ether layer at 2,700 Å and check also at 2,980 Å for complete conversion of tocopherol. Compare with standard curve prepared by oxidizing known amounts of tocopherol.

Summary

Autoxidizing methyl esters of fatty acids interfered with the determination of α-tocopherol by ultraviolet spectrophotometry or by the bipyridine colorimetric method. Interference with the colorimetric method was removed by sulfuric acid treatment, but spectrophotometry was applicable only when the tocopherol was completely separated from oxidized fat. This separation could not be obtained by sulfuric acid treatment but was accomplished by room temperature saponification in an alcohol-petroleum ether system protected by pyrogallol. The sensitivity of the spectrophotometric method was increased by oxidizing tocopherol quantitatively to the *p*-quinone with 2 *N* nitric acid.

Acknowledgment

The technical assistance of J. W. Halcro is gratefully acknowledged.

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ABSTRACTS . . . . R. A. Reiners, Editor

• Oils and Fats

S. S. Chang, Abstractor
Sin'itiro Kawamura, Abstractor
Dorothy M. Rathmann, Abstractor

The polymorphism of glycerides—an application of x-ray diffraction. E. S. Lutton (Procter & Gamble Co., Cincinnati, O.). *J. Soc. Cosmetic Chemists* **6**, 26–34 (1955). Methods used in the study of the modes of crystallization of a number of mono-, di-, and triglycerides are reviewed. (*C. A.* **50**, 7481)

Continuous refining of rapeseed oil. A. M. Zharskii and T. E. Romanova (Fat Combine, Kharkov). *Masloboino-Zhirovaya Prom.* 21(8), 12–3(1955). Rapeseed oils of acid number 3.5–4.5 were refined by the continuous process of A. A. Schmidt. The oils were hydrated with steam, held two hours and centrifuged. Refining was with 100% excess lye solution of 130 g. per liter concentration. Tests on 10 oils yielded refined oils containing 0.36–1.25% soap and 0.24–0.38% free fatty acids. The foots contained 9–12% soap and a saponified fatty acid to neutral oil of ratio of 1:0.49 to 1:0.3. The refined oil was efficiently decolorized with 2% active earth when the moisture present was 0.5–1.5%. (*C. A.* **50**, 7481)

Obtaining easily refinable extracted cottonseed oil. I. V. Gavrilenko and I. E. Bezuglov. *Masloboino-Zhirovaya Prom.* 21(8), 5–9(1955). Method of processing and characteristics of products are reported from operation at some Russian plants. In pressing with a "FP prepress" oil in cake is reduced to 12% on 1–4 grade seed and 15% for 5- and 6-grade seed. The gossypol content was 0.05–0.11% in the cake and 0.11–0.17% in the prepress oil. The cakes were extracted with benzene to yield miscella of 6.22–9.35% concentration. Miscella at one plant was concentrated in 2-stage equipment: in the first stage miscella passed through 4 compartments of increasing temperature of 57–92° where it was concentrated from 9.35 to 81.42% and final concentration was done in a second single step stage at 115°. Another factory uses a 3-stage distillation, the first 2 stages being each 4-compartment units as the first stage of the above. (*C. A.* **50**, 7481)

Mineral constituents of peanut oil. K. S. Srinivasa Varadan. *Indian Pharmacist.* 10, 263–4, 271(1955). The minerals found in the ash in terms of their oxides were P_2O_5 55.82, Fe_2O_3 8.76, CaO 6.5, CuO 5.18, MgO 2.85, and SiO_2 1.10%. The other minerals present were thought to be Na_2O and K_2O, but no data are given. Chlorides were found but only traces of sulfates were detected. (*C. A.* **50**, 7481)

Synthesis of some some higher fatty acids. E. D. Bergmann and M. Ish-Shalom (Ministry Defense, Tel Aviv). *Bull. Research Council Israel* **5A**, 65–6(1955). Pentadecanoic, nonadecanoic, and decosanoic acids were prepared by the method of Fieser and Szmuszkowicz. (*C. A.* **50**, 8447)

Chromatographic behavior of fatty acids containing an oxygenated function supplemented in their chains. P. Desnuelle and M. Burnet (Fac. sci., Marseilles). *Bull. soc. chim. France* **1956**, 268–74. The best technique for the separation of a group of oxygenated fatty acids is that of partition chromatography in inverse phases with powdered rubber as the support and aqueous solution of acetone as the eluant. 12-Hydroxystearic acid, ricinoleic acid, 12-oxostearic acid, *trans*-9,10-dihydroxystearic acid, and lauric, myristic, and palmitic acids were prepared and tested. (*C. A.* **50**, 8398)

Electrical characteristics of animal fats. A. A. Lapshin (Leningrad Technol. Inst. Refrig. Ind.). *Myasnaya Ind. S.S.S.R.* 27(1), 13–5(1956). The dielectric constants and conductivities of animal fat (lard) in relation to temperature and moisture content are graphically presented. The dielectric constants plotted with respect to temperature show a maximum within the crystallization zone; the other relationships are linear. (*C. A.* **50**, 9039)

Determination of glyceride structure of fats. M. K. Yakubov (Polytech. Inst., Kharkov). *Masloboino-Zhirovaya Prom.* 21 (1), 14–7(1956). A few changes are recommended for Kartha's and Hilditch's methods of acetone-potassium permanganate oxidation in determination of saturated, mono-, di-, and triunsaturated glycerides. (*C. A.* **50**, 9038)

The catalytic air oxidation of vegetable oils at elevated temperatures. J. M. Martínez Moreno and J. M. Huesa López (Inst. grasa y sus derivados, Seville, Spain). *Compt. rend. 27° congr. intern. chim. ind. Brussels 1954*, 3; *Industrie chim. belge* 20, Spec. No., 717–20(1955). Cottonseed oil, olive oil (both crude and refined), and mixtures of oils were air oxidized at 120° with manganese dioxide catalyst. The results indicate that hydroxyl groups are introduced in the initial stages of the reaction followed by the hydroxylation of double bonds and polymerization. (*C. A.* **50**, 9038)

Operating of the expeller press "EP." M. Chernov. *Myasnaya Ind. S.S.S.R.* 27(1), 19–20(1956). This expeller press has a shaft containing four stages of different diameters. The diameter is large at the inlet, smallest in the next stage, followed by 2 stages of increasing diameters. Its operation for the pressing of cracklings is described. (*C. A.* **50**, 9039)

Cold degreasing of bones. V. Petrovskii. *Myasnaya Ind. S.S.S.R.* 27(1) 9–12(1956). Data for operation of an impulse degreaser are presented. (*C. A.* **50**, 9039)

Determination of glyceride composition in vegetable fats. M. Filajdić (Univ. Zagreb). *Kemija u Industriji (Zagreb)* 4, 235–48(1955). Methods of determining the glyceride composition of vegetable fats are reviewed. (*C. A.* **50**, 6813)

Molecular associations between lipides. I. Fatty acids and triglycerides. L. de Bernard and D. G. Dervichian (Inst. Pasteur, Paris). *Bull. soc. chim. biol.* 37, 943–55(1955). Characteristics of surface films of water of mixtures of myristic acid and trimyristin are discussed. (*C. A.* **50**, 6814)

The influence of aging on the physical properties of tung oil. P. Guimãraes de Fonseca and B. Schneiderman(Escola politécn., São Paulo). *Bol. dept. quím. escola politéc.* (São Paulo) **1**, 1–6 (1955). During the process of aging both the density and the viscosity of tung oil increase, more probably due to intramolecular rearrangement than to a large scale polymerization. The constant b of Andrade's viscosity formula might prove more valuable in characterizing a certain sample of oil than the viscosity itself. (*C. A.* **50**, 6816)

Turtle oil. Nadja Avalle. *Inds. parfum.* **10**, 463–4(1955). The oil extracted from the muscles and genital organs of the Mexican giant turtle*(Chelonia athecae)* has the constants: $d^{25} = 0.911–919$, $n_D^{20} = 1.4599–1.4715$, saponification number 197–210, iodine number 89–97, acetyl number 3.5, Reichert-Meissl number 0.20, unsaponifiable matter 0.6%, unsaturated fatty acids 65%. The oil gives excellent results in creams, or pure as a vehicle for vitamins. It is useful in cosmetic emulsions. (*C. A.* **50**, 6815)

Castor oil—its uses and possibilities. M. A. Saboor. *West Bengal, Govt., Dept. Inds., Bengal Ind. Research Board, Bull. No.* **113**, 9 pp. (1951). Tung oil substitutes were prepared from castor oil by dehydration conducted with and without vacuum, also with and without catalysts. (*C. A.* **50**, 6815)

Separation, identification, and determination of fatty acids volatile with steam. N. Coppens. *Mededel. Vlaam. Chem. Ver.* **17**, 199–213(1955). Methods of separation of volatile fatty acids by steam distillation and analysis with chromatography are reviewed. Paper chromatography is recommended. (*C. A.* **50**, 6815)

Fatty-acid composition of Cololabis oil by spectrophotometric method. Yasuhiko Tsuchiya and Mitsu Kayama(Tohoku Univ., Sendai). *Tohoku J. Agr. Research* **5**, 269–76(1955). The refractive index, iodine value, acid, and the fatty acid composition by the fractionation of methyl esters were determined. (*C. A.* **50**, 6815)

Separation of methyl esters of fatty acids from their mixtures by urea complexes. A. S. Gupta and J. S. Aggarwal. *Jour. Indian Chem. Soc.* **33**, 197–200(1956). The separation of saturated and unsaturated acids from their mixtures by the urea-complex procedure is only of qualitative nature and cannot be adopted as an analytical method.

Liquid edible oil situation. *Monthly Bull. Agr. Economics & Statistics* **5**(6), 15–8(1956). World production of liquid edible oils, excluding the U.S.S.R., reached record levels of over 9.5 million tons available for use in 1955, and there are good prospects for production of similar quantities during 1956.

Crystalline derivatives of vitamin A. III. Stability of vitamin A urethanes. Toshio Agawa, Shigeo Yokoi, and Saburô Komori (Osaka Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 686–8(1955). Concerning the stability of vitamin A, 2-naphthyl- and biphenyl-urethanes of vitamin A were superior to liquid vitamin A ester (palmitate). When the urethane was covered with N.D.G.A., the vitamin A was sufficiently stable.

The mechanism of hydrogenation of unsaturated fatty acids. III. Hydrogenation of methyl oleate with the unreduced nickel-copper catalyst under pressure. Seiichi Ueno and Tooru Hidaka (Kinki Univ., Osaka). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 944–5(1955). Examination of partially hydrogenated product (liquid and solid fatty acids) with infrared adsorption spectra revealed that the liquid acids consisted of *cis*- and *trans*-octadecenoic acid approximately in the ratio 2:1 and the solid acids consisted mostly of *trans* isomer.

Application of sulfonic acids with lyophilic group. XII. Stepwise fat hydrolysis reaction in the Twitchell process. Kazuo Fukuzumi and Masateru Mizuta(Nagoya Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **59**, 610–12(1956). Coconut oil was hydrolyzed with 1% dibutylnaphthalenesulfonic acid and a water, 0.5 *N* or *N* sulfuric acid at 100°. The course of hydrolysis was followed by determining hydroxyl no., monoglyceride content, and acid no. to calculate free fatty acid, mono-, di-, and triglycerides. Apparent velocity constants of stepwise hydrolysis were calculated.

XIII. Catalysis of fat hydrolysis by cation-exchange resin and sulfonic acid. Kazuo Fukuzumi and Yoshito Koyama. *Ibid.* 612–14(1956). Experiments were made with coconut and soybean oils. In the presence of the acid-type cation-exchange resin, Dowex-50, dibutylnaphthalene sulfonic acid was more effective than its sodium salt. The split oil was less discolored.

Behavior of some vegetable oils during deodorization heating. Seiichi Ueno and Akio Uno(Kinki Univ., Osaka). *J. Japan Oil Chemists' Soc.* **4**, 327–8(1955). Soybean, rape, or cottonseed oil were heated at 220–260° for 1–3 hrs. under hydrogen at vacuum of 4 mm. Hg, and acid no., saponification no., iodine no., peroxide no., sp. gr., refractive index, and relative viscosity were measured. In general rape and cottonseed oils were not so remarkably affected by this treatment, while soybean oil showed higher iodine no. after heating. Ultraviolet absorption spectra indicated that conjugated diene compounds increased in soybean oil after deodorization heating.

Properties of Japanese vegetable oils. Seiichi Ueno and Kenji Matsushima(Kinki Univ., Osaka). *J. Japan Oil Chemists' Soc.* **5**, 14–15(1956). Five new seed oils are reported. Plant, oil content of the seed, d, *n*, acid no., saponification no., iodine no., and unsaponifiable matter % were, resp., *Phytolacca americana*, 10.8%, 0.9178/15°, 1.4737/20°, 2.1, 187.5, 106.7, 2.82%; *Photinia glabra*, 18.5%, —, —, 8.6, 183.5, 114.7, 5.8%; *Buxus microphylla*, 14.1%, 0.9213/15°, 1.4726/20°, 5.1, 207.9, 116.6, 2.06%; *Achyranthes bidentata*, 0.89%, —, 1.4770/20°, 6.0, 212.3, 115.0, 6.69%; and *Iris pseudacors*, 4.17%(seed hull 15.81%, seed kernel 3.10%), seed-hull oil: —. —, —, 206.7, 160.1, 18.1%; seed-kernel oil; —, —, —, 172.8, 136.1 32.0%.

Application of polarography in the field of fats and oils. Teruzo Asahara and Shigeo Hayano(Univ. Tokyo). *J. Japan Oil Chemists' Soc.* **5**, 202–16(1956). A review with 73 ref.

Infrared absorption spectra of branched-chain fatty acids. D. A. Guertin, S. E. Wiberley, W. H. Bauer and J. Goldenson(Dept. of Chem., Rensselaer Polytechnic Inst., Troy, N. Y.). *Anal. Chem.* **28**, 1194–1195(1956). From a study of the infrared absorption spectra of long branched-chain fatty acids Freeman has shown that the relative intensities of the bands at 7.8 and 8.1 microns are valuable in identifying α-substitution. This correlation holds for the branched-chain hexanoic acids. In addition, the relative intensities of the bands at 6.8 and 7.1 microns are valuable in identifying α-substitution in acids containing less than 14 carbon atoms.

Permeability of acetostearin products to carbon dioxide, oxygen, and nitrogen. N. V. Lovegren and R. O. Feuge(Southern Reg. Res. Lab., New Orleans, La.). *J. Agr. and Food Chem.* **4**, 634–638(1956). The acetostearins are modified fats capable of being formed into waxlike films, potentially useful as protective coatings. Permeability to carbon dioxide was measured by modification of the standard cup method, using Ascarite as the adsorbent. An apparatus was developed which could measure in about 8 hours the passage of a few hundredths of 1 ml. of gas through a film of acetostearin, 2⅜ inches in diameter. Permeability of the acetostearins to carbon dioxide was less than that reported by other investigators for ethylcellulose and approximately the same as for polystyrene and polyethylene. Nylon and regenerated cellulose have lower permeabilities. Polystyrene and ethylcellulose are more permeable to oxygen and nitrogen than acetostearin; polyethylene has approximately the same permeability. Cellulose acetate, regenerated cellulose, and nylon are less permeable.

Studies in the cold storage of peanuts. P. B. Mathur, M. Prasad and K. K. Singh(Central Food Tech. Research Inst., Mysore, India). *J. Sci. Food Agr.* **7**, 354–60(1956). Shelled and unshelled peanuts were stored in small gunny sacks at 32–5, 42–5, 52–5, or 71–92°F. for 9 months. The relative humidities in the cold-storage rooms were between 85 and 90% and at room temperatures between 50 and 82%. The effects of the storage conditions were evaluated by determinations of the moisture contents of the kernels, acid and peroxide contents of the extracted oil, and germination of the kernels. Free fatty acid contents above 1% were associated with low germination. The data lead to the recommendation that peanuts be shelled and stored at 32–5°F. and 85–90% relative humidity.

Extraction of antioxidant from Osage orange fruit. J. R. Clopton(Texas Research Foundation). *U. S. 2,752,314.* Osage orange fruit is dried at temperatures above 60°. The antioxidant is then extracted with a fat-solvent.

Solvent extraction process. D. McDonald(Barber-Greene Co.). *U. S. 2,752,377.* Fat is extracted by a process in which the tissue is ground in a hot chlorinated solvent. The resulting slurry is separated into miscella and residue.

Hydration method of refining glyceride oils. P. L. Julian and H. T. Iveson (The Glidden Co.). *U. S. 2,752,378.* Animal and vegetable oils containing 0.15 to 1% of free fatty acids and less than 0.5% of gums are refined at 50 to 70°F. with aqueous alkali having a specific gravity between 12° and 20° Bé and containing an emulsion-breaking agent such as alkali metal borates, pyrophosphates, silicates, acetates, oxalates and salts of ethylenediamine tetraacetic acid. The sterol concentration of the "foots" obtained by centrifuging the mixture is higher than can be obtained when the oil is refined in the absence of the emulsion-breaking agent.

Determination of butterfat content of milk products. R. L. Batchelor. *U. S. 2,752,815.* The butterfat content of milk may be determined by reducing the size of the fat particles to a maximum of about 4 microns and measuring the light transmission of the sample.

Process of extracting liquids from plant and animal tissue. J. L. Owades and O. N. Breivik(Standard Brands Inc.). *U. S. 2,753,362.* Plant and animal tissues containing lipids which cannot be extracted with alcohol are first treated under anhydrous conditions with a lipophaneretic agent which will dissociate the combination of lipids with other tissue components so the lipids may subsequently be extracted in the usual manner. Lipophaneretic agents are C_{1-12} monobasic aliphatic acids, anhydrides, amides or N-substituted amides, pyridine, pyridine homologues and morpholine.

Edible spreads from vegetable oils. E. P. Jones and E. B. Lancaster(U.S.A., Secy. Agr.). *U. S. 2,754,213.* A combination of 70 to 90% of an edible glyceride oil, 9 to 30% monoglycerides and 0.1 to 2.0% phosphatides is blended at temperatures above the melting point of the mixture. It is cooled rapidly until microcrystals begin to form and is then held at 90° to 140°F. for 3 to 48 hrs.

Vegetable oil refining. H. Wolff and L. P. Hayes(A. E. Staley Mfg. Co.). *U. S. 2,754,309.* The efficiency of the degumming process is improved by the addition of 1% (by wt.) of ketene during treatment of the oil with water.

Method of decolorizing neutralized fatty oils. I. A. Afzelius (Aktiebolaget Separator). *U. S. 2,754,310.* The process of decolorizing oils after neutralization is improved by removing the soap and treating the oil with an aqueous solution of a strong base containing the salt of a strong base and a weak acid. This solution has a pH greater than 11.0 but no higher than 12.8 after diluting 100 times.

Separation of solid and liquid fatty acids. N. V. Koninkliike Stearine Kaarsenfabrieken Gouda-Appollo. *Dutch 78,617.* A mixture of molten fatty acids is cooled in steps to give, in each step, a mixture of liquid and crystals which is filterable. Compounds influencing the crystal form (habit) may be added, e.g., a mixture of asphaltenes obtained by extraction of stearin pitch with petroleum ether. (*C. A.* 50, 6819)

Regeneration of autooxidizable substances. M. Loury(Institut de recherches pour les huiles de palme et oleagineux). *Fr. 990,704.* Substances subjected to autooxidation with formation of peroxides, preferably rancid edible fats, e.g. palm oil, rapeseed oil, and butter, also tetralin, nopinene, and ethyl ether are regenerated by passing them over columns with an adsorbent, e.g. dried silica gel. Butter is dissolved in light ligroine before passing it over the adsorbent. (*C. A.* 50, 9042)

FATTY ACID DERIVATIVES

Preparation and properties of n-nonadecyl and n-eicosyl formates. A. W. Scholl and J. G. Morrison(Marshall Coll., Huntington, W. Va.). *West Va. Univ. Bull., Proc. West Va. Acad. Sci.* 26, 35–7(1954). *n*-Nonadecanol and *n*-eicosanol were prepared from *n*-nonadecylic acid and arachidic acid by reduction with $LiAlH_4$. *n*-Nonadecyl formate and *n*-eicosyl formate were also prepared. (*C. A.* 50, 8447)

Arylation of esters of erucic acid. Ng. Ph. Buu-Hoï, Ng. D. Xuong, and E. Lescot(Dept. of Organ. Chem., Radium Inst., Univ. of Paris). *J. Organic Chem.* 21, 621–623(1956). The double bond in the molecule of alkyl erucates is shown to undergo aluminum chloride-catalyzed arylation with various aromatics, and the properties of the resulting alkyl arylbehenates are investigated. Several high molecular ketones derived from erucic and behenic acid are described.

Mass spectra of alcohols. A. Friedel, J. L. Schultz, and A. G. Sharkey, Jr.(Bureau of Mines, U. S. Dept. of the Interior, Bruceton, Pa.). *Anal. Chem.* 28, 926–934(1956). Mass spectra of 69 alcohols from methanol have been studied in order to find correlations of fragmentation patterns with molecular structure. On the basis of spectra, primary alcohols have been sub-classified into (1) straight-chain and branched on or beyond the γ-carbon atom, and (2) branched on the β-carbon atom. The mass spectra can be applied to the identification of unknown alcohols and to the analysis of components in mixtures of alcohols. Type analyses of complex mixtures have been carried out. The advantages of combining mass and infrared spectral data are indicated.

Determination of traces of fatty amines in water. A. Milun and F. Moyer(Res. Labs., Gen. Mills, Inc., Minneapolis, Minn.). *Anal. Chem.* 28, 1204–1205(1956). A method was developed for determining traces of high molecular weight fatty amines in water. The procedure should be applicable to the control of amine concentration in steam condensate systems where fatty amines are added to inhibit corrosion. Amine concentration is determined by titrating with an anionic surface active agent to the disappearance of pink color due to an amine-eosin complex. A calibration curve is given for the concentration range of 0.5 to 10 p.p.m.

The position isomerism of the oleic acid formoxylation reaction. J. Rockett(Olin Mathieson Chem. Corp., New Haven, Conn.). *J. Am. Chem. Soc.* 78, 3191–3193(1956). The perchloric acid catalyzed addition of formic acid to oleic acid has been examined to determine the positions on the carbon chain to which the formoxy group becomes attached. *Via* a series of syntheses, a mixture of dibasic acids was obtained which, upon chromatographic separation, was shown to be a 50–50 molar mixture of azelaic and sebacic acids. The formic acid addition, therefore, takes place equally, and perhaps exclusively, at the 9- and 10-positions.

The role of solvents in the decompostion of propionyl and butyryl peroxides. J. Smid, A. Rembaum and M. Szwarc(Chem. Dept., College of Forestry, State Univ. of N. Y., Syracuse, N. Y.). *J. Am. Chem. Soc.* 78, 3315–3322(1956). The decomposition of propionyl and butyryl peroxides in a variety of solvents was investigated. It was shown that the primary reaction involves the rupture of O–O bond and formation of $R{\cdot}CO_2$ radicals which decarboxylate rapidly, yielding the corresponding hydrocarbon radicals. The decomposition in hydrocarbon solvents was contrasted with the decomposition proceeding in polar solvents. The role of solvents in the decomposition was discussed and the ionic mode of decomposition was considered. The radical induced decomposition was investigated, and it was demonstrated that this reaction is initiated mainly by solvent radicals.

Oiliness of palmitic acid and cetyl alcohol on steel-steel surfaces and the effect of atmospheres. Yuzaburo Nagai, Hisae Ishida, Yasukatsu Tamai, Utaka Wakatsuki, and Jiro Kamiyama(Univ. Tokyo). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 874–8(1955). The oiliness of the added agents in spindle oil was improved in the absence of oxygen. It may be explained by the fact that polar molecules are more strongly adsorbed on the steel surface poor in oxygen.

Hydroxylation of vegetable oils. P. L. Julian, H. T. Iveson and S. B. Radlove(The Glidden Co.). *U. S. 2,752,376.* A glyceride oil containing at least one unsaturated fatty acid, an unsaturated blown oil or mixtures thereof is treated at temperatures between 70° and reflux with a mixture of hydrogen peroxide (at least 70%) and a water-soluble lower hydroxy acid until the iodine value of the oil has been lower by at least 20 units but not below a value of 15. The amount of hydroxy acid is equivalent to 0.25 to 0.55 mol. for each hydroxyl group to be introduced into the oil.

Purification of long chain vinyl esters and ethers. D. Swern and W. S. Port(U.S.A., Secy. Agr.). *U. S. 2,756,222.* A method is described for the removal of polymerization inhibitors, cross-linking agents or polymerized materials from monomers such as the vinyl esters of C_{8-22} straight chain fatty acids or the vinyl ethers of C_{8-22} straight chain fatty alcohols. The impure monomer is reacted with urea at 0° to 50°. The urea complex is separated and then decomposed to yield the purified monomer.

Preparation of epoxidized acids, esters and nitriles. E. F. Riener (Rohm and Haas Co.). *U. S. 2,756,242.* Epoxidized acids, esters and nitriles are prepared by reacting a strong base with C_{18-22} saturated aliphatic nitriles, acids or esters containing the group –CHX–CH(OCOR)– in which *X* is chlorine or bromine and *R* is hydrogen or a methyl group.

• Biology and Nutrition

F. A. Kummerow, Abstractor
Joseph McLaughlin, Jr., Abstractor

An outbreak of bronchial asthma in South Africa affecting more than 200 persons caused by castor-bean dust from an oil-processing factory. D. Ordman(S. African Inst. Med. Research, Johannesburg). *Intern. Arch. Allergy and Appl. Immunol.* **7**, 10–24(1955). In the eleven months in which castor beans were handled in the factory 197 cases of asthma occurred, whereas before that time very little asthma was noted. This asthma occurred not only in factory employees but also in individuals living in the vicinity of the factory. (*C. A.* 50, 9039)

The lipides in the prostate of the dog. Arlene R. Seaman(State Univ. of New York Coll. of Med., New York). *J. Urol.* **75**, 324–33(1956). Histochemical investigations show that lipides form a major component of the prostatic epithelium and secretion in the dog. The lipides of the acinar epithelium are predominantly neutral fat; the remainder consists of phospholipides, cholesterol, and cholesterol esters. Birefringent lipides are localized in both the epithelium and. stroma. Cholesterol is absent in the acinar lumen. (*C. A.* **50**, 8828)

Intestinal absorption of carbon-labeled oleic and palmitic acids in the normal infant and in cystic fibrosis of the pancreas. R. Blomstrand, B. Lindquist, and K. Pääbo(Univ. Lund, Sweden). *Helv. Paediat. Acta* **10**, 640–8(1955). In the normal child, 93% of the fed labeled fatty acids were absorbed, and in the child with cystic fibrosis of the pancreas only 26%. A large part of the fecal fatty acids in normal infants comes from unabsorbed dietary fatty acids. The steatorrhea in cystic fibrosis of the pancreas is largely due to unabsorbed dietary fatty acids. (*C. A.* **50**, 8843)

Intestinal absorption of carbon-labeled oleic acid in the normal infant and in congenital bile duct atresia. R. Blomstrand and B. Lindquist(Univ. Lund, Sweden). *Helv. Paediat, Acta* **10**, 627–39(1955). The major part of the fecal fatty acids in normal infants comes from unabsorbed dietary fatty acids. Steatorrhea in congential bile duct atresia is also mainly due to unabsorbed dietary fatty acids. An average of 85% of the fed labeled oleic acid was absorbed by the normal infants, and 42% by the child with the biliary atresia. Most of the unabsorbed oleic acid passed unchanged through the alimentary canal. Only a small portion was hydrogenated, probably from bacterial action in the large intestine. (*C. A.* **50**, 8843)

The hydrolytic cleavage products of boron trifluoride complexes of β-carotene, some dehydrogenated carotenes and anhydrovitamin A_1. F. J. Petracek and L. Zechmeister (Gates and Crellin Chem. Labs., Calif. Inst. of Tech., Pasadena, Calif.). *J. Am. Chem. Soc.* **78**, 3188–3191(1956). β-Carotene in chloroform when treated with BF_3-etherate yielded, upon hydrolysis of the blue complex, isocryptoxanthin, whereby the trifluoride had acted first as a dehydrogenating agent. From the 3,4-dehydro-α-carotene and 3,4-dehydro-β-carotene complexes the corresponding 4-hydroxy derivatives were obtained. *retro*-Bisdehydrocarotene yielded 2-hydroxy-3,4-dehydro-β-carotene. By dehydrating the latter compound with HCl-chloroform, the *retro*-bisdehydrocarotene was recovered. The hydrolysis of the blue complex of anhydrovitamin A_1 did not result in the recovery of the vitamin but in the formation of a new isomer, very probably 4-hydroxy-axerophthene which, under the influence of acid chloroform, dehydrated to anhydrovitamin A_1.

Cholesterol metabolism in the dog. L. L. Abell, E. H. Mosbach and F. E. Kendall(Res. Serv., Goldwater Memorial Hospital, Columbia Univ., New York, N. Y.). *J. Biol. Chem.*, **220**, 527–535(1956). The cholesterol balance and bile acid excretion were determined in three small dogs on low and high cholesterol diets with and without administration of thiouracil. On the low (average 0.040 per cent) cholesterol diet the dogs excreted 18 to 32 mg. of cholesterol and 21 to 30 mg. of bile acids per kilo of body weight per day. On the high (2.4 per cent) cholesterol diet the euthyroid animals excreted 32 per cent of the ingested cholesterol as fecal bile acid.

Changes in fat extractability and protein digestibility in fish meal during storage. H. J. Almquist(The Grange Co., Modesto. Calif.). *J. Agr. and Food Chem.* **4**, 638–639(1956). Fish meals prepared by conventional methods from whole California sardines were analyzed periodically up to 331 days' storage for solvent-extractable fat, protein, and pepsin-indigestible proteins. The extractability of the fat progressively decreased, while the pepsin-indigestible protein slowly increased. The latter also increased in samples from which the fat had been extracted initially. Little or no change was observed in sealed-in-glass samples. Oxidation appeared to be responsible for the changes noted. Some arginine was lost during 24 hours' holding of the raw fish.

Vitamin A deficiency in chicks produced by adding high levels of bentonite to synthetic diets. G. M. Briggs and M. R. S. Fox (Nat. Inst. of Health, Bethesda, Md.). *Poultry Sci.* **35**, 570–575(1956). Bentonite, a naturally occurring clay with adsorptive properties, caused a deficiency of vitamin A in chicks when fed at a level of 2 to 3 per cent, or higher, in a synthetic diet otherwise containing ample amounts of vitamin A in unstabilized form. Both sodium and calcium bentonites were active in this regard. All signs of deficiency were prevented by the use of stabilized vitamin A, by higher levels of vitamin A or carotene, or by injected vitamin A.

A method for the synthesis of C_{21}-labeled cholesterol. P. Kurath and Margaret Capezzuto(Div. of Cancer Res., Dept. of Surgery, Univ. of Rochester Med. Center, Rochester, N. Y.). *J. Am. Chem. Soc.* **78**, 3527–3529(1956). A modification of Woodward's and Robinson's synthesis of the cholesterol side chain is described. This modification involves an alteration of the sequence of addition of carbon atoms to the C-20 acid. In this work carbon atom 21 was added after the addition of carbon atoms 22–27 to the C-20 acid. The synthesis was used to prepare cholestanol-21-^{14}C acetate which was then converted by known procedures to cholesterol-21-^{14}C.

Fat studies in poultry. 5. The effect of dietary fat level on the choline requirement of the chick. B. March and J. Biely(Poultry Nutrition Lab., Univ. of Br. Columbia, Vancouver, B. C., Canada). *Poultry Sci.* **35**, 545–549(1956). The effect of dietary fat level on the requirement of the chick for supplementary choline in a natural diet supplemented with vitamin B_{12} has been studied. It is concluded that a diet containing 600 mg. of choline per lb. from natural ingredients supplies sufficient choline for growth if the diet is adequate in methionine. The choline requirement of the chick is increased when high levels of fat are added to a diet low in methionine.

Folic acid supplementation of high protein-high fat diets. B. March and J. Biely(Poultry Nutrition Lab., Univ. of Br. Columbia, Vancouver, B. C., Canada). *Poultry Sci.* **35**, 550–551(1956). Diets of natural ingredients containing 20 and 26 per cent protein were formulated with and without 7.5 per cent tallow. Each diet was fed at levels of 0.15, 0.40, and 0.65 mg. of folic acid per lb. The data with respect to rates of growth of chicks fed the diets in two experiments were presented. It was concluded that the folic acid requirement of chicks is increased with high protein-high fat diets.

A monophosphoinositide of liver. J. M. McKibbin(Dept. of Biochem., State Univ. of N. Y., Syracuse, N. Y.). *J. Biol. Chem.* **220**, 537–545(1956). A method was described for the separation of a monophosphoinositide from the alcohol-insoluble phosphatides of horse and dog liver. The lipide contains no sugar or nitrogen, but all preparations contain small amounts of nitrogenous cephalin contaminant. The molar ratio of inositol-P-glycerol-fatty acid is 1:1:1:2. Salts of inositolmonophosphoric acid were isolated from both acid and alkaline hydrolysates of the lipide. This ester has unique high growth, promoting activity for *Saccharomyces carlsbergensis.*

Colorimetric standard for carotene. W. J. Rabourn and E. D. Schall(Purdue Univ., Lafayette, Ind.). *Anal. Chem.* **28**, 1197–1198(1956). Solutions of β-carotene in purified mineral oil showed a fairly constant absorptivity at 436 mμ under normal laboratory conditions for at least 9 months. These solutions may be used as calibration standards for the determination of carotene and for interlaboratory collaborative work.

Distribution of lipides in the cerebellar cortex and its subjacent white matter. E. Robbins, K. M. Eydt and D. E. Smith(Depts. of Neuropsychiatry and Pathology, Washington Univ. School of Med., St. Louis, Mo.). *J. Biol. Chem.* **220**, 677–681(1956). Quantitative data was obtained on the distribution of cephalins, lecithins, total sphingomyelins, non-phosphorus-containing sphingolipides, cholesterol, and total lipides in the molecular and granular layers of the cerebellar cortex and its subjacent white matter. It was suggested that cephalins (probably phosphatidyl serines rather than phosphatidyl ethanolamines) are as charactersitic of white matter (myelin) as are cerebrosides, cholesterol, and sphingomyelin.

Microdetermination of phospholipides and sphingolipides in brain. E. Robins, O. H. Lowry, Kathryn M. Eydt, and R. E. McCaman(Depts. of Neuropsychiatry and Pharmacology, Washington Univ. School of Medicine, St. Louis, Mo.). *J. Biol. Chem.* **220**, 661–675(1956). Methods were described for measuring cephalins, lecithins, total sphingolipides, sphingomyelins, non-phosphorus-containing sphingolipides, and total phospholipides in a single 10 γ, dry weight, specimen of brain.

Measurement of the rate of fat absorption. H. C. Tidwell, Carolyn Dunkelberg, W. A. Wood, and W. W. Burr, Jr.(Dept. of Biochem., Univ. of Texas, Southwestern Med. School, Dallas, Tex.). *J. Biol. Chem.* **220**, 733–739(1956). Carboxyl-labeled palmitic acid dissolved in olive oil was fed to rats, and the absorption of the lipide was followed by a number of direct and indirect methods. The lipide recovered from the alimentary tract had considerably less activity per mg. than the fed fat. The amounts of absorption based on the disappearance of activity from the tract were not in agreement with amounts determined by a modified Cori technique.

The enzymatic synthesis of triglycerides. S. B. Weiss and E. P. Kennedy(Ben May Lab. for Cancer Research, Univ. of Chicago, Chicago, Ill.). *J. Am. Chem. Soc.*, **78**, 3550(1956). These results suggested that D-α,β-diglycerides might be common intermediates in the biosynthesis of phospholipides and of neutral fat. A close interconnection was thus indicated between the enzymatic synthesis of phospholipides and of neutral fat.

Alpha-carotene in leaves of the carrot plant. V. H. Booth (Dunn Nutritional Lab., Cambridge). *J. Sci. Food Agr.* **7**, 386–9(1956). In leaves of pigmented carrots about 13% of the carotene is α-carotene. Even before the roots become colored, α-carotene is present in cotyledons of these varieties. α-Carotene is absent from leaves of all types of "white"-rooted carrots except second generation albinos although the content of β-carotene is normal.

Studies on the effects of treatment with chlorine dioxide on the properties of wheat flour. III. Lipid changes and vitamin content of treated flours. A. C. Frazer, J. R. Hickman, H. G. Sammons and M. Sharratt (Dept. Pharmacol., Medical School, Edgbaston, Birmingham 15). *J. Sci. Food Agr.* **7**, 375–80(1956). Air oxidation or overtreatment of flour with chlorine dioxide causes rancidity of the flour lipids. Consequently, palatability is reduced and rats may eat less of the rancid breadcrumb than of regular bread. However, there was no demonstrable alteration in the nutritional value of the flour protein. All oxidative methods destroyed vitamin E but this is not considered to be of serious nutritional significance because flour contributes only about 10% of the total vitamin E in human diets.

Process for making fat-soluble vitamin active powder. M. A. Cannalonga and L. Magid (Hoffmann-LaRoche Inc.). *U. S. 2,756,177.* Droplets of an aqueous emulsion of fat-soluble vitamins and a protective colloid are mixed with starch powder (finer than 150 mesh) which has been predried to a moisture content of less than 8%. After the starch has absorbed the water from the droplets, the mixture is dried. The product consists of particles ranging in size from 10 to 150 mesh.

Selective hydrogenation of ergosterol. Fumikazu Mukawa and Susumu Môri (Tokyo Municipal Univ.). *J. Chem. Soc. Japan, Ind. Chem. Sect.* **58**, 718–19(1955). In the synthesis of cortisone it is necessary to hydrogenate $\Delta^{5,7}$-steroid to Δ^{7}-steroid. In such selective hydrogenation of ergosterol or ergosteryl acetate the Urushibara nickel catalyst [*Bull. Chem. Soc. Japan* **25**, 280(1952); **27**, 486(1954)] gave higher yield than the Raney nickel.

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• Detergents

Lenore Petschaft Africk, Abstractor

Carbon soil removal in the presence of polyphosphates and hard water. P. T. Vitale and J. Ross (Colgate-Palmolive Co., Jersey City, N. J.) and A. M. Schwartz. *Soap, Chemical Specialties* **31**(6), 41–4, 180(1956). In synthetic detergent mixes the primary function of phosphate is to soften the water. The ratio of detergent to phosphate required for optimum washing is determined by the amount of hard water used. This relationship holds for the anionic detergents whose calcium salts are highly soluble. Where their salts are insoluble (soaps and higher molecular weight sulfates and sulfonates) then, the phosphate required is a sufficient excess to prevent precipitation of the detergent. In general, this amount of sequestrant will also prevent soil redeposition and give the highest detergency.

Mechanism of the action of carboxymethylcellulose in the laundering process. Application of fluorescence microscopy. H. Stupel and E. Rohrer (Seifenfabrik, Hochdorf, Switz.). *Fette u. Seifen Anstrichmittel* **56**, 588–92(1954). Fluorescence microscopy was applied to an investigation of the adsorption of Na carboxymethylcellulose (I) by fibers and by soil particles. Soil removal by I results from adsorption of I on soil particles which then prevents these from adsorption or resorption on textile cellulose. (*C. A.* **50**, 7484)

An approach to soap perfumery. J. Pickthall (Polak and Schwarz, Ltd., England). *Soap, Perfumery, Cosmetics* **29**, 808–13(1956). The theoretical aspects of soap perfumery are reviewed from the point of view of the chemistry of various types of perfumes and their physical relationship with the soap. Results of tests with such perfume types as alcohols, terpenes, phenols, esters, ethers, ketones, and aldehydes are described and their orientation and association in the soap molecule help to explain their effectiveness as soap perfumes.

Development of liquid disinfectants, a development of wetting-agent chemistry. R. Neu. *Seifen-Ole-Fette-Wachse* **81**, 479–80, 503–4, 530–1, 584, 603–4, 629, 672, 696(1955). A review with 69 references. (*C. A.* **50**, 9691)

Factors affecting the solubility of nonionic emulsifiers. W. N. Maclay (B. F. Goodrich Co., Brecksville, Ohio). *J. Colloid Sci.* **11**, 272–85(1956). The effect of detergents, electrolytes, and organic liquids on the cloud point of Triton X-100, a nonionic emulsifier of the alkylphenol/polyethylene oxide type, is described. The lowering of the cloud point in dilute aqueous solution by electrolyte is a linear function of the ionic strength. The observed salting-out effect for the alkali metal and multivalent cations is roughly in the order of decreasing ion hydration. Crystalline nonelectrolytes cause only slight cloud point changes. Nonpolar liquids and anionic detergents significantly raise the cloud point of the nonionic emulsifiers. As the polarity of the organic solubilizate is increased by introduction of double bonds and more polar constituent groups, the increase in cloud point is less marked. Aromatics and polar aliphatics even cause the cloud point to be sharply decreased. The cloud points of mixtures of nonionic emulsifiers lie intermediate between the cloud points of solutions of the pure components.

Chemical bleaching of industrial tallows and their soaps. M. Loury and C. Defromont. *Rev. franc. corps gras* **3**, 172–82 (1956). Bleaching of either technical tallows (I) or the soaps (II) prepared therefrom with various oxidizing agents yields II of less satisfactory color than if both I and II are bleached. Combination bleaching of the I with $NaClO_2$ in presence of H_3PO_4 and the II with $K_2S_2O_8$ gives the best results. From bone fat (acidity 58%, Lovibond color Y 47, R 14.6, B1) the II bleached with 2% of $K_2S_2O_8$, shows Lovibond color Y2, R 0.9 when 2% of $NaClO_2$ and 0.5% of H_3PO_4 is employed for bleaching the fat, and, respectively, 2.7, 1.1, —, and 3, 1.5, 0.5 when the fat is previously bleached with, respectively, 1% of $NaClO_2$ alone and not at all. Presence of Fe has no immediate influence on the color but is instrumental in development of color during storage of the II. (*C. A.* **50**, 8234)

Electrochromatographic separation of cationic surface agents. S. Fumasoni, E. Mariani, and G. Torraca (Univ. Rome). *Chemistry & Industry* **1956**, 69–70. Cationic surface agents of the alkylpyridinium chloride type, where alkyl is a straight chain of 8–18 even C atoms, were separated and identified by electrochromatographic paper techniques. Whatman No. 3 strips and either pH 9, 0.2 *M* Na borate or pH 6, 0.07 *M* KH_2PO_4–Na_2HPO_4 buffers were employed. Location of the separated spots were determined by either a spray of 0.1% solution of Supranolot BB containing 1% NH_3 or by submission of the strip to I vapors. Quantitative applications with a densitometer were successfully applied to the determination of lauryl pyridinium chloride in commercial products. A precision of 10% in the range of 100–300 γ is claimed. (*C. A.* **50**, 9041)

Equilibrium and kinetics of detergent adsorption—a generalized equilibrium theory. A. Fava and H. Eyring (Univ. of Utah, Salt Lake City, Utah). *J. Phys. Chem.* **60**, 890–8(1956). As a result of the study of the adsorption of detergents, new theory of detergent action is proposed which postulates that in addition to the usual stabilizing of dirt in the solvent by micelle formation, adsorption of detergent on the fabric surface weakens the bond of dirt to fabric and so speeds up the dissolution of such bonds. The peculiar break and the maximum in the adsorption *versus* concentration curves are shown to arise from the anomalous properties of the solution rather than from peculiarities of the adsorbate-surface system. The rates of adsorption and desorption of detergent are found to follow a very simple nonlinear reduced equation which has general applicability to condensed systems approaching equlibrium. Irreversible thermo-dynamics suffices to represent only the final part of this equilibrium process which is, however, readily formulated in terms of reaction rate theory.

Carbon-14 method tests home-laundering procedures. Florence Ehrenkranz and E. H. Jebe (Iowa State Coll., Ames). *Nucleonics* **14**(3), 96–101(1956). Carboxyl-tagged tripalmitin stains on muslin swatches were used to study laundering effectiveness. Increased wash temperatures were better. Soap and soft water were more effective than detergents and hard or soft water. (*C. A.* **50**, 9042)

Crystalline phases of toilet soap. P. Dobbelman. *Compt. rend. 27ᵉ congr. intern. chim. ind., Brussels,* **1954**, 3; *Industrie chim. belge* **20**, Spec. No., 700–3(1955). A review largely from the standpoint of x-ray diffraction measurements. A method of preparing small quantities of soap in various phases is mentioned. α-Na palmitate or stearate is obtained by crystallizing the soap from alcohol. The β-phase is obtained by heating the soap above 43°, and the ω-phase by heating above 103° for several hours. The δ-phase is prepared by crystallizing the soap (α and β) from 50% alcohol. Toilet soap consists largely of the ω-phase; the β-phase is essentially absent. The preparation of β-phase soap requires special apparatus with temperature control. (*C. A.* **50**, 9042)

Ampholytic surface active agents. Sburo Komori (Osaka Univ.). *J. Japan Oil Chemists' Soc.* **5**, 189–93(1956). A review with 26 references.