ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: J. Iavicoli, F. A. Kummerow, H. S. Liles, C. C. Litchfield, Louise R. Morrow, E. G. Perkins, and T. H. Smouse

• Fats and Oils

COPPER AND IRON CONTENT OF ICE CREAM AND MELLORINE AND ITS SIGNIFICANCE IN THE DEVELOPMENT OF OXIDATIVE FLAVOR DEFECTS. C. Vanderzant and A. H. Miah (Texas Agr. Exp. Sta., College Sta.). *Food Technol.* 15, 515–20 (1961). An analysis of 107 samples of ice cream and mellorine showed that the chocolate-flavored samples usually contained more copper and iron than the vanilla or strawberry samples. The means of copper content of the vanilla, strawberry, and chocolate samples were, respectively, 0.305, 0.390, and 1.160 ppm. No relation could be established between oxidative flavor defects and the copper or iron content of the samples. The addition of 0.82 ppm of copper after homogenization caused a metallic flavor in vanilla ice cream after 11 days of storage at −25C. When copper was added before homogenization the rate of development of oxidative flavor defects was much slower. Iron did not seem to be involved in the development of a metallic off-flavor.

THE ANALYSIS OF MIXTURES OF ANIMAL AND VEGETABLE FATS. II. THE PAPER CHROMATOGRAPHY OF SOME STEROLS, PROVITAMINS, VITAMINS, AND PENTACYCLIC TRITERPENOID ALCOHOLS. J. W. C. Peereboom, J. B. Roos, and H. W. Beekes (Government Dairy Sta., Leiden, The Netherlands). *J. Chromatog.* 5, 500–14 (1961). The determination of R_f values of several sterols, fat-soluble vitamins, provitamins, and pentacyclic triterpenoid alcohols in the system paraffin/acetic acid-water (84:16) is discussed. There is a nearly linear relation between the R_m (R_f) values and the number of carbon atoms. Some rules are given regarding the effect of the R_f value of the introduction of one or more double bonds into the molecule. The separation of the pairs cholesterol-stigmasterol, β-cholestanol-coprostanol, cholesterol-epicholesterol, lanosterol-dihydroxy-lanesterol, and ergosterol-lumisterol have been achieved.

FATTY ACID COMPOSITION OF MEAT TISSUE LIPIDS. I. Hornstein, P. F. Crowe and H. J. Heimberg (Meat Lab., Eastern Utilization Res. and Development Div., U.S.D.A., Beltsville, Md.). *J. Food Sci.* 26, 581–86 (1961). The lipids extracted from beef and pork muscle were fractionated into triglycerides, cephalins, and a mixture of lecithins and sphingomyelins. The fatty acid composition of these fractions was determined, and the possible effect of phospholipids on meat flavor was evaluated.

THE STRUCTURAL IDENTIFICATION OF SOME NATURALLY OCCURRING BRANCHED CHAIN FATTY ALDEHYDES. G. M. Gray (Lister Inst. of Preventive Medicine, London, England). *J. Chromatog.* 6, 236–42 (1961). Branched chain aldehydes isolated from animal tissues have been shown to belong to either the iso- or anteiso-series of compounds by oxidizing them to corresponding acids and comparing the gas chromatographic behavior of these acids with that of pure synthetic acids of known structure.

IDENTIFICATION, ESTIMATION AND PREPARATION OF FATTY ACIDS BY CIRCULAR PAPER CHROMATOGRAPHY. C. V. Viswanathan, and B. M. Bai (Dept. of Biochem., Indian Inst. of Sci., Bangalore, India). *J. Chromatog.* 6, 264–268 (1961). A comparatively simple and rapid method for the identification, estimation, and preparation of fatty acids has been developed, using reversed phase circular paper chromatography. The method is also suitable for the analysis of "Critical Pairs" of fatty acids and for the preparation of fatty acids. When used at a higher temperature, the method revealed the presence of traces of higher fatty acids in the seeds of *Adenanthera pavonina.*

VOLATILE FLAVOR OF SAUERKRAUT. GAS CHROMATOGRAPHIC IDENTIFICATION OF A VOLATILE ACIDIC OFF-ODOR. Marie L. Vorbeck, L. R. *Mattick*, F. A. Lee, and C. S. Pederson (New York State Agr. Exp. Sta., Cornell Univ., Geneva, N. Y.). *J. Food Sci.* 26, 569–73 (1961). A method is presented for gas chromatographic identification of the chain length and structure of methyl esters of lower-molecular-weight fatty acids. The chemical identity of the "cheese-like" off-odor of sauerkraut was established. Abnormally high concentrations of *n*-propionic, *n*-butyric, and *n*-caproic acids were found in samples of kraut that had been graded low because of this off-odor defect. A very poor sample that had been discarded, contained isobutyric and isovaleric acids in addition to the *n*-propionic, *n*-butyric, *n*-valeric, and *n*-caproic acids. In this sample *n*-butyric acid was found in the largest concentration, 103 ppm.

A SIMPLE PROCEDURE FOR THE ESTIMATION OF TOTAL LIPIDS IN LIQUID EGG WHITE. O. J. Cotterill (Poultry Husbandry, Univ. of Mo., Columbia, Mo.). *Poultry Sci.* 40, 1514–17 (1961). A simple procedure for the estimation of total lipid in egg white is described. The ethyl alcohol, ethyl ether, and petroleum ether extraction technique has been modified to accommodate a larger egg white sample. Subsequently, the extracted fat is weighed on an analytical balance. This procedure was found to recover 90% of the lipids from a yolk contaminated egg white in a concentration range of 0.05 to 0.4% added yolk.

LIQUID-LIQUID PARTITION CHROMATOGRAPHY OF STEROIDS. SYSTEMATIC APPROACH RELATING COLUMN TO PAPER CHROMATOGRAPHY USING THE R_M FUNCTION. P. Kabasakalian and J. M. Talmage (Chemical Res. and Dev. Div., Schering Corp., Bloomfield, N. J.). *Anal. Chem.* 34, 273–5 (1962). A direct extension of R_F data for steroids from paper to partition column chromatography has been made. The practical quantitative range of a series of Zaffaroni-type solvent systems has been described using the generalized R_M function previously reported.

THE KEEPING QUALITY OF OLIVE OIL. X. STORAGE OF REFINED OLIVE OIL IN CANS. R. Gutierrez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 234–238 (1961). Various antioxidants (NYOX 52, G-15, G-16, BHT, and NDGA) were added to refined olive oil and stored at room temperature in open, semi-open, and closed cans. On the basis of peroxide value, Kreiss test, and A.O.M. stability tests, all antioxidants were found effective in prolonging keeping quality. However, organoleptic tests showed the presence of atypical favors whose development could not be retarded by the use of antioxidants.

A COMPARATIVE EVALUATION OF THE ANTIOXIDANT PROPERTIES OF GOSSYPOL, RELATED COMPOUNDS, AND SOME COMMERCIALLY USED PHENOLIC ANTIOXIDANTS IN METHYL OLEATE. M. M. Hafez, M. H. Chahine, and A. S. Radwan (National Research Center, Dokki, Cairo, Egypt). *Grasas y Aceites* 12, 227-233 (1961). Antioxidant activities of gossypol, dianilinogossypol, gossypol acetic acid, mixed tocopherols, BHT, and propyl gallate in methyl oleate were compared by measuring oxygen absorption at 81C and 100C. BHT proved the most effective antioxidant tested. Gossypol, dianilinogossypol, gossypol acetic acid, and propyl gallate were approximately equivalent, but not as effective as BHT. Mixed tocopherols was the least effective antioxidant.

STUDY OF THE WASTE LIQUOR FROM OLIVE OIL EXTRACTION FOR POSSIBLE INDUSTRIAL UTILIZATION. VI. AMINO ACIDS IN THE YEAST TORULOPSIS UTILIS. M. J. Fernandez and J. A. Fiestas (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 161–165 (1961). The proteins from the yeast *Torulopsis utilis* grown in the waste liquor from olive oil mills were analyzed for amino acid content by electrophoresis and paper chromatography. All essential amino acids were present, indicating that the yeast would make a valuable animal feed.

PHYSICAL-CHEMISTRY STUDIES ON GROUND OLIVE PASTES. IX. EFFECT OF SURFACE ACTIVE AGENTS ON OLIVE OIL EXTRACTION LIQUOR. J. M. Martinez, C. Gomez, and C. Janer (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 166–173 (1961). The action of various surfactants on olive oil extraction liquor ("alpechin") was studied. Many anionic and nonionic detergents were effective in suppressing the ability of the liquor to emulsify droplets of oil.

ALTERATION OF OLIVE PRESSCAKE DURING STORAGE. I. CHEMCAL TRANSFORMATIONS. J. Gracian, G. Arevalo, and F. Albi (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 174–189 (1961). Olive presscake was found to undergo two types of chemical change during storage: enzymatic hydrolysis of the fat, and degradation of the nonfatty, nonnitrogen-containing substances. The undesirable properties of sulfur olive oil (obtained by solvent extraction of olive presscake) can be traced to these two causes.

FLAVOR REVERSION IN SOYBEAN OIL. R. Gutierrez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 190–198 (1961). A review.

VEGETABLE PHOSPHATIDES: SOURCES, PROPERTIES, AND USES. G. Loew (Instituto Argentina de Grasas y Aceites, Chile 1192, Buenos Aires, Argentina). *Revista del Centro Quimicos Industriales* **1961**, 34–44. A review.

AMERICAN SOYBEAN OIL: TYPES, QHALITIES, AND COMMERCIAL PRACTICES. VIII. E. M. James (Soybean Council of America). *Lipidos* **20**, 269–274 (1960). A review.

ANTIOXIDANTS IN FOODS. II. C. C. Dalfo. *Lipidos* **20**, 274–283 (1960). A review.

A LABORATORY METHOD FOR CALCULATING THE REFINING LOSS ON SULFUR OLIVE OILS. R. de Castro (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 221–226 (1961). A laboratory method for determining the refining loss on sulfur olive oils is described. Tests on different sulfur olive oils indicated that the refining loss is usually slightly more than twice the F.F.A. percentage.

PHYSICAL-CHEMISTRY STUDIES ON GROUND OLIVE PASTES. X. MECHANISM OF THE ACTION OF SURFACTANTS ON OLIVE OIL EXTRACTION LIQUOR. J. M. Martinez (Instituto de la Grasa y sus Derivados, Seville, Spain). C. Gomez, C. Janer, F. Catalina, and M. L. Janer. *Grasas y Aceites* **12**, 213–220 (1961). The action of various surfactants on oil-water emulsions was studied by electron microscopy and measurement of surface tension. It was shown that the stability of emulsions against surfactant action depended on the amounts of protein and ionic lipids at the interfacial surface.

STUDY OF THE WASTE LIQUOR FROM OLIVE OIL EXTRACTION FOR POSSIBLE INDUSTRIAL UTILIZATION. V. KINETICS OF THE DEVELOPMENT OF TORULOPSIS UTILIS IN THE LIQUOR. J. A. Fiestas (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 57–66 (1961). The kinetics of the development of *Torulopsis utilis* yeast in the waste liquor from olive oil extraction were studied to determine optimum growth conditions, consumption of liquor sugars, and yields.

CORRECT DETERMINATION OF THE FAT CONTENT OF OLIVES. J. Gracian, C. Ruano, and M. del Pilar (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 73–85 (1961). To measure the fat content of olives, the fruit was ground in a hammer mill. A weighed sample of the paste was dried with sodium sulfate and then extracted with petroleum ether. Filtration, and evaporation of the solvent yielded the fat contained in the original sample.

MODIFICATION OF NATURAL FATS BY INTERESTERIFICATION. D. Domingo Martin (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 126–133 (1961). A review.

SEPARATION OF "CRITICAL PAIRS" OF FATTY ACIDS BY PAPER CHROMATOGRAPHY. M. Aparicio (Centro de Investigaciones Biologicas, Madrid, Spain). *Grasas y Aceites* **12**, 109–114 (1961). The fatty acid "critical pairs" lauric-linolenic and myristic-linoleic were separated by paper chromatography using undecane-acetic acid-water, undecane-methanol-water, and undecane-dioxane-water solvent systems. Palmitic-oleic mixtures could not be separated with these solvent systems, but could be resolved by an undecane-acetylnitrile-water system.

PHYSICAL-CHEMISTRY STUDIES ON GROUND OLIVE PASTE. VIII. THE RECOVERY OF OIL FROM FOOTS BY MEANS OF SURFACE-ACTIVE AGENTS. J. M. Martinez, C. Gomez, and C. Janer (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 118–122 (1961). Chemical and microscopic studies showed that olive oil foots (tank settlings) consist of an oil-in-oil emulsion in which the two phases are separated by lipoproteic membranes. Certain surfactants which destroy these membranes were used to recover the oil from the foots.

HYDROXYL NUMBER OF THE UNSAPONIFIABLE MATERIAL AS A TEST FOR RE-ESTERIFIED OILS IN OLIVE OIL. J. Gracian and J. Martel (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 123–125 (1961). The hydroxyl number of the unsaponifiable fraction was determined on a number of olive oils produced by re-esterifying high F.F.A. olive oils or distilled olive oil fatty acids with glycerol. Re-esterified oils made from distilled fatty acids showed an abnormally low unsaponifiable hydroxyl number, due to the loss of unsaponifiable material during distillation.

A MODIFIED TECHNIQUE FOR VIZERN'S TEST FOR OLIVE OIL. J. Espejo (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* **12**, 115–117 (1961). Vizern's test for detecting the presence of solvent-extracted olive oil in virgin olive oil was found to give more reliable results when the unsaponifiable fraction of the oil was used instead of the oil itself.

FURTHER STUDY OF THE LIPIDS FROM PITHOMYCES CHARTARUM (SPORIDESMIUM BAKERI) AND RELATED FUNGI. L. Hartman, Isobel M. Morice, and F. B. Shorland (Dept. of Sci. and Ind. Res., Wellington, New Zealand). *Biochem. J.* **82**, 76–80 (1962). The fatty acid composition (molar percentages) of the lipids from *Stemphylium dendriticum*, family Dematiaceae, consisted of 52% linoleic, 19% palmitic, and 17% oleic acid as major components, thereby resembling that of the fungal mats and spores of *Pithomyces chartarum*, another member of the same family. In contrast, the fatty acid composition of *Cylindrocarpon radicicola*, from the related Tuberculariaceae family, resembled more that of other fungi previously examined in containing 29% linoleic, 24% palmitic, 27% oleic, and 10% linolenic. The amounts of total sterols in the glyceride fraction of *Pithomyces chartarum* and *Cylindrocarpon radicicola* were found to be from 8.3–9.6% and of free sterols from 5.4–8.4%. where as the corresponding amounts of *Etemphylium dendriticum* were 15.6 and 14.3%. Glycerol was isolated from the glycerides of *Pithomyces chartarum*, their saponifiable fraction consisting predominantly of triglycerides.

PLASTICIZER FOR FAT. J. E. Farbak, H. Gebel, and P. Gibson (Swift & Co.). *U. S. 3,021,221.* A composition suitable for incorporation in an edible vegetable triglyceride oil having a substantial amount of unsaturation consists of: coconut oil, sodium lauryl sulfate, and a fatty acid monoester of a polyhydric alcohol. At least half the amount of the monoester should be monoglycerides of coconut oil.

• Fatty Acid Derivatives

LIQUID GELLING AGENT FOR GASOLINE. J. S. Carson, G. B. Feild, R. E. Kegan, W. H. Markwood, Jr., and F. O. Whitney (Sec'y of the Army, U.S.A.). *U. S. 3,018,252.* The described composition consists of a suspension of an aluminum salt of a single fatty acid containing from 6 to 12 carbon atoms in a liquid such as isopropanol; butyl acetate; isopropanol containing from 1 to 2.5% ethyl cellulose; mixtures of isopropanol and ethylene chloride, ethylene glycol, carbon disulfide or nitrobenzene; mixtures of butyl acetate and ethylene chloride; mixtures of n-butanol and ethylene chloride; or mixtures of ethylene glycol and hexylene glycol. The solids content of the composition lies in the range of 10 to 40% by weight.

GREASE COMPOSITION. D. F. Hallowell, Jr. (Richfield Oil Corp.). *U. S. 3,020,233.* The described composition consists of a lubricating oil thickened to a grease consistency with a soap selected from the group consisting of alkali metal and alkaline earth metal fatty acid soaps, and from about 0.25 20% of monostearoyl tetraethylene pentamine silicate.

• Biology and Nutrition

LIPOLYTIC ACTIVITY OF MICROORGANISMS AT LOW AND INTERMEDIATE TEMPERATURES. III. ACTIVITY OF MICROBIAL LIPASES AT TEMPERATURES BELOW 0C. J. A. Alford and D. A. Pierce (Eastern Utilization Res. and Development Div., U.S.D.A., Beltsville, Md.). *J. Food Sci.* **26**, 518–24 (1961). The lipolytic activity at −7, −18, and −29C of strains of *Pseudomonas fragi, Staphylococcus aureus, Geotrichum candidum, Candida lipolytica, Penicillium roqueforti* and an identified *Penicillium sp.* in emulsions of corn oil, coconut oil, and lard was determined. The action was measured by titratable acidity and quantitative determination of the fatty acids by gas chromatography. In general, the lipases from these organisms showed considerable activity within 2 to 4 days at −7C and within a week at −18C. At −29C, activity was evident within 3 weeks in some cases. The rate of hydrolysis in frozen substrates was directly related to their degree of unsaturation.

INFLUENCE OF IRRADIATED BACON LIPIDS ON BODY GROWTH, INCIDENCE OF CANCER, AND OTHER PATHOLOGIC CHANGES IN MICE. Margaret S. Dixon, D. L. Moyer, L. T. Zeldis, and R. W. McKee (Dept. of Physiological Chem., School of Med., Univ. of Calif., Los Angeles). *J. Food Sci.* **26**, 611–17 (1961). Uncured bacon irradiated with 5.58 megarads of gamma rays was compared with similar uncured, unirradiated bacon by feeding to 757 mice. There were no major differences between the control and experimental groups. The incidence of spontaneous cancers showed no significant differences among the diet groups and indicates that irradiation of the bacon did not produce carcinogens or growth-altering substances demonstrable under the conditions of these experiments.

A NEW PAPER CHROMATOGRAPHIC SYSTEM FOR THE RESOLUTION OF 17-KETOSTEROIDS. S. Katy and J. R. Broich (Dept. of Biochem., Yeshiva Univ., New York, N. Y.). *J. Chromatog.* **6**, 514–17 (1961). A paper partition chromatographic system for the resolution of 17-ketosteroids is described which employs

n-heptane as the mobile phase and dimethyl sulfoxide as the stationary phase. This system has several advantages over the Zaffaroni types in current use, namely a development time of 2.5–24 hours for 17-ketosteroids. It affords excellent resolution and the solvents used do not interfere with the characterization tests.

THE CHROMATOGRAPHY OF PHOSPHATIDES ON SILICIC ACID IMPREGNATED FILTER PAPER. M. H. Hack (Depts. of Medicine and Anatomy, Tulane Univ., New Orleans, La.). *J. Chromatog.* 5, 531–38 (1961). Techniques for the uniform impregnation of filter paper with silicic acid for the chromatography of phosphatides under controlled conditions are described.

THE ENERGY VALUE OF FATS AND FATTY ACIDS FOR CHICKS. 2. EVALUATED BY CONTROLLED FEED INTAKE. R. J. Young and N. R. Artman (Procter and Gamble Co., Miami Valley Labs., Cincinnati 39, Ohio). *Poultry Sci.* 40, 1653–62 (1961). Certain fats were evaluated by a method whereby all chicks were carefully restricted to the same feed intake. The utilizable energy in various fats and fatty acids was determined by comparing the growth responsess of chicks fed the test fats to growth responses of chicks fed graded levels of soybean oil. This biological evaluation of these fats gave utilizable energy values which were in good agreement with the metabolizable energy values and absorbability values. The absorbability values of these fats were not affected by restricted feeding or the level of fat in the diet. The restricted feeding technique was used to evaluate the utilizable energy value of intact and hydrolyzed fats. The utilizable energy values of soybean oil fatty acids, lard, and lard fatty acids were found to be similar to their respective metabolizable energy values. Beef tallow and beef tallow fatty acids showed utilizable energy values slightly higher than their metabolizable energy values.

EFFECTS ON SERUM-CHOLESTEROL LEVEL OF CHANGES IN DIETARY FAT COMPOSITION AND OF ADMINISTRATION OF VITAMINS, THYROID, AND OTHER SUBSTANCES. O. Turpeinen and S. G. Jokipii (Kustaankartano Home for the Aged, Helsinki, Finland). *J. Atherosclerosis Res.* 1, 307–16 (1961). The subjects studied were female inmates in a home for the aged. While consuming the ordinary house diet, their mean serum cholesterol level was 244 mg/100 ml. Attempts were made to lower this level by changing the fat composition of the diet or by administering vitamins, desiccated thyroid, and other substances while the house diet was maintained. The house diet was replaced by a low-fat diet to which were added 50 g daily of 1) soybean oil, 2) rapeseed oil, or 3) butterfat. The diets (1) and (2) caused a large decrease in serum cholesterol, while the diet (3) caused no significant change. When whole milk in the house diet was replaced by an emulsion of soybean oil in skimmed milk, and butter and margarine were replaced by a special unsaturated margine, serum cholesterol values fell moderately. The subjects were given certain biologically active substances while the house diet was maintained. Administration of vitamin A, α-tocopheryl acetate, pyridoxine hydrochlorirde, inositol, and potassium iodide had no effect on serum cholesterol; dessicated thyroid caused a very marked decrease.

A STUDY OF THE ATAXIAS OF VITAMIN A AND VITAMIN E DEFICIENCIES IN THE CHICK. M. L. Scott and G. S. Stoewsand (Dept. of Poultry Husbandry, Cornell Univ., Ithaca, N. Y.). *Poultry Sci.* 40, 1517–23 (1961). Encephalomalacia in the chick is prevented by supplementing a vitamin E deficient pro-oxidant containing diet with α-tocopherol, α-tocopheryl acetate, or diphenyl-p-phenylenediamine (DPPD). In the presence of α-tocopheryl acetate the ataxia was shown to be caused by a deficiency of vitamin A. Since the ataxic symptoms of vitamin A deficiency and encephalomalacia are similar, it is difficult to distinguish these deficiency diseases by gross examination of the chicks. Histological examinations of the cerebellum of vitamin E deficient chicks usually show hemorrhages and edema within the molecular and/or granular layers, pyknosis and eventual disappearance of the Purkinje cells and separation of the molecular and granular layers of the cerebellar folia. None of these lesions was observed in chicks suffering from vitamin A deficiency. On the other hand, vitamin A deficient chicks always showed depleted vitamin A liver stores which usually were accompanied by increased urate deposits in the kidney and ureters.

EFFECT OF STERCULIA FOETIDA OIL ON MORTALITY OF THE CHICK EMBRYO. D. L. Schneider, M. G. Vavich, A. A. Kurnick and A. R. Kemmerer (Dept. of Ag. Biochem. and Poultry Sci., Univ. of Ariz., Tueson). *Poultry Sci.* 40, 1644–8 (1961). Supplementing as little as 25 mg. of *Sterculia foetida* oil per day in the diet of laying hens increased the mortality of the developing embryos to over 80% by the last day of incubation. The possible relationship of the active factor in *Sterculia foetida* oil with that found in crude cottonseed oil is discussed.

THE EFFECT OF CHOLESTEROL FEEDING ON THE OXYGEN CONSUMPTION OF AORTIC TISSUE FROM THE COCKEREL AND THE RAT. A. F. Munro, B. F. Rifkind, H. J. Liebescheutz, R. S. F. Campbell, and B. R. Howard (Glasgow Univ. Veterinary School, Glasgow, Scotland). *J. Atherosclerosis Res.* 1, 296–306 (1961). The oxygen consumption, *in vitro*, of segments from different levels of the aorta taken from cockerels receiving either an ordinary or an atherogenic diet has been measured and compared. The oxygen consumption of the aorta from rats, a species relatively resistant to experimental atheromatosis, receiving either an ordinary or a cholesterol-supplemented diet was also studied. The thoracic area of the cockerel aorta on either type of diet had a lower oxygen consumption than the other segments of the vessel. Cholesterol feeding of the cockerel resulted in a lower oxygen uptake for all levels of the aorta. In the rat, cholesterol feeding resulted in a higher oxygen uptake of the aorta. No differences were found in the overall oxygen consumption between live cockerels or rats fed ordinary diets, and the corresponding animals on cholesterol-supplemented diets. These results, in conjunction with other reported studies, suggest that atheromatous lesions occur in those areas of the vessel wall with higher oxygen uptakes.

EFFECT OF TYPE OF DIETARY FAT ON PLASMA AND LIVER CHOLESTEROL CONCENTRATION IN FEMALE CHICKS. E. C. Miller, H. Menge, and C. A. Denton (U. S. Dept. of Ag., Animal Husbandry Res. Div., Beltsville, Md.). *J. Nutrition* 75, 367–72 (1961). Female chicks were fed a basal diet supplemented with 0.5% of cholesterol and 3% of fat or oil. The addition of 3% of fat or oil to the diet without cholesterol supplementation did not increase plasma or liver cholesterol concentration. When 0.5% of cholesterol was added to the diet, the type of oil fed had a definite effect on plasma and liver cholesterol concentration. There was no significant difference in the plasma cholesterol level of groups receiving the cholesterol supplement and fed either lard or vegetable oil. These groups, fed either lard or vegetable oils, had significantly higher plasma cholesterol levels than any of the groups fed fish oil. Although adding fish oils to the diet of cholesterol-fed chicks resulted in lower plasma cholesterol levels than when other oils were fed, only the groups fed red-fish oil had a significantly lower liver cholesterol concentration. No significant reduction in plasma or liver cholesterol resulted from adding vanadium to the diet. Both feed consumption and rate of growth were decreased by the addition of 50 ppm of vanadium to the diet.

DESTRUCTION OF VITAMIN E IN COTTONSEED OIL. L. J. Machlin (Lab. of Biochem. and Nutrition, Monsanto Chemical Co., St. Louis, Mo.). *Poultry Sci.* 40, 1631–2 (1961). Addition of 0.25 to 2.0% lauryl peroxide to cottonseed oil followed by heating to 115C resulted in destruction of most of the vitamin E with no detectable destruction of linoleic acid. Feeding of cottonseed oil treated with 0.5% lauryl peroxide resulted in 88% incidence of encephalomalacia within 20 days. When ethoxyquin was added, no encephalomalacia was observed and growth was the same as birds fed untreated cottonseed oil.

THE EFFECT OF DIETARY FAT AND CELLULOSE ON APPARENT CALCIUM DIGESTIBILITY IN GROWING CHICKENS. F. D. Griffith, R. B. Grainger, and J. J. Begin (Kentucky Ag. Exp. Sta., Lexington, Ky.). *Poultry Sci.* 40, 1492–97 (1961). In this experiment it was found that: (1) apparent calcium digestibility was decreased at the 4.62 and 9.24% dietary fat levels (dietary cellulose zero), (2) apparent calcium digestibility was decreased at the 3, 6, and 12% dietary cellulose levels (dietary fat zero), (3) a fat × cellulose interrelationship at the 2.31 and 4.62% dietary fat levels and at the 3 and 6% dietary cellulose levels had caused an increase in apparent calcium digestibility, (4) percent bone ash was not affected by dietary fat and/or cellulose levels, and (5) there was a highly significant negative correlation between apparent calcium digestibility and the formation of ether insoluble fecal soaps.

IMMUNOCHEMICAL STUDIES OF ORGAN AND TUMOR LIPIDS. X. THE PRESENCE OF A NOVEL LIPIDE HAPTEN, CYTOLIPIN G, IN TUMORS AND TISSUES OF THE GASTROINTESTINAL TRACT. Liselotte Graf, M. M. Rapport, and R. Brandt (Sloan-Kettering Inst. for Cancer Res. and Albert Einstein College of Med., Yeshiva Univ., N. Y.). *Cancer Res.*, 21, 1532–36 (1961). Lipids extracted from human carcinomas of the stomach, small intestine, and colon were fractionated on silicic acid columns and the fractions tested for serological activity with two antisera; one containing anticytolipin H and the other devoid of this antibody but reactive with crude lipids of gastrointestinal tissues, both normal and neoplastic. Two different haptens could be demonstrated, one identifiable with cytolipin H, and the other a novel hapten for which the designation cytolipin G is proposed.

CHOLESTEROL AND PHOSPHOLIPID CONTENT OF HUMAN β-LIPOPROTEIN IN DIFFERENT LIPEMIC STATES AND FOLLOWING MYOCARDIAL INFARCTION. K. Cramer (First Medical Service, Sahlgrenska Sjukhuset, Univ. Goteborg, Sweden). *J. Atherosclerosis Res.* 1, 317–34 (1961). The heparinphenol precipitation technique of Scanu, Lewis, and Page has been found to provide a simple reliable and reproducible method for the isolation of β-lipoproteins from serum. The total cholesterol/phospholipid ratio of β-lipoproteins (β-C/P ratio) isolated by this technique does not change with age in subjects free from clinical manifestations of heart disease. Linoleic acid (up to 40 g daily) in the diet does not influence the β-C/P ratio appreciably. Estrogen in the form of dioxydiethylstilbestrol (15 mg daily) depresses the ratio significantly. On the 2nd day after an acute myocardial infarction the β-C/P ratio is significantly elevated above the normal value. It drops to a level slightly lower than the normal mean in the 3rd week. Re-examination of survivors of acute myocardial infarction in the 3rd month and after the 8th month from the occurrence revealed a signigcantly depressed β-C/P ratio in the last group, also the absolute amount of β-lipoprotein was much increased.

CHARACTERIZATION OF β-LIPOPROTEIN ISOLATED FROM HYDROXYLAPATITE COLUMNS. K. Cramer and I. Brattsten (First Medical Service, Univ. Goteborg, Sweden). *J. Atherosclerosis Res.* 1, 335–44 (1961). Chromatography on hydroxylapatite as described by Hjerten was used for the preparation of β-lipoprotein from human serum. The preparation obtained has been demonstrated to be immunologically homogeneous. A slight contamination with lipid-free proteins was occasionally observed. Ultracentrifugation demonstrated the presence in the preparation of lipoproteins of the density classes 0.96–1.006 and 1.019–1.063. The preparation from one hypercholesterolemic serum contained also lipoproteins of density 1.006-1.019. In free electrophoresis the examined preparations were found to contain approximately 85% of a homogeneous component, together with small amounts of protein with higher mobility. Preparative electrophoresis revealed the existence of not more than 2% of lipid-poor protein, migrating behind the rest of the fraction. The main fraction is divided into two portions, containing 78 and 20%, respectively, of the protein present. Both portions have the lipid constitution of β-lipoprotein. The foremost portion has a higher triglyceride content, but does not show the typical pattern of lipoproteins of density <1.006.

OLIVE SEED PROTEINS. IV. WATER SOLUBLE FRACTION. M. J. Fernandez (Instituto de la Grasa y sus Derivados, Seville, Spain). *Grasas y Aceites* 12, 67–72 (1961). Electrophoretic separation of the water soluble proteins from olive seeds indicated the presence of only one major component. Fractions obtained by acetone, ethanol, and HCl precipitation were analyzed for amino acid content.

ANALYSIS OF LIPIDS FROM FRESH AND PRESERVED ADULT HUMAN BRAINS. A. N. Davison and Martha Wajda (Guy's Hospital Med. School, London). *Biochem. J.* 82, 113–17 (1962). A method for the separation of lipids by chromatography on alumina has been investigated and used to analyze brain lipids. The separated fractions are then analyzed by simple chemical procedures or by chromatography on paper.

THE OXIDATION OF β-CAROTENE IN LINOLEATE-AGAR GELS. J. A. Blain and G. Shearer (Royal College Sci. Technol., Glasgow). *Chem. & Ind. (London)* 1962, 217–18. Butylated hydroxyanisole (BHA), catechol, NDGA, propyl gallate and α-tocopherol were compared by estimating the time of an arbitrary induction period corresponding to a 6% loss of carotene color. This was carried out without catalyst, with hemoglobin, in the reaction system, and with soya extract in the standard reaction volume. BHA was superior to the others for autoxidation and hematin-catalyzed oxidation while NDGA was superior against the lipoxidase-catalyzed reaction. While α-tocopherol was rather better than NDGA in autoxidation, it was ineffective in the catalyzed reactions. Propyl gallate and catechol were ineffective.

THE TOCOPHEROLS. A. L. Bacharach and J. Green (Vitamins Ltd.). *Chem. & Ind. (London)* 1961, 2135. Three tocopherols have been found in wheat germ with the following distribution: α-tocopherol, 56% of total tocopherols; β-tocopherol, 34%; and ε-tocopherol, 10%. The bran contained α-tocopherol, 11%; β-tocopherol, 6%; ε-tocopherol, 68%; and ζ-tocopherol, 15%.

METHOD OF ENHANCING THE XANTHOPHYLL CONTENT OF POULTRY FEEDS. N. F. Kruse (Central Soya Co.). *U. S. 3,020,159.* A xanthophyll concentrate is prepared by distilling orange oil under reduced pressure to obtain a distillation residue containing xanthophyll at a concentration of at least 500 units per gram. The orange oil xanthophyll concentrate is then mixed with a poultry feed material to give a feed containing in excess of 10,000 units of xanthophyll per pound. The concentrate may also be prepared by extracting xanthophyll-containing orange oil with anhydrous methanol.

• Detergents

CONTINUOUS, AUTOMATIC PRODUCTION OF SOAP FROM FATTY ACIDS. G. Zecchi. *Grasas y Aceites* 12, 239–241 (1961). A description of the Mazzoni "SC" process for the continuous production of soap from fatty acids.

DETERGENT COMPOSITION. J. H. Wilson (Lever Bros. Co.). *U. S. 3,017,363.* The described composition consists of a soluble salt of pentadecyl benzene sulfonic acid and a soluble salt of dodecyl benzene sulfonic acid, the two salts being present in the proportion of 1:1 by weight.

DRY CLEANING COMPOSITIONS. R. L. Mayhew, J. P. Miller, and M. Kopp (General Aniline & Film Corp.). *U. S. 3,018,251.* A composition adapted for use in the dry cleaning of textile and fibrous materials consists of a surface active agent mixture for each 100 parts of which there are present at least 25 parts of a polyoxyalkylated dialkenoid fatty amine containing from 14 to 53% alkylene oxide and 30 to 75 parts of an anionic surface active agent.

PROCESS FOR PRODUCING SURFACE-ACTIVE AGENTS FROM SUCROSE. S. B. Crecelius (Economics Lab., Inc.). *U. S. 3,018,281.* One mol of sucrose dissolved in water is reacted with 3 to 8 mols of butylene or propylene oxide at a temperature of 75–80C. The resulting product is reacted with 1 mol of dodecene oxide at temperatures of 100–110C to produce a water soluble surfactant compound.

PRODUCTION OF LIQUID FATTY ACID ESTERS OF SUCROSE ADDITION COMPOUNDS. S. B. Crecelius (Economics Lab., Inc.). *U. S. 3,018,282.* Sucrose is reacted with from 2 to 8 times an equimolar quantity of an aliphatic epoxide compound having from 3 to 18 carbon atoms in water with a strong acid catalyst. The resulting addition compound is reacted with an unsaturated fatty acid chloride having from 12 to 18 carbon atoms at a temperature of 40 to 100C. The resulting ester is diluted with a solvent, the hydrochloric acid neutralized, and the liquid fatty acid ester of sucrose addition compound is separated.

MIRROR BRIGHT GOLD ALLOY ELECTROPLATING. E. C. Rinker (Sel-Rex Precious Metals, Inc.). *U. S. 3,020,217.* A process for the electrodeposition of gold consists of electrolyzing a gold cyanide bath containing, per gallon, the following ingredients: potassium cyanide, 4–16 oz.; potassium gold cyanide, 0.5–4 oz.; potassium hydroxide, 2–6 oz.; antimony compound (calculated as antimony), 0.02–0.5 oz.; polyhydric alcohol, 30–120 cc; sulfonated vegetable oil, 10–90 cc.

CLEANSING COMPOSITION IN DRY GRANULAR FORM. L. D. Dunn. *U. S. 3,020,237.* A dry, pulverulent cleansing composition capable of sudsing, is produced by mixing together until dry about 71 to 87 parts by dry weight of borax and 1 to 6 parts of a potassium soft soap. The soft soap is a potassium soap of a short chain fatty acid comprising a mixture containing at least 70% of fatty acid having from 8 to 14 carbon atoms (at least 60% having from 12 to 14 carbons). Then about 12 to 25 parts of a sodium soap of a long chain fatty acid is added to the mixture. At least 90% of the fatty acid should have from 16 to 18 carbon atoms.

LIQUID DETERGENT COMPOSITIONS. R. B. Doan (Atlantic Refining Co.). *U. S. 3,021,284.* An improved heavy duty liquid detergent composition consists of an aqueous solution of the following ingredients in weight % based on the total weight of the solution: trisodium phosphate, 2.5–5.0; sodium tripolyphosphate, 0–2.5; potassium tripolyphosphate, 5.0–7.5; alkyl benzene sulfonate, 7.5–15.0; laurylethanolamide, 2.5–7.5; and morpholine oleate, 5.0–12.0. The alkyl benzene sulfonate consists of a mixture of 95–70% of a water soluble salt of a mono-alkylated benzene sulfonic acid in which the alkyl group contains from 9 to 15 carbon atoms and 5–30% of a water soluble salt of an alkylated benzene sulfonic acid such as xylene sulfonic acid or ethyl benzene sulfonic acid.

PREPARATION OF SUGAR ESTERS. G. Knafo, R. Fuhrmann, T. E. Neesby, and V. K. Babayan (Drew Chemical Corp.). *U. S. 3,021,324.* A method for making partial esters of sugar polyols having at least 6 hydroxyl groups consists of: dissolving the sugar polyol in an amount of water not more than the polyol; adding an amount of an alkali metal hydroxide, carbonate, or bicarbonate to give a pH of 8 to 11; and introducing the chloride of a higher fatty acid having 8 to 22 carbon atoms in an amount less than that necessary to completely esterify the polyol. By maintaining the temperature between 40 to 50C, a reaction takes place forming partial esters of the sugar polyols.