| Charge | Iodine value | Linoleate | Yield (Starting from the Me-esters of safflower oil fatty acids) |
|---|---|---|---|
| | *(theory 172.7)* | *(%)* | *(%)* |
| 1 | 172.0 | 99.3 | 23 |
| 2 | 171.7 | 99.0 | 21 |
| 3 | 172.3 | 99.6 | 24 |

To precipitate the linoleate itself as urea adduct, dissolve another 2.5 kg. of urea in the filtrate, and allow the solution to stand over-night at −5°C. Filter off the urea adduct of methyl linoleate, and wash with 2 liters of methanol cooled to −5°C.

The methyl linoleate content of samples of the last adducts from different charges was liberated and analyzed. By Bertram's method (5) only traces of saturated fatty acids were found. From the iodine value the percentage of linoleate was calculated; it was assumed that only oleates were present. The percentages of linoleic acid so found were in reasonably good agreement with those obtained by means of U.V. spectrophotometry, which were however somewhat higher. Since the experimental error in the latter method is higher than that involved in the determination of the iodine value, only the percentages calculated from these iodine values are given.

The iodine values of the residues (*ca.* 3% by weight of the initial amounts) were lower than those of the adducts, owing to the accumulation of conjugated dienoic acids and oxidation products.

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

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## • Fats and Oils

THE CONTENT OF FAT AND FAT-FREE DRY MATTER IN WINTER HERRING DURING THE YEARS 1930–1956. E. Flood. *Fiskeridirektorat. Skrifter, Ser. Teknol. Undersøk.* 3(5), 1–9 (1958). The fat of winter herring varies considerably year by year and diminishes during the catching season, the average figures declining from 12.5 to 9.6%. On the other hand the fat-free dry material is a figure of more constant value, showing a small seasonal decline, 19.9–19.1% on the average. (*C.A.* **53** 5534)

AUTOXIDATION PATTERN OF NATURAL FATS DURING AERATION. A. R. S. Kartha (Maharaja's Coll., Ernakulam). *J. Sci. Ind. Research* (India) **17B**, 237–8 (1958). Natural fats show an autoxidation pattern, shown by the unsaturated fatty acid esters during aeration at 99°. The saturated acid or glyceryl radicals present in the molecule do not affect the pattern, in spite of the fact that they form more than 75% of the total fat in ghee. (*C. A.* **53**, 6470)

COMPOSITION OF PULP AND SEED OIL OF PITHECOLOBIUM DULCE. L. G. Gamo and A. O. Cruz (Inst. Sci. and Technol., Manila). *Philippine J. Sci.* **86**, 131–4 (1957). The dried pulp of *Pithecolobium dulce* contains 4.5% oil; and dried seeds, 8.9%. The $d_{30}$ of *Pithecolobium dulce* pulp and seed oil is 0.9044; $n_{29}$ 1.4546; color (Lovibond) red, 5.7, yellow, 33.0; saponification value 185.3; iodine value 80.7; acid value 1.2; unsaponifiable 0.6%; thiocyanogen value 56.0; saturated acids 24.3%. Richness in protein makes the residue of kamachile-seed-oil extraction a good animal feed. The oil, very similar to peanut and Philippine kapok oil, shows a higher percentage of saturated glycerides. (*C.A.* **53**, 6654)

INVERSE RADIAL PAPER CHROMATOGRAPHY OF THE HIGHER FATTY ACIDS. H. Sulser. *Mitt. Gebiete Lebensm. u. Hyg.* **49**, 264–72(1958). The stationary phase was obtained by impregnating the paper in a petroleum ether solution of 10% paraffin oil. The mobile phase consisted of 85% aqueous acetic acid. After drying the chromatogram was cut in two equal pieces. One piece was treated with a cupric acetate solution followed by a potassium ferrocyanide solution to test for the saturated fatty acids. The other piece was sprayed according to the potassium permanganate-benzidine method for the unsaturated fatty acids. The two developed halves were then glued together. The paper chromatograms of the fatty acids of lard, hydrogenated lard, palm oil, coconut oil, and hydrogenated coconut oil were obtained. (*C.A.* **53**, 6653)

APPLICATION OF ULTRAVIOLET SPECTROPHOTOMETRY TO THE DETERMINATION OF SOME ANTIOXIDANTS. J. P. WOLFF. *Rev. franc. corps gras* **5**, 630–40 (1958). Methods are given for the determination of *butyl hydroxytoluene, butyl hydroxyanisole,* and gallates in oils or lard. The optical densities of a solution obtained by repeated ethanol extractions of the solution of the sample in cyclohexane at 72° are determined at 285, 274, and 274 mμ, and the amounts of butyl hydroxyanisole and gallates are calculated with formulas which take into account the absorption of the respective fats free of antioxidants. The spectrophotometric examination of the remaining cyclohexane solution after concentration by chromatography, in order to determine butyl hydroxytoluene, is not definite. Butyl hydroxytoluene should be determined by saponifying the sample, taking up the unsaponifiable material with cyclohexane, passing the cyclohexane extract through aluminum oxide containing 5% water, and determining absorption of the eluate fraction. (C.A. **53**, 5705)

ELAIDINIZATION: STUDIES ON THE ISOMERIZATION OF FATTY ACIDS AND ESTERS AND PREPARATION OF ELAIDIC ACID. N. A. Khan (East Regional Lab., Tejgaon, Dacca). *Pakistan J. Biol. Agr. Sci.* **1**, 107–18 (1958). The *cis-trans* interconversions of methyl oleate, linoleate, and linolenate, when treated with oxides of nitrogen, were determined by infrared absorption. In all cases *polymerization* continued to increase with time until all the fatty acid esters were converted to polymeric products. *Trans* isomers from methyl linoleate and linolenate were less than 5%; from methyl oleate, 35%. (*C.A.* **53**, 7002)

THE SIGNIFICANCE OF PEROXIDE VALUE IN THE EVALUATION OF EDIBLE OILS. Halina Byonisz, Maria Arbatowska, Halina Leszczyńska, Regina Oledzka, and Leokadia Staniszewska. *Roczniki Państwowego Zakładu Hig.* **9**, 255–66 (1958) (English summary). Some chemical and organolepptic changes occurring during processing and storage of peanut, soya, and rapeseed oils were studied in order to establish chemical data of spoilage. Neither an increase in acidity nor a positive Kreis test give evidence of spoilage. When the peroxide value

exceeds 7.0 for peanut and soya oils, and 9.0 for rapeseed oil, the oils are not fit for consumption. 20 references. (*C.A.* **53**, 5533)

KEEPING QUALITYY OF GHEE. I. INFLUENCE OF COMMON FLAVORING MATERIALS. R. Soundararajan (Agr. Coll., Coimbatore). *Indian J. Dairy Sci.* 11, 96–100 (1958). The aroma rating of 64-day-old ghee to which flavorings had been added during melting of the ghee was as follows, from best to poorest: curry leaf 0.5, citric acid 0.06, moringa leaf 0.5, betal leaf 0.2, lime juice 0.12%, and control with no added flavor. The peroxide value of the product flavored with curry leaf was also markedly low, and the values for the other 5 samples in the above order, indicating that the antioxidant activity of a flavor determines its value in supporting the aroma of ghee during storage. 17 references. (*C.A.* **53**, 5532)

THE COMPOSITION OF THE PHOSPHATIDES OF BUTTER MADE FROM RIPENED CREAM. J. Koops (Netherlands Inst. Dairy Research, Ede). *Neth. Milk Dairy J.* 12, 226–37 (1958). Phosphatides isolated from butter serum had the ratio lecithin: cephalin:sphingomyelin 30:45:25. (*C.A.* **53**, 5532)

PHOSPHOLIPIDE AND CASEIN INTERACTIONS IN MILK. S. M. Husaini (Univ. of Wisconsin, Madison). *Univ. Microfilms* Ann Arbor, Mich.). *L. C. Card* No. **Mic 58-5350**, 75 pp.; *Dissertation Abstr.* 19, 919–20 (1958). (*C.A.* **53**, 5531)

MOBILIZATION OF FAT IN GERMINATING LINSEED AND POPPY SEED. A. R. S. Kartha and A. S. Sethi (Maharaja's Coll., Ernakulam). *J. Sci. Ind. Research* (India) **17C**, 104 (1958). The linseed studied contained 42% oil, of iodine number 178. Neutral oils isolated at 4 germination stages corresponding to 15, 32, 67, and 73% oil had iodine numbers 180, 179, 179, and 173, respectively. The poppy seed contained 43% oil of iodine number 140. The neutral oil isolated at 3 germination stages corresponding to 62, 72, and 85% oil had iodine numbers 62, 72, and 85, respectively. These results show the absence of selective mobilization of the more unsaturated acids in the germinating linseed and poppy seed. (*C.A.* **53**, 5708)

WORLD SUPPLY OF UNSATURATED OILS. Helen B. Brown and I. H. Page (Cleveland Clinic, Cleveland, O.). *Lancet* **1959-I**, 152–3. A table of world production of corn and oil seeds, 1956 exclusive of USSR. (*C.A.* **53**, 5708)

DETERMINATION OF GOSSYPOL IN COTTONSEEDS BY PAPER CHROMATOGRAPHY. R. R. Rakhmanov and A. M. Yakubov. *Doklady Akad. Nauk Uzbek. S.S.R.* **1957**(9), 51–5. Ether extracts (Soxhlet, 24 hours) of cottonseeds were prepared, and the gossypol was separated and determined by paper chromatography. The chromatograms were irrigated (10–12 hours) with solvent mixtures of isoamyl alcohol-water-ammonia-formic acid (3:3:2:1) or isoamyl alcohol-methyl alcohol-water-acetic acid (2:2:5:1), and were developed by spraying with a 2% (in ethyl alcohol) solution of stannic chloride and heating at 105–10° for 15 minutes. The gossypol was identified by a purple-red color, and the size of the spots were a linear relation to the concentration (0.05–0.40 mg. of gossypol). (*C.A.* **53**, 5708)

CHEMISTRY OF A THERMALLY OXIDIZED OIL. E. G. Perkins (Univ. of Illinois, Urbana). *Univ. Microfilms* (Ann Arbor, Mich.), *L. C. Card* No. **Mic 58-5475**, 89 pp.; *Dissertation Abstr.* 19, 959–60 (1958). (*C.A.* **53**, 5707)

UREA COMPLEXES: PREPARATION OF FATTY ACIDS AND ESTERS FROM SESAME OIL. N. A. Khan (East Regional Lab., Tejgaon, Dacca). *Pakistan J. Biol. Agr. Sci.* 1, 124–9 (1958). Heating sesame oils with acetic acid permitted separation of the fatty acids. With 3–7 fractionations 3–8% linoleic acid was still present in the oleic acid fractions and 2.5% or more of oleic acid remained in the linoleic acid fraction. Samples of the urea-treated oleic and linoleic acids left open to the atmosphere did not become rancid in 6 months as did the control samples of the same fatty acids. (*C.A.* **53**, 5707)

THE CORROSIVE BEHAVIOR OF NONDRYING OILS AND FATS WITH PARTICULAR REFERENCE TO MODERN LUBRICATION AND CONSERVATION PRACTICES WITH METALS. A. Bukowiecki. *Schweiz. Arch. Angew. Wiss. Tech.* 24, 295–303 (1958). Corrosion tests with nondrying fats and oils show that attack on iron is not related to the total acidity of the oil, which increases with age, but rather to the volatility and reactivity of the acids formed. Saponification numbers may also be important. (*C.A.* **53**, 5707)

EFFECT OF THE SPENT CATALYST ON INCREASED ACIDITY OF HYDROGENATED FATS. V. P. Golendeev, K. G. Bogareva, E. I. Bobkova, and O. N. Dobrynina (Polytech. Inst., Gorki). *Zhur. Priklad. Khim.* 31, 1722–31 (1958). About 8% of the fats accumulated on the spent nickel-copper catalyst used in the hyrogenation of fats consist of calcium, magnesium, nickel, and sodium soaps which are not extractable with ethyl ether or chloroform. The presence of calcium and magnesium soaps increased the acidity of the hydrogenated fats. Accumulation of such soaps on the catalyst should be avoided by reducing contamination with calcium and magnesium. (*C.A.* **53**, 5706)

MODERN TECHNOLOGY OF FATS. LII. DISINTEGRATION OF RAW MATERIALS. H. P. Kaufmann and J. G. Thieme. *Fette, Seifen, Anstrichmittel* 60, 687–92 (1958).

MODERN TECHNOLOGY OF FATS AND FATTY PRODUCTS. LIV. DIMINUTION OF THE RAW MATERIALS. *Ibid.* 984–91. (*C.A.* **53**, 5706)

MODERN TECHNOLOGY OF FATS AND FATTY PRODUCTS. LV. DIMINUTION OF RAW MATERIALS. H. P. Kaufmann and J. G. Thieme. *Ibid.*, 1079–86 (1958). (*C.A.* **53**, 7627)

INTERESTERIFICATION IN FATS. I. THEORETICAL BACKGROUND AND LITERATURE. INTERESTERIFICATION BY HYDROGENATION. H. P. Kaufmann, F. Grandel, and B. Grothues. *Fette, Seifen, Anstrichmittel* 60, 919–30 (1958). On heating a mixture of soybean oil 200 g., nickel catalyst 0.2%, and butyric acid 25 g. to 220° and 4 atmospheres, up to 70% interesterification occurs. 173 references. (*C.A.* **53**, 5705)

THE SIGNIFICANCE OF ORGANIC PEROXIDES IN THE CHEMISTRY OF FATS. A. Rieche. *Fette, Seifen, Anstrichmittel*, 60, 637–45 (1958). A lecture, discussing formation, reaction, and analysis of peroxides in fats. 49 references. (*C.A.* **53**, 5705)

PREPARATION AND OXIDATIVE DEGRADATION OF RADIOACTIVE OLEIC, LINOLEIC, AND γ-LINOLENIC ACID. K. Bernhard, M. Rothlin, J. P. Vuilleumier, and R. Wyss (Univ. Basel, Switz.). *Helv. Chim. Acta* 41, 1017–23 (1958). The liquid fatty acids from *Phycomyces blakesleeanus* grown in a medium containing $C^{14}$-acetate were separated by countercurrent distribution and used for feeding experiments with rats, raised on a fat-free diet. Determination, in rats deficient in unsaturated fatty acids, of the oxidation of radioactive oleic acid, linoleic acid, and γ-linolenic acid by the activity of the carbon dioxide expired showed, in 24 hours, 46.7% oxidation of radioactive oleic acid, 38.0% of linoleic acid, and 65.0% of γ-linolenic acid. In normal rats, the difference in oxidation rate were not significant. (*C.A.* **53**, 7366)

ANTIOXIDANTS. L. R. Dugan, Jr. (Am. Meat Inst. Foundation, Chicago). *Am. Perfumer Aromat.* 73(2), 47–8, 52 (1959). The development of oxidative rancidity in fatty materials is due to the formation of hydroperoxides which break down into aldehydes, ketones, and acids. The rancidity odors and flavors are due to the secondary products. The active oxygen method, the oven test, and the A.S.T.M. bomb test are the procedures commonly used for evaluating fat stability. Synergetic antioxidants are used in conjunction with acidic materials to enhance the antioxidant effectiveness. (*C.A.* **53**, 7454)

PRESERVATION WITH ANTIOXIDANTS. B. N. Stuckey (Eastman Chem. Products Inc., Kingsport, Tenn.). *Am. Perfumer Aromat.* 73(2), 35–6, 38 (1959). Ten antioxidants considered safe for foods and cosmetics are listed. They stabilize lipides and are quite effective in animal and mineral fats, but less so in the vegetable oils. The best way of using antioxidants and good techniques for obtaining the best ones for particular preparations in which rancidity, off-odors, and off-flavors must be avoided, are discussed. (*C.A.* **53**, 7453)

INFLUENCE OF IONIZING RADIATION ON FATS. B. A. J. Sedláček (Hyg.-Inst., Prague). *Nahrung* 2, 547–56 (1958). The effects of x-rays, γ-rays from $Co^{60}$, and γ-rays from an atomic reactor on butter, soybean oil, pork fat, and hydrogenated edible fat, were studied. In general, all types of radiation caused damage to organoleptic properties and increased oxidative rancidity, both initially and usually to an increased degree during storage. Peroxide number was considerably increased, and other chemical properties were usually worsened. (*C.A.* **53**, 7453)

ANTIOXIDANTS FOR LARD PRESERVATION. S. Pyszniak (Inst. Przemysłu Miesnego, Warsaw). *Prace Inst. Przemysłu Miesnego* 1, 163–72 (1957) (English summary). Guaiacol, tannin, propyl or isobutyl gallates, and vitamins A, C, or E were added, at 0.01–0.05%, to high-grade lard containing 1.3% fatty acids and 0.15% water to improve keeping qualities. Additions of tannin, isobutyl gallates, vitamins C and E, or mixtures of vitamins C and E were effective for lard stored at room temperature over 347 days or oxidized intensely by bubbling water-free 97–9° air at a rate of 140 ml./minutes for 5–15 hours (Lea number 126.3). Traces of heavy metals in lard catalyzed the

oxidation of fats and decomposition of vitamin E. The action of tannin and isobutyl gallate consisted in precipitation of lead and copper. However, under household conditions, lard containing antioxidants showed organoleptic changes. (*C.A.* **53**, 7453)

THE APPLICATION OF ANTIOXIDANTS TO FISH OILS TO INCREASE THEIR STABILITY. Yu. S. Davydova and V. I. Treshcheva. *Rybnoe Khozy.* **34**(10), 70–4 (1958). Observations were made on the effect of ethyl gallate, octyl gallate, butylated hydroxyanisole, butylated hydroxytoluene, ascorbyl palmitate, and nordihydroguaiaretic acid on cod-liver oils in open glass containers having a diameter of 55 mm. and stored at 40° for about 27 days. Ethyl gallate, butylated hydroxytoluene, butylated hydroxyanisole, and octyl gallate at 0.05% by weight were best because of their greater solubility in oils. (*C.A.* **53**, 7630)

THE EFFECT OF DRYING METHOD AND WATER CONTENT ON ETHER-EXTRACTED OIL CONTENT OF SOYBEAN. T'ung-Fang Chao and Kung-Lin Shen. *Chih Wu Sheng Li Hsüeh T'ung Hsun* **3**, 1–3 (1957). Soybean samples dried in shade, under sunlight, in an oven (60°), in a desiccator (with calcium chloride), or under 74% relative humidity (with saturated sodium chloride solution), when adjusted to the same level of dryness before ether extraction, gave the same yield of oil. (*C.A.* **53**, 7630)

PREPARATION OF PEANUTS FOR EXTRACTION. W. Grecki (Inst. Przemysłu Tłuszczowego, Gdańsk, Poland). *Tłuszcze i Srodki Piorace* **2**, 221–7 (1958). To improve press capacity and extraction yield from peanuts, size should be reduced to ⅛–⅛ and they should be preheated to 55–65° and 80–100° before, respectively, preliminary and secondary pressing, and worked to pulpy 0.3-mm. flakes (fats <15%) or dustless 10–15-mm. granules (if for battery extraction). (*C.A.* **53**, 7629)

RAPID DETERMINATION OF OIL IN SEED CAKE, GRIST, AND HUSKS. H. Grynbergowa. *Tłuszcze i Srodki Piorace* **2**, 240–1 (1958). (*C.A.* **53**, 7629)

THE MOISTURE-CONTENT LIMIT OF OIL SEEDS. E. Bartoszak (Zakłady Przemysłu Tłuszczowego, Szamotuły, Poland). *Tłuszcze i Srodki Piorace* **2**, 218–21 (1958). Moisture limits for stable storage of hemp, linseed, soybean, sunflower seed, rapeseed, peanut, radish seed, poppyseed, etc., in bags or loosely in heaps were determined. Maximum moisture limits based on nonfat material varied from 5–10%. (*C.A.* **53**, 7629)

KENAF-SEED OIL. R. de Castro Ramos (Inst. Grasa y sus Derivados, Seville, Spain). *Grasas y aceites* (Seville, Spain) **9**, 176–7 1958). Seeds of Kenaf *(Hibiscus cannabinus)* contain 15–25% oil. The oil constants are: acidic number, 0.5–5.0; saponification number, 187–97; iodine number, 90–105; unsaponifiable, 0.4–3.4%. It is a nondrying oil similar to cottonseed oil, and contains the following fatty acids: oleic, 45.3–51.0; linoleic, 23.4–26.4; palmitic, 14.0–15.8; stearic, 6.0–6.8%. (*C.A.* **53**, 7629)

FATTY ACIDS OF THE SEED OIL OF CARDIOSPERMUM HALICACABUM. Mary J. Chisholm and C. Y. Hopkins (Natl. Research Council, Ottawa). *Can. J. Chem.* **36**, 1537–40 (1958). The major fatty acids in the glycerides of the seed oil of *Cardiospermum halicacabum* were identified by gas chromatography and by distillation of the methyl esters. The oil contains 11-eicosenoic acid as the chief component acid (42%). The estimated content of the other acids was: palmitic 3, linolenic 8, linoleic 8, oleic 22, stearic 2, arachidic 10, and low-molecular-weight acid and $C_{22}$ acids totalling 5%. (*C.A.* **53**, 7629)

ESTERIFIED OILS. F. Custot. *Ann. fals. et fraudes* **51**, 401–8 (1958). The differences between synthetic glycerol esters and natural oils and the food law aspects of the former were discussed. (*C.A.* **53**, 7629)

DETERMINATION OF THE PEROXIDE INDEX BY IODIMETRY. A. del Pozo and P. Alemany. *Galénica Acta* 11(3), 7–24 (1958). Existing iodometric determinations of peroxide indexes of oils were compared to determine peroxides in grease excipients. Rancid ethyl oleate and corn germ oil were used as typical samples because of the wide difference in peroxide index. Most accurate results were obtained by boiling 1 g. of the sample with 10 ml. acetic acid:chloroform (2:1) and a small amount of crystalline potassium iodide for 30 minutes, cooling, pouring the mixture into 1 ml. fresh saturated potassium iodide solution, and titrating with sodium thiosulfate. (*C.A.* **53**, 7629)

PAPER CHROMATOGRAPHY OF HIGHER SATURATED FATTY ACIDS. S. Fiker and V. Hájek. *Collection Czechoslov. Chem. Communs.* **24**, 296–7 (1959). (*C.A.* **53**, 7629)

HYDROGENATION OF FATS WITH PALLADIUM CATALYST. II. HYDROGENATION OF WHALE OIL. M. Zajcew. *Fette, Seifen, Anstrichmittel* **60**, 1051–2 (1958). Palladium catalyst is preferred over nickel because of lower aldehyde and peroxide numbers in the hardened oils. Palladium appears to selectively produce the *trans* isomer. (*C.A.* **53**, 7629)

CATALYTIC REACTIONS UNDER HIGH PRESSURE IN A GLASS-LINED AUTOCLAVE. A. Bognár and I. Szebényi (Tech. Univ., Budapest, Hung.). *Magyar Kém. Lapja* **13**, 321–3 (1958). Hydrogenation tests in autoclaves with and without the glass liner have indicated that glass linings inhibit side reaction caused by "aged" autoclave walls. Usefulness of glass lining is emphasized. (*C.A.* **53**, 7628)

COMPOSITION OF UNHYDROLYZED SOLIDS AFTER FAT SPLITTING. H. Grynbergowa. *Tłuszcze i Srodki Piorace* **2**, 243–5 (1958). (*C.A.* **53** 7627)

SPECTROMETRY IN THE DETECTION OF ADULTERATION OF OLIVE OIL. E. Bottini and C. Sapetti (Staz. Chim.-Agrar. Sper., Turin, Italy). *Ann. sper. agrar.* (Rome) **12**, 1007–44 (1958). By determination of infrared spectra between 2.80 and 3.3 $\mu$ and between 8.5 and 13 $\mu$ it is possible to distinguish the oils of peanut, sesame, sunflower, first pressing of olive oil and chemically refined olive oil, and refined solvent extracted olive oil, and synthetic oil, the latter two not being distinguishable. Triolein, synthetic oil, and solvent-extracted olive oil have a strong absorption at 2.90 $\mu$, while the other oils are low. Triolein has a strong band at 10.35, and inedible olive oil at 3.10 and 3.22 $\mu$. Peanut oil has a characteristic band at 10.95 $\mu$, sunflower oil at 10.95 and 11.8 $\mu$, and sesame oil at 10.95 and 12.32 $\mu$. It is concluded that infrared spectra are of some value in the detection of adulteration. (*C.A.* **53**, 6471)

FISH CONSERVES IN OLIVE OIL. INFLUENCE OF THE STORAGE TIME UPON THE DIFFUSION OF THE FISH LIPIDES INTO THE FILLING OIL. P. Cattaneo, Germaine Karman de Sutton, and R. A. Dubos. *Anales direc. nac. quím.* (Buenos Aires) **10** (19), 5-13 (1957) (English summary). The olive oils drained from sardine cans have a considerably higher iodine number than does pure olive oil. A fish-oil extract also produces bromide compounds, insoluble in acetic acid. The main diffusion of the fish lipides into the filling oil takes place during the hot sterilization of the canned goods. The further diffusion during storage for two years is small. (*C.A.* **53**, 6472)

DIRECT IDENTIFICATION OF SESAME OIL BY THE VILLAVECCHIA-FABRIS REACTION IN SAMPLES OF EDIBLE OILS AND FATS COLORED WITH FAT-SOLUBLE AZO DYES. L. Polzella. *Boll. lab. chim. provinciali* (Bologna) **5**, 163-67 (1958). The method was based on the reducing action of stannous chloride. (*C.A.* **53**, 6470)

CONTROL OF REFINING OF EDIBLE OILS BY DRAWING INTO FILMS. J. Vallée and R. Guillaumin (Inst. Corps Gras, Paris, France). *Rev. franç. corps gras* **5**, 565-70 (1958). The length of films produced in the surface-tension test of Thibaud (*C.A.* **51**, 1629i) on edible oil is dependent upon the amount of phosphatides present. Data from many samples show film lengths in mm. as follows: cold pressed oil 60, pressed oil from heated seeds 150, degummed oils (0.25-0.15% phosphatides) 53, neutralized degummed oil (0.04% phlosphatides) 8, and after final bleaching 0 mm. These data indicate the usefulness of the test for control of refining. Addition of free fatty acids or sterols to the oil sample did not affect the test; addition of phosphatides did increase film length. (*C.A.* **53**, 6470)

VARIATION IN THE UNSATURATED FATTY ACIDS OF BUTTER. W. Haab (Milchtech. Inst. d. ETH, Zurich, Switz.). *Schweiz Milchztg.* **84**, 454 (1958). Cows without supplements of feed and water produced, in cool summer weather, milk from which the derived butter contained the following percentages of fatty acids: oleic, 31-5.7; conjugated doubly unsaturated, 0.63-1.80; conjugated triply unsaturated, 0.014-0.029; conjugated quadruply unsaturated, 0.002–0.005; linoleic, 1.23–1.67; linolenic, 0.54-1.31; arachidonic, 0.27-0.49. Iodine numbers ranged from 35.9 to 41.9. Corresponding ranges for butter from cows given feed and water supplements in hot summer weather were, respectively: 24.5-34.7; 0.50-1.33; 0.016-0.031; 0.003-0.004; 1.22-1.66; 0.51-1.04; 0.27-0.42; 29.4-38.2. (*C.A.* **53**, 6466)

AUTOXIDATION OF GHEE (BUTTERFAT). III. EFFECT OF METALLIC CATALYSTS ON THE EVOLUTION OF WATER AND CARBON DIOXIDE DURING OXIDATION OF COW GHEE. S. M. Vachha, S. A. Vasavada, V. K. Leley, N. Narayana, and J. A. Daji (Coll. Agr., Poona). *Indian J. Dairy Sci.* **11**, 91-5 (1958). Oxygen absorbed from air bubbled through ghee appears as water, carbon dioxide, or fat-bound oxygen. The total absorption of

oxygen was greatly accelerated by including 0.01% copper or 0.06% iron in the sample, mostly appearing as water. More carbon dioxide appeared with iron than with copper. (*C.A.* **53**, 6466)

THE CAPSULE OF MILK-FAT GLOBULES AS VIEWED IN THE ELECTRON MICROSCOPE. E. Knoop, A. Wortmann, and Anne M. Knoop (Bundesforschungsanstalt Milchwirtschaft, Kiel, Ger.). *Naturwissenschaften* **45**, 418 (1958). Milk fat was embedded in a mixture of methyl and butyl methacrylate, sectioned, and viewed with an electron microscope. The capsules were 5-10 mμ thick. (*C.A.* **53**, 6464)

ODOR CONTROL BY CATALYTIC OXIDATION OF RENDERER EXHAUST VAPORS. L. J. Pircon and O. H. M. Wilder. *Am. Meat Inst. Bull. No. 37*, 22 (1958). Objectionable odors, not removed by ordinary means, were destroyed by passing exhaust vapors through a Pt-Pd catalyst (R-34, Catalytic Combustion Corp.) at 400°F., less than the temperature required for noncatalytic incineration. The experimental heater and catalyst chamber are described. (*C.A.* **53**, 6461)

SUNFLOWER OIL. L. Mártonfi, L. Sarudi, and L. Fulop (Gyógyszerészeti Kémiai Tanszék, Marosvásárhely, Romania). *Orvosi Szemle* (Marosvásárhely) **6**, 219–23 (1958); Rev. Med. (Tg.-Mures) **6**, 220–4 (1958). No relation is evident between the acidity of sunflower oil and the degree of its rancidity at the start of decomposition. However, initially the peroxide number and the glycidic aldehyde content increase simultaneously and in proportion. Filtration increases both. (*C.A.* **53**, 6655)

UREA FRACTIONATION OF ELASMOBRANCH SHARK LIVER OILS. A COMPARATIVE STUDY OF FRACTIONATION WITH LEAD AND LITHIUM SALTS. T. N. Methta, C. V. N. Rao, B. Y. Rao, and S. S. Lokras (Laxminarayan Inst. Technol., Nagpur). *Indian J. Appl. Chem.* **21**, 15–24 (1958). Fractionation by the lead salt-alcohol and urea methods were compared on shark liver oils obtained from five species of sharks. The urea complex formation permits the separation of the highly unsaturated acids and esters found in various marine oils. (*C.A.* **53**, 6655)

VARIATIONS OF THE CHARACTERISTICS OF PALM OILS, ESPECIALLY THEIR CAROTENE CONTENT. A. Bienaymé and M. Servant (Inst. rech. huiles et oleagineux, Paris). *Qualitas Plant. et Materiae Vegetabiles* **3-4**, 336-53 (1958) (in French). The iodine number, titer, melting points, and carotenoid content of palm oils from fifteen different stations in French, Portuguese, and Spanish zones of West Africa were determined for one season. (*C.A.* **53**, 6655)

POLAROGRAPHIC INVESTIGATION OF BEHAVIOR OF GOSSYPOL IN RAW COTTON OILS AND ALKALINE SOLUTIONS. A. L. Markman and S. N. Kolesov. *Doklady Akad. Nauk Uzbek. S.S.R.* **1597** (10), 25–9. The changes of gossypol in crude cottonseed oil and in sodium hydroxide on heating were studied polarographically. The gossypol changes in cottonseed oil and in refined sunflower oil are similar, but are more rapid in the former owing to the presence of proteins and phosphatides. The rate of oxidation of gossypol in sodium hydroxide is reduced by the presence of reducing agents such as sulfites. (*C.A.* **53**, 6654)

FRICTION COEFFICIENT FOR COTTONSEEDS AND THEIR BY-PRODUCTS. B. A. Kats. *Masloboĭno-Zhirovaya Prom.* **24**(12), 28–30 (1958). Tabulated data concerning the effects of the following factors on the friction coefficients of cottonseeds and their by-products: moisture content and fluffiness of cottonseeds, and moisture content of hulls, meats, and pulp, as well as the oil content of the powdered oil-cake. (*C. A.* **53**, 6654)

CHEMICAL INVESTIGATIONS OF THE FATTY OIL FROM THE SEEDS OF SAPIUM INDICUM. N. H. Khan and K. Ahmad (Dacca Univ.). *Pakistan J. Biol. Agr. Sci.* **1**, 59-62 (1957). Powdered seeds of *Sapium indicum* extracted with petroleum ether yielded 57% oil. The oil, slightly yellowish, has specific gravity at 25°, 0.91998; $n^{28}$ 1.4829; saponification value 196.6; iodine number Hanus 158.5; Polenske number 0.95; Reichert-Meissl number 1.24; acetyl number 18.18; Hehner number 80.28; acid number 7.8; diene number 2.1; and unsaponifiable 0.62%. (*C.A.* **53**, 6654)

CHEMICAL PHYSIOLOGY AND ANALYSIS OF POLYMERIZED FATS. K. Taufel, Cl. Franzke, and H. Hoppe (Inst. of Food Chemistry and Technology, Humboldt University, Berlin). *Deut. Lebens. Rund.* **54**, 245-52 (1958). The application of various methods used for the analyses of polymerized oils was examined using heat polymerized linseed oil. The oil was polymerized at 250° under nitrogen for 16 hours, samples were taken at 0.5, 1, 2, 4, 8, and 16 hours. The iodine values, density, refractive index, and specific absorption for initial and 16 hour polymerized oil are respectively: 186, 145; 0.9285, 0.9507; 1.4700, 1.4759; 0.3002, 0.2966. Molecular weight determinations by freezing point depressions gave 878 for linseed oil and 1160 for the 16 hour polymerized oil. Conjugation also increased with time; percent linoleic acid decreased from 53.5 to 24.4; linolenic acid decreased to 13.4, then increased to a final value of 15.3%. Linseed oil polymerized for 16 hours was soluble in acetone and butanol and of lesser solubility in propanol. Paper chromatography of the oil using a 1:1 mixture of methanol-acetone caused separation of polymeric and non polymeric glycerides. Monomeric glycerides ascended to the top of the paper while polymeric glycerides remained at the starting point. A water solution of rhodamine B-nile blue sulfate was used to spot the materials. Up to ten percent polymeric glycerides was detected by this method. Paper chromatography gave faster and more well-defined results than did column chromatography on aluminum oxide. Molecular distillation of the 8-hour polymerized oil at 1.0–0.1 microns pressure and 285°C. gave a distillate of brighter color than the starting material. The distillate had a M.W. of 870–890, the residue had M.W. of 960-1045.

THE PHOTOCHEMICAL OXIDATION REDUCTION OF THE GLYCEROL FERRIC CHLORIDE COUPLE. M. Loury and G. Lechartier (Inst. des Corps Gras). *Rev. Franç. Corps Gras* **6**, 223–227 (1959). In the presence of light and ferric chloride, glycerol is converted into aldehyde and ketone products. Removal of the ferric salt is necessary to prevent the reaction and should be done as soon as possible after refining. Long storage of the material is not desirable. The use of ion exchangers is recommended as a method for the removal of iron salts from glycerol.

RADIOACTIVITY IN THE FIELD OF FATS AND DERIVATIVES. A. Gatineau and A. Uzzan (Department of Documentation, Institut des Corps Gras). *Rev. Franç. Corps Gras* **6**, 228–239 (1959). Techniques used with ionizing radiations and radioisotopes in fats and their derivatives are reviewed and discussed.

SIMPLE DETERMINATION OF THE ACETYL VALUE. Kiyoshi Hirayama and Mitsuo Inomata (Nippon Univ., Tokyo). *Nippon Daigaku Yakugaku Kenkyu Hôkoku* **2**, 29-31 (1958). After the acetylation of unsaponified oils, the excess of acetic anhydride is determined as acetic acid, and by correction with a blank test. (*C.A.* **53**, 6654)

CHROMATOGRAPHIC ANALYSIS OF MIXTURES OF FATTY ACIDS. A. I. Trippel (F. Engels Inst. Soviet Trade, Leningrad). *Izvest. Vysshikh Ucheb. Zavedeniĭ. Pishchevaya Tekhrol.* **1958** (4), 156-62. A method of paper chromatography by using the hydrocarbon-acetic acid-water system offers a possibility of separation and identification of $C_{10}$ to $C_{18}$ free fatty acids with straight chains. (*C.A.* **53**, 6653)

FACTORS CONTROLLING THE SETTLING OF UNSAPONIFIABLES IN THE COURSE OF MANUFACTURE OF SYNTHETIC FATTY ACIDS. N. K. Man'kovskaya and Z. V. Oleĭnikova. *Masloboĭno-Zhirovaya Prom.* **24**(12), 17-20 (1958). Both the dispersion of manganese salts of dicarboxylic acids in oxidized paraffin, and the presence of naphthenic hydrocarbons, asphalt derivatives, and resins in the saponified oxidized paraffin impaired the settling of unsaponifiable matter, and consequently its separation from soaps. (*C.A.* **53**, 6653)

PAPER CHROMATOGRAPHY OF THIOCYANOGEN DERIVATIVES OF FATTY ACIDS. W. Awe and B. Grote. *Fette, Seifen, Anstrichmittel* **60**, 806–9 (1958). The $R_f$ values for the thiocyanogen derivatives of oleic, elaidic, linoleic, ricinoleic, and erucic acids were found to vary with the acetic acid concentration (70–95%) in the system acetic acid-undecane. For the identification of the thiocyanogen derivatives the dried chromatogram was sprayed in an ammonium atmosphere with a solution of ferric ammonium sulfate or ferric chloride ( 1 g.) in 100 ml. 50% acetone containing 4 ml. 25% hydrochloric acid. On drying, orange-red spots appeared which indicate the position of the separated acid derivatives. (*C.A.* **53**, 3737)

USE OF DILATOMETRY FOR THE CHARACTERIZATION OF COMPOSITION AND PROPERTIES OF FATS. L. A. Grauerman, L. G. Karantsevich, and O. I. Nevzorova. *Masloboĭno-Zhirovaya Prom.* **24**(12), 10–3 (1958). Dilatometric curves have been determined for samples of hydrogenated whale and vegetable oils, milk fat, coconut oil, beef tallow, and milk margarine, and are presented to show that dilatometry can be used in the technical control of margarine manufacturing processes. (*C.A.* **53**, 6653)

IODINE FIXATION OF FATS IN AQUEOUS MEDIUM. A. Romeo and Maria De Leo (Lab. Chim. Provinciale, Reggio Calabria).

*Boll. lab. chim. provinciali* (Bologna) 9, 143–53 (1958). The iodine number of the oils was determined by treating the saponified samples dissolved in water with an aqueous 0.1 *N* iodine solution and back-titrating excess iodine with 0.1 *N* sodium thiosulfate. The results were compared with those of Hübl's method. The fixation of iodine to the double bonds occurred faster in aqueous than in alcohol medium. The percentage of double bonds saturated with iodine during the first 5 minutes was 64.5% in olive-, 62.75% in almond-, 68.65% in castor-, and 60.0% in linseed-oil soaps. The tests were completed in 30 minutes. The rancidity of oils had a noticeable influence on Hübl's method, while the iodine fixation on the double bonds was not shifted in aqueous solution. The iodine number of olive oils determined in aqueous solution was higher but very near the numbers calculated from Hübl's method. (*C.A.* 53, 5707)

HYDROGENATION OF CASTOR OIL. I. J. van Loon. *Fette, Seifen, Anstrichmittel* 60, 899–903 (1958). Hydrogenating castor oil with 3% nickel-kieselguhr catalyst at 180° and atmospheric pressure saturates 60% of the available double bonds in 40 minutes and 83% in 120 minutes. The hydroxyl number reaches a minimum of 134 after 40 minutes and remains unchanged after longer reaction. Extracting the same castor oil with sodium carbonate increases the rate of hydroxyl reduction, and decreases saturation of double bonds. At higher pressures (5, 40, 120 atmospheres) below 200°, the hydrogenation is more selective, reducing all unsaturation and only 15–20% of the hydroxyl groups. Above 200° the rate of hydroxyl reduction is increased. At 280°, due to hydrolysis, decomposition, polymerization, and catalyst poisoning, a liquid, highly unsaturated product is obtained. Hydrogenation of the castor oil ethyl esters at 100° below 5 atmospheres shows only a minor decrease in hydroxyl number and a negligible attack at higher pressures, at 180° hydrogenation of the double bonds is complete and the hydroxyl reduction decreases with increasing pressure. (*C.A.* 53, 5707)

THERMAL MICROANALYSIS OF CARNAUBA WAX. B. Chiarlo (Univ. Genoa, Italy). *Lab sci.* (Milan) 6, 97-105(1958). Microscopic features of two varieties of carnauba wax are illustrated and discussed in terms of analytical data. (*C.A.* 53, 5708)

SPECTROPHOTOMETRIC DETERMINATION OF SORBIC ACID IN MARGARINE. H. Onrust (Keuringsdienst van Waren, Rotterdam, Neth.). *Chem. Weekblad* 54, 498–9(1958). Slight modifications of the method of Luckman and Melnick (*C.A.* 50, 6697a) are suggested. (*C.A.* 53, 3525)

INACTIVATION OF FATTY ESTER-REARRANGEMENT CATALYSTS. Thomas Hedley & Co., Ltd. *Brit. 802,129.* Water and an acidic agent are introduced into the flow stream of the liquid fat-catalyst system to deactivate the alkali metal (or derivative) catalyst. A salt with a multivalent anion which forms a buffered solution of pH 9.5–10.5 is obtained. Carbon dioxide is the preferred agent; sodium acid carbonate, phosphoric acid, or sodium monobasic-orthophosphate can also be used. In a typical run, loss of lard through saponifying was cut from 4.3% (by using only water) to 2% (by using also carbon dioxide). (*C.A.* 53, 5710)

SYNTHETIC WAXES. L. Ivanovszky and A. Groszek (Abril Corp. (Gt. Britain) Ltd.). *Brit. 802,727.* Crude synthetic waxes of the formula RCONHXOOCYCOOH are described, in which R is a univalent aliphatic radical containing at least 10 C atoms, X is a bivalent aliphatic radical containing at least 2 C atoms, and Y is a bivalent aliphatic radical containing at least 4 C atoms. The wax is prepared by condensing a dicarboxylic acid or derivative with a condensation product of a fatty acid or derivative and an alkylolamine. The free carboxyl group facilitates emulsification. (*C.A.* 53, 5710)

POWDERED, NONAGGLOMERATING WAX. E. Brennecke (Firma Gottlob Epple). *Ger. 944,212.* (*C.A.* 53, 7632)

HIGHER-MOLECULAR FATTY ACIDS. M. Luther (Badische Anilin-& Soda-Fabrik Akt.-Ges.). *Ger. 958,557.* A residue (100 parts of average molecular weight 330) from the oxidation of lignite oil and distillation of the resulting fatty acid mixture, containing 14% unsaponifiable compounds, was treated 0.5 hour with stirring with 25% sulfuric acid (100 parts) at 95°, and the mixture washed acid-free with hot water, dried, and steam-distilled at 1 mm. to give a distillate (up to 340°) containing 80% fatty acids, saponification number 176. (*C.A.* 53, 7016)

FATTY-ACID PREPARATION FROM STEARIN PITCH. E. Schramm. *Ger. 961,650.* From the undistillable residue (stearin pitch) formed during distillation of fatty acids, fats, or oils, a 65–70% yield of pure fatty acids is obtained by saponification with 100% alkali. (*C.A.* 53, 7632)

FATTY-ACID PREPARATION FROM PARAFFINS BY OXIDATION. O. Brücke, A. Milbers, K. Blass, and A. Buschmeier (Vereinigte Oelfabriken Hubbe & Fahrenholtz und Metallgesellschaft Akt.-Ges.). *Ger. 966,064.* By the oxidation of paraffins, not only fatty acids but also anhydrides, hydroxy acids, lactones, lactides, ketones, and ester acids are formed. (*C.A.* 53, 7631)

DRYING OF FATTY OILS OBTAINED FROM ONGOKER SPECIES. H. P. Kaufmann. *Ger. 985,414.* Isano oil, the fatty oil obtained from the fruits of *Ongokea*, is known for its lack of drying characteristics even after the addition of driers. Two methods are described to impart drying properties to this oil. The first method consists in heating isano oil with a multivalent acid, e.g. maleic or phthalic acid, and a compound capable of removing water. The second method consists in formation of conjugated double bonds in the partial hydrogenation and subsequent heating of the partially hydrogenated oil with uni- or multivalent organic acids, e.g. with higher-molecular fatty acids, rosin acids, maleic acid, or phthalic acid. (*C. A.* 53, 6649)

RECOVERY OF RESIDUAL OIL FROM OLIVE PASTES. E. Pochini and A. Chelazzi. *Ital. 527,383.* The oil is separated by circulating the paste through a system of conveyor screws in a steam-jacketed cylindrical apparatus. In this process, oxidation of the oil is minimized. (*C.A.* 53, 5710)

RECOVERY OF OILS AND FATS FROM DECOLORIZING SUBSTANCES. Fratelli Gianazza Società in accomandita semplice. *Ital. 532,224.* An apparatus consisting of a rotating drum and auxiliary attachments is described for the recovery of fatty material from activated earths and clays used to decolorize fats and oils. (*C.A.* 53, 4778)

RECOVERY OF PURE FATTY ACIDS FROM RAW MATERIALS. E. Gfeller (Buss Akt.-Ges.). *Swiss 330,135.* A combination of vacuum and steam-distillation processes is used in series. Repeated distillation left a residue containing 11% free fatty acids which could be redistilled. (*C.A.* 53, 7632)

COLORIMETRIC ASSAY METHODS FOR FREE AND PHOSPHORYLATED GLYCERIC ACIDS. G. R. Bartlett (Scripps Clinic and Res. Foundation, La Jolla, California). *J. Biol. Chem.* 234, 469–71 (1959). Spectra are given for the reaction of glyceric acid, monophosphoglyceric acid, and 2,3-diphosphoglyceric acid with 1,3-dihydroxynaphthalene, 2,7-dihydroxynaphthalene, and 4,5-dihydroxy-2,7-naphthalenedisulfonic acid. The last named reagent is recommended for the identification and quantitative assay of glycerates.

THERMAL DIFFUSION COLUMN THEORY FOR LIQUIDS. A. H. Emery, Jr. (Purdue Univ., Lafayette, Ind.). *Ind. Eng. Chem.* 51, 651–54 (1959). The operating equations ordinarily used for thermal diffusion columns separating liquids contain the assumption that the physical properties of the liquid, including viscosity and diffusivity, are independent of temperature. The assumption is particularly poor in the case of these two properties. The effect of temperature on viscosity and diffusivity is here incorporated into these equations. The results show that this effect is frequently unimportant, but for some systems and operating conditions it may be very large.

## FATTY ACID DERIVATIVES

TRANSFORMATION OF OXYGEN COMPOUNDS IN "UNSAPONIFIABLES-II" INTO ALCOHOLS OR KETONES. A. N. Postol'nyĭ (Polytech. Inst., Kharkov.). *Maslobo˘ino-Zhirovaya Prom.* 24 (10), 15–9 (1958). "Unsaponifiables-II," obtained as by-products in the manufacture of synthetic fatty acids, were reduced to a mixture of fatty alcohols by the Meerwein-Ponndorf method by using aluminum propoxide, aluminum isopropoxide, or aluminum butoxide. For 6–14 hours reaction periods, the consumption of aluminum was 15–25% (by weight of unsaponifiables) and conversions were 85–88%, representing hydoxyl number increases of 73–110. Alternately unsaponifiables were also converted predominantly to a mixture of carbonyl compounds by the Oppenauer oxidation method by using aluminum butoxide or isoproperoxide and a large excess of acetone. The resultant mixture was crystallized from water-ethyl alcohol-acetone to remove hydrocarbons and allowed to react with formamide at 130–170° to yield cationic surface-active agents. (*C.A.* 53, 5707)

MANUFACTURE OF ALCOHOLS FROM UNSAPONIFIABLE-II. A. I. Kudryashov, I. S. Sukhoterin, and V. I. Babaev (Synthetic Fatty Acids and Alcohols, Shebekinsk Combine). *Maslobo˘ino-Zhirovaya Prom.* 24(11), 26–9 (1958). Condensation of fatty

alcohol and boracic acid at 110–115° *in vacuo* and cleavage of the resulting esters at 98° were successfully used for separation of fatty alcohol from unsaponifiable-II in the course of manufacturing synthetic fatty acids from paraffin. 2 references. (*C.A.* 53, 6067)

PREPARATION AND PROPERTIES OF VARIOUS COMPOUNDS CONTAINING LACTIC ACID. J. C. Wootton and E. S. Lutton (Procter & Gamble Co., Miami Valley Laboratories). *J. Am. Chem. Soc.* 81, 1762–4 (1959). The following new fatty compounds containing lactic acid have been prepared and the phase behavior of these compounds is described: 0-palmitoyllactic acid, monomorphic; 1-mono-0-palmitoyllactin, dimorphic (metastable form, fleeting); 1-0-palmitoyllactyl-2,3-dilactin, monomorphic (α, tri-0-palmitoyllactin, dimorphic (α, fairly stable); 1-0-palmitoyllactyl-2,3-dipalmitin, dimorphic (usually stable, super-α). 1-Palmitoyl-2,3-dilactin, monormorphic (α, stable), has been reported previously. Of particular interest were 1-0-palmitoyllactyl-2,3-dilactin, 1-palmitoyl-2,3-dilactyllactin and 1-palmitoyl-2,3-dilactin. These triglycerides, each with one long and two short chains, showed stable α-forms; likewise, having two unesterified hydroxyl groups in the molecule, they possessed surface activity of the same order of magnitude as monoglycerides such as 1-monoolein.

MASS SPECTROMETRIC ANALYSIS OF ALIPHATIC AMIDES. J. A. Gilpin (The Dow Chemical Co., Midland, Mich.). *Anal. Chem.* 31, 935–39 (1959). The mass spectra of 35 aliphatic amides, comprising primary, secondary, and tertiary forms, are tabulated and correlated. Special note is given to the fragmentation and rearrangement ions and to the common spectral characteristics. The data aid in the determination of molecular structure of aliphatic amides.

PAPER CHROMATOGRAPHY OF 2,4-DINITROPHENYLHYDRAZONES. RESOLUTION OF 2-ALKANONE, N-ALKANAL, ALK-2-ENAL, AND ALK-2,4-DIENAL DERIVATIVES. A. M. Gaddis and R. Ellis (U.S. Dept. of Agriculture, Beltsville, Md.). *Anal. Chem.* 31, 870-75 (1959). A rapid ascending paper chromatographic method is developed for the separation and identification of 2-alkanone, *n*-alkanal, alk-2-enal, and alk-2,4-dienal derivatives in mixtures. The sample is reacted to form the 2,4-dinitrophenylhydrazones which are resolved with petroleum ether on untreated filter paper.

THE REACTION OF LAURIC ACID ESTERS WITH SULFURIC ACID. R. A. Bauman and I. J. Krems (Univ. of Vienna, Vienna, Austria). *J. Am. Chem. Soc.* 81, 1620–7 (1959). Reversibility of the reaction of methyl laurate with sulfuric acid to form lauric acid and methyl sulfuric acid has been demonstrated, and concentration equilibrium constants have been calculated for the reaction at 30.5 and 40.7°. The effect of water and of sulfuric anhydride was observed. Diesters of lauric acid and ethylene, propylene, trimethylene and pentamethylene glycols were prepared and allowed to react with 100% sulfuric acid. The reactions of ethylene glycol mono-laurate and of sodium lauroxyethyl sulfate with sulfuric acid also were studied. Stepwise rapid cleavage of lauric acid from the diesters was observed, and except in the case of pentamethylene glycol dilaurate, one of the principal products obtained on quenching the reaction with water was the glycol monolaurate. A cyclic carbonium ion mechanism is suggested to account for the results.

CLOUD POINT AS A MEANS OF CHARACTERIZING THE POLYGLYCOLS OF POLYOXYETHYLENE(8) STEARATE. M. D. Brewster and J. D. Brandner (Atlas Powder Co., Wilmington, Del.). *J. Agr. and Food Chem.* 7, 348–9 (1959). Polyoxyethylene (8) stearate which has been used extensively in yeast-raised baked goods may be characterized by the cloud point of the recovered polyethylene glycols. This test is sensitive to the molecular weight distribution of the polyglycols in the mixture and hence will distinguish between polyethylene glycols which have a Poisson-type distribution and those of the same average molecular weight but having a non-random distribution of polyethylene glycols. Cloud point is particularly sensitive to the presence of polyethylene glycols of molecular weight greater than 600.

PURIFICATION OF N-HIGHER FATTY ACID AMIDES OF LOWER MONOAMINOCARBOXYLIC ACIDS. M. B. Epstein (Colgate-Palmolive Co.). *U.S. 2,881,193.* Higher fatty acids and alkali metal soaps are removed from the corresponding N-fatty amide by acidification of an aqueous solution of the impure amide to a pH at which the amide is present as a water-soluble salt and the fatty acid is separated.

POLYAMIDE RESIN PROCESS AND PRODUCT. D. E. Peerman and D. E. Floyd (General Mills, Inc.). *U.S. 2,881,194.* A process is described for the preparation of a polyamide resin from polymeric fatty acids and a polyamine.

ALKYLENE BIS-STEARAMIDE-SYNTHETIC RUBBER COATING COMPOSITION. G. A. Clark and H. W. Raisch, Jr. (American Can Co.). *U.S. 2,884,392.* A coating for the interior of cans to prevent adhesion of meat is prepared from 25 to 75% by wt. of an alkylene bis-stearamide synthetic wax and 75 to 25% of a synthetic rubber.

FATTY ALCOHOLS. F. F. A. Branconier and H. Le Bihan (Société belge de l'azote et des produits chemiques du Marly, S.A.). *Brit. 795,388.* See *U.S. 2,844,633.* (*C.A.* 53, 7011)

FATTY ACID ESTERS OF OLIGOSACCHARIDES. Thomas Hedley & Co., Ltd. *Brit. 804,197.* The fatty acid esters of nonreducing oligosaccharides such as sucrose, trehalose, glucoxylose, raffinose, melezitose, gentianose, and stachyose, are prepared by interesterification with the ester of a primary monohydric alcohol of 1–16 carbon atoms, or of a polyhydroxy compound, such as ethylene glycol, glycerol, erythritol, pentaerythritol, mannitol, and sorbitol. The reaction is carried out in the presence of an interesterification catalyst at 20–150° and in the presence of a cyclic amide, such as a substituted morpholine or piperidine. (*C.A.* 53, 6657)

CHLORINATED FATTY ACIDS. B. Blaser and H. Wedell (Henkel & Cie. G.m.b.H.). *Ger. 961,531.* Unsaturated fatty acids containing 8–25 carbon atoms and their chlorides or esters are treated with hydrochloric acid at an elevated pressure, preferably in the absence of solvents, to give the title compounds, which are useful as intermediates. (*C.A.* 53, 6657)

# • Biology and Nutrition

THE PROTEIN COMPONENT OF THE LIPOPROTEINS. Anna Eperjessy, A. Kiss, and J. Csegedi (Acad. R.P.R., Marosvásárhely, Romania). *Orvosi Szemle (Marosvásárhely)* 6, 224–7 (1958). *Rev. Med.* (Tg.-Mures) 6, 224–8 (1958). The hydrolyzate composition of the protein components of the lipoproteins of various organs showed a difference in the qualitative composition of amino acids and in their number. It is hypothesized that the qualitative composition of the protein part of the lipoprotein essentially affects the influence exerted by the lipide part on biological oxidation. (*C.A.* 53, 6310)

THE ROLE OF THE LUNG IN FAT METABOLISM IN HUMANS. D. Michel, K. H. Schultz, and O. Hartleb (Univ. Leipzig, Ger.). *Arztl. Wochschr.* 13, 853–9 (1958). Total lipides, total cholesterol, and free- and esterified cholesterol were determined in venous and arterial blood of 42 normal subjects and 29 patients given high-fat diets. All the measured substances decreased in concentration in passing through the lungs. This was most notable in the group given the high-fat diets. The decrease in concentration was greater in men than in women, especially for total cholesterol. Differences in metabolism of normal subjects and those on the special diets are most pronounced for total lipides and esterified cholesterol. The rate of metabolism of free-cholesterol probably depends on the age of the subject. (*C.A.* 53, 6384)

THE EFFECT OF HIGH-FAT DIET ON THE INTESTINAL ABSORPTION OF CALCIUM. Hisako Kubota (Tokyo Women's Med. Coll.). *Tokyo Joshi Ikadaigaku Zasshi* 26, 561–2 (1956). The effect of high-fat diet on rat intestinal absorption of $Ca^{45}$ was studied. $Ca^{45}Cl_2$ was given orally to rats. The total incorporation of $Ca^{45}$ into kidney, liver, heart, spleen, lung, blood, muscle, and bone was 30.9% in high-fat diet, and 22.0% in normal diet. The results showed that turnover rate increased in high-fat diet. (*C.A.* 53, 5436)

LOWERING BLOOD LIPIDE LEVELS BY CHANGING FOOD PATTERNS. Helen B. Brown and I. H. Page (Cleveland Clinic Foundation, Cleveland, O.). *J. Am. Med. Assoc.* 168, 1989–95 (1958). On a diet in which the principal source of fat was a mixture of cottonseed oil 94, monostearin 1.5, distearin 1.5, and tristearin 3%, the serum-cholesterol levels were reduced in normal and many hypercholesterolic people. The level was less variable than that of people on a low-fat diet. (*C.A.* 53, 5431)

SERUM TRIGLYCERIDES IN CORONARY ARTERIAL DISEASE. Margaret J. Albrink and Evelyn B. Man (Yale Univ.). *A. M. A. Arch. Internal Med.* 103, 4–8 (1959). There was a significant increase in the serum triglycerides in patients with coronary arterial disease. An error in the metabolism of triglycerides may be the lipide abnormality operative in this disease. (*C.A.* 53, 7369)

THE REGULATION OF FATTY ACID BIOSYNTHESIS BY LIPOGENIN. G. N. Catravas and H. S. Anker (Univ. of Chicago). *Proc.*

*Natl. Acad. Sci. U.S.* **44**, 1097–9 (1958). The injection of lipogenin into fasted rats results in a drop in blood sugar concentration and an increase (measured by determining the *in vitro* incorporation of labeled acetate into liver fatty acids) in lipogenesis. The administration of lipogenin to fed animals does not have these effects. It is suggested that lipogenin is one of the means of regulation of fatty acid biosynthesis in mamalian organisms. (*C.A.* **53**, 7358)

SERUM CHOLESTEROL OF MALE AND FEMALE CHAMPION SKIERS. M. J. Karvonen, Y. Rautanen, P. Rikkonen, and Jaakko Kihlberg (Inst. Occupational Health, Työsterveyslaitos, Finland). *Ann. Med. Internae Fenniae* **47**, 75–82 (1958) (in English). Mean blood-serum-cholesterol levels of 44 male (age 20–39) and 15 female (age 20–9) skiers were 204 ± 5.4 and 194 ± 8.1 mg./100 ml., respectively. These levels are significantly lower than those in the Finnish rural population of the same age. Mean blood-serum-cholesterol levels did not rise significantly with age. Participation in skiing races did not cause any uniform change in mean blood-serum-cholesterol levels. (*C.A.* **53**, 7357)

SUPPLY AND DIETARY USE OF FATS. H. M. Sinclair. *Lancet* **1959-I**, 252–4. It was concluded that the evidence indicates that abnormally raised serum cholesterol could be lowered by reducing the dietary ratio of saturated to unsaturated fat, and that the structure of the fat is relevant, rather than the mere number of double bonds, so that we are justified in speaking of essential fatty acids (or vitamin F). There is no proof that the lowering serum cholesterol decreases atherosclerosis, but there is circumstantial evidence that lowering is desirable and that the adverse dietary ratio is the most important single factor in the rise of atherosclerosis. (*C.A.* **53**, 7349)

DIETARY FAT AND HYPERCHOLESTEROLEMIA IN THE CEBUS MONKEY. III. SERUM POLYUNSATURATED FATTY ACIDS. O. W. Portman, Karoly Pinter, and Takuya Hayashida (Harvard School of Public Health, Boston, Mass.). *Am. J. Clin. Nutrition* **7**, 63–9 (1959). When cholesterol was included in the diet of the *Cebus* monkey the polyunsaturated acid content of serum was reduced. The level of polyunsaturated fatty acids in the diet influenced the level of polyunsaturated fatty acids esterified with cholesterol in serum. A fat-free diet fed to *Cebus* monkeys gave rise to hair and skin changes. The polyunsaturated fatty acid levels in total serum lipides and in the serum cholesterol ester fractions of these monkeys was depressed. The dienoic acids were the principal groups affected. (*C.A.* **53**, 7338)

EFFECT OF MIXED FAT FORMULA FEEDING ON SERUM CHOLESTEROL LEVEL IN MAN. S. A. Hashim, R. E. Clancy, D. M. Hegsted, and F. J. Stare (Harvard School of Public Health, Boston, Mass.). *Am. J. Clin. Nutrition* **7**, 30–4 (1959). Serum cholesterol was decreased in ten patients with hypercholesterolemia by the feeding of safflower oil, or a mixture of safflower and coconut oils. The mixture effect was noted whether it was fed before the safflower or later. These results are incompatible with the hypothesis that the serum-cholesterol-lowering effect is proportional to the iodine number or the linoleic acid content of the fat, or that saturated fats counteract the effect of polyunsaturated fats. (*C.A.* **53**, 7338)

INTERRELATIONS BETWEEN THE KIND AND AMOUNT OF DIETARY FAT AND DIETARY CHOLESTEROL IN EXPERIMENTAL HYPERCHOLESTEROLEMIA. D. M. Hegsted, Anna Gotsis, F. J. Stare, and Jane Worcester (Harvard Med. School, Boston, Mass.). *Am. J. Clin. Nutrition* **7**, 5–12 (1959). Olive oil, coconut oil, corn oil, safflower oil, and a mixture of coconut and safflower oils were fed at levels of 5, 10, and 20% to 30 groups of 2 adult male rats each, at levels of 0.45% and 1.35% cholesterol in the diet. Regression equations relating the amount of fatty acid in the diet to the serum-cholesterol level were calculated. The coefficient for the monounsaturated acid was positive; for saturated and polyunsaturated acids it was negative. The equation suggested that the monounsaturated acid raised serum cholesterol level, while the other 2 reduced it, with the saturated acids being about ¼ as active as the polyunsaturated acid. (*C.A.* **53**, 7338)

PLATELET PHOSPHATIDES: THEIR SEPARATION, IDENTIFICATION, AND CLOTTING ACTIVITY. A. J. Marcus and T. H. Spaet (Montefiore Hosp., New York, N. Y.). *J. Clin. Invest.* **37**, 1836–47 (1958). Crude phospholipide extracts of human blood platelets were subjected to paper and column chromatography on silicic acid. The components resolved were phosphatidyl ethanolamine, phosphatidyl serine, lecithin, sphingomyelin, and inositol phosphatide. Phosphatidyl serine obtained by column chromatography could replace platelets in thromboplastin generation and prothrombin consumption reactions. An unidentified fraction showed thromboplastic activity. The role of phosphatidyl ethanolamine could not be clarified. Lecithin or sphingomyelin were inactive. High concentrations of the various phosphatides appear to act as anticoagulants. 86 references. (*C.A.* **53**, 6391)

A METHOD FOR INCORPORATING CHOLESTEROL AND OTHER LIPIDES INTO SERUM LIPOPROTEINS IN VITRO. J. Avigan (Natl. Heart Inst., Natl. Insts. of Health, Bethesda 14, Md.). *J. Biol. Chem.* **234**, 787–90 (1959). Cholesterol dispersed on Celite dissolves in the presence of whole human or rat serum and of isolated serum lipoproteins. Most of the cholesterol dissolved by serum is associated with lipoprotein fractions. Similarly to cholesterol, some other lipides can be solubilized in serum, or serum lipoproteins. Cholesterol incorporated into serum lipoprotein by the present method behaves, when administered intravenously, more like cholesterol incorporated biosynthetically than does labeled cholesterol in the form of a suspension. It is suggested that the procedure may serve as a convenient and useful method for labeling or modifying lipoproteins.

BODY FAT AND BLOOD PRESSURE OF NATIVES IN NEW GUINEA: REFLECTIONS ON ESSENTIAL HYPERTENSIONS. H. M. Whyte (Sydney Hosp.). *Australasian Ann. Med.* **7**, 36–46 (1958). Natives who are known to eat little protein and fat were examined in the highlands (221 males, 169 females), where salt is scarce, and on the coast (146 males, 87 females). There was no apparent relation between blood pressure and relative body weight or obesity when allowance was made for errors due to arm circumference. Coastal natives, whose appetite for salt is satisfied, did not have a higher blood pressure than the highlanders, who crave salt. Results are interpreted to mean that natives are physically as bulky as Europeans (allowing for the difference in height); that the influence of sex and aging of elastic arteries affect both races alike; but that natives lack, while Europeans acquire, the complaint of muscular arteries which is sometimes called essential hypertension. (*C.A.* **53**, 5445)

SERUM CHOLESTEROL AND LIPOPROTEINS IN NATIVES OF NEW GUINEA AND AUSTRALIANS. M. S. DeWolfe and H. M. Whyte (Sydney Hosp.). *Ibid.* 47–54 (1958). Measurements of total serum cholesterol were made in Autralians and in natives living in the central highlands of New Guinea (Wabag and Chimbu) and on the coast. The total cholesterol level in natives was lower than that of Australians. Unlike Australians, the natives showed no upward trend in cholesterol level with age, and the value was lower in males (in Wabag) than in females. Paper electrophoresis of serum from males 20 to 40 years of age showed that the β-lipoproteins accounted for 78% of the total cholesterol in Australians, 80% in Chimbus, and 86% in coastal natives. The percentage tended to increase with the total cholesterol level in Australians but to remain constant, regardless of total level, in the natives. A group of employed natives who had been eating extra food (18% of calories from fat) for 1–2 years had the same average total serum cholesterol concentration and lipoprotein distribution as the ordinary village natives. (*C.A.* **53**, 5445)

BIOLCGICAL VALUE OF HEATED OILS. A. Dangoumau, Dr. Boussagol, and H. Debruyne (Inst. des Corps Gras). *Rev. Franç. Corps Gras.* **5**, 613–30 (1958). Corn, cottonseed and peanut oils were oxidized for 24 hours at 200° with aeration, according to the procedure of Johnson and Kummerow. Acid values and viscosities of the oils increased and iodine values decreased. Extinction coefficients of the oils at 270 and 234 mμ increased due to the formation of unsaturated carbonyl compounds and diene conjugation. The oxidized oils were fed at the 20% level in a completely synthetic diet containing all water and lipid soluble vitamins; the rats were also allowed to ingest filter paper cellulose. Male rats fed thermally oxidized peanut oil for 60 weeks showed growth depression, but female rats fed under the same conditions showed little depression. Identical results were obtained when male and female rats were fed thermally oxidized cottonseed oil for 20 weeks. When both male and female rats were fed oxidized corn oil for 20 weeks, no growth depression was observed. No serious pathological changes were noted. A study of the influence of temperature on peroxide formation indicated that peroxide increased during oxidation up to 150° and then decreased sharply. At 200° the peroxide value was 30% of that at 150° and negligible at 290°.

LIVER COCARBOXYLASE DURING A LOW-FAT DIET. P. Scarpa (Univ. Padua, Italy) and S. Volpato. *Acta Paediat. Latina* **11**, 205–8 (1958). In rats fed a normal diet for 28–74 days, or a low-fat containing one for 28–30 or 36–69 days, the liver cocarboxylase concentration averaged 9.98 ± 1.61, 8.61 ± 0.25,

and 14.26 ± 3.52, respectively. Liver pyruvic acid (micromoles/100 mg. fresh tissue) was, respectively, 173 ± 74, 184 ± 53 (35–36 days' diet), and 55 ± 23 (60–74 days' diet). The above changes are interpreted as an index of a more intense production of acetylcoenzyme A, used for both a compensatory synthesis of fats and energy purposes in the Krebs cycle. (*C.A.* **53**, 4461)

BEHAVIOR OF LIPASE AND LIVER FAT IN RATS FED A LOW-FAT DIET. S. Volpato (Univ. Padua, Italy) and Laura Bottacin. *Acta Paediat. Latina* **11**, 209–12 (1958). In experiments like those of preceding abstract (feeding of a low fat diet for 60–67 and 74–80 days) liver lipase (in millimoles tributyrin hydrolyzed in 60 minutes by 100 mg. dry tissue) averaged 37.6 ± 4.5, 38.6 ± 10.0, and 27.4 ± 1.9, respectively, and liver fat (mg. %) 3.50 ± 0.47, 4.12 ± 0.09, and 5.44 ± 0.71, respectively. (*C.A.* **53**, 4461)

USE OF DIETS CONTAINING LARGE AMOUNTS OF LINOLEIC ACID. Florence E. Olson, S. Splitter, H. Balch, P. F. Flynn, and L. W. Kinsell (Highland-Alameda County Hosp., Oakland, Calif.). *Am. J. Clin. Nutrition* **6**, 632–34 (1958). Diets containing 2,000 calories are listed by groups which supply no animal fat, or some meat, ham, and eggs, and with fish, fowl, and liver. (*C.A.* **53**, 3403)

BEHAVIOR OF COENZYME A IN RATS FED A LOW-FAT-CONTAINING DIET. S. Volpato (Univ. Padua, Italy). *Acta Paediat. Latina* **11**, 317–21 (1958). In rats fed either a normal diet for 32–65 days or a low-fat-containing one for 28–65 days, liver coenzyme A averaged 123.6 ± 7.9 and 144.5 ± 16.9, respectively. This increase was interpreted as a sign of the higher metabolic work required for demolishing carbohydrates and synthesizing lipides. (*C.A.* **53**, 3407)

BEHAVIOR OF TOTAL AND FRACTIONATED SERUM LIPIDES IN RATS FED A LOW-FAT-CONTAINING DIET. K. Gaburro (Univ. Padua, Italy) and S. Volpato. *Ibid.*, 322–9. In experiments like those of preceding abstract (feeding for 50–77 days) total lipides, triglycerides, phospholipides, and total cholesterol (all in mg./100 cc.) averaged on the normal diet 454.3 ± 47.5, 299.9 ± 58.0, 106.3 ± 15.6, and 48.2 ± 7.8, and on the low fat diet 727.5 ± 80.4, 577.2 ± 65.3, 81.3 ± 40.4, and 68.9 ± 18.8, respectively. (*C.A.* **53**, 3407)

ISOLATION OF CAROTENOIDS, COUMESTROL, CHLOROGENIC ACID, AND ANTIBIOTICS. APPLICATION OF COUNTERCURRENT DISTRIBUTION. C. R. Thompson, A. L. Curl, and E. M. Bickoff (Western Regional Research Lab., Albany 10, Calif.). *Anal. Chem.* **31**, 838–41 (1959). Various biologically active materials are isolated from their natural sources by countercurrent distribution technique. The isolated compounds include carotenoids, coumestrol, chlorogenic acid, and antibiotics.

FAT METABOLISM IN HIGHER PLANTS. XI. THE CONVERSION OF FAT INTO CARBOHYDRATE IN PEANUT AND SUNFLOWER SEEDLINGS. C. Bardbeer and P. K. Stumpf (Department of Agricultural Biochemistry, Univ. of California, Davis, Calif.). *J. Biol. Chem.* **234**, 498–501 (1959). Carbon-14 from both acetate-1- and-2-$C^{14}$ was rapidly incorporated into free sugars and intermediates of the tricarboxylic acid cycle by excised cotyledons from etiolated peanut and sunflower seedlings. The observed distributions of the carbon-14 within malic acid and the glucose moiety of sucrose are consistent with the operation of the glyoxylate cycle in the conversion of fat into carbohydrate in these tissues.

TURNOVER OF CHOLESTEROL IN THE ARTERY WALLS OF NORMAL CHICKENS. S. Dayton (Department of Medicine, University of California, Los Angeles, Calif.). *Circulation Research* **7**, 468–75 (1959). Studies of cholesterol metabolism in the walls of arteries of normal intact cockerels indicate that plasma cholesterol is the major precursor of the cholesterol in the artery wall, but that local synthesis may contribute a significant fraction. The fractional turnover of cholesterol in the wall of the abdominal aorta is faster than in either the thoracic aorta or the brachiocephalic arteries. However, considered in relation to endothelial surface area, the rate of cholesterol transfer from plasma is smallest in the abdominal aorta. The abdominal aorta also has a lower cholesterol concentration in this species than do the other large arteries.

INTERMITTENT FEEDING OF VITAMIN A TO CHICKENS. W. H. Hastings, P. E. Sanford, and C. R. Creger (Kansas State College, Manhattan, Kansas). *Poultry Sci.* **38**, 385–9 (1959). Intermittent feeding of vitamin A, as compared with feeding the nutrient continuously, resulted in no significant difference in chick growth. Growth was significantly better in lots receiving chemical vitamin A material than in those lots receiving dehydrated alfalfa meal. Feed conversion, in general, was better with continuous vitamin A feeding. More vitamin A-containing feed was consumed than the basal ration even though each was offered for the same length of time.

EFFECT OF VITAMIN D, SUCROSE, CORN OIL, AND ENDOCRINES ON TISSUE CHOLESTEROL IN RATS. C. C. Lee and R. G. Herrmann (Lilly Res. Labs., Eli Lilly and Co., Indianapolis, Ind.). *Circulation Research* **7**, 354–9 (1959). A diet containing 65% sucrose with added cholesterol resulted in hypercholesteremia and increased tissue cholesterol deposition in rats. Ten per cent corn oil with added cholesterol in Purina laboratory chow had no apparent effect on the serum total cholesterol but increased cholesterol deposition in tissues. Ovariectomy was without significant effect. Thyroidectomy or hypophysectomy aggravated the hypercholesteremia and the increased tissue cholesterol deposition induced by the sucrose diet. The effect of hypophysectomy was not due to the loss of thyrotrophic hormone alone. Addition of vitamin D aggravated hypercholesteremia and increased liver cholesterol deposition in normal, thyroidectomized or hypophysectomized rats fed the sucrose diet. In ovariectomized rats, the tissue cholesterol deposition was also augmented. When corn oil diet was fed, the supplementary vitamin D increased the serum total cholesterol level of the thyroidectomized rat.

RAPID PAPER CHROMATOGRAPHIC MICROASSAY OF FREE AND ESTER CHOLESTEROL OF BLOOD. M. L. Quaife (Harvard School of Public Health, Boston, Mass.), R. P. Geyer, and H. R. Bolliger. *Anal. Chem.* **31**, 950–55 (1959). A simple and rapid quantitative paper chromatographic method is devised for determining free and ester cholesterol in blood serum. The sample is applied to Whatman No. 1 filter paper impregnated with zinc carbonate, and chromatographed with 1.5% ethyl ether in cyclohexane.

SATURATED AND UNSATURATED FATS. EFFECTS ON CHOLESTEROLEMIA AND ATHEROGENESIS IN CHICKS ON HIGH-CHOLESTEROL DIETS. J. Stamler, R. Pick, and L. N. Katz (Medical Res. Inst., Michael Reese Hospital, Chicago, Ill.). *Circulation Research* **7**, 398–402 (1959). The effects of supplementary oils—saturated and unsaturated—were examined in groups of cholesterol-fed cockerels. Unsaturated oils failed to suppress hypercholesterolemia and atherogenesis. When various oils and fats high in oleic acid were added to the mash, slight lowering of serum cholesterol occurred. Oleic acid *per se* given to a group was accompanied by a diminution in atherosclerosis.

EFFECT OF SATURATED AND UNSATURATED FATS ON THE CONCENTRATION OF SERUM CHOLESTEROL AND EXPERIMENTAL ATHEROSCLEROSIS. A. Steiner, A. Varsos, and P. Samuel (Goldwater Memorial Hospital and the Department of Medicine, Columbia University, New York, N. Y.). *Circulation Research* **7**, 448–53 (1959). The feeding of a diet rich in unsaturated fats to rabbits produced no significant alteration of the serum cholesterol level, while the feeding of a diet rich in saturated fats produced an elevation of the serum cholesterol without the development of experimental atherosclerosis. The addition of unsaturated fats to a diet rich in cholesterol failed to prevent hypercholesterolemia and experimental atherosclerosis in rabbits.

THE BIOSYNTHESIS OF LYCOPENE IN TOMATO HOMOGENATES. Elie Shneour and I. Zabin (Dept. of Physiological Chemistry, Univ. of California, Los Angeles, Calif.). *J. Biol. Chem.* **234**, 770–73 (1959). The preparation of homogenates of tomatoes which can synthesize radioactive lycopene from 2-$C^{14}$-mevalonic acid is described. For optimal incorporation of tracer, ATP, pyridine nucleotides, glutathione, manganese ion, and incubation in air are necessary.

THE NATURE OF THE PROTEINS ASSOCIATED WITH DOG AND HUMAN CHYLOMICRONS. M. Rodbell and D. S. Fredrickson (Lab. of Cellular Physiology and Metabolism, N.I.H., United States Public Health Service, Bethesda, Maryland). *J. Biol. Chem.* **234**, 562–6 (1959). It has been found that three proteins are associated with both dog and human chylomicrons. In both species, one of these proteins has been shown to have the same N-terminal amino acid, paper electrophoretic mobility, and "fingerprint" pattern as does the major protein found in the density 1.063 to 1.21 plasma lipoproteins. Another protein associated with the chylomicrons has been described which is probably identical to a protein found throughout the density spectrum of human plasma lipoproteins. It is suggested from the results that these proteins may play a fundamental role in the transport and metabolism of exogenous triglycerides.

METABOLISM OF CHYLOMICRON PROTEINS IN THE DOG. M. Rodbell, D. S. Frederickson, and K. Ono. *Ibid.*, 567–71 (1959). The finding that intestinal mucosal cells incorporated amino

acids into proteins having the same electrophoretic mobility as the chylomicron A and B proteins indicated that the intestine was a possible source of the proteins of chylomicrons as well as the protein in the high density lipoprotein fraction. During the disappearance from the plasma of chylomicrons containing labeled proteins, there was an immediate appearance of radioactivity in the high density lipoproteins suggesting a rapid equilibration of the A protein with this fraction. The behavior of the labeled B protein suggested that it disappeared with the chylomicrons and reappeared in the plasma in a small pool of soluble lipoprotein.

CONVERSION OF CAROTENOIDS TO OXYCAROTENOIDS BY MYCOBACTERIUM PHLEI. H. G. Schlegel (Dept. Microbiology, School of Medicine, Western Reserve Univ., Cleveland, O.). *J. Bacteriol.* **77**, 310–16 (1959). The principal carotenoid in this strain of *M. phlei* was myxoxanthophyll. Interconversions of carotenoids were studied and are discussed in terms of hypotheses of carotenogenesis.

STUDIES ON THE UTILIZATION OF $C^{14}$-LABELED OCTADECENOIC ACIDS BY LACTOBACILLUS ARABINOSUS. W. M. O'LEARY (Div. Biol. & Med. Research, Argonne Natl. Lab., Lemont, Ill.). *J. Bacteriol.* **77**, 367–73 ( 1959). *Lactobacillus arabinosus* was grown on media containing *cis*-vaccenic-1-$C^{14}$ or oleic-1-$C^{14}$ in lieu of biotin. Most of the fatty acid removed from the medium was incorporated into cellular lipides of octadecenoic and lactobacillic acids. The significances of these observations to biotin-fatty acid interrelationships and mechanisms of fatty acid biosynthesis are discussed.

EFFECT OF IRRADIATED FATTY ACIDS ON THE GROWTH OF ESCHERICHIA COLI. E. F. Stillwell, S. P. Maroney, Jr., and K. M. Wilbur Dept. Zoology, Duke Univ., Durham, N. Carolina). *J. Bacteriol.* **77**, 510-11 (1959). Methyl linoleate and linolenate were partially oxidized by ultraviolet irradiation and added as solutions in bovine serum albumin to cultures of *E. coli*. The irradiated compounds inhibited growth to a greater degree than did the unoxidized (unirradiated) material. The free acids were somewhat more inhibitory than their esters.

FACTORS INFLUENCING THE FREE ACIDITY OF THE FAT OF PENICILLIUM SPINULOSUM IN SURFACE CULTURES. I. R. Shimi (Botany Dept., Ain Shams Univ., Cairo, Egypt). *J. Sci. Food Agr.* **10**, 244–8 (1959). The influence of the following factors on the free acidity of the fat of *P. spinulosum* were studied: sterilization procedure, initial pH of the medium, buffering of the medium with calcium carbonate, concentration of glycerol and glucose in the medium, and addition of sodium sulfite.

LECITHINASE AND LYSOLECITHINASE OF INTESTINAL MUCOSA. B. Epstein and B. Shapiro (Hebrew Univ.-Hadassah Med. School, Jerusalem, Israel). *Biochem. J.* **71**, 615–19 (1959). The isolation and properties of a particulate enzyme system from the mucosa of rat intestines is described. This system hydrolyzes lecithin and lysolecithin into glycerylphosphorylcholine and fatty acids.

PROPERTIES AND SPECIFICITY OF PANCREATIC PHOSPHOLIPASE A. A. Rimon and B. Shapiro (Hebrew Univ.-Hadassah Med. School, Jerusalem, Israel). *Biochem. J.*, **71**, 620–3 (1959). The preparation and properties of phospholipase A from aged ox pancreas are described. No activity could be demonstrated in fresh ox pancreas.

THE TRANSPORT OF CAROTENOIDS, VITAMIN A, AND CHOLESTEROL ACROSS THE INTESTINES OF RATS AND CHICKENS. J. Ganguly, S. Krishnamurthy, and S. Mahadevan (Indian Institute of Science, Bangalore-3, India). *Biochem. J.* **71**, 756–62 (1959). Chickens kept on a low-carotenoid diet and normal adult rats were fasted 24 hr., dosed with oily solutions of vitamin A alcohol, its acetate or palmitate, free cholesterol, its acetate or palmitate, $\beta$-carotene, lycopene or lutein, and sacrificed 1 to 3 hr. later. Vitamin A was found mostly as ester in both the intestinal muscles and in the mucosal cells; this ester was recovered almost completely from the supernatant fraction of the cell homogenate. Cholesterol was found predominantly as the free compound in both the intestinal muscle and mucosal cells; most of this was in the microsomal fraction of the mucosal cells. Except for lutein in chickens, all carotenoids were found only in traces in intestinal muscles or mucosa. The role of stereospecific binding by lipoproteins in the absorption, transport and storage of the carotenoids is discussed with special reference to species differences in the selective absorption of different carotenoids.

SITE OF FATTY ACID ABSORPTION. J. M. Johnston (Dept. Biochem., Univ. Texas, Southwestern Med. School, Dallas). *Proc. Soc. Exptl. Biol. Med.* **100**, 669–70 (1959). In an *in vitro* sac preparation from the hamster intestine, fatty acid absorption, resulting in serosal triglyceride, took place primarily in the upper jejunum.

UTILIZATION OF SERUM LIPIDS BY CULTURED MAMMALIAN CELLS. J. M. Bailey, G. O. Gey, and Margaret K. Gey (Johns Hopkins Med. School, Baltimore, Md.). *Proc. Soc. Exptl. Biol. Med.* **100**, 686–92 (1959). The uptake of serum lipids by cultures of various mammalian cells were determined. The preferential utilization of triglycerides was noted in five cell strains. In the MB III strain of mouse lymphoblasts saturated and unsaturated lipids were utilized equally readily and there was little breakdown of lipid to satisfy energy requirements. There was considerable conversion of triglycerides to phospholipid following absorption. Cholesterol uptake was a general phenomenon. Cholesterol contents of the cells were related to the type of serum in the medium. Mechanisms are discussed.

ANTICOAGULANT ACTIVITY OF PHOSPHATIDYLSERINE FREE OF LYSOPHOSPHATIDYLSERINE. M. J. Silver, D. L. Turner, R. R. Holburn, and L. M. Tocantins (Jefferson Med. Coll., Philadelphia, Pa.). *Proc. Soc. Exptl. Biol. Med.* **100**, 692–5 (1959). Serine phosphatide fractions free of lysophosphatidylserine were prepared from brain. The strong anticoagulant activity of this preparation is ascribed to a naturally occurring serine phosphatide in the diester form which apparently blocks the formation of plasma thromboplastin as well as neutralizes any preformed thromboplastin.

EFFECTS OF CROTON OIL ON SUGAR ABSORPTION BY ISOLATED SURVIVING GUINEA PIG INTESTINE. J. P. DuRuisseau and J. H. Quastel (McGill-Montreal General Hospital Research Inst., Montreal, Canada). *Proc. Soc. Exptl. Biol. Med.* **100**, 711–17 (1959). Croton oil inhibited glucose absorption by isolated guinea pig intestine preparations. Castor oil had a much smaller activity than croton oil. Cod liver oil and olive oil had little or no effect on glucose absorption. On the basis of the effects of adding amino acids to the media, it is concluded that the croton oil action may be mediated through some phase of intestinal amino acid metabolism.

SERUM LIPID, LIPOPROTEIN, AND VASCULAR TISSUE STUDIES IN CHOLESTERAL-FED HORSE. L. N. Norcia, W. Joel, and R. H. Furman (Univ. Oklahoma Med. Center, Oklahoma City). *Proc. Soc. Exptl. Biol. Med.* **100**, 759–61 (1959). A diet containing 1.7 to 2% cholesterol did not alter serum lipid or lipoprotein levels when fed to a gelded horse for 3 months. When cholesterol supplementation was discontinued there was a small but significant increase in serum total and free cholesterol, lipid phosphorus, C/P ratio and high density (alpha) lipoprotein which persisted until sacrifice 3 months later. Fecal lipid analyses indicated net cholesterol absorption in excess of 70%. Liver and aortic lipid analyses and histologic examination of myocardium, coronary arteries, and aorta revealed no remarkable changes.

ASYMMETRIC INCORPORATION OF LINOLEIC ACID-1-$C^{14}$ AND STEARIC ACID-1-$C^{14}$ INTO HUMAN LYMPH LECITHINS DURING FAT ABSORPTION. R. Blomstrand, O. Dahlback, and E. Linder (Univ. Lund, Sweden). *Proc. Soc. Exptl. Biol. Med.* **100**, 768–71 (1959). Carboxyl-labelled linoleic and stearic acids were fed as free acids or triglycerides to patients provided with thoracic duct fistula. Linoleic acid was transported and incorporated into lymph lipids in the same manner as oleic and palmitic acids. Chyle triglycerides constituted the main transport form of oleic, palmitic, stearic, and linoleic acids. When linoleic acid was fed only about 4% of the total lymph radioactivity was in the phospholipids as compared to 20% when stearic acid was fed. After feeding linoleic acid-1-$C^{14}$ about 75% of the label in the lymph lecithins was in the alpha-position; with stearic about 80% of the label was in the beta-position.

ABSORPTION OF CHIMYL ALCOHOL IN MAN. R. Blomstrand and E. H. Ahrens, Jr. (Univ. of Lund, Sweden and Rockefeller Inst., N. Y. City). *Proc. Soc. Exptl. Biol. Med.* **100**, 802–5 (1959). Results of feeding labelled chimyl alcohol to a patient with chyluria indicated that the alcohol was almost completely absorbed and that rupture of the ether linkage occurred in the intestinal mucosa. The liberated palmitic alcohol moiety was readily oxidized to palmitic acid.

## • Paints and Drying Oils

SOYBEAN CHEMURGIC COATINGS. M. F. Taggart (O'Brien Corp., South Bend, Ind.). *Soybean Digest* **19**(7), 16–17 (1959). The history of developments in the use of soybean oil in paints is reviewed briefly.

ALKYD RESIN MANUFACTURE WITH ISOPHTHALIC ACID. R. F. Carmody (Socony Mobil Oil Co.). *U.S. 2,884,390.* An oil-modified alkyd resin is prepared by first reacting a vegetable oil with isophthalic acid at a temperature between 450° and 575°F., cooling the mixture to about 100° to 475°F., adding a saturated aliphatic polyhydric alcohol and completing the reaction at a temperature between 400° and 500°F.

# • Detergents

CONTINUOUS SOAP PROCESSING. Anon. *Soap Chem. Specialties* 35(2), 133, 135, 137–8 (1959). The Monsavon, DeLaval, and Sharples continuous soap processes are described and comparisons made as to characteristics of glycerine lyes obtained by the different processes and the energy consumed by each process.

HIGH OUTPUT SULFONATION UNIT. Anon. *Soap Chem. Specialties.* 35(4), 131, 133, 135 (1959). Rapid production of high quality detergent intermediates in a small space is now possible with a new type continuous sulfonation unit-Chemithon. Continuous sulfonation of detergent alkylate (alkyl benzene) with oleum in such a unit, involves three basic steps: sulfonation, dilution, and separation of excess acid, and neutralization of the concentrated sulfonic acid.

A STUDY ON MICELLE FORMATION IN COLLOIDAL ELECTROLYTE SOLUTIONS. C. Botre, V. L. Crescenze, and A. Mele (Istituto di Chimica Farmaceutica, Roma, Italy). *J. Phys. Chem.* 63, 650–3 (1959). Membrane electrodes of both negative and positive type have been used to determine the activity of counterions in aqueous solutions of cationic and anionic detergents. The method has been found to be a useful tool to determine the critical concentration for micelle formation. An evaluation of the degree of association between micelles and counterions from the experimental activity coefficients has indicated that the strong electrostatic field of the charged micelles tends to bind a large fraction of counterions. A simple treatment of soap micelles as polymeric electrolytes has been considered.

NEW PETROCHEMICAL INTERMEDIATES FOR DETERGENTS. G. E. Hinds. *Petrochem. Ind.* 2, 7–9 (1959). The "Alfol" process consists of treating Al, H, and $C_2H_4$ to produce Al triethyl. The addition of further $C_2H_4$ produces higher-molecular trialkyl Al. Oxidation with air and subsequent hydrolysis produces fatty acids containing 6-18 C atoms. End uses of these materials are discussed. (*C.A.* 53, 7630)

THE DETERMINATION OF ALKYL ARYL SULFONATES BY ULTRAVIOLET ABSORPTION. R. M. Kelley, E. W. Blank, and R. Fine (Colgate-Palmolive Co., Jersey City, N. J.) and W. E. Thompson. *ASTM Bull. No.* 237, TP 90–3 (1959). A method for the determination of alkyl aryl sulfonates by ultraviolet absorption is described. Dishwashing compounds, liquid detergents, and all types of industrial specialty detergents have been analyzed using this method. Various other types of detergents do show absorption in the same ultraviolet region so must be removed before this technique can be applied. 14 references.

ANALYSIS OF COMMERCIAL SODIUM TRIPOLYPHOSPHATE BY REVERSE FLOW ION EXCHANGE CHROMATOGRAPHY. R. H. Kolloff (Monsanto Chem. Co., St. Louis, Mo.). *ASTM Bull. No.* 237, TP 94–100 (1959). The ion exchange chromatographic method presented in this paper utilizes studies previously published and employs a continuous gradient pressurized, "upflow" elution. The pressurized, reverse flow pattern works to prevent channeling and eliminates eluant convection currents in the resin bed. This is the key to complete recovery of each species of phosphate. 18 references.

ANIONIC SURFACTANTS IN TOILETRIES AND PERSONAL PRODUCTS. J. M. Longfellow (Colgate-Palmolive Co., Jersey City, N. J.). *Soap Chem. Specialties* 35(2), 53–6, 101–3; (3), 60–3 (1959). The special requirements for surfactants used in cosmetics and toiletries are reviewed. These include such esthetic properties as color, odor and taste, and the very important factor of toxicity—dermal, eye, oral, and inhalation. The amounts of surfactants used in shampoos (where they form the primary functional ingredient), in toothpastes (where they are a minor ingredient of great importance), and in toilet soaps are given. 46 references.

ANTIREDEPOSITION PROPERTIES OF DIFFERENT WASHING AGENTS AND OF THEIR BLENDS WITH CARBOXYMETHYLCELLULOSE AND SULFATE PULP. F. V. Nevolin, G. A. Kral-Osikina, and M. V. Orekhova. *Masloboino-Zhirovaya Prom.* 25(1), 25–7 (1959). The antiredeposition properties of soaps and syndets were sharply increased in the presence of 5% of carboxymethylcellulose (I) with regard to cotton and staple fiber fabrics, and remained unaffected when determined on natural silk, wool, and Caprone. I preserved the white color of fabrics for longer periods of time than did sulfated pulp. (*C.A.* 53, 8667)

ANIONIC SURFACTANTS IN HEAVY DUTY DETERGENTS. C. C. Tillotson (Procter & Gamble Co., Cincinnati, Ohio). *Soap Chem. Specialties* 35(2), 49–52, 169 (1959). The principles and requirements important for heavy duty household detergents are outlined. The four components essential for formulation of these products are the organic active ingredient, alkaline builders, soil suspending agent, and fabric whitener. Heavy duty liquids contain these same components, but are more difficult to formulate because of settling and phase separation. Statistics on the field are included. 19 references.

SPECIALTY ANIONICS OF FATTY ORIGIN. F. E. Woodward (General Aniline & Film Corp., New York, N. Y.). *Soap Chem. Specialties* 35(4), 53–5, 60 (1959). The various types of fatty based anionics useful as detergents are outlined. These include sulfated and sulfonated oleic acid, *alpha*-sulfo fatty acids, amides, esters, and sulfonated tallow. Properties, applications and production figures are detailed.

FATTY ACID AMIDO DERIVATIVES. H. W. Zussman (Geigy Industrial Chemicals, Ardsley, N. Y.). *Soap Chem. Specialties* 35(4), 51–2 102–3 (1959). The reactions of fatty acids or their derivatives with various types of organic amino compounds to form a wide variety of surface active agents are reviewed.

CONCENTRATING SYNTHETIC ORGANIC DETERGENT SOLUTIONS. C. L. Carpenter and S. J. Silvis (Colgate-Palmolive Co.). *U.S. 2,879,839.* A process is described for concentrating a solution or dispersion of the sodium salt of monoglyceride higher fatty acid sulfate in a lower aliphatic monohydric alcohol and water in a manner to circumvent or avoid an inoperative gel region occurring between approximately 39% and 57% total solids, thereby to provide a feed to a subsequent drying operation which will materially reduce the evaporation load on the drier.

DETERGENT COMPOSITION. E. E. Ruff and J. L. Thornton (Lever Brothers Co.). *U.S. 2,880,178.* A palmitic alkanolamide is used in the range of about 2 to 10% by weight of the total composition in admixtures with a formulated detergent including N-substituted $\beta$-amino propionates and $\alpha$-amino acetates to overcome the destructive effect of bleach upon the sudsing of these detergents.

DETERGENTS. Societe belge de l'azote et des produits chimiques du Marly S.A. and Societe carbochimique S.A. *Belg. 564,082.* Alkali carbonates improve the detergent power of quaternary mixtures composed of one or more surface-active agents (anionic or nonionic), fatty alkylolamides, alkali polyphosphates, and alkali silicates. Alkali carbonates are cheaper than the alkali pyrophosphates generally used and are also more efficient because of a synergistic action with the alkali silicates. (*C.A.* 53, 8671)

GERMICIDAL DETERGENTS. D. Steward (Scottish Oils Ltd.). *Brit. 806,791.* A solution of 5-chloro-2-hydroxydiphenylmethane 10 in iso-propyl alcohol 59 and an aqueous solution of 20% Na secondary alkylsulfate 31 parts are mixed and added in an amount of 0.36 part to 100 parts water for use as a germicidal detergent. (*C.A.* 53, 8670)

DETERGENT COMPOSITIONS. Thomas Hedley & Co., Ltd. *Brit. 807,586.* Phase separation of liquid detergents can be overcome by the inclusion in the liquid detergent composition of an alkali metal toluene sulfonate which acts as a solubilizer for the alkylbenzene sulfonate in the aqueous phosphate solution, and by careful selection of the ingredients and control of the proportions.

DETERGENT POWDER. Degussa G.m.b.H. *Brit 807,640.* A detergent powder claimed to remain dry in storage consists of a nonionic detergent component, builders, and silicon dioxide. The detergent is spray-dried while hot and the silicon dioxide is admixed with the cooled powder.

WASHING AND DISPERSING AGENTS. P. Schlack (Farbwerke Hoechst Akt.-Ges. vorm Meister Lucius & Bruning). *Ger. 949,236.* Cellulose ethers are treated with surface-active compounds to give stable solid products. The reaction product of an alkali cellulose and $NaOOCCH_2Cl$ mixed with Mersol D, a mineral-oil sulfonate, forms a solid product, which is stable and easy to use. Similar products from cellulose and ethylene oxide were treated with Mersol D or partly with AcOH to give useful dressing and sizing agents. (*C.A.* 53, 8670)