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

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• Fats and Oils

Paper chromatography of steroids. P. Kabasakalian and A. Basch (Chemical Research and Development Division, Schering Corp., Bloomfield, N. J.). *Anal. Chem.* **32**, 458–61 (1960). A series of Zaffaroni-type solvent systems has been chosen which encompasses the entire range of steroidal polarities commonly encountered. Based on calculations from values given in this paper, the practical chromatographical range of each solvent system can be quantitatively described. The mobility of a steroid in each solvent system can be estimated by inspection of its structure, thus permitting the choice of a suitable solvent system without literature references or experimentation. The method is developed in detail for the pregnane series and illustrated by application to a related series of compounds The method is general and can be extended to include other solvent systems and steroidal types.

Paper chromatography in thp field of fats. XXXIX: Quantitative paper-chromatographic analysis of fatty acid mixtures containing palmitic acid. H. C. Kaufmann, H. Schnurbusch, and Z. E. Shoeb (Deut. Inst. Fettforschung, Munster [Westf.]). *Fette Seifen Anstrichmittel* **62**, 1–5 (1960). Fatty acid mixtures which contain myristic, palmitoleic and linoleic acids in addition to other constituents, are separated on paper using the system undecane/acetic acid/acetonitrile, and evaluated photometrically after covering the copper salt spots with dithio-oxamide. The spot which contains the above mentioned components is extracted and the mixture is once again paper chromatographed either after hydrogenation or with the aid of the Hydrogenation Difference Method. As illustrations of the applications of this method the fat from several animals was analyzed; horse fat, rabbit fat, and the oil from the feet of different animals.

Influence of the nature of side chain position on the physical properties of alkanes and saturated fatty acids. W. Hager (Leipzig). *Fette Seifen Anstrichmittel* **62**, 7–13 (1960). Refractive index, density, solidification temperature, surface tension, molar refraction, and parachlor have been determined in the case of homologues of straight and branched chain paraffins and fatty acids. The deviations from values of the corresponding n-alkanes and n-fatty acids have been discussed.

The role of chlorophyll during the autoxidation of olefinic fats. K. Taufel, Cl. Franzke, and G. Heder (Inst. for Food Chemistry and Technology, Humboldt University, Berlin). *Fette Seifen Anstrichmittel* **61**, 1225–32 (1959). The authors have studied the mechanism of autoxidation of methyl oleate and methyl linoleate under the influence of chlorophyll and phenolic antioxidants as well as mixtures consisting of both of them in various proportions. Chlorophyll has been found to act as a pro-oxidant in the daylight and indifferent in the dark. In the case of combination with antioxidants, it acts as a synergist in the dark and supports the inhibitive effect of antioxidants. An increase in the chlorophyll content strengthens its synergistic effect.

The influence of expelling, extraction, de-acidification, and bleaching on the stability of rapeseed oil. A. Rutkowski (Inst. for Fat Industry, Warsaw, Poland). *Fette Seifen Anstrichmittel* **61**, 1216–19 (1959). The author has described the changes in the stability of oil during various stages of oil extraction and refining, and has found that it is dependant on the amount of phosphatides, tocopherol, and iron present in the oil. The results have been illustrated with the aid of a number of diagrams.

Investigations in dietetic therapeutics with polyunsaturated fatty acids. N. Henning and H. Schon (University Medical Clinic, Erlangen). *Fette Seifen Anstrichmittel*, **61**, 1207–10 (1959). Diets rich in polyunsaturated fatty acids have been investigated with the help of long range experiments on animals. The authors confirm that the depression of serum cholesterol levels depends upon the iodine value of the administered fat. In case of a drop in the total fat concentration the liver cholesterol level increases markedly. The experiments on human beings show marked differences with respect to resorption, storage, and metabolism of fats rich in polyunsaturated fatty acids.

Ripe rapeseed. K. J. Steinbach and Cl. Feanzke (Humboldt Univ., Berlin). *Nahrung* **3**, 95–101 (1959). The composition of rape seeds depended on the degree of ripeness. The protein, fat, and ash increased with ripening, while water decreased. The percentage-composition of the fat fraction did not vary significantly with ripening. (*C. A.* **54**, 3782)

Detection of refined arachic oil in edible oil by means of partition chromatography on filter paper. B. Briski and A. Brodarec (Centr. Hig. Zavod, Zagreb, Yugoslavia). *Kem. i ind.* (Zagreb) **7**, 93–101 (1958). The difficulty of detecting admixtures of 5 to 10% arachic oil in edible oil by existing methods is due to the fact that the crystalline precipitate obtained never is pure arachidic acid. As a rule it is mixed with palmitic, stearic, behenic, and lignoceric acids. However, this can be overcome owing to the fact that only refined arachic oil contains considerable amounts of both behenic and lignoceric acids, which can be identified by the chromatographic method. This indirect method was found particularly suitable in detecting refined arachic oil in edible oil containing erucic acid since the position of the latter on the chromatograms coincides with that of arachidic acid and may interfere with the interpretation of the results. (*C. A.* **53**, 22585)

Checking the behavior at low temperatures of refined oils and liquid fatty acids. G. B. Martinenghi. *Olearia* **10**, 192–4 (1956). A method is suggested for determining the initial cloud, solidification, flow, and clear points in this order on a single sample, while progressively lowering the temperature by 2° steps. The critical temperature at which an oil stays clear indefinitely is between the initial cloud and the clear points.

II. G. Balestrini, G. B. Martinenghi, and B. M. Samaja. *Ibid.* 238–41 (1956). The findings are confirmed with tests of 24 samples of refined and semirefined oils, acid oils, and fatty acids. (*C. A.* **54**, 4000)

Reaction of N_2O_4 with castor oil. S. V. Vasil'ev, T. Moskov. *Inst. Tonkoĭ Khim. Tekhnol. im. M. V. Lomonosova* **1956**, No. 6, 26–36. With stoichiometric amounts of N_2O_4 or the liquid reagent, ONO and NO_2 were added to the double bonds of the glycerides. The saturation was complete. With excess N_2O_4 the glycerides decomposed. The saturated and unsaturated acids were separated by nitration and separation of the nitro products. Reduction of the nitroglycerides yielded NH_2OH, NH_4Cl, and nitrogen-free acids. (*C. A.* **53**, 19413)

Antioxidant activity of phospholipides from vegetable oils. V. P. Rzhekhin and I. S. Preobrazhenskaya. *Maslo-boĭno-Zhirovaya Prom.* **25**(7), 20-4 (1959). Lecithin and cephalin extracted under controlled conditions from sunflower and soybean oils, and/or cephalin after heating with glucose at 120°, were added at 0.15% concentration to the following sunflower oils: expeller oil, raw oil pressed at 20°, and refined and bleached expeller oil. These antioxidants were found to be more effective as stabilizers of phospholipide-deficient raw oil pressed at 20° (0.02% phosphatides) than dibutylmethylphenol when added at a concentration of 0.01%. At both 120° and 20° the phospholipide-rich (1.08%) expeller oil was found to be the most stable, and raw oil pressed at 20° the least stable. The resistance of sunflower oil to oxidative deterioration increased with both the phospholipide and unsaponifiable matter contents. To improve the keeping qualities of raw oil pressed at 20° the addition of 0.3–0.4% of phospholipides is recommended. (*C. A.* **53**, 20844)

Influence of fat and carbohydrates of feedingstuffs on the composition of the triglycerides of milk. M. I. Kniga (Zootech. Inst. Sta., Lozovenka, Kharkov). *Intern. Dairy Congr., Proc., 15th Congr., London,* **1**, 218–24 (1959). The quantity of fat in the feed influences the yield of milk fat and its composition. A fat intake equivalent to 40% of the fat in the milk with vegetable fodder did not insure lipogenesis, and the unsaturated fatty acids in the glycerides dropped 28%. Such a low unsaturated acid content has a hardening effect on the butter. An intake of 65% of fat based on the fat in the milk increased fat 0.15% and unsaturated acids rose to 30.5%. The ratio between saturated nonvolatile fatty acids and unsaturated fatty acids was within limits 1.7–1.8. Rations with a fat content of 80–100% of the fat in the milk raised the unsaturated fatty acid content still higher. Raising sugar ration from 15 to 25% of the digestible organic substance increased the fat yield 8–10%. The content of volatile fatty acids increased 15–20%. (*C. A.* **53**, 22571)

STRUCTURE OF ε-TOCOPHEROL. J. Green, P. Mamalis, S. Marcinkiewicz, and D. McHale (Walton Oaks Exp. Sta. Vitamins Ltd. Tadworth, Surrey). *Chem. & Ind.* **1960**, 73–4. Evidence is presented in favour of ε-tocopherol being 2,5,8-trimethyl-2-(4,8,12-trimethyl trideca-3,7,11-trienyl)-chroman-6-ol.

SOLVENT REFINING OF OILS AND FATS. A. D. Shitole (Univ. Bombay). *Bombay Technologist* **7**, 51–6 (1957). A review with 31 references. (*C. A.* **54**, 3997)

IMPURITIES CONTAINED IN THE GLYCEROL RESIDUE IN THE AUTOCLAVING OF FATS AND CHEMICAL METHODS FOR THEIR ELIMINATION. C. P. Poggi. *Compt. rend. congr. intern. chim. ind., 31ᵉ, Liège, 1958* (Pub. as *Ind. chim. belge, Suppl.*) 2, 551–7 (Pub. 1959). An address. (*C. A.* **54**, 3998)

EFFECT OF SORBIC ACID ON AUTOXIDATION OF FATS. K. Täufel, Cl. Franzke, and J. Vogel (Humboldt Univ., Berlin). *Nahrung* **3**, 134–52 (1959). Sorbic acid was sensitive to oxygen in solution in water, acetone, and chloroform. Oxygen uptake, measured manometrically, of solutions of ethyl linoleate or methyl oleate increased with increasing sorbic acid concentration. The autoxidation of butter, melted butter, and lard was increased in the presence of sorbic acid. In soybean oil sorbic acid had no effect. (*C. A.* **54**, 3998)

AREA MEASUREMENT OF CIRCULAR PAPER CHROMATOGRAMS OF UNSATURATED FATTY ACIDS WITH THE MICROPHOTOMETER. H. Sulser. *Mitt. Gebiete Lebensm. & Hyg.* **50**, 275–86 (1959). Synthetic mixtures of pure oleic and linoleic acids were separated by circular paper chromatography. The chromatogram is then photographed and reverse developed to obtain a positive. The area and density are measured with a microphotometer. Good agreement with theoretical values was obtained. (*C. A.* **54**, 3999)

DETERMINATION OF THE IODINE NUMBER OF FATS AND OILS WITH *N*-BROMOSUCCINIMIDE. I. FATTY ACIDS. A. Jovtscheff (Bulgarian Acad. Sci., Sofia). *Nahrung* **3**, 153–60 (1959). For fatty acids treat a weighed sample with a known volume of *N*-bromosuccinimide reagent (prepared by dissolving 18 g. *N*-bromosuccinimide in 1 l. acetic acid), let stand 1 hour, add 20–5 ml. of 10% potassium iodide solution and 100 ml. water, stir, and titrate the unreacted iodine with 0.1*N* $Na_2S_2O_3$. Run blank and in calculation deduct blank titration. Accuracy is ± 0.8%. (*C. A.* **54**, 4000)

UTILIZATION OF WASTES AND BY-PRODUCTS OF THE FATTY-OIL INDUSTRY. A. P. Alvares (Univ. Bombay). *Bombay Technologist* **8**, 32–5 (1957–58) (Pub. 1958). Review. (*C. A.* **54**, 4000)

OIL TECHNOLOGY IN SICILY. M. Jacona and M. Pitanza. *Olearia* **10**, 46–9 (1956). A brief review. (*C. A.* **54**, 4000)

PRESERVATION OF OILS. I. STABILIZING ACTION OF AN ESTER OF ASCORBIC ACID *(ascorbyl palmitate)*. G. Cerutti (Centro ricerche ist. chemioterapico ital., Milan). *Olearia* **10**, 39–41 (1956). Ascorbyl palmitate is effective in preventing peroxide formation in olive oil.

II. ANTIOXIDANT ACTION OF ASCORBYL PALMITATE IN SOME VEGETABLE OILS. *Ibid.* 130–2. Addition of 0.02% ascorbyl palmitate is sufficient to assure good preservation. (*C. A.* **54**, 4000)

RAPID METHODS FOR THE ESTIMATION OF THE OIL CONTENT OF SINGLE COTTONSEED. I. OIL-EXPRESSION TECHNIQUE. S. Nurul Ahmad and Mazhar Mahmood Qurashi (Pakistan Council Sci. Ind. Research, Karachi). *Pakistan J. Sci. Ind. Research* **2**, 13–8 (1959). Single dehulled seeds from the L.S.S. variety of cotton were sandwiched between 3 filter papers (green number 401) on either side and pressed in a 10-ton hydraulic press at loads from 0.5 to 10 tons. The area of the oil spot on the 2 innermost papers was approximated from 2 mutually perpendicular diameters, the accuracy being about 5 sq. mm. in a spot area of 80–200 sq. mm. Sensitivity, as area/unit mass in sq. mm./mg., when plotted against the crushing load had a maximum of 5.25 ± 0.11 total area and 3.42 ± 0.11 total area less crushed kernel area at 7-ton load. The mean ratio of percentage oil content of M4 and L.S.S. varieties for 1957–8 was 0.75 (0.71 ratio by an extraction method). (*C. A.* **54**, 4001)

WAX FROM SISAL WASTE. V. V. Mhaskar, V. K. Hinge, and S. M. Shah. *Research Ind.* (New Delhi) **4**, 219–20 (1959). The wax recovered from the waste material left over after separating the fiber from the leaves of the indigenous plants of the Agave family, commonly known as sisal, can replace carnauba wax in many of its uses. Sisal wax resembles carnauba wax in solvent take-up and heat resistance properties that determine the suitability of a wax for use in the preparation of polishing compositions. (*C. A.* **54**, 4004)

TOTAL EXTRACTION OF PARATHION FROM OLIVE OIL AND ITS DETERMINATION. T. L. Pepe and G. Storace (Univ. Bari, Italy). *Olearia* **10**, 9–11 (1956). A method and a modified extraction apparatus are designed to separate parathion from olive oil with petroleum ether (boiling point at 40–70°). (*C. A.* **54**, 4003)

THE WAX OF SUGAR CANE. G. Torricelli. *Ind. vernice* (Milan) **11**, 8–10 (1957); *Chem. Zentr.* **129**, 3468 (1958). The sugarcane wax had: melting point 80°, d_{15} 0.965, saponification number 11, iodine number 13.8, nonsaponifiable matter 50%. (*C. A.* **54**, 4004)

RICE-BRAN OIL. K. M. Kamath (Univ. Bombay). *Bombay Technologist* **9**, 12–15 (1958–59). (Pub. 1959). A review of with petroleum ether (boiling at 40–70°). (*C. A.* **54**, 4003)

MODIFIED METHOD FOR REMOVING THE INTERFERING COAL-TAR DYE IN OILS AND FATS PRIOR TO VILLAVECCHIA AND FABRIS TEST FOR SESAME. S. C. Roy, A. R. Sen, and R. K. Chatterjee. *J. Proc. Inst. Chemists* (India) **31**, 16–8 (1959). Extraction of coal-tar dyes from sesame oil with concentrated hydrochloric acid also removes the fraction which gives the color in the furfural test. Dilution of hydrochloric acid with ethyl ether eliminates this interference. (*C. A.* **54**, 4004)

SOME ASPECTS OF ANTIOXIDANT ACTIVITY OF TOCOPHEROL AND ITS MECHANISMS. N. A. Kahn (East Regional Lab., Tejgaon, Decca). *Pakistan J. Biol. Agr. Sci.* **2**, 24–7 (1959). Trielaidin, 40% trielaidin in olive oil, olive oil, and cod-liver oil were treated with d-α-tocopherol (900γ/g. fat). The deterioration of the d-α-tocopherol increased with the degree of unsaturation of the fat. Addition of hydroperoxides obtained from methyl oleate and methyl linoleate greatly accelerated the deterioration of the d-α-tocopherol. (*C. A.* **54**, 4004)

COTTONSEED OIL SOAP STOCK. Y. L. Pankya (Univ. Bombay, India). *Bombay Technologist* **7**, 95–9 (1957). Production, chemical composition, and uses are reviewed. 24 references. (*C. A.* **54**, 4005)

"SUNLIGHT FLAVOR" IN MILK. E. G. Samuelsson (Mejeriavdelning, Alnarp, Swed.). *Svenska Mejeritidn.* **50**, 407–12 (1958). Oxidative changes of flavor in milk may be caused by oxidation of the fat phase or the fat-free part of milk. In skim milk the development of the so-called *sunlight flavor* requires the presence of light, proteins, peptides or amino acids, oxygen and riboflavine. Sour milk is more likely to get sunlight flavor, which may partly be explained by its higher content of free amino acids. The usual clear, transparent bottles were compared with brown bottles. When exposed to daylight sunlight flavor was detected in transparent bottles after 5 minutes, in brown bottles after 20 minutes. In the case of luminous-tube illumination (with light between 3000 and 4000 A.) the difference was still greater: sunlight flavor was detected in white bottles after 30–60 minutes, with none in brown bottles after 5 hours. (*C. A.* **54**, 3771)

EFFECT OF DEODORIZED MILK FAT ON THE FLAVOR DETERIORATION OF DRY WHOLE MILK. B. W. Tharp (Pennsylvania State Univ., University Park). *Univ. Microfilms* (Ann Arbor, Mich.), *L.C. Card* No. *Mic* 59-5132, 100 pp.; *Dissertation Abstr.* **20**, 1505 (1959). (*C. A.* **54**, 3771)

DETERMINATION OF VITAMIN A IN MARGARINE. Koji Naito (Univ. Tokyo). *Vitamin* **13**, 371–8 (1957). A review with 12 references. (*C. A.* **54**, 3774)

DETECTION OF ADULTERATION OF BUTTERFAT. K. S. Holla (Univ. Bombay). *Bombay Technologist* **9**, 16–20 (1958–59) (Pub. 1959). A review with 13 references. (*C. A.* **54**, 3774)

QUALITY AND KEEPING QUALITY OF NONWASHED UNSALTED BUTTER. F. H. McDowall, J. A. Singleton, and B. S. LeHeron (Dairy Research Inst., Palmerston North, N.Z.). *Australian J. Dairy Technol.* **14**, 125–28 (1959). Churnings under factory conditions of nonwashed salted butter and washed and nonwashed unsalted butter were compared. There was no appreciable difference in grade score of the butters either fresh or after storage for 4 months. The salted butter maintained its quality for 8 months better than the unsalted butters. There was no appreciable difference in the grade scores allotted to the washed and nonwashed unsalted butters. The latter had a sweetish milk flavor. (*C. A.* **54**, 3774)

Food wastes: edible oil cakes and their evaluation. S. F. Rubbi, B. D. Mikherjee, H. Rahman, H. C. Das, and N. A. Khan (East Regional Lab., Tejgaon, Dacca). *Pakistan J. Biol. Agr. Sci.* **2**, 19–23 (1959). The protein, fat, carbohydrate, and mineral contents of coconut, peanut, and sesame oil cakes were given. The analyses did not indicate the reason sesame cakes are not acceptable as a human food. (*C. A.* **54**, 3778)

Utilization of cottonseed oil in vanaspati manufacture. P. V. Krishna (Univ. Bombay). *Bombay Technologist* **8**, 67–71 1957–58) (Pub. 1958). Production, refining, chemical properties, and economics of cottonseed and peanut oils are discussed. (*C. A.* **54**, 3778)

Some factors contributing to the stability of fat in chilled doughs. C. Edith Weir, Audrey D. Slover, Jean D. Parsons, and L. R. Dugan (Am. Meat Inst. Foundation, Univ. of Chicago, Chicago, Ill.). *Food Research* **25**, 120–6 (1960). The stability of lard in pastry was not affected by baking after low temperature storage, the percentage of fat in the pastry or the storage temperature between —10° F. and 20° F. The addition of 0.003% citric acid or propyl gallate to the lard did not extend the Schaal oven life of the pastry made from it. The addition of 0.01% of either BHA or BHT markedly extended the fat stability of the pastry; a combination of BHA and BHT was even more effective. Peroxide values increased slightly during the first enght weeks of cold storage and thereafter remained at a low level.

The effect of several silicones on volume of yellow cakes. W. J. Stadelman and Grace Bennett (Purdue Univ., Lafayette, Ind.). *Food Tech.* **14**, 119 (1960). The effect of seven silicone oils on yellow cakes prepared with institutional and consumer-type cake mixes was determined. Of the silicones tested, none resulted in serious diminution of cake volume when included in the batter at 0.1 or 1.0 ppm. At a 10 ppm. level, some of the silicone oils resulted in a reduction in volume of yellow cakes by as much as 20%. Others of the silicones used had no significant effect on volume of yellow cakes even when 10 ppm. of the silicone was incorporated into the batter.

Composition of cherry seed and cherry seed oil (Prunus cerasus). K. G. Weckel and H. D. Lee (Dept. of Dairy and Food Industries, Univ. of Wisconsin, Madison). *Food Tech.* **14**, 151–4 (1960). The composition of cherry seeds and of cherry kernel oil was determined. Cherry kernels have a fairly high protein and oil content which may have potential in animal and food mixtures. The composition of cherry kernel oil resembles that of almond oil and is quite similar to that of corn oil, peanut oil and sesame seed oil. Elaeostearic acid was shown to be present in cherry kernel oil. The presence of elaeostearic acid may be the cause of accelerated development of oxidative rancidity observed in the oil.

Green pigments in the fatty oil from the fruit of Pimpinella Anisum. G. Rankov, A. Popov, and D. Tschobanov. *Compt. rend. Acad. bulgare Sci.* II(1), 33–6 (1958) (in German). The color of the oil is due to chlorophyll, which appears in the oil during extraction. The green color deepens when oil is extracted in the presence of copper turnings. (*C. A.* **54**, 2788)

Stearin and olein by fractionation with hexane. I. Distribution of the unsaponified matter between the stearic and oleic fractions. G. B. Martinenghi. *Olearia* **10**, 123–9 (1956). Stearic and oleic acids can be separated by crystallization from hexane at temperatures between —20 and +5°. The precipitate is easily filtered and can be purified better by rinsing than can the precipitate obtained from methyl alcohol. The stearic acid is nearly free of unsaponified matter, has an iodine number <1, and a higher solidification point than has that precipitated from methyl alcohol.

II. Rinsing of the stearic fraction. *Ibid.* 185–7 (1956). The stearic fraction was purified by remelting, redissolving, and reprecipitation, or by direct washing. The latter provided the better results.

II. J. Mašek and Y. Holá. *Ibid.* 100–5. The antioxidant activity of alkaline whey, extract of oats, quercetin, dihydroquercetin, and a combination of quercetin and citric acid on butter and lard was investigated. The agents were used in a concentration of 0.05%, or impregnated in parchment paper (90 r/sq. cm.). Quercetin and dihydroquercetin were found to be the most efficient antioxidants under the observed experimental conditions. 37 references. (*C. A.* **54**, 3774)

Determination of foreign fats in cocoa production. X. Detection of small additions of hydrogenated fats in cocoa butter and chocolate fats with infrared spectrographic determination of isoöleic acid (trans fatty acid) content. A. Purr, H. Lück, and R. Kohn (Inst. Lebensmitteltech. Verpackung, Munich, Ger.). *Rev. intern. chocolat.* **14**, 332–9 (1959). Comparative examination of the spectra of cocoa butter and chocolate fats between 2 and 15 μ and in near infrared (1 to 2.5 μ) taken with a Beckman infrared spectrophotometer IR4 is described. Thus, in the analysis of foreign fat in cocoa substitutions only the measure of intensity of *trans* bands (10.35 μ) will be convenient for the quantitative determination of *trans*-olefins. In cocoa butter a minimum of 1%, and in suitable conditions 0.5%, of *trans*-olefins can be detected. According to a standard diagram *trans*-olefins are expressed as elaidic acid. Standardization is deduced from determination of band-lengths (in terms of relative units) of 10.35-μ band of pure butter, ethyl ester of elaidic acid, and a mixture of these 2 components. Additions up to 5% in cocoa butter and chocolate fat can be detected very simply, with no need to purify the substance, and can be determined in terms of elaidic acid with ±10 to ±20% error. (*C. A.* **54**, 3782)

Use of emulsifiers and emulsified oils to reduce cohesion in canned white rice. R. E. Ferrel, E. B. Kester, and J. W. Pence (Western Regional Research Lab., Albany, Calif.). *Food Tech.* **14**, 102–5 (1960). A rinse treatment with dilute vegetable oil emulsions or dilute dispersions of certain surface-active agents during the canning of short-grain rice markedly reduced the cohesion that normally develops in the product. Cold storage of the product after canning was also beneficial. Neither the type nor concentration of emulsifier in the emulsion influenced significantly the degree of cohesion in treated products. Emulsifiers differed in their effect upon cohesion when used alone, but no correlation with their type or structure was evident. Reduction of cohesion in the rice was directly related to logarithm of oil concentration in the emulsions. The amount of oil taken up by the rice reflected the concentration of oil in the emulsion but barely exceeded 1.0% even at a level of 15% oil in the rinse. When the level of oil was below 5% in the rinse, a taste panel could not reliably distinguish between treated and untreated rice. No change in organoleptic properties appeared in treated rice after 19 weeks of holding at 100°F.

Carbonyl compounds in fatty oils. Senjiro Maruta and Yoshihito Suzuki (Yamanashi Univ., Kôfu). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 811–13 (1959). The carbonyl compounds were separated from fatty oils by use of anion exchange resin. Carbonyl compounds were converted to 2,4-dinitrophenylhydrozones, nonreacted reagent was removed by alumina, and the hydrazones were determined photometrically. When expressed as capronaldehyde, the contents were as follows: silkworm pupa oil 2568, cuttle-fish dark oil 3441, coconut oil 899, rice bran oil 702, cottonseed oil 665, rapeseed oil 360, sardine oil 335, and hardened oil 320 mg./100 g. Paper chromatography showed the presence of capronaldehyde in animal oils and butyraldehyde and capronaldehyde in vegetable oils.

Compounds of the nonazelaic acid parts obtained by the ozonization and decomposition of oleic acid and mixtures of fatty acids using glacial acetic acid as the solvent. Gaku Izumi (Nagoya Ind. Tech. Expt. Sta.). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 814–17 (1959). The original samples used were oleic acid, rice-bran oil fatty acids, and tall oil fatty acids. The nonazelaic acid part contained pelargonic acid and besides caprylic acid in the amount about 1/5 of the former acid. The identification was made by gas chromatography.

Solvent fractionation of soybean oil by nitroethane. Chikai Kimura, Kageaki Kashiwaya, and Teruzo Asahara (Univ. Tokyo). *Kógyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 1381–3 (1959). Extraction was made at 0° with nitromethane. The extract phase and the raffinate phase were analyzed, but no distinct difference was observed in the distribution of linoleic and linolenic acids. Similar experiments were made on interesterified soybean oil (with Na methylate) with similar results. Extract phase with iodine no. 151 could be obtained by extracting 4 times repeatedly.

Electric resistance of alkali salts of fatty acids. Heinachi Ezaki and Syun Noguchi (Marumiya Co., Ltd., Tokyo). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. *Chem. Sect.*) **62**, 1834–5 (1959). Electric resistance showed maximum and minimum on the curve *versus* temperature in cases of K laurate, K stearate, and Li oleate, as in cases of Na salts of fatty acids.

PURIFICATION OF JAPANESE TALL OIL. Toichiro Waida and Masayoshi Terauchi (Nippon Camphor Co., Ltd., Kobe). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 1734–41 (1959). Crude tall oil was decolorized by heating with 0.3% zinc chloride followed by distillation. Tall oil was thermodecomposed with *p*-toluenesulfonic acid to obtain polymerized resin acids and fatty acids.

POLYUNSATURATED ACIDS. I. IDENTIFICATION AND QUANTITATIVE ESTIMATION OF POLYUNSATURATED FATTY ACIDS BY PAPER CHROMATOGRAPHY. Takaharu Miyakawa, Hideo Nomizu, and Noboru Yamamoto (Osaka Kôgyô Gijutsu Shikenjo, Osaka). *Nippon Kagaku Zasshi* **80**, 1501–6 (1959). Inversed-phase paper chromatography was successfully applied with petroleum hydrocarbon as the stationary phase and acetonitrile-acetic acid as developing phase. Linoleic, linolenic, eicosatetraenoic, and eicosapentaenoic acids could be well separated and determined by photoelectric measurement of colored spots produced with $CuSO_4$ and K ferrocyanide solutions. Examples are shown for the analysis of the oils from *Colorabis saira* and cuttle-fish.

FATTY OILS OF AQUATIC INVERTEBRATES. XXI. FATTY OIL OF THE SEA-HARE APLYSIA KURODAI AND ITS STEROL COMPONENTS. Tatsuo Tanaka and Yoshiyuki Toyama (Nagoya Univ.). *Nippon Kagaku Zasshi* **80**, 1326–8 (1959). Four samples of fatty oil from *Aplysia kurodai* were analyzed. The range of values are as follows: $n^{40/D}$ 1.4953–1.4833, saponification no. 127.3–137.6, iodine no. 138.1–157.1, acid no. 22.2–42.9, unsaponifiable matter 39.4–61.7%. Highly unsaturated acid contents, calculated as pentaenoic to be C_{22}, were hexaenoic 2.4–2.6, pentaenoic 5.4–19.6, tetraenoic 8.2–11.7, trienoic 0.7–10.9, and dienoic 7.6–10.2%. The sterols consisted of cholesterol and $\Delta^{5,7}$-conjugated component.

XXII. UNSAPONIFIABLE COMPONENTS OTHER THAN STEROLS IN THE OIL OF THE SEA-HARE APLYSIA KURODAI. *Ibid.* 1329–32 (1959). As new compounds, $C_{16}H_{21}OBr$, m.p. 69–71°, possibly a bromophenol, and another crystalline compound, m.p. 146.5–147.5°, were isolated.

A NEW SUBSTANCE FROM SAWAMILLET GRAIN OIL. I. ISOLATION AND CHEMICAL PROPERTIES OF THE NEW SUBSTANCE FROM SAWAMILLET GRAIN OIL. Tetsujiro Obara and Shokichi Abe (Tokyo Univ. Education). *Nippon Kagaku Zasshi* **80**, 677–8 (1959). When grain oil extracted with petroleum ether from sawamillet, *Echinochloa crusgalli*, was allowed to stand with a small amount of acetone, crystals of hexagonal tablets were obtained. This substance, $C_{31}H_{52}O$, had m.p. 278° and $[\alpha]_D$ 8.2°. Ultraviolet and infrared spectra of this compound and its oxide showed the absence of carbonyl and conjugated double bond and the presence of trisubstituted double bond (—CH:C:) and β-methoxyl. This new pentacyclic compound was called sawamilletin.

II. STRUCTURE OF SAWAMILLETIN. Shokichi Abe and Tetsujiro Obara. *Ibid.* **80**, 1487–91 (1959). This was shown to be 3β-methoxy-isoolean-14-ene.

III. SYNTHESIS OF SAWAMILLETIN. Shokichi Abe. *Ibid.* **80**, 1491–2 (1959). The above structure was verified by synthesizing it from taraxerol.

OXIDATION OF MONO-OLEFINIC UNSATURATED FATTY ACID ESTERS WITH PB (IV) SALTS OF SATURATED FATTY ACIDS I. OXIDATION OF METHYL OLEATE. Yoshiharu Matsubara, Shoji Wakabayashi, and Shigeto Nakamitsu (Saisei Shônô K.K., Kobe). *Nippon Kagaku Zasshi* **80**, 1195–7 (1959). Oxidation of methyl oleate in acetic acid and acetic anhydride with Pb tetraacetate gave diacetate and monoacetate of methyl 9,10-dihydroxystearate, methyl monoacetoxyoctadecenoic acid, nonylaldehyde (in a small amount), and azelaic half aldehyde (in a small amount).

OXIDATION OF UNSATURATED FATTY ACIDS. V. REACTION OF METHYL PALMITOLEATE WITH TERT-BUTYL CHROMATE. Yutaka Watanabe (Hiroshima Univ.). *Nippon Kagaku Zasshi* **80**, 1187–8 (1959). This reaction at 30° for 30 hrs. gave myristic, lauric, capric, nonanoic, heptanoic, and azelaic acids. This proves that *tert*-butyl chromate effected β-oxidation and isomerization.

THE ABSORPTION SPECTRUM OF THE RESIDUE FROM MOLECULAR DISTILLATION OF WHALE-LIVER OIL. Yoshimori Omote (Tokyo Univ. Education). *Nippon Kagaku Zasshi* **80**, 804–5 (1959). The residual oil left after exhaustive molecular distillation to recover vitamin A seems to contain kitol. However, it shows about 10,000 USP units from extinction coefficient and some samples show $E^{1\%/1 cm.}$ 20 at 290 mμ, the absorption maximum of kitol. Ultraviolet absorption spectra are shown for such residual oil and its fractions (obtained by saponification and by alumina column chromatography).

THE SEQUENCE OF FORMATION OF OIL IN CASTOR SEEDS. V. BIOSYNTHESIS OF C^{14}-LABELED CASTOR SEED OIL FROM D-GLUCOSE 1-C^{14}. Kazuyuki Mihara (Musashi Inst. Technol., Tokyo). *Nippon Kagaku Zasshi* **80**, 639–40 (1959). An aqueous solution of D-glucose-1-C^{14} was made to penetrate into the stem of growing castor plant. The ricinoleic acid separated purely from matured castor seed oil was radioactive. The radioactivity of the products (β-hydroxy-pelargonic and azelaic acids) of ozonolysis of ricinoleic acid was similar. Oxidation of β-hydroxy-pelargonic acid with alkaline permanganate gave heptanoic acid and CO_2, and this CO_2 showed radioactivity. Thus it was presumed that D-glucose-1-C^{14} was first split into 2-C compounds in the castor plant and then condensed to form ricinoleic acid.

VI. FATTY ACID COMPOSITION OF CASTOR LEAF OIL. Kazuyuki Mihara. *Ibid.* 641–3 (1959). Crude oil content of fresh leaves was 0.02% in young leaves and increased to 0.25% in mature leaves. The fatty acid composition of the oil from mature castor leaves was conjugated dienoic acids 12.4, conjugated trienoic 8.0, linoleic 7.2, linolenic 15.2, oleic 44.1, and saturated 13.0%.

THE STEREO-CONFIGURATION OF 2,4-DECADIENALS ISOLATED FROM OILS CONTAINING LINOLEIC ACID. G. Hoffmann and J. G. Keppler (Unilever Res. Lab., Vlaardingen). *Nature* **185**, 310–311 (1960). The volatile decomposition products of palm oil and groundnut oil were subjected to gas-liquid chromatography. Two isomeric 2,4-decadienals, possessing the stereo-configurations of 2(*trans*)-4(*cis*) and 2(*trans*)-4(*trans*), were found to be present in the ratio of 28:72.

SYNTHETIC HARD BUTTER. G. Barsky, V. K. Babayan, and G. Knafo. *U. S. 2,924,528.* The desired product has a closed capillary melting point of about 35–40° and consists of the random esterified mixture of palmitic (65–85%) and stearic (35–15%) acids with propylene glycol.

EDIBLE COMPOSITION CONVERTIBLE INTO A STIFF MASS BY AERATION. H. M. Levin. *U. S. 2,924,530.* A mixture which is convertible into a semi-permanent mass having a density analogous to that of whipped cream contains vegetable gum, acidulated water, sugar, salt, an edible butter fat emulsion, and an edible gas under pressure.

METHOD OF RETARDING WATER SURFACE EVAPORATION. F. W. Crawford and C. E. Stoops (Phillips Petroleum Co.). *U. S. 2,925,318.* The addition of a synthetic long straight-chain primary alcohol containing an odd number of carbon atoms retards the evaporation of water from a surface.

PREPARATION OF AN ANTIOXIDANT FROM ROOTLETS. D. L. Baker and W. B. Dockstader (Basic Products Corp.) *U. S. 2,925,345.* The mixing of pulverized rootlets of malted seed with fatty material significantly inhibits the auto-oxidation of the fat.

BRIGHT-DRYING POLISH EMULSIONS. G. Keonig, G. von Rosenberg, and W. Sapper (Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Brüning). *U. S. 2,925,349.* The desired formulation consists of an aqueous emulsion of at least one ester wax, a nonionic emulsifier (ethylene oxide treated aliphatic alcohol of at least 16 carbons or fatty acid partial esters of polyhydric alcohols), and a monohydric alcohol having 5 to 14 carbon atoms.

TREATMENT OF REFINERY WASTES. P. Bradford (Swift & Co.). *U. S. 2,925,383.* An improved method for treating a first aqueous vegetable oil refinery waste containing a suspended floc is described. An aerated second waste water carrying fine solid particles is introduced into the first waste. The two wastes are mixed to distribute the air throughout the mixture and to intermingle the suspended floc and solid particles. The combined wastes are introduced into a quiescent zone, the flocs floated to the surface of the combined liquids, and the floated floc separated from the liquid.

CHEMICAL COMPOSITIONS. W. H. Kirkpatrick and Alice Walker (Visco Products Co.). *U. S. 2,925,429.* The desired composition is the product of the reaction at 150–300° of castor oil, an organic dicarboxy acid, and a polyoxyalkylene compound having an average molecular weight between 1700 and 7500. The molar ratio of dicarboxy acid to castor oil should be at least 1:3, and the molar ratio of the polyoxyalkylene compound to castor oil should also be at least 1:3.

PROCESS FOR MAKING WOOL RESISTANT TO FELTING AND SHRINKING. A. Rapp (Böhme Fettchemie G.m.b.H.). *U. S. 2,926,064.* Wool is immersed in an aqueous bath containing the following ingredients: (1) between 0.1 and 1.0 gm./liter of a polymerized epoxide compound such as a carboxylic acid epoxyalkyl ester or an epoxidized unsaturated fatty oil; (2) an inert solvent such as tetrahydrofurfuryl alcohol, dioxane, or acetone;

(3) an emulsifier, e.g., ethylene oxide addition products of fatty acids with 12 to 18 carbon atoms; (4) a chlorine and oxygen releasing material such as alkali metal hypochlorites. After 5 to 10 minutes the wool is removed from the bath and dried at a temperature of about 70°.

ANTIOXIDANT COMPOSITION. L. Dugan Jr., and H. R. Kraybill *U. S. 2,926,092.* Animal fat is stabilized against oxidative deterioration by the addition of 0.0005% to 0.02% of a synergistic combination of 2,6-di-tertiarybutyl-p-cresol and butylated hydroxyanisole.

STABILIZATION OF ORGANIC SUBSTANCES. H. A. Cyba (Universal Oil Products Co.). *U. S. 2,926,093.* Organic substances normally subject to oxidative deterioration (lubricants, hydrocarbon oils and polymers, and fatty materials) are stabilized by the incorporation of an aminophenyl alkoxyphenyl ether inhibitor.

METHOD OF PACKAGING FOOD SLICES. F. E. Long (Continental Can Co., Inc.). *U. S. 2,927,029.* A method of packaging slices of fat-containing meat and cheese for refrigerated storage consists of dusting a coating of water-swelling cellulose gum powder on the surface of the slice and juxtaposing another slice with its surface upon and in contact with the coated surface.

TETRADECANOL FROM CASTOR OIL. Societe des produits chimiques de bezons. *Brit. 822,700.* See U. S. 2,897,243. (*C. A.* **54**, 2790)

SPLITTING OF SOAPSTOCK. H. Gates (Unilever N. V.). *Dutch 90,078.* Soapstock, obtained from peanut oil, palm oil, hardened fish oil, etc., having a total content of fatty substances <40%, e.g., 15–25% is treated with an excess of sulfuric acid and the dispersion of small lumps of a water-in-oil emulsion in an aqueous phase, which is obtained at first, is exposed to vigorous mechanical treatment, preferably with rapidly rotating beating blades, during 5–15 minutes at 50–95°. By the shearing forces, the dispersion is changed into a simple oil-in-water emulsion that can be separated in a centrifuge. (*C. A.* **54**, 4008).

REFINING RICE OIL. G. B. Martinenghi. *Ital. 554,502.* Rice oil is dewaxed completely by cooling at about 0° (before or after deacidification) its 1:1 solution in commercial hexane. The deacidification is carried out by esterification with glycerol. Pigments and (or) extraneous matter are removed, e.g., with 50% diluted sulfuric acid solution, activated bleaching earth, or carbon, in the presence of mineral acids. (*C. A.* **54**, 4007)

NEUTRALIZATION OF VEGETABLE OR ANIMAL OILS AND FATS. Carmelo Vaccarino and G. Vaccarino. *Ital. 550,940.* The neutralization is made in a lipophilic and hydrophilic solvent, such as a ketone; an alcohol; an aldehyde; an ester; or an ether, by means of an excess of alkali (maximum 30% concentrated) at >40° in the presence of salts to make the phase separation easier. (*C. A.* **54**, 2790)

ESTERIFICATION OF FATTY ACIDS. F. Gianazza. *Ital. 557,303.* The small amounts of acids which remain nonesterified during the conventional process are steam-distilled without being transferred to another apparatus. The apparatus is described. (*C. A.* **54**, 2790)

NEUTRAL FATS. C. Berti. *Ital. 559,292.* Acid fats are esterified until a residual unreacted amount of 5–10% remains, which is steam-distilled without transfer to another apparatus. Finally the product is washed with an alkaline solution. The apparatus is claimed. (*C. A.* **54**, 2790)

IMPROVING THE STABILITY OF FATS AND FATTY PRODUCTS. F. Yu. Rachinskiĭ, A. S. Mozzhukhin, N. M. Slavachevskaya, and L. I. Tank. *U.S.S.R. 118,934.* Fats and fat-containing substances are preserved by the addition of cysteamine and cystamine in which H in the SH or NH$_2$ group is replaced by alkyl or aryl radicals or by adding to the fats free bases of thiazolines. (*C. A.* **53**, 23010)

REMOVING GOSSYPOL FROM COTTONSEED OIL OR ITS BENZENE MISCELLA. V. P. Rzhekhin and A. B. Petushina. *U.S.S.R. 119,642.* To the oil, anthranilic or some other aromatic acid or amine is added. This precipitates gossypol as its phenylamine derivative, insoluble in oil and the benzene miscella. Thus, gossypol is separated from the oil to obtain a high-grade light-colored oil and a gossypol derivative which is subsequently used in the manufacture of plastics, fire-resistant coatings, paints, antiseptics, and pharmaceuticals. (*C. A.* **54**, 4007)

EXTRACTION OF FATS AND OILS AT HIGH PRESSURES. L. A. Yutkin and L. I. Gol'tsova. *U.S.S.R. 120,884* (addition to U.S.S.R. 105,011). Fats and oils from vegetable or animal tissue are placed in a container containing an aqueous medium. Electrical discharges are generated until an oil-fat emulsion is formed in the container. The procedures of the main patent are applied. The oils and fats are extracted from the emulsion by known procedures. (*C. A.* **54**, 4006)

• Fatty Acid Derivatives

PHOSPHORUS DERIVATIVES OF FATTY ACIDS. VII. ADDITION OF DIALKYL PHOSPHONATES TO UNSATURATED COMPOUNDS. R. Sasin, W. F. Olszewski, J. R. Russell and D. Swern (Fatty Acid Producers' Council of the Association of American Soap and Glycerine Producers, Inc., and the Eastern Regional Research Lab.). *J. Am. Chem. Soc.* **81**, 6275–6277 (1959). The addition of dialkyl phosphonates to unsaturated compounds under free radical conditions has been shown to be a general reaction of wide applicability. Addition proceeds smoothly with unsaturated compounds containing a terminal or an isolated double bond and also with a series of vinyl esters. Trialkyl ω-phosphonoundecanoates were prepared in 53–66% yield by the addition of dialkyl phosphonates to alkyl undecenoates. All the phosphates are colorless, thermally stable, high-boiling liquids, except dimethyl- and diethyl-2-stearoxyethylphosphonates, which are white solids melting at 45 and 47°, respectively.

THE PYROLYSIS OF β-HYDROXYOLEFINS. R. T. Arnold and G. Smolinsky (Dept. of Chemistry of Columbia Univ.). *J. Am. Chem. Soc.* **81**, 6443–6445 (1959). In order to examine more fully the manner by which ricinoleic acid undergoes thermal decomposition into heptaldehyde and undecylenic acid, a number of related β-hydroxyolefins were prepared and subjected, for short periods of time in a flow system, to temperatures near 500°. The products formed in each case are readily explained in terms of a six-membered cyclic transition state.

KINETIC FRICTION COEFFICIENT OF FATTY ACID-METHYL SILICONE OIL SOLUTION. Kazuo Hayashi and Hisayoshi Yamaguchi (Shinetsu Chem. Co., Ltd., Iriarai, Ota-ku, Tokyo). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 854–6 (1959). The fatty acids added to methyl silicone oil were caprylic and lauric acids. The higher the viscosity of methyl silicone oil was, the smaller was the amount of caprylic acid to be added to constant kinetic friction coefficient. Smaller amount of lauric acid made the coefficient constant.

SOME PROPERTIES OF MIXTURE OF PHENYLMETHYL SILICONE OIL AND DIESTER. *Ibid.*, 856–9 (1959). Phenylmethyl silicone oil mixed with di-(2-ethylhexyl) adipate or di- (2-ethylhexyl)azelate was subjected to the determinations of cloud point, viscosity-temperature property, and kinetic friction coefficient. The effect of mixing diester was different with the content (5 or 25 mol. %) of phenyl group in the silicone oil.

RELATION BETWEEN THE STRUCTURE AND THE PROPERTY OF ESTERIC PLASTICIZERS. Koichi Murai and Giichi Akazome (Sansuiso Fats and Oils Ind. Co., Fushimi, Kyoto). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 1094–8 (1959). Esteric plasticizers [for poly(vinyl chloride)] containing 2 ester linkages were examined in regard to the chain length of alkyl (C$_8$–C$_{12}$), branching, and the position of ester linkages.

RELATION BETWEEN THE STRUCTURE AND THE PROPERTY OF PLASTICIZERS DERIVED FROM FATTY OILS. Koichi Murai and Giichi Akazome. *Ibid.* 1098–1101 (1959). Double bond increased the mixing property, but the effect was smaller than that of an epoxy group or an ester linkage. Good plasticizers with mol. wt. 300–500 were of straight chain structure with 2–3 efficient polar groups or linkages.

THERMAL DECOMPOSITION OF EPOXY FATTY ACID ESTERS. Koichi Murai, Giichi Akazome, and Shizuo Nishiyama (Sansuiso Fats and Oils Ind. Co., Ltd., Fushimi, Kyoto). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 1004–6 (1959). Butyl 9,10-epoxystearate synthesized from butyl oleate was studied for decomposition by heating at 160–220°. Such tests were also carried out on the mixture with poly(vinyl chloride) in relation to stability of the epoxy acid ester as the plasticizer.

SYNTHESIS OF PLASTICIZERS BY ESTERIFICATION WITH REMOVAL OF SODIUM CHLORIDE. Yuya Yamashita and Tsuneo Shimamura (Nagoya Univ.). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) **62**, 1552–5 (1959). Optimum conditions were sought for synthesizing the ester from chloromethylnaphthalene and Na salts of fatty acids (especially oleic and lauric) with removal of NaCl in the presence of tertiary amines as the catalyst.

VISCOSITY BEHAVIORS OF THE AQUEOUS SOLUTION OF POLYOXYETHYLENE GLYCOL STEARYL ETHER. Shigetaka Kuroiwa (Shinshu Univ., Ueda, Nagano-ken). *Kôgyô Kagaku Zasshi* (J. Chem.

Soc. Japan, Ind. Chem. Sect.) **62**, 1588–93 (1959). The polyoxyethylene derivative from stearic acid showed different viscosity behavior from that from oleic acid. The mixed derivatives showed maximum viscosity at different ratio of mixing at different temperature.

PHOTOGRAPHIC STRIPPING PAPER. R. S. Bryce and W. H. Griggs (Eastman Kodak Co.). *U. S. 2,925,340.* The desired product consists of a paper support, a superficial coating on one surface consisting of a Werner complex in which a trivalent nuclear chromium atom is coordinated with a carboxylic acido group having at least 10 carbon atoms, and a gelatino silver halide emulsion layer directly over the superficial coating.

CORROSION INHIBITION. A. J. Rosenthal (Celanese Corp. of America). *U. S. 2,927,031.* A stable, non-corrosive composition of matter consists of a solution of a lower alkanoic acid ester of cellulose in a halogen-containing organic solvent with a hydroxy lower alkyl amine nitrite or a cadmium salt of a water-insoluble fatty acid as stabilizer.

ALIPHATIC ALCOHOLS. V. Mills, E. O. Korpi, and J. Blinka (Procter & Gamble Co.). *Ger. 1,008,273.* Esters of C_6–C_{22} fatty acids are hydrogenated with hydrogen containing 0.3–1.4% CO at 287–330° and 140–280 atmospheres in the presence of a copper-chromium oxide catalyst (1–5% by weight of ester). The methyl esters are preferred. A 15 to 40-fold molar excess of hydrogen (by amount of ester) is used. The alcohols formed and the excess hydrogen are removed from the reaction zone and the excess hydrogen is separated and recycled. Since most of the CO present reacts with hydrogen to give methanol, the recycled hydrogen contains much less CO. (*C. A.* **54**, 2792)

FATTY PERACIDS. A. Gross (Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler). *Ger. 1,022,210.* See U. S. 2,806,045. (*C. A.* **54**, 2790)

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• Biology and Nutrition

EFFECT OF HIGH LEVELS OF DIETARY CHOLESTEROL ON THE SERUM PROTEINS OF THE CHICKEN. R. E. Clegg, A. T. Ericson, and U. K. Misra (Kansas State University, Manhattan). *Poultry Sci.* **39**, 35–39 (1960). The electrophoretic pattern of the blood serum proteins has been determined for the cholesterol-fed chicken and it has been shown that the electrophoretic components that increase in amount during the cholesterol feeding can be distinguished from the electrophoretic components that increase in amount during diethylstilbestrol injection.

VITAMIN E ACTIVITY OF SELENIUM IN TURKEY HATCHABILITY. C. R. Creger, R. H. Mitchell, R. L. Atkinson, T. M. Ferguson, B. L. Reid, and J. R. Couch (Depts. of Biochemistry & Nutrition & Poultry Sci., Texas A&M College, College Station, Tex.). *Poultry Sci.* **39**, 59–62 (1960). Beltsville Small White turkey hens, reared on range and fed a complete practical ration, were placed in wire-floor pens and fed a diet low in vitamin E for the first nine weeks of the laying period. Supplements of dried brewers yeast, selenium and vitamin E were added for an additional twelve weeks of production. Supplementation of 5% dried brewers yeast to a basal diet deficient in vitamin E produced an increase in fertility, but had no effect on the hatchability of fertile eggs. The addition of 0.1 p.p.m. selenium appeared to produce a slight depression in fertility. Supplementation with 10 I.U. of vitamin E per pound produced an increase in both the fertility and hatchability of fertile eggs.

AN UNIDENTIFIED WATER-SOLUBLE FACTOR IN ALFALFA WHICH IMPROVES UTILIZATION OF VITAMIN A. B. H. Ershoff (Dept. of Biochemistry and Nutrition, Univ. of Southern Calif., Los Angeles) and H. J. Hernandez. *J. Nutrition* **70**, 313–320 (1960). Supplements of a water-soluble extract from alfalfa increased the length of time required for depletion, the maximum weight increment attained and the length of survival of rats fed a purified diet deficient in vitamin A. The alfalfa extract also prolonged the survival time of rats depleted of vitamin A and caused weight increase in such rats following administration of a suboptimal amount of vitamin A. It could not, however, replace completely the carotene or vitamin A in the diet as evidenced by the fact that the weight of rats fed the basal vitamin A-free diet supplemented with the alfalfa extract eventually plateaued and the rats developed symptoms of vitamin A deficiency. The active factor (or factors) in alfalfa is distinct from any of the known nutrients.

EFFECTS OF NICOTINIC ACID AND RELATED COMPOUNDS ON STEROL METABOLISM IN THE CHICK AND RAT. J. L. Gaylor, R. W. F. Hardy, and C. A. Baumann (Dept. of Biochemistry, Univ. of Wisconsin, Madison). *J. Nutrition* **70**, 293–301 (1960). High levels of nicotinic acid, comparable to those used in human therapy, were fed to rats and chicks, and the effects compared with those resulting from nicotinamide or isonicotinic acid. Nicotinic acid did not alter the blood cholesterol level of rats fed a hypercholesterolemia-inducing diet (basal plus 0.5% of cholic acid and 1% of cholesterol). The blood cholesterol level of chicks fed a cholesterol-containing diet (0.5%) was depressed by nicotinic acid and altered only slightly by the amide.

POTENCY OF VITAMIN K_1 AND TWO ANALOGUES IN COUNTERACTING THE EFFECTS OF DICUMAROL AND SULFAQUINOXALINE IN THE CHICK. P. Griminger and Olga Donis (Dept. of Poultry Science, Rutgers Univ., New Brunswick, N. J.). *J. Nutrition* **70**, 361–368 (1960). When graded levels of vitamin K_1, menadione or menadione sodium bisulfite complex were added to a vitamin K-deficient diet, 1 mg., 1.15 mg. and 1.45 mg., respectively, per kilogram of feed were required to obtain prothrombin times indicating an optimum level of plasma prothrombin. When the same compounds were fed with a diet containing 400 mg. of dicumarol per kg., the requirement of the chicks appeared to be elevated to 1600 mg. of vitamin K_1. Up to 8 times this level, on an equimolecular basis, of the two menadione compounds did not counteract the hypoprothrombinemic effect of dicumarol. When the diet contained 0.2% of sulfaquinoxaline, vitamin K_1 (4 mg./kg. diet), as well as the two forms of menadione, counteracted most but not all of the hypoprothrombinemic effect of this drug.

STUDIES WITH CHICKENS AND TURKEYS ON THE RELATIONSHIP BETWEEN FAT, UNIDENTIFIED FACTORS AND PELLETING. W. F. Pepper, S. J. Slinger, and J. D. Summers (Dept. of Poultry Husbandry, Ontario Agricultural College, Guelph, Ontario, Canada). *Poultry Sci.* **39**, 66–74 (1960). Both pelleting and the addition of fat to the feed resulted in fairly consistent improvement in feed efficiency. In general, the effect of pelleting on feed efficiency tended to be less as the fat level increased. The results suggest that there may be a sparing relationship between fat and unidentified factor sources for the growth of turkeys. It would also appear that fish meal and dried whey increase body weight almost entirely by increasing feed intake.

THE CONVERSION OF β-CAROTENE TO VITAMIN A IN VIVO. I. R. Sibbald and Lillian M. Hutcheson (Dept. of Nutrition, Ontario Agricultural College, Guelph, Ontario, Canada). *Poultry Sci.* **39**, 99–103 (1960). The minimum time necessary for the production of vitamin A from β-carotene injected into the ligatured duodenal loops of living, vitamin A-depleted chicks shows considerable variation. Some birds produced vitamin A in less than five minutes while the majority converted carotene to vitamin A within fifteen minutes. The minimum quantity of β-carotene required to produce 1 I.U. of vitamin A was predicted to be 0.383 ± 0.685 mcg. which is not different from the widely used value of 0.6 mcg.

RADIOCHEMISTRY OF FATS. Saburo Komori (Univ. Osaka). *Yukagaku* **8**, 91–9 (1959). A review. (*C. A.* **54**, 3998)

EFFECT OF COENZYME Q_{10} ON THE DETERMINATION OF TOCOPHEROL IN ANIMAL TISSUE. W. J. Pudelkiewicz and L. D. Matterson (Univ. of Connecticut, Storrs, Conn.). *J. Biol. Chem.* **235**, 496–8 (1960). Interference of coenzyme Q_{10} in the analysis of tocopherol is indicated if it is allowed to come in contact with a reducing substance without molecular distillation. The latter procedure effectively separated it from tocopherol, thereby eliminating it as a source of interference.

THE FORMATION OF Δ^9-UNSATURATED FATTY ACIDS. D. K. Bloomfield and K. Bloch (Harvard Univ., Cambridge, Mass.). *J. Biol. Chem.* **235**, 337–45 (1960). Extracts prepared from anaerobically grown yeast with the aid of the Hughes' press catalyze the desaturation of palmitic to palmitoleic acid and of stearic to oleic acid. The cofactors required for the conversion are coenzyme A, adenosine triphosphate, reduced triphosphopyridine nucleotide, and Mg^{++}. Molecular oxygen is essential for the reaction and cannot be replaced by artificial electron acceptors. With palmityl coenzyme A as the substrate, desaturation takes place in a system containing only the particulate fraction or yeast homogenates, reduced triphosphopyridine nucleotide, and oxygen in the gas phase. The reaction product has been identified as palmitoleyl coenzyme A. Evidence is presented to show that in yeast monounsaturated fatty acids are formed primarily by desaturation of the corresponding saturated acid. In resting cells of biotin-deficient strain of yeast the incorporation of C^{14}-acetate into fatty acids is greatly stimulated by addition of biotin to the medium.

THE PHOSPHOLIPID AND PHOSPHOLIPID FATTY ACID COMPOSITION OF HUMAN SERUM LIPOPROTEIN FRACTIONS. G. J. Nelson and

N. K. Freeman (Univ. of California, Berkeley, Calif.). *J. Biol. Chem.* **235**, 578–83 (1960). The phospholipid compositions of human serum lipoproteins have been determined on ultracentrifugally separated serum lipoprotein classes by silicic acid column chromatography and infrared spectrophotometry. The lipoproteins were separated into three classes: $S^{o/f}$ 20–400, $S^{o/f}$ 0–20, and the major high density lipoproteins. The phospholipids were separated into a fraction containing phosphatidyl ethanolamine and phosphatidyl serine, a lecithin fraction, and a sphingomyelin fraction. All phospholipids are present in each lipoprotein class, but their distributions in each class are sufficiently different to be characteristic. Analyses were run on sera from five individuals and only small deviations from the average values were observed. In a few cases the fatty acids of the separated phospholipids were analyzed by gas chromatography.

ZEINOXANTHIN, A CRYSTALLINE CAROTENOL FROM CORN GLUTEN. E. N. Petzold and F. W. Quackenbush (Dept. of Biochem., Purdue Univ., Lafayette, Ind.). *Arch. Biochem. Biophys.* **86**, 163–165 (1960). A crystalline carotenol was prepared from corn gluten by extraction, chromatography, and crystallization from benzene and methanol. The pigment showed no provitamin A activity in assays with rats. Its spectral properties resembled those of α-carotene, while its partition coefficients were similar to those of cryptoxanthin. On magnesia, it adsorbed below cryptoxanthin and above the carotenes. The pigment appears to be a monohydroxycarotenol of the all-*trans*-α-carotene structure, a deoxylutein. Its properties were found to differ from those of synthetic 4-hydroxy-α-carotene only in a lesser adsorptive affinity for lime and a negative test for allylic hydroxyl groups. Evidence indicates that it is widely distributed among corn inbreds and quite abundant in some of them.

DETERMINATION OF 3-β-HYDROXY STEROLS WITH ANTHRONE REAGENT. G. V. Vahouny, R. M. Mayer, J. H. Roe, and C. R. Treadwell (Dept. of Biochem., Geo. Washington Univ. School of Medicine, Washington, D.C.). *Arch. Biochem. Biophys.* **86**, 210–214 (1960). The sterol digitonide complex is freed from excess digitonin by washing with hot acetone—water. The moist precipitate is dissolved in glacial acetic acid, anthrone reagent added, and the mixture heated in a boiling water bath for 12 minutes to develop the color. After cooling under a water tap, the solution is transferred to a colorimeter tube and read at 600 mμ. The color developed is stable for 24 hours if the tube is stoppered and kept in the dark. The specificity and application of the method are discussed.

COMPARISON OF LYMPHATIC ABSORPTION OF DIHYDROCHOLESTEROL AND CHOLESTEROL IN THE RAT. G. V. Vahouny, R. M. Mayer, and C. R. Treadwell (Dept. of Biochem., Geo. Washington Univ. School of Medicine, Washington, D. C.). *Arch. Biochem. Biophys.* **86**, 215–218 (1960). The comparative absorption of cholesterol and dihydrocholesterol (DHC) was studied in lymph fistula rats. DHC was absorbed less efficiently (24–26%) than cholesterol (42-44%) at two dietary levels. For all experimental groups, absorbed cholesterol and DHC were esterified from 84 to 100%. When mixtures of the sterols were administered, cholesterol absorption was inhibited to a greater extent than DHC absorption.

STUDIES ON THE DISTRIBUTION OF LIPIDES IN HYPERCHOLESTEREMIC RATS. 1. THE EFFECT OF FEEDING PALMITATE, OLEATE, LINOLEATE, LINOLENATE, MENHADEN, AND TUNA OILS. J. J. Peifer, F. Janssen, P. Ahn, W. Cox, and W. O. Lundberg (Hormel Inst., Univ. of Minnesota, Austin, Minn.). *Arch. Biochem. Biophys.* **86**, 302–308 (1960). The effect of feeding highly unsaturated fatty acids, or precursors of such polyenoic acids, to hypercholesteremic rats was a marked and rapid depression of plasma cholesterol. This was accompanied by an accumulation of the higher polyenoic acids in heart lipides and in the phospholipides of the liver. The observed effect could not be related to any of the recognized types of essential fatty acid activity.

DETECTION OF SPECIFIC LIPIDS IN MYCOBACTERIA BY INFRARED SPECTROSCOPY. D. W. Smith, H. M. Randall, A. P. MacLennan, R. K. Putney, and S. V. Rao, (Dept. of Medical Microbiology, Univ. of Wisc., Madison, and H. M. Randall Lab. of Physics, Univ. of Mich., Ann Arbor). *J. Bacteriol.* **79**, 217–229 (1960). Using a combination of column chromatography and infrared spectroscopy, analysis of some 70 strains of mycobacteria has shown that many of the lipids found are common to all strains (nonspecific). Among these substances are fatty acids, representatives of the mycolic acid family, and mono-, di-, and triglycerides. Six specific lipids have been identified: phthiocerol dimycocerosate (human and bovine); Ga (glycolipid in photochromogens); Gb (glycolipid in bovine); Jav (glycolipid peptide in avian); Jat (glycolipid peptide in some scotochromogens); Jabs (lipopeptide in some strains shown to contain either Jat or Jav).

DIETARY CHOLESTEROL AND LIVER VITAMIN A IN NORMAL AND CASTRATED MALE RATS. A. A. Horner and R. A. Morton (Dept. of Biochem., Univ. of Liverpool). *Biochem. J.* **74**, 301–304 (1960). When vitamin A and cholesterol were given together in the diet, liver vitamin A stores were significantly lowered to the same degree in normal and castrated animals. No significant changes in kidney or plasma vitamin A levels were observed. If the animals were given large doses of vitamin A before cholesterol was given, liver vitamin A stores were not affected in either normal or castrated rats. Castration significantly decreased the rate of utilization of liver vitamin A, and in castrates receiving a cholesterol-free diet liver unsaponifiable material was markedly reduced.

THE ROLE OF N-VALERIC ACID IN THE SYNTHESIS OF THE HIGHER SATURATED STRAIGHT-CHAIN ACIDS CONTAINING AN ODD NUMBER OF CARBON ATOMS IN BOVINE MILK FAT. T. Gerson, J. C. Hawke, F. B. Shorland, and W. H. Melhuish (Fats Res. Lab. & Div. of Nuclear Sci., Dept. of Scientific and Ind. Res., Wellington, New Zealand). *Biochem. J.* **74**, 366–368 (1960). The distribution of C^{14} among fatty acids in the milk fat of a lactating cow which had been injected with labelled valerate showed that the saturated acids of similar molecular weight, containing odd and even number of carbon atoms, had closely similar specific activities. Valeric acid is not, therefore, a direct precursor in the formation of acids containing an odd number of carbons. Results suggest that acids up to and including C_{10} are synthesized predominantly in the udder, and that those from C_{13} to C_{18} at some other site such as the liver. The high specific activity of glycerol carbon shows valerate to be glycogenic rather than lipogenic.

THE FATTY ACIDS OF HUMAN FAECAL LIPIDS. A. T. James, Joan P. W. Webb, and T. D. Kellock (National Inst. for Medical Res., Mill Hill, London, N.W. 7). *Biochem. J.* **74**, 21P (1960). The structures of unusual fatty acids not existing in the dietary fat but present in faeces were determined by chromatographic methods. The first unusual component was found to be a mixture of C_{18} monoenoic acids having the double bond in positions 4:5, 5:6, 7:8, 10:11, 11:12, and 12:13. The second was a saturated C_{18} hydroxy acid.

LIPID SYNTHESIS BY HUMAN LEUCOCYTES IN VITRO. A. A. Buchanan (Medical Unit, St. Mary's Hospital, London, W. 2). *Biochem. J.* **74**, 25P–26P (1960). Leucocytes alone synthesized lipid in exactly the same amounts as did the total cells (red- and white-blood cells), showing that the erythrocytes do not synthesize any of the labelled lipid found after incubation of the whole blood with sodium-[carboxy C^{14}]-acetate.

LIPID BIOSYNTHESIS IN HUMAN BLOOD: THE INCORPORATION OF ACETATE INTO LIPIDS BY DIFFERENT TYPES OF HUMAN-BLOOD CELL. C. E. Rowe, A. C. Allison, and J. E. Lovelock (National Institute for Medical Res., Mill Hill, London, N.W. 7). *Biochem. J.* **74**, 26P–27P (1960). Incorporation of radioactivity into the unsaponifiable lipid was proportional to the number of leucocytes in the fraction. In addition, a high incorporation of acetate into the fatty acids of neutral saponifiable lipid was associated with a high leucocyte count. The incorporation into the fatty acids of the phospholipids showed some scatter.

INHIBITION OF LIPID PEROXIDATION IN MICROSOMES BY VITAMIN E. A. L. Tappel and H. Zalkin (Univ. of Calif., Davis, Calif.). *Nature* **185**, 35 (1960). The microsome fraction from rat livers deteriorated by lipid peroxidation at a rate of 0.1 ml. oxygen reacted/mgm. nitrogen/hr. at 37°. Increase in thiobarbituric acid reactants paralleled oxygen absorption during the first 2 hours. Added α-tocopherol at 0.25 mgm./mgm. nitrogen gave 72% inhibition of oxygen absorption and 69% inhibition of thiobarbituric acid reactants. The lipid peroxidation appears to be catalyzed by cytochrome b_5 and other haemochromes present.

BIOSYNTHESIS OF GLYCERIDES IN THE MUCOSA OF THE SMALL INTESTINE. B. Clark and G. Hübscher (Dept. of Medical Biochem. & Pharmacol., Univ. of Birmingham). *Nature* **185**, 35–37 (1960). Using mitochondrial preparations from rabbit intestines, α-monostearin, α,β-dipalmitin, and α-glycerophosphate all stimulated the incorporation of labelled fatty acids into glycerides (90% in tri- and diglycerides) when supplemented with adenosine triphosphate, coenzyme A, reduced glutathione, and magnesium chloride. α-Glycerophosphate gave an apparently greater stimulation than the lower glycerides. Similar studies with rat mitochondria, however, showed relative rates of stimulation of incorporation of labelled palmitate by α-monoglyceride or α-glycerophosphate to be 100:10.

CONFIGURATION OF INOSITOL PHOSPHATE IN LIVER PHOSPHATIDYL INOSITOL. J. N. Hawthorne, P. Kemp, and R. B. Ellis (Dept. of Medical Biochem. & Pharmacol., Univ. of Birmingham). *Nature* **185**, 37–38 (1960). Evidence is presented for the inositol 1-phosphate structure for liver phosphatidyl inositol. Soya phosphoinositide also appears to have this configuration.

''CARCINOLIPIN'': AN ENDOGENOUS CARCINOGENIC SUBSTANCE. J. Hradec (Dept. of Biochem., Oncological Inst., Prague) and J. Kruml. *Nature* **185**, 55 (1960). A factor isolated from egg yolk and from animal tissue which affects protein synthesis was found to produce tumors when injected subcutaneously into rats. The chemical nature of the substance has not been definitely established. It is of lipid nature and seems to also contain a bound phosphorylated pentose. The name ''carcinolipin'' has been proposed. It appears to possess a general role of a growth-promoting factor in tissues, since it has been found to stimulate the growth of young rats and chickens when added to their diet.

INFLUENCE OF INSULIN ON THE INCORPORATION OF 2-C^{14}-SODIUM PYRUVATE INTO GLYCERIDE GLYCEROL IN DIABETIC AND NORMAL BABOONS. N. Savage, J. Gillman, and C. Gilbert (Univ. of Witwatersrand, Johannesburg). *Nature* **185**, 168–169 (1960). Carbon-14 was markedly incorporated into the glyceride glycerol of the liver and plasma and to a much lesser extent into the glycerol of the fat depots of depancreatized baboons. No incorporation occurred in the normal baboon, and administration of insulin to the diabetic animals completely blocked incorporation.

REDUCTION OF INTESTINAL ABSORPTION BY A SYNTHETIC CHEMICAL. J. A. Nissim (Pharmocol. Dept., Guy's Hospital Medical School, London, S.E. 1). *Nature* **185**, 222–224 (1960). Large doses of trimethylhexadecylammonium stearate (a drug proposed for treatment of human alimentary infections) administered to mice brought about the total destruction of mucosal epithelial cells and led to the degeneration and collapse of the whole villus. Smaller doses appeared to reduce the functional efficiency of the mucosal cell probably both in its absorbing as well as its digestive roles. Moderate doses given to a healthy adult male resulted in an increase in bulk and softness of the feces and loss of weight, while larger doses produced mild nausea and fluid stools.

LIPOAMINO-ACIDS: THE QUESTION OF ARTIFACT. J. J. Wren (California Inst. of Technology, Pasadena, and Univ. Chemical Lab., Cambridge). *Nature* **185**, 295–297 (1960). One lipoamino acid, phosphatidylserine, has been isolated from the lipid fraction of many biological materials and its chemical structure established. Experimental evidence shows the presence of phosphorus-free lipoamino acids, some of which are artifacts formed *in vitro* from endogenous amino acids and others which do exist *in vivo*.

DIETARY FATS AND THROMBOSIS T. Geill, P. F. Hansen, and E. Lund (De Gamles By Geriatric Unit, Copenhagen). *Nature* **185**, 330 (1960). Statistically significant differences were observed in the occurrence of thrombosis in a group of 133 hospital patients fed an ordinary hospital diet and a similar group in which the butterfat, margarine, and lard of the diet were replaced with unhydrogenated corn oil and soybean oil.

METABOLISM OF 1-C^{14} LIGNOCERIC ACID IN THE RAT. S. Gatt and B. Shapiro (Dept. of Biochem., Hebrek Univ.—Hadassah Medical School, Jerusalem). *Nature* **185**, 461–462 (1960). About 99% of injected lignoceric acid was removed from the blood within 15 minutes after injection. More than 50% of the activity was found in the liver. Small amounts were present in the lungs and spleen, but no radioactivity was found in the brain and only traces in the adipose tissue. A similar pattern of distribution was observed after 24 hours. Rate of incorporation into the liver lipids and turnover rate of these lipids were much lower than with palmitic acid. After 24 hours, about 8% of free fatty acid was still present in the liver.

A SUBSTANCE IN LINGCOD LIVER OIL WHICH PREVENTS HYPERCHOLESTEROLAEMIA IN CHOLESTEROL-FED CHICKENS. J. D. Wood (Fisheries Res. Board of Canada, Technological Station, Vancouver 8, B. C.) and J. Biely. *Nature* **185**, 473–474 (1960). Lingcod liver oil, corn oil, herring oil, and the free fatty acid and unsaponifiable fractions from each of these oils were added to a diet containing 1% cholesterol and fed to chickens for 9 days. Lingcod liver oil prevented hypercholsterolaemia, but the corn and herring oils stimulated the rise in serum cholesterol concentration. The free fatty acids from all three oils increased the degree of hypercholesterolaemia. The unsaponifiables from herring oil produced a slight increase, those from corn oil no increase, and those from lingcod a decrease in serum cholesterol.

RARE-EARTH FATTY LIVER. F. Snyder, E. A. Cress, G. C. Kyker (Medical Div., Oak Ridge Inst. of Nuclear Studies, Oak Ridge, Tenn.). *Nature* **185**, 480–481 (1960). The maximal increase in liver lipids after a 2-mg./kg. dose of stable cerium was found to occur at 2 to 3 days. Six days after the injection the liver lipids returned to normal. A significant elevation in liver lipids was noted in rats, mice, and hamsters; no fatty livers were seen in rabbits, guinea pigs, chickens, or dogs even after doses of 38 mg./kg.

ABSORPTION OF CHOLESTEROL-4-C^{14} OLEATE. L. Swell, H. Field, Jr., and C. R. Treadwell (Vet. Admin. Center, Martinsburg, W. Va., and Dept. Biochem., School of Medicine, Geo. Washington Univ., Washington, D. C.). *Proc. Soc. Exptl. Biol. Med.* **103**, 263–266 (1960). Cholesterol-4-C^{14} oleate and cholesterol-4-C^{14} were fed in a test meal to lymph fistula rats. Data indicated that free cholesterol was absorbed to a greater extent than esterified cholesterol. The study also provided evidence to support the concept that preliminary hydrolysis is obligatory for absorption of cholesterol esters and that only free cholesterol can enter the intestinal wall. The significance of these findings is discussed.

DIETARY VITAMIN K REQUIREMENT OF THE RAT. M. S. Mameesh and B. C. Johnson (Div. of Animal Nutrition, Univ. of Illinois, Urbana). *Proc. Soc. Exptl. Biol. Med.* **103**, 378–380 (1960). The dietary vitamin K requirement of the coprophagy-prevented growing male rat was found to be 0.1 μg/g. of diet fed as vitamin K_1. This requirement satisfied the needs for maintenance of normal plasma prothrombin levels and for growth.

EFFECT OF CHOLIC AND HYODEOXYCHOLIC ACIDS ON METABOLISM OF EXOGENOUS CHOLESTEROL IN MICE. W. T. Beher, Gizella D. Baker, and W. L. Anthony (Edsel B. Ford Inst. for Medical Res., Henry Ford Hospital, Detroit, Mich.). *Proc. Soc. Exptl. Biol. Med.* **103**, 385–386 (1960). In the female mouse fed a cholesterol-free diet, a supplement of 1% cholesterol did not alter liver or carcass cholesterol levels. However, 1% cholesterol plus 0.5% cholic acid brought about large increases in liver and carcass cholesterol levels. Hyodeoxycholic acid reversed the effect of cholic acid and prevented cholesterol accumulation. Possible explanations for this action of hyodeoxycholic acid are discussed.

WATER, NEUTRAL FAT AND SOLIDS OF ADIPOSE TISSUE. A. A. Pandazi, J. K. Herrington, D. P. Schlueter (Dept. of Physiology, Marquette Univ. School of Medicine, Milwaukee, Misc.). *Proc. Soc. Exptl. Biol. Med.* **103**, 394–396 (1960). Peri-renal adipose tissue of rats was found to contain varying amounts of water, neutral fats, and solids. The absolute amount of these constituents was a function of weight of tissue. Cold exposure, in addition to depleting adipose tissue of neutral fat, also decreased water content of fat-free solids. Water and solids varied directly with each other and both varied inversely with the amount of neutral fat present. It appeared that water present in adipose tissue was located in tissue solids and not associated directly with neutral fats. When neutral fats were added to adipose tissue, they were added independently of water.

EFFECT OF DIETARY PROTEIN QUALITY ON ALTERATION OF SERUM PROTEINS AND LIPOPROTEINS IN THE RAT. E. S. Erwin (Dept. of Animal Science, Univ. of Arizona, Tucson). *Proc. Soc. Exptl. Biol. Med.* **103**, 396–398 (1960). Serum proteins and lipoproteins were fractionated in sera from male and female rats fed purified rations containing casein, lactalbumin, gluten, and zein, respectively, as the primary protein source. Almost all lipo- and serum protein fractions were affected by sex. Type of dietary protein markedly altered the fractions of lipoproteins. Results suggested that the influence of dietary protein quality on serum cholesterol is mediated through alteration of quantity and type of serum lipoproteins. That is, dietary protein affects the transportation mechanism for cholesterol and probably does not contribute to its synthesis.

EFFECT OF BETA-AMINOPROPIONITRILE AND CHOLESTEROL ON LIPIDS AND AORTIC S^{35}-SULPHATED MUCOPOLYSACCHARIDES IN COCKERELS. K. Kowalewski (Univ. of Alberta, Edmonton, Alberta, Canada). *Proc. Soc. Exptl. Biol. Med.* **103**, 433–435 (1960). Beta-aminopropionitrile (Lathyrus factor) alone, or combined with cholesterol was added to the diet of cockerels for 4 weeks. Normal diet or cholesterol rich diet was fed to control birds. BAPN feeding resulted in deformities of extremities and frequent death from aortic rupture. These changes were not influenced by the addition of cholesterol to the diet. BAPN had no effect on lipid content in serum, liver, or aorta. Alteration in lipid pattern was obtained only with cholesterol rich diet. Parallel to increase of lipids in tissues there was a significant rise of S^{35} uptake by sulphated mucopolysaccharides of the aorta in cholesterol fed birds.

Poultry treatment for skin pigmentation. N. F. Kruse and W. W. Cravens (Central Soya Co., Inc.). *U. S. 2,924,525.* Soybean oil containing xanthophyll is alkali-refined to form soapstock containing at least 400 units of xanthophyll per gram. The soapstock is separated from the refined oil, dried, and added to poultry feed at a concentration of at least 1%.

Method of treating hypercholesterolemia with d-thyroxine. L. D. Bechtol (Baxter Labs., Inc.). *U. S. 2,925,364.* The administration of d-thyroxine and its therapeutically active salts is beneficial in the treatment of hypercholesterolemia without substantially increasing metabolic rates.

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• Paints and Drying Oils

Polymerization of drying oils. C. Boelhouwer, E. F. Boon, M. Tels, and H. I. Waterman. *Compt. rend. congr. intern. chim. ind., 31^e, Liège, 1958* (Pub. as *Ind. chim. belge, Suppl.*) 2, 556–63 (1959). Oxygen is required for the polymerization. For linseed oil polymerized for 15 minutes at 330° or 45 minutes at 300°, a mixture of 70% SO_2 and 30% air gave the highest viscosity. The oil, polymerized at 300° under nitrogen, was separated by molecular distillation into triglycerides 46, triglyceride polymers 49, and free fatty acids 5%. The methyl esters of saponified triglycerides contained monomers (0.3 rings/molecule) 39 and dimers (2.2 rings/molecule) 7%. The methyl esters of saponified triglyceride polymers contained monomers (0.3 rings/molecule) 24 and dimers (2.5 rings/molecule) 25%. A possible mechanism for SO_2 catalysis is the addition of SO_2 to a double bond to form a conjugated sulfone, from which SO_2 splits off at high temperature. Evidence is offered that the catalyst is homogeneous; the amount of diene formed is equal whether the oil-SO_2 interface is large (by agitation) or small. An apparatus for the continuous polymerization of linseed oil is described. (*C. A.* **54**, 4002)

Increasing viscosity of copolymers. P. J. Berkeley, Jr. (Esso Res. & Eng. Co.). *U. S. 2,925,449.* About 75 to 100 parts of butadiene are copolymerized with about 25 to 0 parts of styrene at a temperature of 20–100° in the presence of a finely divided alkali metal catalyst and an inert hydrocarbon diluent to form a drying oil. Addition to the reactor feed of about 30 to 500 p.p.m. of a dihydroxy aromatic compound (on reacting butadiene) will increase the molecular weight of the drying oil.

Emulsion copolymerizate of heat-bodied glyceride oils and vinylic monomers. J. G. Kingston and R. F. Schwartz (The Glidden Co.). *U. S. 2,926,151.* A mixture of about 20 to 95 parts of heat bodied glyceride oil and about 5 to 80 parts of at least one monomeric copolymerizable vinylic compound (styrene, vinyl toluene, divinyl benzene, etc.) is emulsion polymerized at temperatures between about 125°F. and 200°F. with an aqueous alkaline medium as the continuous phase and the organic mixture as the dispersed phase. The reaction requires a period of about 4 to 72 hours in the presence of a peroxide polymerization catalyst.

Preparation of interpolymers of blown oils and vinyl chloride-vinyl acetate mixtures. R. M. Christenson (Pittsburgh Plate Glass Co.). *U. S. 2,926,153.* A mixture of 10 to 30% by weight of blown, unsaturated glyceride oil (soya or linseed) and 70 to 90% of a vinyl chloride-vinyl acetate mixture is heated in the absence of diluents and under pressure at least equal to that autogenously generated by reaction at temperatures of 50–100° for a period of 1 to 30 hours. An organic peroxide is used as catalyst. The resulting product is xylene soluble and suitable for use as a coating medium.

Dry, friable molding batch with thermosetting properties for foundry work. M. Lottermoser (Croning & Co.). *U. S. 2,927,032.* The molding batch consists of a dry nontacky mixture of 100 parts by weight of a granular refractory material with 2 to 25 parts by weight of powdered coagulated oxidized products of oil having at least semi-drying properties and powdered elemental sulphur (20 to 70% by weight of coagulated products).

Protective coating composition. A. L. Seaver III. *U. S. 2,927,036.* A coating which forms a clear, stable film upon drying and which is readily removable from the surface to which it is applied, has the following formulation: 10 to 25% cellulose acetate butyrate dispersed in organic solvent, 8 to 18% plasticizer, and 0.2 to 1.5% soybean lecithin.

Modified-hydrocarbon resin esters. F. P. Greenspan and R. E. Light, Jr. (Food Machinery & Chem. Corp.). *U. S. 2,927,934.* An ester is formed by the reaction of 50 to 15 parts of an epoxidized Diels-Alder polycyclopentadiene (3 to 6 cyclopentadiene units and an epoxy functionality of 2 to 4) with 50 to 85 parts of a fatty acid having 4 to 24 carbon atoms.

Protective coatings for iron and steel. H. N. Copthorne. *U. S. 2,927,089.* About 30% to 65% by weight of a fatty acid having 16 to 40 carbon atoms is reacted with 30% to 65% by weight of litharge and 2% to 10% sulfur. The resulting product (about 30% by weight) is combined with about 35% of calcined gypsum, 15% of phenol-formaldehyde varnish, and sufficient volatile thinner to impart a consistency for coating iron and steel.

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• Detergents

Meccaniche-Moderne process for manufacturing pure plodded household soap containing 62% of fatty acids. Anon. *Indian Oil & Soap J.* 25, 181–4 (1959). A machine has been developed capable of cooling down soap and making a continuous bar of it. This method reduces the possibilities of selecting raw material compelling the soap makers to use only that material which will give a hard soap, e.g., high titer tallows, palm oils, palm kernel oils or copra. Two consequences of this phenomenon are (a) a better behavior of the soap, and (b) no deformation of the soap on aging.

The effect of synthetic detergent on keratin. E. Cianetti and S. Felici (Univ. Rome) *Rass. chim.* **10**(1), 7–9 (1958). One gram samples of keratin were put into aqueous detergent solutions containing 5% active material, stirred occasionally for 1 hr., and undissolved keratin was recovered by filtering the solution through a tared filter. The tests were repeated with 5 g. keratin in 100 ml. 1% detergent solutions. The solubilization of keratin in 5% detergent solution (1 g. keratin in 100 ml.) is suggested as a test for harshness, with 40% solubilization suggested as the maximum acceptable. (*C. A.* **54**, 3967)

Low foam nonionic surfactants. J. Dupre, R. E. Wolfrom and D. R. Fordyce (Rohm & Haas Co., Bristol, Penn.). *Soap Chem. Specialties* **36**(2), 55–8, 91–3; (3) 55–6, 112 (1960). Nonionic surfactants which have very low foaming properties even under severe agitation and at the same time still have useful surface active properties, are prepared by introducing a second hydrophobic group into a conventional surfactant. In this test, the capacity of a built surfactant to prevent soil deposition, spotting and filming on clean glasses included with a soil containing load is measured. With the modified nonionics, the presence of two hydrophobic groups could prevent close vertical packing at the surface and thereby reduce the intermolecular hydrogen bonding between the surface molecules and thus give a weaker surface film. The modified nonionics can be used in mixture with high foam surfactants where they reduce foaming. The low foam properties in combination with good wetting and detergency and defoaming characteristics suggest that these modified nonionics would be useful in spray metal cleaning and textile wetting.

Titrimetric equivalent of hydrophobic substances. L. Kaertkemeyer. *Ind. chim. belge Suppl.* 2, 538–42 (1959). Nonionic surfactants in ethanol are titrated with water to a turbidity end point which is determined for a range of temperature (20 to 80°). The volume of water plotted vs. temperature gives a characteristic curve for each material, from which the nature of the hydrophobic group and the chain length can be determined. A formula is given, relating (for a fixed temperature) the volume of water with the molecular weight of ethylene oxide condensates (I) of alkyl phenols. Curves are given for I of fatty acids and alcohols. The method can also be used for alkylbenzenes, such as decyl- and dodecylbenzene, and hydrocarbons, such as nonenes and isoöctane. (*C. A.* **54**, 5130)

Infrared study of some organic salts in solution. Cyclohexylammonium salts of detergents. C. LaLau and E. A. M. F. Dahmen (Koninklijke/Shell-Lab., Amsterdam). *Spectrochim. Acta* **1957**, *Suppl.* 594–600. The use of infrared methods for the study of commercial detergents, such as alkyl sulfonates, alkyl-aryl sulfonates, and monoalkyl sulfates, requires the conversion of these into derivatives which are soluble in the organic solvents employed. Cyclohexylammonium salts, which can be prepared from the original Na salts and cyclohexylammonium chloride, satisfy the requirement. At 1500–3200 cm.$^{-1}$ these salts display the spectral features of the NH_4^+ group so that the presence of the ion-pair molecules is indicated. At 500–1300 cm.$^{-1}$ bands assignable to internal vibrations of the SO_4^- group are found, amongst others. One or more bands observed around 800 cm.$^{-1}$ in the spectra of monoalkyl sulfates were interpreted as due to vibrations essentially involving a stretching of the covalent S–O bond. Marked differences between the spectra according to the physical state (solution or solid) are related to rotational isomerism. Some applications of the spectra are indicated. (*C. A.* 54, 5130)

Selective Adsorption studies by radio tracer technique: selective adsorption of labeled alkali p-dodecylbenzene sulfonate S^{35} or labeled potassium hexadecanoate C^{14} at the air-solution interface of aqueous solutions of surfactant mixtures. K. Shinoda and K. Mashio (Yokohama Nat. U., Yokohama, Japan). *J. Phys. Chem.* 64, 54–7 (1960). In the present investigation, the selective adsorptivity was determined from the measurements of (1) the ratio of counts from the dried samples of collapsed foams to those from solutions and (2) the concentration of collapsed foams. Selective adsorptivities of alkali-*p*-dodecylbenzene sulfonate to sodium dodecyl sulfate, potassium dodecanoate and potassium tetradecanoate were 35–50, 180–280 and 5–6, and that of potassium hexadecanoate to potassium dodecanoate and potassium tetradecanoate were 50–66 and 5–8, respectively. The concentration of detergent in a collapsed foam was 6 times greater than in a solution of sodium dodecyl sulfate. The concentration of radio-active sodium *p*-dodecylbenzene sulfonate in collapsed foams was about 125–155 times larger than in the original solution in the case of mixture with sodium dodecyl sulfate.

History and development of syndets. T. V. Subba Rao (The Tata Oil Mills Co., Ltd.). *Indian Oil & Soap J.* 25, 167–74 (1959). The development of the catalytic hydrogenation process for the conversion of fatty acids into fatty alcohols, and of detergents based on fatty alcohols derived from various natural glyceride oils is reviewed. It is the surpassing detergent properties possessed by alkyl sulfates which have stimulated research to develop economic commercial processes for large scale manufacture of syndets.

Paper chromatography of anionic surface active agents. Noriyuki Yamamoto, Iwao Shimamoto, and Masahisa Kobayashi (Sun Star Tooth Paste Co., Ltd., Takatsuki, Osaka). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) 62, 1549–51 (1959). Anionic surfactants were chromatographed on paper after removing inorganic salts by filtration after boiling with ethanol, treatment with cation exchange resin, and hydrolysis with HCl or H_2SO_4. The coloring agent used was Pinacryptol Yellow. Several developing solvents were used and R_f values were given for Na lauryl sulfate, Na lauryl triethylene glycol ether sulfate, Na lauroglyceryl sulfate, Na lauryl benzene sulfonate, Na di-isobutyl phenol diethylene glycol ether sulfonate, Na butyl naphthalene sulfonate, Na oleylmethyl tauride, Na oleyl isethionate, Na lauryl sulfoacetate, and Na dioctyl sulfosuccinate.

High polymers as the detergent. Detergency of water-soluble high polymers for cotton fabrics. Tetsuya Matsukawa (Ochanomizu Univ., Tokyo). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) 62, 1584–8 (1959). A new method of evaluating detergency was devised in which dust-treated cotton fabric was immersed in aqueous solution of high polymers (starch, methylcellulose, polyvinyl alcohol, polyvinyl alcohol acetate, polyvinyl methyl ether, carboxymethyl cellulose, carboxymethyl starch, Na alginate, copolymer of polyvinyl acetate and maleic anhydrodie, and copolymer of polyvinyl methyl and maleic anhydride), and then washed with water or detergent solution. *Ibid.*, 1892–7. The above method was applied to soap solutions and mixtures of soap and high polymers with excellent results.

Precipitating of low-sulfonated lignin in the SO_2-hydrotropic cooking black liquor by cation active surfactants. Junzaburo Yamamoto, Hiroshi Asaoka, and Kanemichi Suzuki (Tôhoku Pulp Co., Ltd., Akita). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) 62, 1600–2 (1959). The ability of precipitating the lignin was in the order: trimethylalkylammonium chloride < dimethylbenzylalkylammonium chloride < $C_{17}H_{35}NH_2CH_2COOH$. The size of alkyl (C_{12}–C_{18}) had no effect on this precipitability.

Orientation of micelles in commercial soaps. Yasuaki Nakaido (Gumma Univ., Kiriu, Gumma-ken). *Kôgyô Kagaku Zasshi* (J. Chem. Soc. Japan, Ind. Chem. Sect.) 62, 1835–7 (1959). Commercial soaps contained 3 layers, of which the orientation of micelles was different. The X-ray diffraction patterns were discussed.

Effect of counter-ions on the critical micelle concentration. II. Cationic surfactants. Kenjiro Meguro and Tamotsu Kondo (Musashi Univ., Tokyo). *Nippon Kagaku Zasshi* 80, 818–21 (1959). The critical micelle concentration (cmc) was determined for solutions of dodecylpyridonium halides. It was dependent on halogens: 17.4 for chloride, 12.5 for bromide, and 4.5 for iodide (unit of cmc is millimole/liter). The effects were studied of added salts (KIO_3, KI, KCl, KBr, and K_2SO_4) on the cmc of dodecylpyridonium bromide. The effects of counter-ions were in the order $I > Br > SO_4 > Cl > IO_3$.

III. Effects of added salts on the conductance curves of ionic surfactants. *Ibid.* 821–3 (1959). Surfactants studied were Na dodecylsulfate and dodecylpyridonium bromide. The effects of added salts were $LiCl > NaCl > KCl$ in the former surfactant, while they were $KCl > KBr > KI$ in the latter.

IV. Effects of the size of counter-ions. *Ibid.*, 823–5 (1959). Surfactants studied were salts of dodecylsulfate with ammonium, tetramethylammonium, tetraethylammonium, tetrabutylammonium, and 1,6-hexane-N,N′-bistrimethylammonium. The cmc decreased in this order.

A symposium on high-molecular surfactants. High-molecular surfactants. Ryohei Oda (Kyota Univ.). *Kôgyô Kagaku Zasshi* 62, (J. Chem. Soc. Japan, Ind. Chem. Sect.), 62, 1265–8 (1959). A review with 19 references.

High polymerization of alkylene oxide. Junji Furukawa, Teiji Tsuruta, Takeo Saegusa, Ryozo Sakata, Genjiro Kakogawa, Akihiro Kawasaki, and Kunihiro Harada (Kyoto Univ.). *Ibid.*, 1269–73 (1959). New catalysts were found.

Syntheses of surface active agents by polymerization. I. Telomerization of vinyl acetate and acrylamide. Yuya Yamashita, Tetsuo Tsuda, and Tatsuo Ichikawa (Nagoya Univ.). *Ibid.*, 1274–6 (1959).

Polypropylene oxide-ethylene oxide type surface active agents. Susumu Sato, Keizo Sonoda, and Morikata Oyamada (Nihon Fats and Oils Co., Ltd., Amagasaki Hyôgo-ken). *Ibid.*, 1277–86 (1959).

Interaction between nonionic surface active agent and dye, C. I. Acid Blue 120. Yoshio Nemoto and Tatsuro Imai (City Ind. Inst., Nagoya). *Ibid.*, 1286–90 (1959).

Sequestering composition containing a corrosion inhibitor. H. W. McCune (Procter & Gamble Co.). *U. S. 2,921,908.* The corrosive action of certain organic chelating agents such as the amino polycarboxylic acids and salts on aluminum, zinc, and german silver, when used in detergents, can be inhibited by the addition of the monoalkyl polyethylene glycol phosphates having an alkyl chain of 14 to 22 carbon atoms and a polyethylene glycol is preferably diethylene, triethylene, or tetraethylene glycol.

Process for control of product density of spray-dried deagents. R. J. Anderson and L. M. Schenck (General Aniline & Film Corp.). *U. S. 2,923,724.* Detergent salts of ester type compounds are prepared by a modified process which consists of heating at 185–300°C. a carboxylic acid and an alkali metal or tertiary amine salt of a 2-hydroxyalkane sulfonic acid in the presence of a phosphorus compound as a catalyst, under an inert atmosphere of nitrogen, carbon dioxide, or saturated or superheated steam.

Process for control of product density of spray-dried detergent compositions. R. K. Flitcraft, W. B. Satkowski, P. J. Schauer, and R. L. Liss (Montanto Chemical Co.). *U. S. 2,925,390.* Low-sudsing, spray-dried detergent compositions with controlled bulk density containing a non-ionic active constituent and alkaline builders such as tetrasodium pyrophosphate, sodium tripolyphosphates, etc., are prepared with a uniform density by the addition of a small amount of potassium or sodium soaps of higher fatty acids and resin acids to the detergent slurry prior to the spray drying operation.

Antiseptic soap compositions. D. J. Beaver, P. J. Stoffel, and R. S. Shumard (Monsanto Chemical Co.). *U. S. 2,026,141.* Trihalogenated tris-phenols containing like or unlike halogen atoms and their mono-alkali metal salts exhibit antiseptic properties in a detergent composition when present in minor proportions. They do not affect the lathering, cleansing, or physical properties of the detergent composition and neither do they impart an unpleasant odor nor discolor the finished detergent composition.

Detergent composition containing n-tris(methylol) methyl amides. C. H. Schramm (Lever Brothers Co.). *U. S. 2,927,081.* Sudsing properties of either light duty, heavy duty, liquid or powdered detergents are improved by the addition of N-tris (methylol) methyl amide prepared by reacting tris(methylol) methylamine with the corresponding fatty acid, acid chloride or anhydride.