polymerization of the fatty acids (4) produced by the hydrolysis mentioned above. Regardless of the type formed, the total amount is a negligible factor as regards fat loss.

The production of free fatty acid followed the same trend as was suggested in an earlier communication from this laboratory (1). Our results indicate that no increase in polymerization therefore is to be expected from this cause in subsequent fryings.

The total of volatile materials and polymer formed was 0.27%, thus indicating that there is no appreciable loss of fat during surface frying of donuts.

REFERENCES

(1) Arenson and Heyl, Oil and Soap, Vol. XX, No. 8, p. 149-51, 1943.
(2) Porter, Michaelis and Shay, Ind. Eng. Chem., Vol. 24, No. 7, p. 811-13, 1932.
(3) Lea, C. H., Rancidity in Edible Fats, 1939.
(4) Hilditch, T. P., Chemical Constitution of Natural Fats, 1941.

Book Review

Toxicology and Hygiene of Industrial Solvents. Edited by K. B. Lehmann and F. Flury. Translated by Eleanor King and H. F. Smyth, Jr. The Williams and Wilkins Company, 378 pp. Price $5.00.

According to the preface, this book forms a companion piece to "Chemical Technology of Solvents" by O. Jordon, and it is predominantly of a medical nature.

Development and organization of the information in the book was the result of an assignment entrusted to the medical committee of the German Society for the Protection of Labor. The literature and experimental work was divided and portions assigned to several members, several universities, the Imperial Health Office and the industrial hygiene laboratory of I. G. Farbenindustrie.

The results of laboratory experimental toxicological investigations, together with medical literature on solvents form the principal part of the book. There are also contributions by O. Jordon on chemistry and technology, by W. Frieboes and W. Schulze on skin injuries, by H. Engel and H. Prillwitz on dangers to health and protection, and by H. Engel on the German official regulations for protection of public and workers.

Since most fat and oil industries use organic solvents the book should be welcomed by the industry. Essential toxicological data on industrial solvents has been well organized by the authors. They also had the advantage of having access to abundant unpublished research information.

M. M. Piskur.

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

Refractive index nomograph for liquid fatty acids. D. S. Davis. *Ind. Eng. Chem. 35*, 1302 (1943).

The component fatty acids of human depot fat. D. L. Cramer and J. B. Brown. *J. Biol. Chem. 151*, 427-38 (1943). The methyl esters of the fatty acids from 2 specimens of human depot fat were separated by distillation through an efficient column into 6 or 7 relatively simple fractions; the main fractions representing esters of single carbon series were studies by crystallization procedures at low temp. Methyl myristate, palmitate, stearate, and oleate were isolated and identified as practically pure compds. The presence of tetradecenoic and hexadecenoic acids was demonstrated in this fat for the first time. The oleic and linoleic acids of human fat are the principal C_{18} unsatd. acids present, but they are found along with isomeric octadecenoic and octadecadienoic acids. The presence of arachidonic acid is confirmed. From the data obtained from crystallization studies on 2 specimens and from distn. data on 3 more, the fatty acid compn. of 5 specimens of human fat have been calculated and recorded. In the 5 specimens studied the linoleic (total octadecadienoic) acid contents ranged from 8.2 to 11.0%; the values for arachidonic acid fell between 0.3 and 1.0%.

The distribution of lipids in animal tissues. M. Kaucher, H. Galbraith, V. Button, and H. H. Williams. *Arch. Biochem. 3*, 202-15 (1943). The lipid [phospholipid (cephalin, lecithin, and sphingomyelin) free and combined cholesterol, cerebroside, and neutral fat] distribution in beef organs and muscles, in the muscles of other warm- and cold-blooded species, and in avian and reptilian eggs, was detd. The essential lipid concn. of the various tissues is related to the extent and variety of their physiological activities and confirms a similar relationship previously demonstrated for the phospholipids, which comprise the largest fraction of the essential lipid in all the tissues studied. The distribution of the other lipid fractions, as well as the individual phospholipid components appears to be more directly related to the particular types of functions performed by individual tissues.

Chemical and physical determinations of vitamin A in fish liver oils. B. L. Oser, D. Melnick, and M. Pader. *Ind. & Eng. Chem. Anal. Ed. 15*, 717-24 (1943). An improved method for plotting the ultraviolet absorption curves of vitamin A products is presented, and applied in studies of crystalline vitamin A acetate, fish liver oils, and concs. to evaluate factors which cause distortions in the curves. Emphasis is placed on the importance of conducting the detn. on the unsaponifiable fraction of oils regardless of their potency. The U.S.P. reference cod liver oil No. 2 is shown to be unsuited as a spectrophotometric or colorimetric standard. The estimation of vitamin A in food product. B. L. Oser, D. Melnick, and M.

Pader. *Ibid.* 724-29 (1943). The antimony trichloride method for detg. vitamin A in food products has been modified to allow corrections for the presence of inhibitors of the color development, for temp. effects, for turbidities produced in the course of the color development, and for extraneous color present in the final test soln.

REPORT ON MARGARINE. L. A. Maynard, H. E. Longenecker, G. O. Burr, C. A. Elvehjem, F. F. Eliot, and C. M. McCay. *Rept. Food and Nutr. Bd. Natl. Research Council No. 118,* 20 pp. (1943). The present available scientific evidence indicates that when fortified margarine is used in place of butter as a source of fat in a mixed diet, no nutritional differences can be observed. Although important differences can be demonstrated between different fats in special experimental diets, these differences are unimportant when a customary mixed diet is used. The above statement can only be made in respect to fortified margarine and it should be emphasized that all margarine should be fortified.

FURTHER STUDIES ON THE COMPARATIVE VALUE OF BUTTER FAT, VEGETABLE OILS, AND OLEOMARGARINES. R. K. Boutwell, R. P. Geyer, C. A. Elvehjem, and E. B. Hart. *J. Nutr. 26,* 601-9 (1943). With lactose as the sole carbohydrate in the diet, rats showed superior growth when fed butter fat or lard as compared to corn oil, coconut oil, cottonseed oil, soybean oil, peanut oil. olive oil, and hydrogenated cottonseed oil. With a mixt. of carbohydrates composed of sucrose, starch, dextrose, dextrin, and lactose in the diet, the av. growth response of the animals fed vegetable oils was equal to that of the animals fed butter fat and lard. The growth rate on this ration was more rapid than when all of the carbohydrate was present as lactose. Properly fortified oleomargarine fats have growth equal to butter fat over a period of 6 weeks when the above mixt. of carbohydrates was incorporated in the rations. Properly fortified oleomargarines did not give growth equal to butter fat when lactose was the sole carbohydrate in the diet. On such a regime rats fed butter fat grew slightly better than rats fed oleomargarines of animal origin but decidedly better than rats fed oleomargarines of vegetable origin.

THE ACTION OF AMINO-ACIDS AND PROTEINS ON LIVER-FAT DEPOSITION. H. J. Channon, G. T. Mills, and A. P. Platt. *Biochem. J. 37,* 483-92 (1943). Glutamic acid was found to exert a lipotropic action on cholesterol but not on fat-fatty livers. The lipotropic actions of various protein fractions were studied. Evidence was obtained that some factor which affects liver-fat deposition, other than cystine, methionine, and tyrosine, is present in the protein molecule. This factor can be concd. in the butanol-sol. amino-acid fraction. Fractionation by the copper-salt method effected further concn. of the unknown factor and indicated the possible presence of a substance which accelerates liver-fat deposition. Conflicting results have been obtained in experiments with gelatin, and in one expt. with caseinogen fractions, and more work is necessary to elucidate the problem completely.

THERMAL DECOMPOSITION OF LARD. C. D. Larsen and H. P. Morris. *J. Am. Chem. Soc. 65,* 2301-3 (1943). Samples of lard have been heated at several temp. between 200 and 350°, with variations in the length of the heating period. The free acid and unsap. fractions in lard increase uniformly with gradations in the temp. of heating up to 300°, decompn. of the lard, with formation of free acids, acrolein, CO_2, water, and unsapon. material, is greatly accelerated. The I. No. of the free acid fraction from heated lard decreases as the temp. is increased and the total quantity of free acids is increased. The I. No. of the simultaneously formed unsapon. fraction becomes greater as the yield of unsapon. material becomes greater.

PATENTS

REFINING OF COTTONSEED OIL. I. K. Giles and W. Kelley (The Lummus Company). *U. S. 2,337,041.* The process of refining vegetable oils, comprises subjecting an oil which is substantially free of gummy material to treatment including admixing a body of said oil with an alkali refining reagent and settling from said oil a soap stock substantially free of gummy material, and thereafter diluting the soap stock to form a flowable mixt. and separating addnl. refined oil from said soap stock.

ANTIOXIDANT FOR FATS AND OILS. H. A. Mattill and C. Golumbic (Lever Brothers Company). *U. S. 2,333,656.* A process of inhibiting oxidation and the development of rancidity in oleaginous matter comprises adding a small amt. of a compd. selected from the group consisting of naphthols, quinones, and quinols and a small amt. of an ascorbic acid.

ANTIOXIDANT FOR FATS AND OILS. H. A. Mattill and C. Golumbic (Lever Brothers Company). *U. S. 2,333,657.* A compn. of matter comprises an oleaginous material in which is included a small amt. of caffeic acid.

ANTIOXIDANT FOR FATS AND OILS. H. A. Mattill and C. Golumbic (Lever Brothers Company). *U. S. 2,333,658.* A compn. of matter comprises as oleaginous material in which is included a small amt. of a hemuronic acid and a cyclic oxy compd. selected from the group consisting of quinones, hydroquinones, naphthoquinones, naphthols, naphthohydroquinones, chromans, chromens, coumarones, and coumarans.

PROMOTION OF DEHYDRATED CASTOR OIL. F. G. Nessler (The Sherwin-Williams Company). *U. S. 2,336,186.* The process of producing a fatty drying oil from castor oil comprises acylating castor oil at the alcoholic OH groups with the mixed acids of dehydrated castor oil, heating the mixt. to about 300°C. under vacuum, and while agitating with an inert gas to split off said acids and to remove them from the dehydrated fatty oil.

TREATMENT OF TALL OIL AND PRODUCTS OBTAINED THEREFROM. R. G. Dressler and R. E. Vivian. *U. S. 2,336,472.* The oil is hydrogenated in volatile solvent soln. after pretreatment with hydrogenation catalyst at 100-130°.

PROCESSING OF TALL OIL. E. Färber (Polyxor Chemical Co., Inc.). *U. S. 2,337,235.* The oil is neutralized with 1.1 the amt. of alkali necessary fractionally distd. and the acids released from the neutral portion with H_2SO_4.

TEXTILE OIL. A. C. Goodings and H. B. Marshall (Ontario Research Foundation). *U. S. 2,336,087.* A textile oil comprises about 80% to 95% of a mineral base oil having a viscosity within the approx. range of 50 and 250 seconds Saybolt Universal at 100°F. and contg. as a scouring agent about 5% to 20% of the di-ester of glycerol with a fat acid and naphthenic acid.