Top finish: glass ring.

Graduation: All lines, figures and letters to be clear-cut and distinct. Each degree mark to be longer than the remaining lines. Graduations to be numbered at zero and at each multiple of 2 degrees.

Immersion: 45 mm.

Marking: "FAC Titer Test," a serial number and the manufacturer's name or trade mark shall be etched on the stem. The words "45 mm. immersion" shall also be etched on the stem, and a line shall be etched around the stem 45 mm above the bottom of the bulb.

Scale error: The error at any point on the scale shall not exceed 0.2° C.

Standardization: The thermometer shall be standardized at the ice point and at intervals of approximately 20°, for the condition of 45 mm immersion, and for an average stem temperature of the emergent mercury column of 25° C.

Case: The thermometer shall be supplied in a suitable case on which shall appear the markings "FAC Titer Test," "—2° to 68° C in 0.2°."

Note: For the purpose of interpreting these specifications, the following definitions apply:

The total length is the over-all length of the finished instrument.

The diameter is that measured with a ring gauge or micrometer.

The length of the bulb is the distance from the bottom of the bulb to the beginning of the enamel backing.

The top of the thermometer is the top of the finished instrument.

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Book Review

MICROBIOLOGY OF MEATS. By L. B. Jensen. The Garrard Press, Champaign, Illinois. 1942. 252 pp. Price $4.

The book treats the microbiological aspects of the flesh food industry as gained by a bacteriologist from industrial practice and research, and a review of the literature on the subject. For this reason and because of the specific nature of the title one might assume it to be a handbook for bacteriologists in the meat industry. However, the book deals with the technical, chemical, and bacteriological sciences as applied to processing and preservation of meats and fats derived therefrom.

Chapter five on the action of microörganisms on fats is an excellent review on the subject. Since chemists have been the main developers of theories on rancidity and have emphasized principally the chemical and physical agencies with very little attention to the effect of enzymes and bacteria on fats, this new book should stimulate a broader concept of the various phenomena that occur during fat spoilage. The author was the first to demonstrate a bacteriological mechanism which induces oxidative rancidity.

Although only one chapter in the book is devoted to the action of microörganisms on fats, the subject of bacterial discoloration and spoilage of fats is treated indirectly in most of the chapters devoted to flesh foods. The methods for handling "cutting" and "killing" fats and oils in a practical, sanitary manner to avoid rancidity and discoloration are discussed in detail.

M. M. PISKUR.

CORRECTION

Review of Literature on Fats, Oils, and Soap, 1941, part I, page 46—*U. S. 2,229,378* should read *U. S. 2,229,376*. Page 47—*U. S. 2,224,043* should read *2,244,034*.

Abstracts

Oils and Fats

Edited by
M. M. PISKUR and SARAH HICKS

A SEASHORE FAT FROM PIAUI. Camilla Rolin. *Rev. quim. ind. 11*, No. 118, 13-5 (1942). A hard waxy fat which is found in lumps at a depth of a few cms. along the shore near Parnaiba in Piaui, Brazil, is apparently derived from algae or from some low form of plant life. It is brown in color and has a strong penetrating odor. It is insol. in H_2O but sol. in the usual fat solvents; its density is 0.95. For a fat its m.p. is high (58-61°) but chemically it is a fat, not a wax, and it has a high free fatty acid content. This crude fat contains about 0.28% moisture, 0.8% ash, 0.14% S and 0.07% N. It has no drying properties; its I no. is only about 30. Industrially, the fat could be utilized in soap manuf. since it contains only about 0.5% unsaponifiable matter. It should be noted, however, that its soap is hard and only sparingly sol. in H_2O. Its possibilities for use in other ways depend on its compn.; analysis indicates that it is particularly rich in palmitic and myristic acids. *(Chem. Abs.)*

THE NATURE OF THE FATTY ACIDS ASSOCIATED WITH STARCH. THE ADSORPTION OF PALMITIC ACID BY POTATO AND DEFATTED CORN AND RICE STARCHES. Leo Lehrman. *J. Am. Chem. Soc. 64*, 2144-8 (1942). Potato and defatted corn and rice starches take up palmitic acid from a methanol soln., probably by adsorption. A discussion of known facts leads to the conclusion that fatty acids assoc. with starch are probably adsorbed.

THE APPROXIMATE COMPUTATION OF MIXED GLYCERIDES PRESENT IN NATURAL FATS FROM THE PROPORTIONS OF THEIR COMPONENT FATTY ACIDS. T. P. Hilditch and M. L. Meara. *J. Soc. Chem. Industry 61*, 117-25

(1942). The object of this communication is to discuss how far, in the light of present knowledge of the glyceride structure of natural fats, it is possible by empirical calns. based on the proportions of the component fatty acids in a fat to predict the general proportions of the chief mixed glycerides present. The use of such calcns., if practicable, might serve in suitable instances to avoid exptl. detn. of component glycerides in fats, thus eliminating either the considerable time and labor involved or the expenditure of the comparatively large quantities of fat requisite, but not always available, for exptl. work of this kind. The matter has been tested with reference to a number of fats for the component glycerides of which exptl. data are now available. For the majority of fats, which follow fairly closely the "rule of even distribution," it has proved possible to suggest methods of calcn. from the fatty acid compns. which at all events indicate with some approach to exactitude the amts. of the chief component mixed glycerides. The methods can generally be used when 1, 2, or 3 individual (major component acids form the bulk of those present, but fats (nut oils, milk fats, marine, animal oils) which include a larger no. of characteristic component acids cannot yet be dealt with by the methods of calcn. at present available. The chief component glycerides in certain groups of fats (e.g. animal body fats rich in stearic acid, or palm oils), which do not follow so closely the "rule of even distribution" in its simplest forms, can be computed approx. by introducing appropriate modifications into the scheme of calcn.

THE IODINE VALUE AS AN INDEX OF THE RELATIVE FIRMNESS OF PIG BACK DEPOT FAT. W. Bolton and R. G. Baskett. *Analyst 67*, 254-6 (1942). The I no. was found to be a good index of relative firmness of the fat.

SUBSTITUTING FOR COCONUT FAT IN DIPPING CHOCOLATE. J. J. Sheuring and P. N. Tracy. *Ice Cream Field, 39*, No. 6, 28 (1942). Expts. were conducted in which soybean oil, hydrogenated soybean oil, cocoa oil, beef fat, hydrogenated cottonseed oil and corn oil were used as substitutes for coconut oil. Samples were prepd. by diluting coating with 8 to 25% of domestic oils and fats, and compared with a standard milk chocolate coating as a control. The results indicate that 8 to 15% of low m. p. fats and 10 to 25% of high m. p. fats can be used successfully as substitutes for coconut oil. The best product was made by using a combination of 5% added hydrogenated soybean oil and 5% soybean oil. They also state that using 10% cocoa, 40% powdered sugar, 35% hydrogenated soybean oil and 15% soybean oil could be used as a satisfactory coating for emergency use although it was not as desirable as one prepd. from chocolate liquor. *(J. Dairy Sci.)*

THE COMPONENT GLYCERIDES OF LINSEED OIL: SEGREGATION BY CHROMATOGRAPHY. F. T. Walker and M. R. Mills. *J. Soc. Chem. Industry 61*, 125-8 (1942). This paper describes the quant. sepn. by fractional adsorption of the glycerides of linseed oil into groups possessing different levels of unsatn., the difference between adjacent glyceride groups being 1 ethenoid linking.

TOCOPHEROL AND THE STABILITY OF CAROTENE. F. W. Quackenbush, R. P. Cox, and H. Steenbock. *J. Biol. Chem. 145*, 169-77 (1942). α-Tocopherol and hydroquinone were equally effective antioxidants for the carotene in linolate *in vitro*. However, after extn. of soln. with H_2O, the carotene remained stable only in the tocopherol-treated samples. Hence, the low protective power of hydroquinone in the animal tests was probably due to its extn. from the lipid phase in the gastro-intestinal tract. Hydroquinone protected tocopherol from autoxidation in linolate soln. *in vitro*, thus sparing the tocopherol for the protection of carotene in the tract. It appears that the problem of instability of carotene in oil solns. exposed to O_2 can be solved by the use of lipophilic antioxidants such as the tocopherols.

THE EFFECTIVENESS OF LINOLEIC, ARACHIDONIC, AND LINOLENIC ACIDS IN REPRODUCTION AND LACTATION. F. W. Quackenbush, F. A. Kummerow, and H. Steenbock. *J. Nutrition 24*, 213-24 (1942). On a low-fat diet furnishing only 3.0 mg. of unsatd. lipid or a calcd. max. of 0.8 mg. of linoleic acid per rat per day, rats were raised to maturity and bred. After a prolonged gestation period and severe hemorrhage in parturition, the young were born dead or died soon after birth. A scaly condition of the hind paws and tail was observed after about ten weeks on the diet. Et linolate and Et arachidonate prevented or cured the dermal symptoms completely and produced normal young which were weaned at the age of 3 weeks with an av. body wt. of 40 g. The requirement for these acids appears to be higher than previously estd. Et linolenate did not make possible the production of normal young; neither did it cure the dermal symptoms. Fat analysis revealed a remarkable constancy in both the percentage of total fat and the I values of the fat, irrespective of the dietary supplements.

LINOLEIC ACID, PYRIDOXINE, AND PANTOTHENIC ACID IN RAT DERMATITIS. F. W. Quackenbush, H. STEENBOCK, F. A. KUMMEROW, AND B. R. PLATZ. *J. Nutrition 24*, 225-34 (1942). Rat acrodynia was produced on a diet contg. 0.003% of unsatd. fat. Various factors were tested for their curative action. Pantothenic acid did not even alleviate the symptoms. Pyridoxine produced temporary alleviation but did not effect a cure. Et linolate cured the acrodynia. Amts. of linolate which were subcurative alone became curative when given with pyridoxine. Pantothenic acid together with pyridoxine improved the dermal condition, and linolate subsequently produced further improvement. The 3 compds. together cured the acrodynia but did not cure completely the scaly condition of the tail and hind paws. The results indicate that an addnl. factor is involved. In prophylactic tests neither pantothenic acid nor pyridoxine prevented the acrodynia but pyridoxine retarded the development of the dermal lesions. A lack of pyridoxine did not result in acrodynia when animals were fed both linoleic acid (corn oil) and pantothenic acid. Sustained growth resulted only when all 3 supplements were fed.

THE BREAKDOWN OF SATURATED FATTY ACID TRIGLYCERIDES TO METHYL KETONES BY PENICILLIUM GLAUCUM. H. Thalor and W. Eisenlehr. *Fette u Seifen 48*, 316-21 (1941). Various satd. triglycerides were introduced into a sterilized culture medium and inoculated. With tributyrin (1) ketone formation took place in acid as well as neutral medium. The highest values were obtained at pH 7. At pH 3 and 5 con-

siderable amts. of ketone were formed, but at pH 7.5 there was a marked reduction. At pH 8.0 no ketone could be detected. In an acid medium the max. ketone concn. was found after 6 days; in neutral medium after 12 days. In distinction from I ketone formation with tricaprylin was displaced more to the neutral point. The amts. of ketone formed were much less than with I or trilaurin. The strong ketone formation was noteworthy during the first day; it rapidly decreased to the third day and then increased during the fifth and sixth days. Only in strongly alk. soln. did ketone formation stop. *(Chem, Abs.)*

THE FLUORESCENCE OF BLEACHED HOG LARD. A. Schloemer. *Z. Fleisch- u. Milchhyg. 50*, 176 (1940). The fluorescence of a hog lard can be explained as due to substances which have been absorbed from the infusorial earth, used as a bleaching agent. The substances of the infusorial earth excite fluorescence, also fluorescence in ether and alc. soln. but do not do so in the absence of a solvent.

ANTIOXIDANTS AND AUTOXIDATION OF FATS. XIV. THE ISOLATION OF NEW ANTIOXIDANTS FROM VEGETABLE FATS. Calvin Golumbic. *J. Am. Chem. Soc. 64*, 2337-40 (1942). Cottonseed and soybean oils and mixed hydrogenated vegetable fats contain alkali-labile antioxygenic substances other than the tocopherols. The chemical behavior of these fat antioxidants showed that they are similar to, if not identical with, the chroman-5,6-quinones and occur in fresh vegetable fats in a colorless, possibly quinol form. Their isolation and concn. were accomplished by chromatographic adsorption and the use of selective solvents. These antioxygenic quinoid substances, like the chroman-5,6-quinone product of α-tocopherol, were devoid of vitamin E activity.

THE INFLUENCE OF THE KIND OF ADDED FAT ON CAROTENE RESORPTION FROM THE INTESTINE. Christian Bomskov and Fritz Ruf. *Klin. Wochschr. 19*, 647-52 (1940). Expts on rats showed that resorption of carotene administered in a bile soln. on triolein is approx. 40%; resorption is less from coconut oil and butter, from margarine it is practically O. Upon the addn. of 1% of an unsatd. fat acid to the margarine, the resorption was greater than 20%. Expts. on rats deficient in vitamin A showed that treatment with small daily doses is more economical than massive doses. *(Chem. Abs.)*

BODY FATS IN RAT ACRODYNIA. F. W. Quackenbush and H. Steenbock. *J. Nutrition 24*, 393-98 (1942). During the development of acrodynia in rats on a low-fat diet, the crude fatty acids decreased in amt. but increased in I no. The non-curative single supplements, pyridoxine and pantothenic acid, produced no significant alterations in the quality or quantity of fat. Supplements which cured or alleviated the dermal symptoms, viz., linoleic ester, rice bran concentrate, or pyridoxine plus pantothenic acid, produced increases in total fat and decreases in I no. Fatty acids from acrodynic rats or from rats which had been cured with rice bran concentrate did not cure acrodynia. The studies did not reveal the mechanism through which pyridoxine, pantothenic acid, and linoleic acid protect against acrodynia.

THE NON-SPECIFICITY OF THIAMINE IN FAT SYNTHESIS. F. W. Quackenbush, H. Steenbock, and B. R. Platz. *J. Biol. Chem. 145*, 163-7 (1942). Thiamine did not prevent rapid losses of total fat in rats on a diet deficient in other B vitamins. Thiamine was not more effective than other B vitamins in increasing the total fat content of rats. The effectiveness of a supplement in restoring normal fat synthesis in deficient rats is apparently detd. by the completeness with which it supplies essentials lacking in the body tissues as well as in the basal diet.

THE GENESIS AND GROWTH OF TUMORS. II. EFFECT OF CALORIC RESTRICTION PER SE. Albert Tannenbaum. *Cancer Research 2*, 460-7 (1942). THE CAL.-RESTRICTED DIET INHIBITED THE FORMATION OF TUMORS. III. EFFECTS OF A HIGH-FAT DIET. *Cancer Research 2*, 468-75 (1942). By utilizing the spontaneous breast carcinoma, induced skin tumor, induced sarcoma, and primary lung tumor of the mouse, the effects of a high-fat diet on the genesis of tumors were studied. The incidence of the spontaneous breast carcinoma was significantly increased. The incidence of the induced skin tumor was increased. The incidence of the primary lung tumor was unaffected and that of the induced sarcoma was unaffected or actually inhibited. A high-fat diet not only produced a definite increase in the incidence of spontaneous breast and induced skin tumors, but also shortened the mean time of appearance of these tumors. The mean growth-rate of sarcomas arising in the high-fat group was not significantly different from that of sarcomas arising in the control group. A 2-fold action of a high-fat diet (solvent action and cocarcinogenic action) is postulated to explain the diverse effects on tumor formation. *(Chem. Abs.)*

CEREBRAL METABOLISM IN FAT FED DOGS. Arthur G. Mulder and Lathan A. Crandall. *Am. J. Physiol. 137*, 436-9 (1942). The brain of the dog which has been fed fat for a sufficient time not only to develop ketosis but to become habituated to the ketotic state does not burn acetone bodies. The brain of the fat-fed dog has an R. Q. of approx. 1.0. The amts. of O and glucose removed by brain during the ketotic state are not significantly different, in terms of mgs. per 100 ml. of blood, from those removed by the brain tissue of normally fed animals.

DRYING OF LINSEED OIL PAINT. COORDINATED METAL SOAPS AS OXYGEN ABSORPTION AND DRYING CATALYSTS. D. G. Nicholson. *Ind. & Eng. Chem. 34*, 1175-9 (1942). Cobaltous *o*-phenanthroline oleates has been used as drying material in linseed oil paints pigmented with (a) ZnO, (b) ZnS, and (c) anatase and rutile TiO_2. In all cases the induction period is materially shortened, as compared with a simple control, when the coordinated drier material is used. This effect is greatest in the case of paints pigmented with TiO_2. The slope of the "per cent gain in wt." curves is nearly constant and is independent of the pigment present when the coordinated drier is used. This is not true when simple drier substances are present. Rutile TiO_2 shows this shortened induction period when Mn, Fe, and cobaltic *o*-phenanthroline coordinated atoms are used as drier materials and compared with their respective simple controls.

THE DIASTEREOISOMERISM OF THE 9, 10, 12-TRIHYDROXYSTEARIC ACIDS AND THE GEOMETRIC CONFIGURATIONS OF RICINOLEIC AND RICINELAIDIC ACIDS. J. P. Kass and S. B. Radlove. *J. Am. Chem. Soc. 64*, 2253-7 (1942). The partial oxidation of ricinoleic and ricinelaidic acids with alkaline permanganate and

with peracetic acid has been shown to result in four distinct diastereoisomeric 9, 10, 12-trihydroxystearic acids formed in 2 inter-related pairs, as expected from theoretical considerations but contrary to statements in the recent literature.

PATENTS

PROCESS FOR REFINING ANIMAL AND VEGETABLE OILS. F. J. Ewing. *U. S. 2,288,441.* The process of removing gummy materials from crude fatty material comprises the steps of mixing said crude fatty material with liquefiied normally gaseous hydrocarbon to dissolve the fatty material and ppt, gummy material, and sepg. said pptd. gummy material from said fatty material, said steps being carried on in the presence of hydrocarbon and under sufficient pressure to maintain said hydrocarbon in liquid form.

CONVERSION AND SEPARATION OF THE CONSTITUENTS OF ORGANIC MIXTURES CONTAINING BOTH FATTY AND RESIN ACIDS, PARTICULARLY TALL OIL. F. H. Gayer and C. E. Fawkes (Continental Research Corp.). *U. S. 2,288,947.* The process of sepg. fatty acids from resin acids contd. in tall oil comprises converting the fatty acids into their alkyl esters, converting the resin acids into their Al salts and sepg. the alkyl esters of the fatty acids from the Al resinates.

CONVERSION AND SEPARATION OF THE CONSTITUENTS OF ORGANIC MIXTURES CONTAINING BOTH FATTY AND RESIN ACIDS, PARTICULARLY TALL OIL. F. H. Gayer and C. E. Fawkes (Continental Research Corp.). *U. S. 2,288,946.* In the process of sepg. tall oil into fatty acids and resin acids the step comprises converting the tall oil into a mixt. of alkyl esters of fatty acids with Zn resinates by esterifying first the fatty acids with a monohydric aliphatic alc. and subsequently converting the resin acids into Zn resinates.

SPREAD COMPRISING ANIMAL BODY FAT. S. L. Komarik (Griffith Laboratories, Inc.). *U. S. 2,288,244.* The method of making an edible plastic spread comprises mixing animal body fat with an edible flavoring material selected from the group consisting of cheese and peanut butter, whereby the fat absorbs material therefrom, and emulsifying the resulting mass with an emulsifier and a wt. of water approx. equal to the wt. of fat to form a plastic emulsion.

COOKING OLEAGINOUS MATERIAL. F. W. Weigle. *U. S. 2,288,662.* A method of prepg. oil seeds for the sepn. of oil comprises transferring heat to said material from a heating surface at a rate of at least 5 B.T.U. per lb. of material per minute through a substantial portion of the period for which heat is transferred to the material, subjecting the material adjacent to the heating surface to agitation such that the movement of substantially all of said material is in the order of at least 200 ft. per minute and maintaining the material in direct contact with steam when the material is at temps. above the temp. for condensation of steam on the material.

BACTERICIDAL, GERMICIDAL, AND ANTISEPTIC MATERIALS. A. K. Epstein and B. R. Harris. *U. S. 2,290,-173-4.* The compds. are esters of fat alcs. and aminocarboxylic acid.

PROCESS OF SEPARATING CHALCOPYRITE ORES. A. W. Ralston and E. W. Segebrecht (Armour and Co.). *U. S. 2,289,996.* Fat acid amines are used as flotation agents.

NITROGENOUS WAXY TO RESINOUS COND. PRODUCTS AND PROCESS OF PRODUCING SAME. H. G. Hummel and M. Jahrstorfer (General Aniline & Film Corp.). *U. S. 2,294,878.* The process of producing waxy to resinous nitrogenous condensation products comprises heating a unilaterally amidated oxalic acid ester which is free from aliphatic radicles contg. more than 4 C atoms, only with a monoamine contg. a H atom attached to the amino N and a fat acid radicle having more than 12 C atoms.

METALLIC SOAP SOLUTION. R. J. Myers (Resinous Products & Chemical Co.). *U. S. 2,289,316.* A nongelatinous soln. comprises aluminum stearate in an amt. normally producing highly viscous solns., aluminum caprylphenoxyacetate and a liquid, water-immiscible org. solvent for said stearate and caprylphenoxyacetate.

Abstracts

Soaps

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SOAP FACTORY EQUIPMENT. PART 2. IN THE PAN ROOM. N. C. Weir. *Soap, Perfumery and Cosmetics 15,* 422-4 (1942). Except for space requirements, round pans seem more desirable than the square. Glass wool, while dear, is probably the best lagging. Two tons water capacity should be allowed per ton of soap. A pet-cock should be fixed in the steam pipe below each valve. The skimmer-pipe should be put outside the pan. Caustic and brine are better sprayed on to the top of the soap mixt. Spent lye storage tanks holding a week's output and easily skimmed for soap are desirable.

BLEACHING POOR QUALITY FATS. Anon. *Am. Perfumer and Essential Oil Rev. 44,* No. 9, 44 (1942). Use of hydrogen peroxide and of benzoyl peroxide is described.

USE OF BONE FAT IN SOAP MAKING. Paul I. Smith. *Am. Perfumer and Essential Oil Rev. 44,* No. 9, 43-4 (1942). Because of the shortage of fats, soapers are considering bone fat as raw material. A resumé of the boiling and the solvent extraction processes is given. The fat obtained is difficult to bleach, and the unpleasant smell may revert in a short time.

SOYBEAN-OIL SOAP. Th. Ruemele. *Allgem. Oel- u. Fett.-Ztg. 38,* 161-2 (1941). The soap requires some coconut-oil components to give good lathering properties with hard water. Other means of improving the properties of the soap and methods for sapon. are suggested. The oil is especially suitable for the manuf. of K soft soap. *(Chem. Abs.)*

TYLOSE, ITS PROPERTIES AND APPLICATION IN THE SOAP INDUSTRY. Hermada. *Seifensied-Ztg. 68,* 343-4, 353-4