (acetic to heptylic) were fed as the sodium salts while the higher homologues were administered as the free acids. Butyric, caproic, and caprylic acids were absorbed the most rapidly. Propionic, valeric, and heptoic acids disappeared from the intestine much more slowly while nonylic acid occupied an intermediate position. The wide discrepancy which we have noted earlier in the rate of absorption of the triglycerides composed of even- and odd-chain fatty acids may be explained on the basis of differences in removal of the component fatty acids from the gut. Capric, undecylic and tridecylic acids were absorbed at rates approximating 20 mg. per 100 sq. cm. per hour as determined in experiments of 1 and 3 hours in duration. Only minimal quantities of lauric acid left the gastrointestinal tract over a 3-hour period. The slow speed of absorption may be partly ascribed to its solidification in the stomach; however, trilaurin, which has a higher melting point, was shown earlier to be absorbed much more rapidly.

THE B VITAMINS AND FAT METABOLISM. IV THE SYNTHESIS OF FAT FROM PROTEIN. E. W. McHenry and G. Gavin. *J. Biol. Chem. 138,* 471-75 (1941). While the administration of thiamine alone will cause the synthesis of fat from carbohydrate, it will not do so from protein. In the latter case pyridoxine is essential. This vitamin, in combination with thiamine, prevents a reduction in body fat of rats maintained on a protein diet. The synthesis of fat from protein is clearly evident when pyridoxine, thiamine, riboflavin, and pantothenic acid are supplied. Various combinations of the isolated members of the vitamin B complex do not cause the synthesis.

URINARY EXCRETION OF THIAMINE ON HIGH FAT AND HIGH CARBOHYDRATE DIETS. Wm. M. Cahill. *J. Nutr. 21,* 411-18 (1941). In all of the experiments reported it was found that even great alterations in the ratio of fat to carbohydrate in diets of the same thiamine content did not significantly affect the urinary thiamine excretion. This was true whether the thiamine intake was adequate or fairly low. The bearing of these findings on the validity of tests for thiamine deficiency which are based on a determination of the amount of thiamine excreted in the urine is pointed out.

CHOLINE IN THE NUTRITION OF CHICKS. D. Mark Hegsted, R. C. Mills, C. A. Elvehjem and E. B. Hart. *J. Biol. Chem. 138,* 459-65 (1941). Choline has been shown to be essential for growth and the prevention of perosis in growing chicks. Choline-deficient chicks did not show fatty livers at 4 weeks of age and bone phosphatase values were normal in chicks suffering from perosis due to choline deficiency.

IS CHOLINE THE FACTOR IN THE PANCREAS THAT PREVENTS FATTY LIVERS IN DEPANCREATIZED DOGS MAINTAINED WITH INSULIN? C. Entenman and I. L. Chaikoff. *J. Biol. Chem. 138,* 477-484 (1941). The lipotropic effects of choline and pancreas were compared in the completely depancreatized dog maintained with insulin. It is shown that 35 mg. of choline per kilo are sufficient for complete prevention of fatty livers. The choline content of the pancreas fraction did not account for its lipotropic effect. The possibility that choline is made available to the organism by the presence of the fraction in the gastro-intestinal tract has not been ruled out. The anti-fatty liver factor of the pancreas is heat-labile.

HYDROLYSIS OF FATS AND FAT ACID ESTERS. VIII. RELATION BETWEEN THE CONSTITUTION AND THE RATE OF HYDROLYSIS OF GLYCERIDES. *J. Agr. Chem. Soc. Japan* 16, 439-53 (1940). Oleic acid radicals in α- and β-oleodisterin were sapond. at 30° with similar velocity in the homogeneous system, but were split off more easily than stearic acid radicals. β-laurodisteurin was selectively hydrolyzed. The higher unsatd. acid radicals in fish oil were more rapidly split off than the lower unsatd. or satd. acids by lipase and KOH at —10°. Moroctic acid was also more easily split off from β-moroctodiolein. The difference in the hydrolysis velocities between triolein and trielaidin may be due to the phys. properties of the glycerides. Triglycerides of α- and β-linolenic acid were equally hydrolyzed in the homogeneous system. The hydrolysis velocity had a close relation to the emulsifying power. It was proved by the detn. of the size of particle in the emulsion by means of the microscope. However tristearin was an exception. (*Chem. Abs.*)

PATENTS

PROCESS FOR HYDROLYZING FATS. V. Mills (The Proctor & Gamble Co.). *U. S. 2,233,845.* In a countercurrent process for hydrolyzing fats with production of fatty acids and glycerin by bringing the fat and water into contact with one another at high temperature and pressure in an enclosed reaction chamber, there is included the step of supplying high pressure steam at the head to form a vapor cushion.

MANUFACTURE OF VULCANIZED, MODIFIED FATTY OILS. L. Auer (J. Randolph Newmann). *U. S. 2,234,545.* The process which comprises mixing a fatty oil with between 2 and 10% of an alkali metal sulphite, heating the mixture to between 250° and 310° C. until a thickened, heat-bodied, polymerized oil product is obtained and then subsequently vulcanizing the modified, heat-bodied oil product so obtained, is described. The products are used in rubber, linoleum, varnish, soap and candle industry.

PURIFICATION OF POLYHYDRIC ALCOHOLS. T. W. Evans and J. R. Scheibli, C. H. van de Griendt (Shell Development Co.). *U. S. 2,234,400.* A special still for purifying glycerine prepared from hydrocarbons is described.

PROTECTIVE COATING COMPOSITION. G. D. Martin (Monsanto Chem. Co.). *U. S. 2,228,667-8.* A coating compn. characterized by resistance to skin formation in the bulk condition contg. a vegetable drying oil having incorporated therein a pos. oxidation catalyst and a controller of oxidation thereof comprises a polyhydroxyl substituted naphthalene and/or phosphoric ester of polyhydric phenol.