# ABSTRACTS . . . R. A. REINERS, Editor

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## • Oils and Fats

**A new procedure for the determination of volatile carbonylic substances in autoxidizing edible fats.** C. H. Lea and P. A. T. Swoboda(Low Temperature Sta. for Research in Biochem. and Biophysics, Univ. of Cambridge and Dept. of Sci. and Ind. Research). *Chem. & Ind.* 31, 974–5(1958). Simple pot stills were used to distill volatile carbonyl substances in autoxidized edible fats. Recovery experiments showed that concentrations of order of 2–4 micro mole per gram aldehydes of chain length $C_6$–$C_{14}$ are recovered practically quantitatively from glyceride oils in 0.5 hour at 50° and 0.01 mm. mercury, using solid carbon dioxide as coolant. In 0.5 hour at 50° about 2.5% of the total carbonyls of cod liver oil or 3% of those of lard are volatilized and condensed, as compared with only 0.5–0.7% of those of cottonseed oil.

**The content of fatty acids produced by the oxidation of solid paraffins.** A. I. Levin. *Khim. i Tekhnol. Topliv i Masel* 3(6), 29–33(1958). Analysis of the commercial product from the oxidation of paraffin showed the total fatty acids to be about 70% with a fairly uniform distribution of compounds in the range of $C_4$ to $C_{21}$. Acids meeting the quality demands of industry had a total fatty acid content of about 50%. The possibility of separating specific fractions up to 70–90% was demonstrated on the laboratory scale with the use of a column with 25 theoretical plates and at 5-mm. pressure. (*C.A.* **52**, 15925)

**Recent results with the synthesis of branched fatty acids.** H. Koch(Max Planck Inst. Kohlenforschung, Mülheim-Ruhr, Ger.). *Fette, Seifen, Anstrichmittel* 59, 493–8(1957). The reaction of carbon monoxide with olefins to yield branched fatty acids is reviewed. The addition is considered to proceed through a carbonium ion intermediate. The use of formic acid as a carbon monoxide source, and also the use of carbon monoxide under pressure are discussed. (*C.A.* **52**, 15925)

**Halogenation and dehalogenation of cottonseed oil.** A. Vázquez Roncero and J. Huesa Lope(Inst. Grasa y Derivados, Seville). *Grasas y aceites* (Seville, Spain) 9, 3–9(1958). Cottonseed oil having increased conjugation and unsaturation and suitable for use as a drying oil was obtained by chlorination followed by dehydrochlorination. Better chlorination occurred with treatment with tert-butyl hypochlorite and a current of chlorine than by either treatment alone. Dehydrohalogenation was carried out by heating to 280° at 5 mm. mercury or by refluxing in dioxane with zinc or tin as catalysts. The former method gave higher unsaturation and conjugation. Zinc gave better results than tin. Increased heating time favored the elimination of chlorine. (*C.A.* **52**, 15926)

**Reduction in oil content of grist by washing it briefly with pure solvent.** V. A. Ivanov, A. N. Mastov, and Ya. A. Koneva (Council of National Economy, Fergansk). *Masloboino-Zhirovaya Prom.* 24(5), 30–1(1958). Data show that the oil content of extracted grist can be reduced to the minimum by washing the grist briefly with either cold (28°) or warm (60°) benzene. Average reductions of 0.32 and 0.37%, respectively, were obtained. Grist 450 mm. thick on a conveyor should be washed for 45 seconds and drained for 2 minutes 15 seconds. (*C.A.* **52**, 15926)

**Continuous refining of sunflower oil with sodium silicate solution.** A. I. Sikpin. *Masloboino-Zhirovaya Prom.* 24(5), 15–8 (1958). Description is given with two diagrams of the process for continuous refining of sunflower-seed oil with a solution of sodium silicate. (*C.A.* **52**, 15927)

**Refining of cottonseed oil.** B. Ya. Sterlin. *Masloboino-Zhirovaya Prom.* 24(5), 18–21(1958). The literature is reviewed concerning the relation of the excess of lye used in refining to color and yield of neutralized cottonseed oil, degradation of nonfat material, and loss of fat due to saponification. Ten references. (*C.A.* **52**, 15927)

**Method for determination of storage stability of sunflower seeds.** E. Z. Plushkina, F. G. Kirillov, and L. V. Tulinova (Central Lab. Fat and Oil Ind., Krasnodar). *Masloboino Zhirovaya Prom.* 24(5), 12–3(1958). Method is based on moisture loss at equilibrium with air of 70% relative humidity. (*C.A.* **52**, 15927)

**Dielectric properties of an oil from a new commercial crop Abyssinian Crambe.** A. Ya. Zbraga. *Zapiski Voronezh. Sel'skokhozh. Inst.* 25(1), 255–7(1954). The oil from Abyssinian Crambe contains saturated acids and also erucic, oleic, and linoleic acids. The dielectric properties of the oil are about the same as those of castor oil. The specific volume resistance at 20° is $5 \times 10^{10}$ ohm-cm. and decreases sharply with an increase in temperature. The dielectric permeability is 3.2 and is independent of frequency. The value of tan $\delta$ decreases with an increase in temperature and increases with an increase in the frequency. The dielectric strength of the oil is $\sim$ 100 kilovolts/cm. (*C.A.* **52**, 15927)

**Absorption of gases by whale oils. I. Absorption of carbon dioxide.** Yasutaro Ishikawa(Hiroshima Univ., Fukuyama). *Sci. Repts. Whales Research Inst.* 11, 191–213(1956). The amount of carbon dioxide absorbed in whale oil was determined by measuring pressure reduction after absorption of gas at constant volume and at 35°. Solubility was proportional to the pressure of carbon dioxide in the range of 927 to 2379 mm. of mercury. There was no great difference between whale oils and other oily substances as oleic acid, oleyl alcohol, liquid paraffin, camelia oil, and castor oil. However, the time required to reach the maximum absorption is very short in the former. Absorption velocity is discussed. (*C.A.* **52**, 15927)

**Distribution of fat in milk with special reference to individual differences and studies of the nature of fat globules by means of permanent preparations.** K. Hunger and K. G. Henrich. *Z. Tierzücht Züchtungsbiol.* 64, 333–54(1955). Microscopical examination of milk indicated that there was a strong positive correlation between the fat content of milk and the size of the fat globules, r = +0.7721. There was no effect of diet. In cows with mastitis and in those given large quantities of beets, the size of the fat globules increased, but in cows with poor appetites it fell. In two cows exercised for an hour the globules were larger at the next two milkings and then returned to normal size. An increase in the interval between milkings from 6½ to 12 hours resulted in an increase of globule size from 15.95 to 21.34 cubic microns. The size depended on the quantity of milk and the pressure in the udder. The range of fat globules was less in morning than in afternoon and evening milk. In five cows the mean size of globules, in cubic microns, was in the morning 15.25, at midday 17.37, and in the evening 16.92. (*C.A.* **52**, 16633)

**Composition of the seed fat of Amaranthus gangeticus.** Dipti Kalyan Chowdhury and Rabindranath Bagchi(Calcutta Univ.). *Naturwissenschaften* 43, 538(1956) (in English). The oil present in mature seeds of *Amaranthus gangeticus* had the following characteristics: $n^{40}$ 1.4645, iodine number 113.7, saponification value 160.3, unsaponifiable matter 0.9%, free fatty acids (as oleic) 0.8%. The composition of fatty acids was linolenic nil, linoleic 37.53, oleic 56.18, and saturated 6.29%. (*C.A.* **52**, 16763)

**Application of electron microscopy in the fat field. II.** H. P. Kaufmann, E. Gulinsky, and M. Vogelmann(Deut. Inst. Fettforschung, Münster/W., Ger.). *Fette, Seifen, Anstrichmittel* 59, 522–5(1957). Thin films of drying oils were examined by means of light and electron microscopy. Crystalline segregations that formed spontaneously, and which are partly produced by the addition of fatty acids and waxes, are shown to be related to the chlorophyll (phaeophytin) content of the oils. (*C.A.* **52**, 15928)

**The composition of the phospholipides of cow milk.** D. N. Rhodes and C. H. Lea(Univ. Cambridge and Dept. Sci. and Ind. Research, London). *J. Dairy Research* 25, 60–9(1958). The phospholipides of skim milk, buttermilk, and butter prepared from one bulk of Friesian milk were examined by chromatographic methods. No major differences were found between the three products. The phospholipides of buttermilk contained (in mole %) phosphatidylethanolamine 29, phosphatidylserine 10, phosphatidylcholine 33, sphingomyelin 19. Nitrogen, associated with the cephalin fraction, equivalent to 14 mole % of the lipide phosphorus was not identified. No lysoglycerophospholipides were present. Unsaturated fatty acids were present in both the $\alpha'$- and $\beta$-positions of the milk glycerophospholipides, in contrast to those from other animal sources which have usually been found to contain unsaturated acids in the $\alpha,\alpha'$-position and predominantly saturated acids in the $\beta$-position. (*C.A.* 52, 15770)

**Changes in size of fat globules in cream during vacreator treatment.** R. M. Dolby(Dairy Research Inst., Palmerston North, N. Z.). *J. Dairy Research* 24, 372–80(1957). The size distribution of fat globules was determined microscopically in cream samples taken from different parts of the vacreator during treatment of cream. It is indicated that splitting of globules in the vacreator is due to a homogenizing effect where steam and cream travel at a high velocity. Flash-boiling causes clumping but not splitting of globules. These observations should apply to any equipment for pasteurization or deodorization of cream with direct steam. (*C.A.* 52, 15772)

**Component fatty acids of vanaspati.** V. S. Patil and N. G. Magar(Inst. Sci., Bombay). *Oils & Oilseeds J.* (India) 10(2), 6–9(1957). A sample of vanaspati made from coconut oil 5, sesame oil 5, and peanut oil 85%, and another sample made from peanut oil 45, linseed oil 50, and sesame oil 5% were each hydrolyzed, and the mixed fatty acids were resolved by low-temperature crystallization and conversion to the methyl esters and identified by alkali-isomerization and ultraviolet and infrared spectrophotometry. The second sample contained myristic, palmitic, stearic, arachidic, oleic, linoleic, and linolenic acids; the first sample contained these except linolenic and also contained lauric acid. (*C.A.* 52, 15772)

**New methods of determining fatty acids in lipides and their characteristics of differentiation.** F. Mecca and L. Poliano. *Chim. ind.* (Milan) 40, 372–6(1958). By fractional distillation of saponified butter, the fatty acids were separated into soluble and insoluble, volatile and nonvolatile fractions. Butyric, caproic, caprylic, capric, higher saturated, and unsaturated fatty acids were calculated from the titration of the various fractions. The values for fourteen samples of butter are reported, the values for a number of fats used as butter substitutes and of butter samples adulterated by addition of 10 to 30% of foreign fats. The calculation of titration results is given. (*C.A.* 52, 15772)

**Effect of different conditions of thermomechanical processing of cream with high fat content on the body and consistency of butter.** A. Grishchenko and M. Zalashko. *Molochnaya Prom.* 19(6), 10–4(1958). Normal consistency butter was obtained in a continuous process when the rate of cooling of cream was maintained at below 0.1°/second, the phase inversion took place in 300 seconds, and the resulting butter was forced finally through a structure-forming device which resembled a sausage-type feeder with perforated plate at the exit end. The perforations were 2–5 mm. in diameter. (*C.A.* 52, 15772)

**Effect of lower fatty acids on the solubilization of 1-butanol in aqueous solutions of sodium salts of fatty acids. I.** A. N. Bose and K. N. Mehrotra(Univ. Lucknow, India). *J. Prakt. Chem.* [4], 5, 1–7(1957). The shorter the chain length of the acid, the more effective it is in decreasing the extent of solubilization of 1-butanol. 1-Butanol is more soluble in laurate systems than in caprate and caprylate in presence of the same amount of free acids. The solubility of 1-butanol in soap solutions decreases with increase in the amount of free acid in the solutions. The viscosity of the solution indicated that two types of micelles are formed.

**II.** *Ibid.* 8–13. The addition of free acids lowers the tendency of the soap solution to form hydrophilic oleomicelles, but it has no effect on the formation of lipophilic hydromicelles. The sol-gel transformation temperature increases with increase in length of the acid chain in the soap and with increase of the chain length of added free acid. Solubilization decreases with increasing chain length in the soap. Viscosity measurements confirm that two types of micelles are formed in the solution. (*C.A.* 52, 16761)

**Fatty acids of butterfat and the volatile acids formed on oxidation.** J. C. Hawke(Dept. Sci. and Ind. Research, Wellington, N. Z.). *J. Dairy Research* 24, 366–71(1957). Despite the presence of appreciable quantities of steam-volatile fatty acids as glycerides in butterfat, no short-chain fatty acids with odd carbon number were detected by gas-liquid chromatography of the acids. Mild oxidation of butterfat for short periods of time produced steam-volatile fatty acids with odd carbon number. A large proportion of these acids are formic, with smaller proportions of propionic, valeric, and nonanoic acids. The relative ease with which short-chain fatty acids are produced on oxidation of fats points to the danger of contaminating naturally occurring fatty acids with extraneous acids. A total analysis of the fatty acids of New Zealand butterfat by gas-liquid chromatography compared well with similar analyses carried out by means of ester-fractionation analysis. (*C.A.* 52, 15772)

**Test method for lard.** R. Grau and R. Mirna. *Fette, Seifen, Anstrichmittel* 60, 357–9(1958). The peroxide, acid, and saponification numbers, and color values of lard increase with age. $E_{268}$ millimicrons values (2 g. in 100 ml. $C_6H_{14}$, 1 cm. cell) increase in 26 days at 37° from below 0.15 to over 1.0. (*C.A.* 52, 15774)

**Hardening of fatty acids.** G. Stalmann. *Seifen-Öle-Fette-Wachse* 84, 425–32(1958). Experimental conditions for the most efficient hydrogenation of fatty acids from tallow, train oil, and castor oil were investigated. Crude fatty acids form purified tallow after hydrogenation for four hours, at 175–80°, and 25 atmospheres hydrogen, in presence of 0.3% nickel. Train oil fatty acids hydrogenated better after distillation. Castor oil was hydrogenated by passing hydrogen at atmospheric pressure for six hours, at 180–90°, in presence of 0.3% nickel, to a final iodine number of 5. The hydroxyl number dropped from 162 to 53, owing to estolide formation. Fatty acids hydrogenated for six hours, at 180–90°, 25 atmospheres hydrogen with 0.3% nickel, had an iodine number of 4; hydroxyl number dropped from 149 to 11. After distillation, iodine number and hydroxyl number were 60 and 2, respectively, owing to dehydration and regeneration of the double bond. Thus, hydroxystearic acid could not be obtained under the described conditions. (*C.A.* 52, 16761)

**A new technique for determining the relative autoxidation rates of fatty acid derivatives.** A. R. S. Kartha(Maharaja's Coll. Ernakulam). *J. Sci. Ind. Research* (India) 17B, 135–7 (1958). The rate of decrease of iodine value is constant for a particular substrate under the conditions of unrestricted supply and availability of oxygen, during which a maximum rate of autoxidation is reached. By this method, the relative autoxidation rates of oleic, linoleic, and linolenic acid methyl esters are in the ratio of 1:2:4; previous workers by other methods gave a ratio of 1:12:25. (*C.A.* 52, 16761)

**The infrared spectrophotometric determination of the hydroxyl content of $C_{18}$ fatty acids and their esters.** H. Bayzer, E. Schauenstein, and K. Winsauer(Univ. Graz, Austria). *Monatsh.* 89, 15–22(1958). From the infrared spectrum of 12-hydroxy-; 9,10-dihydroxy-; 9,10,12,13-tetrahydroxy-; and 9,10,12,13,15,16-hexahydroxystearic acids, the extinction coefficients of hydroxyl (3130 cm.$^{-1}$) and CH– (2920 cm.$^{-1}$) bonds were calculated. The ratio of $E_{OH}/E_{CH}$ was 0.443, 0.885, 1.033 and 1.19 for mono-, di-, tetra-, and hexahydroxylstearic acids, respectively. The plot of $E_{OH}/E_{CH}$ versus %-hydroxyl indicated that this might serve as a means of determining the hydroxyl content in substances in which it is not known. (*C.A.* 52, 16762)

**Some degradation products in oils and fats.** F. Mihelić(Fac. Farm., Zagreb, Yugoslavia). *Farm. Glasnik* 14, 183–97(1957). The relation between the formation of certain primary and secondary degradation products in fats and oils has been examined. Experiments were performed under various conditions on edible sunflower oil and lard. Examinations of lard have also been carried out after addition of 0.002% of the inhibitor nordihydroguaiaretic acid of the copper peroxidant, and of chlorophyll b as well as after adding a combination of 0.001% nordihydroguaiaretic acid and 0.001% of chlorophyll. Autoxidizing processes in sunflower oil are hastened by light. Lard (both in lightness and in the dark) added oxygen less rapidly than did sunflower oil. (*C.A.* 52, 16642)

**Trace elements in edible fats. VI. Stabilizing of olive oil by demetallization with ion-exchange resins.** A. Vioque, M. del Pilar Villagrán, and R. Gutiérrez Gonzáles-Quijano(Inst. Grasa y Derivados, Seville). *Grasas y aceites* (Seville, Spain) 9, 10–13 (1958). Stability of olive oil was considerably improved by removing trace amounts of iron, zinc, and copper. Olive oil was dissolved in acetone and the solution was passed through a cation-exchange column. Efficiency of cation-exchange column for metal removal was usually better than 90%. Stability was directly related to iron content of olive oil. Treatment with cation-exchange column might become a standard part of the refining of olive oil if the need for a solvent could be eliminated. (*C.A.* 52, 16642)

**The physicochemical composition of the fat of mare's milk.** A. N. Odintsova. *Konevodstvo* 24(10), 33–6(1954). *Nutrition Abstr. & Revs.* 25, Abstr. No. 3347(1955). The melting point of mare's milk fat varies between 21° and 23°, the solidification point between −10° and −15.5°, and the $n^{40}$ between 1.4585 and 1.4606. The chemical constants estimated were the amount of volatile fatty acids soluble in water expressed by the acid numbers, 4.5–5.8; the saponification number, 210–12; and the iodine number, 80–108. The melting point and solidification point of mare's milk fat were close to those for cow's milk fat, being 26–34° and −18° to −23°, respectively. The refraction number at 40° was 48.5–51.5 for mare's milk and 42–45 for cow's milk fat. The chemical properties of cow's milk fat were as follows: volatile fatty acids soluble in water 25–30, saponification number 222–32, amount of unsaturated fatty acids 25–40. The fat of mare's milk was more liquid than that of cow's milk and contained more unsaturated acids. According to the amount of fatty acids soluble in water, it was nearer to human than cow's milk. (*C.A.* **52**, 16638)

**Percentage of fat in goat milk.** S. Berge. *Sat og geit* **1955** (4), 85–6, *Nutrition Abstr. & Revs.* **26**, Abstr. No. 1559(1956). The composition of goat milk as sampled at the Tretten cheese factory in 1932–3 and as recorded for the whole country in 1949 is, respectively: total solids 12.20, 11.82; fat 3.75, 3.48; protein 3.10, 3.17; lactose 4.01, 4.33; ash 0.81, 0.83%. English milk has more protein (3.34%) and more fat (4.5%) than does Norwegian milk. Lactose (4.08%) is about the same. There is a low inverse correlation between lactose and fat. (*C.A.* **52**, 16637)

**Influence of phosphatides on the glycerolysis of linseed oil.** R. Boyer, M. Naudet, and P. Desnuelle(Natl. Lab. Oils & Fats Sci. Fac., Marseilles, France). *Peintures, pigments, vernis* **34**, 303–8(1958). The first stage of the manufacture of alkyd resins based on glycerol is the preparation of monoglycerides by glycerolysis of linseed oil. The reaction, catalyzed by sodium hydroxide or sodium oleate, proceeds from triglyceride via diglyceride to monoglyceride. The cephalin fraction of the phosphatides naturally occurring in linseed oil strongly inhibits the glycerolysis by inactivation of the catalyst, while the lecithin fraction is practically inactive. Additional quantities of catalyst appear to speed up the glycerolysis reaction to a desirable rate. (*C.A.* **52**, 16757)

**Argentine peanut butter. I. Fatty acid composition.** P. Cattaneo and Germaine Karman de Sutton. *Anales asoc. quím. arg.* **46**, 96–110(1958). A study of the fatty acid composition of Argentine peanut oils from the various areas of seed production was carried out. Extreme values of composition are related to the influence of the zone of seed production on iodine number and linoleic acid content. Analyses show that behenic acid is the principal component of the $C_{20}$–$C_{24}$ saturated acids. A graphical treatment of the data shows that linoleic acid varies directly with the iodine number. However, saturated acids and oleic acids vary inversely to the iodine number. (*C.A.* **52**, 16763)

**Component fatty acids of the seed fat of Citrus aurantium or karna khatta.** D. R. Dhingra, G. N. Gupta, and R. P. Argawal. *Indian Soap J.* **23**, 67–71(1957). The seeds were decorticated and cleaned. The decorticated seeds contained fat (petroleum ether extract) 44.86 and water 5.46%. The fat had the following characteristics: $d_{20}$ 0.9236, $n^{20}$ 1.46486, acid value 4.36, iodine value 86.05, saponification value 238.7. It was very pale in color and had a pleasant odor. The fat contained the following acids: oleic 7.96, linoleic 54.18, myristic 0.74, palmitic 14.18, stearic 19.32, and arachidic 1.21%. The unsaponifiables amounted to 2.41%. The fat can be used for medicinal and edible purposes and the cake can be used for cattle feed. (*C.A.* **52**, 16762)

**Molecular composition of kamala seed oil.** V. H. Kapadia and J. S. Aggarwal(Natl. Chem. Lab., Poona). *J. Sci. Ind. Research* (India) **17B**, 117–19(1958). The characteristics of fractions of kamala seed oil obtained by the extraction of freshly decorticated and finely ground kamala seed kernels with different solvents were determined. A major portion of the oil is composed of complex triglycerides formed by the condensation of carboxyl groups of various constituent fatty acids both with the hydroxyl groups of glycerol and α-kamlolenic acid. The rest of the oil, not exceeding 12%, consists of simple triglycerides of the component fatty acids. (*C.A.* **52**, 16763)

**The reclamation of rancid fats.** A. Khair, S. Bhattacharyya, B. T. R. Iyengar, and M. M. Chakrabarty(Calcutta Univ.). *J. Proc. Inst. Chemists* (India) **30**, 40–5(1958). In one case, neutralized oil was treated with 4% bentonite (activated with sulfuric acid) in vacuo for one half hour. In a second case, the same sample was treated in the same way but under carbon dioxide for one half hour, and in a third case, at room temperature for three hours. Peroxide values were 6.1, 5.8, and 15.5, respectively. Alkali refining does not greately reduce the peroxide value and increasing the time of contact has no positive effect. Activated bentonite is very effective in removing peroxides; antioxidants and synergist definitely lengthen keeping time. (*C.A.* **52**, 16642)

**Refining of olive oil containing parathion residues. II.** Maria E. Alessandrini, R. Fontanelli, and A. Sampaolo. *Rend. ist. super. sanità* **20**, 1004–13(1957). The preparation tested for partition of 100 micrograms of sodium diethyl thiophosphate between 10 g. olive oil and 10 ml. of a 1:1 mixture of 0.5 normal sodium hydroxide and saturated sodium chloride solution show that the ratio of sodium diethyl thiophosphate in olive oil to sodium diethyl thiophosphate in the aqueous phase was 0.41. Also, sodium diethyl thiophosphate was not stable in olive oil for 40% was lost in one hour and all disappeared in five days. The sodium diethyl thiophosphate was decomposed by refluxing in one normal sulfuric acid, but not affected on refluxing in one normal sodium hydroxide. The sodium diethyl thiophosphate added with $(C_2H_5O)_2$ $PO_2Na$ to olive oil was completely extractable by water. In refining olive oil with use of reducing agents, neither the decomposition products nor the parathion itself remain in the oil. (*C.A.* **52**, 15927)

**Composition of volatile substances which determine the aroma of hydrogenated sunflower-seed oil.** B. N. Tyutyunnikov and L. P. Grechishnikova(Polytech. Inst., Kharkov). *Masloboĭno-Zhirovaya Prom.* **24**(5), 22–7(1958). The volatile substances, with intense hydrogenated fat odor, separated from hydrogen circulated through the oil during the hydrogenation process contained: optically active hydrocarbons with average molecular weight of 158–262; straight-chain aldehydes $C_{10}$–$C_{14}$, formaldehyde and acetaldehyde; alcohols $C_{13}$–$C_{15}$; high-molecular-weight fatty acids, predominantly saturated; unsaturated and hydroxy acids with average molecular weight of 188–225. The unsaturated and hydroxy acids with average molecular weight 188–225 and the $C_{10}$–$C_{12}$ aldehydes had the most repulsive odor. Among those, low-molecular-weight aldehydes had typical hydrogenated fat odor. The composition of volatile matter from deodorized hydrogenated fat was basically the same as that of the volatile products isolated from circulated hydrogen during the hydrogenation process. (*C.A.* **52**, 15927)

**Paper-chromatographic identification of monofatty acid esters of sorbitan, polyoxyethylene, and polyoxyethylenesorbitan.** R. Schrepfer and H. Egle(Firma Nährmittelwerk W. Eiseln, Ulm/D., Ger.). *Z. Lebensm.-Untersuch. u. -Forsch.* **107**, 510–12 (1958). The procedure is designed for analysis of baking improvers. The esters are extracted with chloroform, saponified, and acidified, fatty acids removed with benzene, and the residue is neutralized to pH 7 with 0.5 *N* sodium hydroxide. Interfering cations are removed by ion-exchanger I (Merck) and anions with ion-exchanger III (Merck). Chromatography is with butyl alcohol saturated with water and $Pb(OAc)_4$ reagent as developer. The $R_f$ values of polyhydroxy moieties released from the esters are: sorbitol 0.06, glycerol 0.3, polyoxyethylene-sorbitol 0.15–0.2, and polyoxyethylene 0.5—0.6 (*C.A.* **52**, 16632)

**Rapid detection of antioxidants in lard. I.** J. Wurziger and E. Lindemann. *Die Fleischwirtschaft* **10**, 405–7(1958). Rapid tests, convenient for use by inspectors of imported lard, are discussed. Most convenient are spot tests with reagents such as ammonium hydroxide, piperidine, alcoholic potassium hydroxide, dichloroquinone chloroimide, and $H_3PO_4 \cdot 12MoO_3$. Color reactions developed with ammonium hydroxide and dichloroquinone chloroimide in samples containing individual and binary mixtures of common commercial antioxidants are described. (*C.A.* **52**, 16642)

**Leaf-waxes of deciduous conifers.** Koichiro Isoi(Kyoto Univ.). *Yakugaku Zasshi* **78**, 814(1958). Examinations of leaf-waxes from 38 kinds of conifers showed that these waxes could be divided into the estolide and nonestolide types. The leaf-waxes of the *Pinaceae* and *Cupressaceae* are the estolide type, and those belonging to *Taxaceae*, *Podocarpaceae*, and *Sciadopityaceae* are the nonestolide type. The leaf-waxes of *Larix* and *Pseudolarix* are exceptional in being the nonestolide type. The leaf-waxes from deciduous plants have a very small ester number compared with that of the evergreen plants and these are evidently not the estolide type. The distinction between these deciduous and evergreen trees is in good accord with the difference of wax type, estolide and nonestolide. (*C.A.* **52**, 16764)

**The specific distribution of fatty acids in the glycerides of animal and vegetable fats.** F. H. Mattson and E. S. Lutton(Procter & Gamble Co., Miami Valley Labs., Cincinnati, Ohio). *J. Biol. Chem.* **233**, 868–71(1958). Naturally occurring triglycerides exhibit a high degree of specificity of fatty acid distribution, so that random distribution does not occur in either vegetable or animal fats. In the vegetable fats the saturated fatty acids are predominantly esterified with the primary hydroxyl groups of glycerol. No general pattern of distribution prevails among the animal fats, although nonrandom distribution is evident. This is particularly apparent with respect to oleic-linoleic acid distribution. Lard is unique in that of all the fats studied, it is the only one in which the saturated fatty acids are predominantly in the 2 position.

**Circular chromatography of phospholipides.** R. F. Witter, G. V. Marinetti, Lilian Heicklin, and Mary A. Cottone(Dept. of Biochemistry, Univ. of Rochester School of Medicine and Dentistry, Rochester 20, New York). *Anal. Chem.* **30**, 1624–25 (1958). 2,6-Dimethyl-4-heptanone-acetic acid (30 to 5), 3-

methyl-2-butanone-acetic acid (30 to 3), octanol-lutidine-acetic acid (45 to 2.5 to 5), and chloroform-lutidine-acetic acid (20 to 30 to 5) have been found to be good solvents for the circular chromatography of the phospholipides. Excellent separations have been obtained both with mixtures of purified phospholipides and with phospholipides isolated from various tissues of the rat.

**Titrimetric determination of unsaturation by catalytic hydrogenation.** W. Seaman(Research Div., American Cyanamid Co., Bound Brook, New Jersey). *Anal. Chem.* **30**, 1840–42(1958). Gasometric determination of unsaturation by catalytic hydrogenation lacks convenience. In the titrimetric method presented, hydrogen generated from standard lithium aluminum hydride solution is used with syringe and hypodermic needle techniques. The excess hydrogen reacts with oxygen to form water, which is titrated with Karl Fischer reagent. The method offers simplicity of equipment and ease of manipulation and replication. The coefficient of variation ranged from 3 to 13%.

**Improved saponification number determination by use of ion exchange.** W. B. Swann, R. J. Zahner, and O. I. Milner(Research and Development Lab., Socony Mobil Oil Co., Inc., Paulsboro, New Jersey). *Anal. Chem.* **30**, 1830–33(1958). In the determination of saponification number by the usual method, detection of the end point is often difficult because of the buffering effect of the weak acid salts. A method has been devised in which the saponified material, in nonaqueous medium, is passed through a cation exchanger. The excess caustic is converted to water and the salts of the organic acids are converted to the free acids, which are titrated potentiometrically. The procedure greatly simplifies the determination of the end point, eliminates the need for precautionary measures to prevent absorption of carbon dioxide, and gives additional information on the nature of the organic acids comprising the original esterified material.

**Separation of fat from oil emulsions.** E. Keller(Bergedorfer Eisenwerk Akt.-Ges., Astra-Werke). *Ger. 933,368.* A description is given of the mechanical separation of fat from water in emulsions, such as butter. (*C.A.* **52**, 16652)

**Transformation of high-molecular fatty acids in low-molecular fatty acids.** A. Marzin. *Ger. (East) 9543.* The process comprises the oxidation of high-molecular fatty acids by air in the presence of catalysts, followed by the saponification with sodium hydroxide or potassium hydroxide, elimination of water, and treatment of the melt at 360° with superheated steam to give low-molecular fatty acids which are suitable for the soap industry. For this process fatty acids with more than fourteen carbon atoms are used which are obtained by oxidation of Fischer-Tropsch products or by oxidation of hydrocarbons manufactured from brown coal by smoldering or hydrogenation. (*C.A.* **52**, 15930)

## FATTY ACID DERIVATIVES

**The hydrogenation of the $C_{10}$–$C_{16}$ fatty acids to alcohols.** D. M. Maĭorov and D. V. Mushenko. *Khim. i Tekhnol. Topliv i Masel* **3**(6), 24–9(1958). A fatty-acid mixture containing $C_8$ to $C_{16}$ acids as follows, respectively: 2.4, 4.8, 4.9, 7.3, 9.8, 12.7, 9.8, 9.7, and 10.8% with a residue above $C_{16}$ of 23.5% was reduced to high-molecular-weight alcohols with a 93% of theoretical yield under the following conditions: catalyst copper-chromium; temperature 230–40°; pressure 300 atmospheres; volume velocity 0.15 1./1. of catalyst/hour; molar ratio of hydrogen to acids 200:1. Little or no solubility of the copper-chromium in the product was observed. The alcohols so obtained serve as intermediates for the synthesis of detergents. (*C.A.* **52**, 15925)

**Enrichment of monoglycerides through molecular distillation.** M. Széplaky(Forschung Inst. pflanzliche Öle u. chem. Haushaltartikel, Budapest). *Fette, Seifen, Anstrichmittel* **59**, 505–9(1957). The enrichment of monoglycerides by molecular distillation of commercial mixtures was studies as a function of the still temperature, the rate of distillation, and the vacuum used. Slowest distillation at the higher temperature gives the maximum yield. The following properties of each distillate is described as to: composition, color, melting character, emulsifying ability, viscosity, ash content, and thermal stability. (*C.A.* **52**, 15925)

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# • Biology and Nutrition

**Digestibility and nutritive value of some oil seed residues.** K. Richter and H. J. Oslage(F.A.L. Braunschweig-Völkenrode, Ger.). *Landwirtsch. Forsch.* **11**, 61–8(1958). Seven by-products from industrial oil production were analyzed and tested in digestibility trials with pigs. With the exception of cottonseed oil meal (digestibility = 42.4%) all tested by-products showed a high percentage of digestibility for pigs. (74.7–92.7%). (*C.A.* **52**, 15671)

**Production of volatile fatty acids from grass by rumen liquor in an artificial rumen. I. The volatile-acid production from fresh grass.** A. J. G. Barnett and R. L. Reid(Univ. Aberdeen, Scot.). *J. Agr. Sci.* **48**, 315–21(1957). Acetic, propionic, butyric, valeric, and caproic acids were estimated. The main acid produced in early stages of the year was acetic acid, but as the season advanced propionic acid became the acid of major production. Dried samples, corresponding to the fresh material, yielded acetic acid in greater proportion than propionic acid. (*C.A.* **52**, 15670)

**A method for the determination of total lipides in organs.** O. W. Thiele(Univ. Göttingen, Ger.). *Z. physiol. Chem.* **311**, 136–9 (1958). A freeze-dried powder of the organ is prepared. It is extracted by boiling under reflux for 30 minutes with 30 times its amount of methyl alcohol-chloroform (3:1 by volume). The solution is filtered. This process is repeated two more times by adding the same volume of the solvent and refluxing for 45 and 60 minutes, respectively. The resulting solution is evaporated almost to dryness in an atmosphere of nitrogen or carbon dioxide and the residue is dissolved in a small volume of methyl alcohol:chloroform (1:2) overlaid with water, and left standing in the dark for 24 hours. Water is removed by suction and the remainder dried and weighed. (*C.A.* **52**, 15634)

**Effect of a corn oil-evaporated milk mixture on serum-cholesterol levels in infancy.** J. Pomeranze, A. Goalwin, and L. B. Slobody(New York Med. Coll., New York, N. Y.). *A.M.A. J. Diseases Children* **95**, 622–5(1958). Fifty grams of corn oil added daily to an infant's evaporated milk formula significantly lowered serum cholesterol levels. A physiological advantage of this result was not demonstrated. Caloric excess associated with this type of experiment may be detrimental, since it encourages added weight gain. If low serum-cholesterol levels prove to be advantageous, breast milk or formulas resembling it may be the feeding of choice for infants. (*C.A.* **52**, 16520)

**The effect of complete exclusion of the stomach on fat and nitrogen absorption.** L. Plzak, Linda Price, and E. R. Woodward(Univ. of California, Los Angeles). *Surgery* **44**, 299–302 (1958). Complete exclusion of the stomach by an esophagojejunostomy produced a moderately severe defect in the absorption of ingested fat and nitrogen in each of five dogs. Following total gastrectomy there was no significant alteration in the absorption of nitrogen and fat. This makes it seem unlikely that the stomach exercises any endocrine influence over digestion in the small intestine. (*C.A.* **52** 16520)

**Effect of higher fatty acids on the activity of proteolytic enzymes of the animal organism.** V. N. Tikhomirova. *Trudy Novocherkassk. Zootekh.-Vet. Inst.* **1957**(10), 201–12; *Referat. Zhur. Khim., Biol. Khim.* **1958**, Abstr. No. 9650. Higher fatty acids depressed the activity of pepsin, trypsin, and cathepsin of the liver *in vivo*. The intensity of such depression was related to the surface activity of the fatty acid and was less in the presence of soluble proteins, probably due to the formation of lipoprotein complexes. Higher fatty acids activated cathepsin of rat liver *in vivo*. The fact that the effects of fatty acids on proteolytic enzymes *in vivo* and *in vitro* were diametrically dissimilar excluded the possibility of their direct effect on enzymes *in vivo*. (*C.A.* **52**, 16517)

**The influence of high-fat diet on the protein absorption in patients with esophageal stricture.** J. Manicki, M. Sierpiński, L. Stankiewicz, H. Reszke, and K. Zienkiewicz. *Polski Tygodnik Lekarski* **11**, 49–53(1956); *Excerpta Med.* **11**, Sect. VI, Abstr. No. 5536(1957). A fluid diet consisting of one liter of milk, 300 g. of powdered milk, 200 g. of sugar, 500 ml. of cream, and 6 eggs was given to 6 dogs previously starved. The percentage of liver fat of these dogs diminished on this diet and the liver protein increased. All dogs did well. Then this diet was administered to twenty patients awaiting operation. In five of them nitrogen balance studies were made. During this feeding the state of all patients was very good. There were no signs of fat intolerance, and the nitrogen balance became strongly positive. The absorption of nitrogen appears to be more rapid in the presence of fat in the diet. (*C.A.* **52**, 16511)

**The significance of nonesterified fatty acids in plasma.** V. P. Dole(Rockefeller Inst. Med. Research, New York, N. Y.). *A.M.A. Arch. Internal Med.* **101**, 1005–8(1958). Review with twenty-seven references. (*C.A.* **52**, 16525)

**Proteins and lipoproteins of the blood in diabetes mellitus.** H. Szereszewska, L. Chodera, and J. Patelski. *Polsk. arch med wewnetrz.* **26**, 1529–42(1956); *Excerpta Med.* **11**, Sect. **VI.** Abstr. No. 5000(1957). Protein and lipoprotein contents in the serum of forty-seven diabetic patients were examined with paper electrophoresis. In diabetes, there is a tendency to hyperproteinemia, connected with hemo-concentration. In long-standing cases, an increase of $\gamma$-globulin fractions is found, probably owing to disturbance of the liver function. In noncompensated diabetes the changes in the proteinogram show a great similarity to the picture of dysproteinemia of the nephrotic syndrome. Complications with arteriosclerosis, retinopathy, and nephropathy, as well as with acidosis, lead to the suggestion of causal relations between the lipoproteinic disorders and the vascular complications of diabetes. (*C.A.* **52**, 16558)

**Blood lipoproteins in the nephrotic syndrome.** J. Patelski, H. Szereszewska, and L. Chodera. *Polsk. arch. med wewnetrz.* **26**, 1515–28(1956); *Excerpta Med.* **11**, Sect. VI, Abstr. No. 4920 (1957). Blood lipoprotein determinations by means of paper electrophoresis in twenty-two patients suffering from nephrotic syndrome showed: (1) an increase of both lipoprotein fractions ($\alpha$ and $\beta$), (2) an increase of the lipoprotein $\beta/\alpha$ index, (3) no correlation of serum cholesterol level with hypo- and dysproteinemia, (4) a correlation of the lipoprotein $\beta/\alpha$ index with serum protein pattern and with the severity of the clinical condition. (*C.A.* **52**, 16558)

**Cholesterol content of certain foods.** D. I. Lobanov, E. N. Vasil'eva, and L. D. Gorelova(Nutrition Inst., Acad. Med. Sci. U.S.S.R., Moscow). *Voprosy Pitaniya* **17**(2), 39–42(1958). Cholesterol content was determined in the following foods by the method of Kritsman and Bavina (*C.A.* **50**, 7271g) (In parentheses the values are given for the cooked foods): beef 48–57 (42–49), bass meat including skin 52–62 (40–49), skinless perch meat 68–76 (46–50), white chicken meat 53–54 (42–43), red chicken meat 57–60 (46–48), beef raw fat 89–102, whole milk 11.9–17.7, skimmed milk 2.8–3.2, cottage cheese 6.5–7.8, butter 231–239, and chicken egg yolk 1600–2130 mg. cholesterol per 100 g., respectively. The fat content of these foods is also tabulated. (*C.A.* **52**, 16641)

**Histochemical studies on lipase in the central nervous system (normal finding).** Y. Ishii. *Arch. histol. Japan* **10**, 551–63 (1956); *Excerpta Med.* **11**, Sect. **I**, Abstr. No. 1121(1957). The normal distribution of lipase in the brain of guinea pigs was studied with the Görömi method with Tween 60 as substrate. The lipase occurs mainly in the gray matter, and only a very small amount is found in the white matter. The cerebral cortex, caudate nucleus, interpeduncular nucleus, cerebellar cortex, and olivary nucleus reveal a moderate activity for lipase, accumulation of lipase being remarkable in the area postrema. The distribution is almost similar to that of esterases, except that lipase activity in the area postrema is far more intense than esterase. Sodium taurocholate ($5 \times 10^{-3} M$) completely inhibited while eserine-salicylate ($10^{-4} M$ to $10^{-6} M$) did not when Tween 60 was used as substrate. (*C.A.* **52**, 15682)

**The optimum ratio of saturated to mono-unsaturated fatty acids in rat diets.** T. K. Murray, J. L. Beare, J. A. Campbell, and C. Y. Hopkins(Food & Drug Labs., Ottawa). *Can. J. Biochem. and Physiol.* **36**, 653–7(1958). Fat mixtures containing 10, 30, 60, and 70% saturated fatty acids as glycerides were fed to male rats at a level of 17% by weight of a chow diet. The saturated acids were mainly palmitic. The fat mixture containing 30% saturated fatty acids produced the greatest weight gains and the highest food efficiency. The same trend was noted when similar fat mixtures were added to a purified diet but differences in weight gain and food efficiency were not significant. The source of fatty acids had no effect on weight gains. The excretion of total lipides was not influenced by the degree of saturation of the fats within the limits studied. Shortening, however, caused increased excretion of total lipide. There were no significant differences in liver and adrenal weights produced by these diets. (*C.A.* **52**, 15675)

**Essential fatty acid deficiency. I. Content of polyenoic acids in testes and heart as an indicator of EFA status.** E. Aes-Jørgensen and R. T. Holman(The Hormel Institute and Dept. of Physiological Chemistry, Univ. of Minnesota, Austin). *J. Nutrition* **65**, 633–641(1958). Weanling male rats were fed a semi-synthetic diet containing either 5% safflower oil or 5% hydrogenated coconut oil for a period of 18 weeks. The diets were supplemented with 1% cholesterol, in an attempt to intensify EFA deficiency. The rats fed the EFA-free diet grew significantly less than those of the control group, and developed relatively strong dermal symptoms of EFA deficiency. Analysis of the hearts of the rats at the end of the experiment revealed a very marked increase in trienoic acid content and a decrease in dienoic acid in the deficient group. Measurement of trienoic acid content of heart tissue appears to be the best criterion for the evaluation of the EFA status of an animal.

**In vivo incorporation of diethanolamine into liver lipides.** C. Artrom, H. B. Lofland, and J. A. Oates, Jr.(Dept. of Biochem., Bowman Gray School of Med., Wake Forest College, Winston-Salem, N. C.). *J. Biol. Chem.* **233**, 833–37(1958). Evidence for the incorporation *in vivo* of an analogue of ethanolamine, diethanolamine (DEA), into liver phospholipides has been obtained by paper chromatography and by isotopic techniques applied to the total and partial hydrolysates of the lipides. The DEA-containing compound is precipitated by acetone plus $MgCl_2$, and accompanies phosphatidyl ethanolamine in the processes of adsorption on, and gradient elution from, a silicic acid column. By mild hydrolysis a product is obtained which, on paper chromatography, behaves as glyceryl-phosphorylethanolamine, and which, on further hydrolysis, yields free DEA. After feeding of DEA for several days, DEA-containing phospholipides accumulate in the liver.

**A study of the quantitative estimation of ethanolamine and serine in phospholipides.** J. C. Dittmer, Judith L. Feminella, and D. J. Hanahan(Dept. of Biochem., Univ. of Wash., Seattle, Washington). *J. Biol. Chem.* **233**, 862–67(1958). A procedure is described for the assay of ethalonamine and serine in phosphatidyl ethanolamine-rich fractions from beef liver, rat liver, and baker's yeast. In the course of the hydrolysis of these phospholipides, O-phosphoethanolamine was formed in amounts as high as 17% of the total nitrogen. Under the conditions of the assay system, these phosphorylated derivatives were not oxidized by periodic acid. Both O-phosphoethanolamine and O-phosphoserine were detected by high voltage paper electrophoresis and assayed by phosphorus assay on the resultant spots. The various hydrolytic procedures and assay systems proposed for estimation of ethanolamine and serine in phospholipides are discussed.

**Production and study of vitamin E deficiency in the baby pig.** R. M. Forbes and H. H. Draper(Animal Nutrition Div., Univ. of Illinois, Urbana). *J. Nutrition* **65**, 535–545(1958). Thirty-seven baby pigs were used in two experiments whose purpose was to produce and study a deficiency of vitamin E. Only under the conditions of a stress provided by at least 5% of cod-liver oil in the diet was an unmistakable deficiency produced. Symptoms of this deficiency included: death, creatinuria, degeneration of skeletal and cardiac muscle, degeneration of the liver and presence of a brownish-yellow substance in the adipose tissue. The deficiency was not accompanied by changes in EKG or by ability of dilauric acid to hemolyze red blood cells. Vitamin E served to prevent appearance of these deficiency symptoms.

**Composition and concentration of lymph and serum lipoproteins during fat and cholesterol absorption in the dog.** L. A. Hillyard, I. L. Chaikoff, C. Entenman, and W. O. Reinhardt(Dept. of Physiology, Univ. of Calif. School of Med., Berkeley, Calif.). *J. Biol. Chem.* **233**, 838–42(1958). Serum and thoracic duct lymph were obtained from dogs before and after the feeding of diets containing fat or fat and cholesterol. Serum and lymph lipoproteins were separated by the ultracentrifugal, density-flotation procedure into 4 or 5 fractions, and each was analyzed for protein, triglycerides, free and ester cholesterol, and phospholipides. In the case of lymph, the lipoprotein fractions were designated as follows: A1-1, those of $S_f 10^3$–$10^5$; A1-2, S 20–1000; A2, $S_f$0–20; and B and C, usually referred to as the high density lipoproteins. In the case of serum, the low-density lipoproteins were isolated as a single fraction designated as A; B and C were thes same as those of lymph; the ultracentrifugal residue was referred to as D. When dogs were fed a meal containing corn oil or corn oil plus cholesterol, an increase in the amounts of A and, to a lesser extent, in the amounts of B, was observed in serum. No essential changes were found in Fractions C and D. The following lymph changes were observed after the animals were fed cream or the meal containing corn oil and cholesterol. The lowest density fractions, A1-1 and A1-2, were increased, but 90% of the increased amounts of lipides that appeared in lymph as a result of the fat meals was found in Fraction A1-1. The concentrations of Fractions A2, B, and C remained unchanged. Five hours after the ingestion of a corn oil-cholesterol meal, the percentage composition of Fraction A1-1 was: protein, 1:1; phospholipides, 5.5; free cholesterol, 0.4; cholesterol esters, 3.0; and triglycerides, 90. In spite of the low concentration of cholesterol in Fraction A1-1, practically all of absorbed cholesterol is carried in this fraction.

**The presence of phosphatidic acid in animal tissues.** L. E. Hokin and Mabel R. Hokin(Dept of Physiological Chem., Univ. of Wis., Madison, Wis.). *J. Biol. Chem.* **233**, 800–804(1958). After labeling of phospholipides of various tissues with $P^{32}$ both *in vivo* and *in vitro* a radioactive spot was found on chromatography which yielded over 85% of its radioactivity as glycerophosphate after mild alkaline hydrolysis. By chromatography of this phospholipide with increasing amounts of carrier substances, it was found to be chromatographically indistinguishable from cabbage phosphatidic acid but it could be distinguished from L-α (distearoyl) phosphatidic acid. After hydrogenation of the radioactive phospholipide, the product was not chromatographically distinguishable from L-α (distearoyl) phosphatidic acid. These several lines of evidence indicate that phosphatidic acids occur in animal tissues both *in vivo* and after incubation *in vitro* and that they contain unsaturated fatty acids.

**Phosphoinositides and protein secretion in pancreas slices.** L. E. Hokin and Mabel R. Hokin(Dept. of Pharmacology, McGill Univ., Montreal, Canada). *J. Biol. Chem.* 233, 805–10(1958). The phospholipides of incubated slices of pigeon pancreas were extracted quantitatively. After incubation of the slices with $P^{32}$, seven radioactive phospholipides were revealed by paper chromatography followed by autoradiography, and six of these were identified. Acetylcholine stimulated the incorporation of $P^{32}$ and glycerol-1-$C^{14}$ into phosphatidic acid. Glycerol-1-$C^{14}$ incorporation into phosphatidyl choline, phosphatidyl ethanolamine, *phosphatidyl serine, and an unidentified phospholipide* was not appreciably stimulated, althogh $P^{32}$ incorporation into these lipides was stimulated.

**Acetylcholine and the exchange of inositol and phosphate in brain phosphoinositide.** L. E. Hokin and Mabel R. Hokin(Dept. of Pharmacology, McGill Univ., Montreal, Canada). *J. Biol. Chem.* 233, 818–21(1958). After incubation of guinea pig brain cortex slices with $NaH_2P^{32}O_4$, the lipides were separated by paper chromatography and 5 different radioactive phospholipides were identified: phosphatidyl choline, phosphatidyl ethanolamine, phosphatidyl serine, phosphatidic acid, and a monophosphoinositide. Two additional unidentified radioactive spots were seen. When the slices were incubated with inositol-2-$H^3$, the only $H^3$-labeled phospholipide in the lipide extracts was a monophosphoinositide. In the presence of acetylcholine, the incorporation of inositol-2-$H^3$ and of $P^{32}$ into monophosphoinositide were both increased to approximately the same extent. This suggests that acetylcholine stimulates the incorporation of inositol phosphate as a unit into monophosphoinositide. The average stimulation was about 80%. Glycerol-1-$C^{14}$ incorporation into monophosphoinositide was not increased in the presence of acetylcholine. Acetylcholine stimulated the incorporation of $P^{32}$ into phosphatidic acid about 100%. There was no equivalent increase in the incorporation of glycerol-1-$C^{14}$ into phosphatidic acid.

**Acetylcholine and the exchange of phosphate in phosphatidic acid in brain microsomes.** L. E. Hokin and Mabel R. Hokin (Dept. of Physiological Chem., Univ. of Wis., Madison, Wis.). *J. Biol. Chem.* 233, 822–26(1958). In cytoplasmic particulate fractions of guinea pig brain hemispheres under condition of oxidative phosphorylation, phosphatidic acid was the only known phospholipide which incorporated appreciable amounts of $P^{32}$. Acetylcholine increased the incorporation of $P^{32}$ into phosphatidic acid. The stimulation by acetylcholine was essentially the same in the total cytoplasmic fraction, the washed cytoplasmic particulate fraction, and the mitochondrial fraction; it was on the average about twice as great in the microsomal fraction. The stimulation increased linearly with the logarithm of the acetylcholine concentration up to the maximal effect. Atropine abolished the stimulatory effect of $10^{-4}$ *M* acetylcholine. The incorporation of $P^{32}$ into phosphatidic acid was greatly increased in the presence of NaF; there was no stimulation by acetylcholine of $P^{32}$ incorporation into phosphatidic acid in the presence of NaF.

**The phosphatide composition of a purified cytochrome oxidase preparation.** G. V. Marinetti, J. Erbland, J. Kochen, and E. Stotz(Dept. of Biochemistry, Univ. of Rochester School of Med. & Dentistry, Rochester, N. Y.). *J. Biol. Chem.* 233, 740–42(1958). The phosphatide composition of a purified pig heart cytochrome oxidase preparation was determined by both quantitative paper and column chromatography. The major phosphatides were lecithin and phosphatidylethanolamine. The other phosphatides were sphingomyelin, phosphatidylserine, inositol phosphatide, and other unidentified components. A comparison is made of the phosphatide composition of the oxidase preparation, a purified cytochrome b-c preparation, and pig heart mitochondria.

**Phosphatides of pig heart cell fractions.** G. V. Marinetti, J. Erbland and E. Stotz(Dept. of Biochemistry, The Univ. of Rochester School of Medicine and Dentistry, Rochester, New York). *J. Biol. Chem.* 233, 562–65(1958). The lipide, and in particular, the phosphatide analysis of the mitochondria, microsomes, and supernatant fluid of pig heart ventricle was determined. Significant differences were noted, especially in the distribution of the individual phosphatides. A lipide, tentatively identified as a polyesterglycerolphosphatide was found to occur almost exclusively in the mitochondria. The ubiquitous nature and cellular localization of this lipide sugest that it may have an important metabolic role.

**The effect of dietary fat on the fatty acid composition of cholesterol esters in rat liver.** S. Mukherjee, K. T. Achaya, H. J. Deuel, Jr., and R. B. Alfin-Slater(Dept. of Biochemistry and Nutrition, Univ. of Southern California, Los Angeles). *J. Nutrition* 65, 469–479(1958). The differences in fatty acid composition of cholestrol esters in the liver of rats have been compared in adult rats fed from weaning on diets containing different dietary fats. Animals fed a diet containing 15% of lard, which besides adequate amounts of essential fatty acids, contains larger amounts of saturated fatty acid, tend to accumulate cholesterol in the liver. Increased proportions of cholesterol are esterified with the more saturated fatty acids. Diets containing highly saturated fats, such as hydrogenated coconut oil, result in the formation of large amounts of saturated fatty acid esters of cholesterol deposited in the liver. Approximately 70% of the cholesterol is combined with saturated fatty acid.

**Preparation of roughage samples for biological determination of vitamin D content.** J. Weits(Lab. of Animal Physiology, Agricultural Univ., Wageningen, Netherlands). *J. Dairy Sci.* 41, 1088–1093(1958). A critical evaluation of existing techniques for assaying the vitamin D content of roughages was conducted, using the curative X-ray method on growing rats. Evidence was presented to show that mixing ground hay with the rachitogenic diet may give aberrant values as a result of the interaction of calcium, phosphorus, and vitamin D. A simple extraction of the hay sample did not remove all of the *antirachitic activity. When the hay sample was pretreated with* alcoholic KOH, it was possible to remove the antirachitic activity quantitatively by petroleum ether extraction. Subsequent studies showed that the presence of a factor, identified as the carotene of the hay extract later on, depressed the curative effect of vitamin D. Removal of this substance by chromatography on alumina resulted in an extract free of the inhibitory factor.

**Enzymatic utilization of acetylenic compounds. I. An enzyme converting acetylenedicarboxylic acid to pyruvate.** Esther W. Yamada and W. B. Jakoby(National Inst. of Arthritis and Metabolic Diseases, National Insts. of Health, U. S. Public Health Service, Bethesda, Maryland). *J. Biol. Chem.* 233, 706–11(1958). An enzyme system has been obtained from a pseudomonad which catalyzes the formation of pyruvic acid from acetylenedicarboxylic acid. The best preparations obtained have been purified approximately 150-fold and are capable of catalyzing the formation of 140 μmoles of pyruvate per minute per mg. of protein. No evidence has been obtained for the participation of more than one enzyme and no cofactor requirements were established. Oxaloacetic acid, hydroxyfumaric acid, and acetylenemonocarboxylic acid are not free intermediates in the reaction.

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## • Drying Oils and Paints

**Drying oil from tall oil.** A. I. Kataev. *Trudy Lesn. Khoz. Zapad.-Sibir. Filiala, Akad. Nauk. S.S.S.R., Zapad.-Sibir. Otdel. Vsesoyuz. Nauch. Inzh.-Tekh. Obshchestva Lesn. Prom. i Lesn. Khoz.* 1955(2), 295–8; *Referat. Zhur., Khim.* **1957**, Abstr. No. 6201. Characteristics of tall-oil fatty acids are described and also a procedure for their processing to drying oil. It comprises four operations: rectification of the oil, esterification of the fatty acids with glycerol, dehydration of the resulting glycerides (according to the type of dehydration used for castor oil), and boiling of the drying oil. By the use of these drying oils it was possible to produce coatings of satisfactory quality that dried within 48 hours. (*C.A.* 52, 16757)

**Polymerization inhibition during heat-bodying of safflower oil.** D. Sivaramaiah and B. S. Kulkarni(Osmania Univ., Hyderabad, India). *Paintindia* 7(3), 33–6(1957). Safflower oil was bodied at temperatures from 150° to 300° with and without hydroquinone as polymerization inhibitor. At 300° hydroquinone retarded polymerization markedly as judged by the viscosity after 2–4 hours heating. At a concentration of 0.1%, the inhibitor did not affect the extent of isomerization to conjugated linkages but did so at higher concentrations. The viscosity in centipoises at 40° and the % conjugation after two hours heating at 300°, with % inhibitor 0, 0.1, 0.5, 1.0 were, respectively: 160.4, 12.2; 154.5, 11.93; 138.3, 9.65; 120.3, 6.30. Corresponding results are given for heating periods of 1, 3 and 4 hours. (*C.A.* 52, 16763)

**Alcoholysis of fatty oil by means of pentaerythritol.** J. Mleziva and V. Hanzlik. *Fette, Seifen, Anstrichmittel* 60, 197–201 (1958). Linseed oil (2320 parts) is heated in a carbon dioxide atmosphere within four hours to 260° and pentaerythritol 618 parts by weight added over two hours with stirring, and heating continued for nine hours. At this time the reaction mixture has the following composition: pentaerythritol monoester 27, pentaerythritol diester 53, monoglyceride 15.9, pentaerythritol polyesters and triglycerides 4.1%. (*C.A.* 52, 16762)

**Determination of salicylanilide in varnishes by ultraviolet spectrophotometry.** M. H. Swann and M. L. Adams (Coating and Chemical Lab., Aberdeen Proving Ground, Maryland). *Anal. Chem.* 30, 1807–08 (1958). A fairly rapid method of high accuracy was developed for the determination of salicylanilide in fungus-resistant varnishes. The absorption of an alkaline extraction solution at 336 mμ is measured and is free of interference from other varnish constituents.

**Improved method for determining ketones in lacquer solvents. New direct application to lacquer vehicles.** G. G. Esposito and M. H. Swann (Coating and Chemical Lab., Aberdeen Proving Ground, Maryland). *Anal. Chem.* 30, 1643–45 (1958). The cause of poor accuracy in the determination of ketones in lacquer solvents by the hydroxylamine hydrochloride method was investigated. Two outstanding sources of error were found, and ways of overcoming these were incorporated in a new modification of this method which allows precise determination of ketones in lacquers and lacquer thinners. A technique for determining ketones directly on lacquer vehicles without prior removal of solvents is included.

## • Detergents

**Chromatographic separation of a non-ionic polyether surfactant.** J. Kelly and H. L. Greenwald (Rohm and Haas Co., Bristol, Pa.). *J. Phys. Chem.* 62, 1096–8 (1958). A mixed *p*-t, t-octylphenoxy-polyoxyethylene-ethanol, with 9.7 ethylene oxide units per phenol was separated into its component compounds by chromatography. Silicic acid columns were used with mixed chloroform-acetone eluents. The shape of the elution curve suggests that resolution was sufficient for the isolation of quite pure species.

**The influence of branching of the dodecyl in dodecylbenzenesulfonates on the surface-active properties and detergency.** L. I. Antus, F. V. Nevolin, G. I. Nikisin, and A. D. Petrov. *Rev. chim.* (Bucharest) 8, 686–8 (1957). Dodecylbenzenesulfonates with various degrees of branching have about equal surface tensions. Branching improves foaming and detergency. The dodecylbenzenesulfonate obtained from 2,2,4,6,6-pentamethyl-4-phenylheptane has the lowest surface tension. The compounds prepared from 2-phenyldodecane exhibit the highest detergency at 40° whereas that obtained from 1-phenyldodecane is more efficient at the b.p. (*C.A.* 52, 10613)

**Textile applications of nonionic surfactants.** G. M. Gantz and W. G. Sumner (General Aniline & Film Corp., Easton, Pa.). *Am. Dyestuff Reptr.* 47, 733–7 (1958). The preparation and classification of nonionics are reviewed. Performance characteristics of nonionic surfactants vary with ethylene oxide content. Surface tension, interfacial tension, Draves wetting time, and wool detergency show an optimum when the ethylene oxide content is between 50 and 70 percent. Emulsifying action, lime soap dispersion power, and cotton detergency do not vary as widely with ethylene content. The alkyl side chain provides another variable in the structure of alkyl phenol nonionics. The concept of micelle structure of nonionic surfactants was reviewed briefly and suggested as a factor in emulsification, detergency, dispersing action. Recent textile applications have been reviewed in the fields of fiber manufacture, cotton processing, wool processing, and synthetic fiber processing. It may be concluded that nonionic surfactant consumption will continue to grow with the textile industry.

**Nonionic surface active agents. II. Synthesis of some polyoxyethylene glycol monohexyl ethers.** B. A. Mulley. *J. Chem. Soc.* 1958, 2065–6. The preparation of the title substances with 2–6 ethylene oxide units per molecule is described. These compounds have lipophilic and hydrophilic properties and are useful for the study of non-ionic surface-active agents. The compounds with 2 and 3 ethylene oxide units are almost insoluble in water at 20°, but higher members are soluble and possess a hydrophilic nature which increases with the number of oxide units per molecule.

**Critical detergent concentration for maximum washing efficiency.** M. Rosch. *Textile Praxis* 13, 288–92 (1958). Artificially soiled cotton and wool fabrics were washed under alkaline, acid and neutral conditions using increasing amounts of non-ionic and anionic detergents to determine critical concentrations for maximum washing efficiency.

**Transparent soaps.** E. T. Webb. *Soap, Perfumery, Cosmetics.* 31, 652–4, 770–7 (1958). Methods of preparing transparent soaps are reviewed. These are the alcohol process, addition of sugars or glycerol, and special physical treatment of soap in vacuum. The chemistry and physical state factors resulting in the formation of these transparent soaps are discussed in detail.

**Preservation of toilet preparations containing nonionics.** Doreen L. Wedderburn (Unilever Ltd., Isleworth, Middlesex, Engl.). *J. Soc. Cosmetic Chemists* 9, 210–28 (1958). The effect of nonionic materials on preservatives has been studied; thirty-six nonionics and twenty-six preservatives were used in the investigation. The nonionic surfactant reduced the efficiency of all the preservatives when the ratio of surfactant to preservative exceeded certain critical values, whereas non-surface-active nonionics did not. The critical ratio varies for each preservative and is dependent on the amount and type of nonionic surfactant present. The possibility that certain nonionic surfactants protect micro-organisms, rendering them more resistant to preservatives, is also discussed.

**The critical micelle concentration of ether alcohol sulfates, $R(OC_2H_4)_iOSO_3Na$.** J. K. Weil, R. G. Bistline, Jr., and A. J. Stirton (Eastern Regional Research Lab., Philadelphia, Penn.). *J. Phys. Chem.* 62, 1083–5 (1958). The critical micelle concentration (c.m.c.) of sodium hexadecyl and octadecyl ether alcohol sulfates [$R(OC_2H_4)_iOSO_3Na$, i = 1,2,3,4] was measured by surface tension, dye titration and conductance methods. In moles per liter x 10,000 the values were 2.1, 1.2, 0.7, 0.8 in the hexadecyl series and 1.9, 0.8, 0.5, 0.4 in the octadecyl series respectively. Although solubility as measured by the Krafft point increased with the number of ethenoxy groups, the c.m.c. decreased; apparently as a result of the combined effects of increased hydrophilicity and greater chain length.

**Glycerin in soaps, soap products and blended synthetic detergents.** F. V. Wells. *Soap, Perfumery, Cosmetics* 31, 663–6, 761–4 (1958). The use of glycerin in various types of soap products is outlined. These products include liquid soaps, transparent soaps, saddle soap, liquid synthetic detergents and shaving aids. 28 references.

**Detergent compositions.** A. D. Scott and B. J. Hazzard (Lever Brothers Co.) *U.S. 2,846,400.* An improved lathering detergent composition consists of an alkyl aryl sulfonate detergent such as sodium dodecyl toluene sulfonate and from 1% to about 50% by weight of the detergent of an alkanolamide which will improve the persistence during washing of the lather, said alkanolamide consisting of para-tertiary-octylphenoxyacetethanolamide or *n*-decyloxyacetethanolamide.

**Granular detergent compositions.** T. M. McCarthy and A. S. Roald (The Procter & Gamble Co.). *U.S. 2,846,401.* A non-caking, free flowing heavy duty, phosphate-containing anionic synthetic detergent is prepared by agitating the spray dried granules and simultaneously spraying on the surface an aqueous solution containing at least one inorganic sulfate of a polyvalent metal selected from the group consisting of magnesium, zinc, and aluminum.

**Alkyl sulfate detergent compositions.** H. Y. Lew (California Research Corp.). *U.S. 2,846,402.* A detergent composition consists of a normal aliphatic alcohol sulfate detergent derived from hydrogenated tallow fatty acid predominating in $C_{18}$ *n*-alkyl sulfate, about 1 to 6 parts per part of sulfate detergent of $C_{12}$-$C_{15}$ monoalkyl benzene sulfonate detergent, and, as a foam-improving agent, about 3 to 75% based on the sulfate detergent, of a $C_2$-$C_3$ monoalkylolamide of a $C_{16}$-$C_{18}$ saturated fatty acid.

**Detergent-soil suspending composition containing carboxymethyl dextran.** M. J. Hiller (The Commonwealth Engineering Co.). *U.S. 2,847,385.* An effective detergent-soil suspending composition contains a synthetic soapless detergent selected from the group consisting of anionic and non-ionic detergents and carboxymethyl dextran containing an average of 0.2 to 3.0 carboxymethyl groups per anhydroglucose unit in an amount of from 0.1% to 5.0% on the combined weights of the detergent and carboxymethyl dextran.

**Odor stabilized detergent composition.** M. E. Ginn and L. E. Weeks (Monsanto Chemical Co.). *U.S. 2,850,460.* Tridecyl-β-sulfopropionate dishwashing detergents free from objectionable odors are prepared by incorporating a small amount of an ethylenediamine acetic acid salt.