ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: R. Aguilar B., J. G. Endres, Kazuo Fukuzumi, J. Iavicoli, K. Kitsuta, F. A. Kummerow, Gladys Macy, Louise R. Morrow, E. G. Perkins, T. H. Smouse and J. A. Thompson

• Fats and Oils

CHEMISTRY OF OXYGENATED FATTY ACIDS. A. S. Perlin *et al. National Research Council of Canada Rev.* 1965, No. 8597, 88. A study of the possibility of identifying the 17 isomeric hydroxystearic acids by gas chromatography has been completed. Using hydroxy-esters or their acetates the 2-, 3-, 4-, 12-, 14-, 16-, 17- and 18-isomers can be distinguished by means of an ethylene glycol succinate column. In addition, by analysis of the corresponding keto esters, the 5-, 6-, 7- and 8-isomers can be distinguished using a silicone QF—1 column. To enhance the practical value of the process for producing hydroxy fatty acids by fermentation of long-chain compounds by *Torulopsis magnoliae*, methods for obtaining optimum yields during the purification procedure have been investigated. The best conditions for the conversion of the hydroxy acids to long-chain dicarboxylic acids are also being worked out. The oxygenated acids, *cis*-9,10-epoxyoctadecanoic, *threo*-9,10-dihydroxyoctadecanoic and 8-hydroxyhexadecanoic, have been found in oil from the spores of species of the club moss *Lycopodium*. (Rev. Current Lit. Paint Allied Ind., No. 288).

ECONOMIC PERSPECTIVES OF SOYBEANS IN ARGENTINA. A. Coscia. *Revista de Grasas y Aceites (Buenos Aires)* 1–3, 12–22 (1965). Soybean cultivation is relatively small in Argentina; it is concluded that the possibilities of expanding this industry are favorable not only for a local market but also for exports.

TECHNOLOGICAL TREATMENT OF SOYBEAN AND PEANUT FLOURS FOR THE UTILIZATION OF THEIR PROTEINS. G. Koew. *Revista de Grasas y Aceites (Buenos Aires)* 1–3, 5–11 (1965). Methods of extracting proteins from defatted soybean flour and shelled peanuts are given as well as the analysis of the resulting products and utilization of their proteins.

REPORT ON THE OLIVE OIL INDUSTRY. G. Coppola. *Informaciones sobre Grasas y Aceites (Buenos Aires)* 10, 3–14 (1965). Production figures by country during 1964 are given as well as the situation in the main producing countries.

WORLD EXPORTS OF OLEAGINOUS VEGETABLE OILS AND ANIMAL FATS. E. Zeni. *Informaciones sobre Grasas y Aceites (Buenos Aires)* 9, 33 (1965). Estimates are given of world exports of oils and fats for the period July 1, 1964 to June 30, 1965. Soybean and coconut are the main oils exported with 1.8 and 1.3 million of metric tons, respectively.

WORLD INDUSTRY OF FAT PRODUCTS. STATISTICS AND PROBLEMS. C. A. C. DeBoinville (Unilever Group). *Informaciones sobre Grasas y Aceites (Buenos Aires)* 9, 17–30 (1965). In 1964 the total world production of oils and fats was of 35.6 million tons (1.2 millions more than in 1963). A comprehensive analysis of the world situation of fats and oils is given including production, export and import statistics.

GERMAN MARKET FOR COTTON SEED, SUNFLOWER AND PEANUT OIL. Anon. *Informaciones sobre Grasas y Aceites (Buenos Aires)* 9, 3–8 (1965). Statistics of European imports of oil from 1959 to 1964 are given with emphasis on the German market, its import-export figures, custom taxes and quality specifications.

NOTES ON THE MANUFACTURE OF FAT PRODUCTS BY ESTERIFICATION. III. R. Parlan M. *Lipidos* 25, 119–121 (1965). The esterification of fatty acids with glycerol is described. A diagram of a modern installation is included. Methods for calculating the amounts of raw material and the index of acidity during the operation are presented.

MULTIPUNCTURING OF THE OLIVES. D. D. Arino. *Lipidos* 25, 101–102 (1965). The laceration of the epicarp of the olives by the multipuncturing apparatus increased oil yield.

METHODS FOR LIPID ANALYSIS I. SOLUTION CRITICAL TEMPERATURE. J. M. Cubero, H. K. Mangold and H. H. O. Schmidt. (Univ. Minnesota, The Hormel Inst.). *Grasas y Aceites* 17, 14–18 (1966). By determining the maximum critical temperature of solution with a standard, an unknown lipid can be identified. The technique is described as well as the isorefractive index determination.

PHYSICAL-CHEMICAL STUDIES ON GROUND OLIVE PASTES. XXX. EFFECTS OF SHEARING ON THE CENTRIFUGATION OF PASTES. J. Martinez Moreno, C. Gomez Herrera, C. J. del Valle, J. P. Marin and E. M. Aranda (Inst. de la Grasa y sus Deriv.). *Grasas y Aceites* 17, 11–13 (1966). The oil yields of olive pastes that are sheared and centrifuged in the laboratory are similar to those obtained in industrial plants by pressing. A quick method, based on centrifugation of 1 kg samples, is proposed to estimate oil yields for industrial presses.

STUDY OF OLIVE OIL STABILITY IN POLYETHYLENE FLASKS. R. Gonzalez Quijano (Inst. de la Grasa y sus Deriv.). *Grasas y Aceites* 17, 1–6 (1965). When samples of olive oil were stored for 2 months in polyethylene bottles using glass bottles as controls, the degree of oxidation, as measured by the peroxide number, was higher in the polythylene bottles. All the rest of the organoleptic characteristics were better in the polyethylene stored samples.

FATE OF CHLORINATED ORGANIC PESTICIDE RESIDUES IN THE PRODUCTION OF EDIBLE VEGETABLE OILS. C. M. B. Gooding (Corn Products Company, Bayonne, N. J.). *Chem. Ind. (London)* 1966, 344. To determine whether chlorinated pesticides survive normal processing procedures used in the production of edible vegetable oils, crude cottonseed oil which had been dosed with most of the common chlorinated pesticides was refined in the pilot plant. All pesticides disappeared upon deodorization. Samples were analyzed by standard electron-capture and micro-coulometric techniques.

SAFFLOWER OIL COMPOSITION. R. Erickson (A. C. Grace Co.). *U.S. 3,261,691.* The described composition consists of safflower oil, 1.2–1.5% by weight of a compound such as glycerol mono- or dioleate, and 1.2–1.5% by weight of a sorbitan monooleate polyoxyethylene in which the glyceride of oleic acid and the sorbitan monooleate polyoxyethylene are present in the ratio of 40–60 parts by weight of one to 60–40 parts of the other.

• Fatty Acid Derivatives

PREPARATION OF DICYANOETHYLATED FATTY AMINES. M. C. Cooperman. *U.S. 3,264,341.* A primary fatty amine containing from 8–22 carbon atoms is heated at autogenous pressure with an excess of the stoichiometric amount of acrylonitrile and a proton transfer catalyst such as water, methanol, morpholine and mixtures thereof. The catlyst is present in a quantity of 1–10% by weight based on the total weight of the reactants. Heating is carried out in two stages: the first stage of maintaining temperatures of 100–130C from about 1 hour and the second stage of maintaining temperatures of 135–180C for about 3–40 hours.

LIQUID ANHYDROUS STANNOUS SOAP COMPOSITIONS. L. M. Edwards and O. E. Loeffler (M.T. Chemicals Inc.). *U.S. 3,262,889.* The process for liquefying substantially anhydrous metal soaps comprises adding to 100 parts by weight of a soap such as stannous oleate, linoleate or linolenate or mixtures thereof, from 0.1–3.0 parts of a compound $R(OH)_a(NR'R'')_b$ in which R is a hydrocarbon radical selected from the group consisting of alkyl, cycloalkyl, aryl, aralkyl, alkenyl, cycloalkenyl radicals and polyvalent radicals derived therefrom; a and b are integers from 0 to 6 and a + b is at least 1; and R′ and R″ are selected from the group consisting of alkyl, aryl, aralkyl, alkaryl, alkenyl, cycloalkenyl, cycloalkyl and hydrogen radicals.

CHLOROACRYLATE POLYMERS CONTAINING METAL SALTS OF FATTY ACIDS. H. D. Anspon (General Aniline & Film Corp.). *U.S. 3,262,895.* A method for preparing a lubricating composition comprises polymerizing methyl-alpha-chloroacrylate in the presence of 5–40% by weight based on the weight of the monomer of an alkaline earth metal salt of a fatty acid having from 12–18 carbon atoms. The fatty acid is selected from the group consisting of saturated and monounsaturated fatty acids.

• Biochemistry and Nutrition

COLOR OF COOKED CARROTS RELATED TO CAROTENE CONTENT. N. C. Borchgrevink and Helen Charley (Oregon State University, Corvallis). *J. Am. Dietet. Assoc.* 49, 116–21 (1966). Carrots were cooked in a saucepan and in a pressure saucepan for equivalent lengths of time to bring them to the just-tender stage; in a third lot of carrots, the cooking time in the pressure saucepan was doubled to produce overcooked carrots. Carotene was determined by chromatographic and spectrophotometric analyses. Carrots cooked in the saucepan had the highest concentration of crude carotene and of all-*trans*-β-carotene, while those cooked in the pressure saucepan were lowest in both. Carrots cooked in the pressure saucepan had the highest concentration of neo-β-carotene B, but the amount did not entirely account for the lower concentration of the all-*trans*-isomer. Differences in carotene content of cooked carrots were due to destruction of all-*trans*-β-carotene plus some isomerization of the *cis* form.

THE BIOSYNTHESIS OF STEROLS IN HIGHER PLANTS. L. J. Goad and T. W Goodwin (University College of Wales, Aberystwyth). *Biochem. J.* 99, 735–46 (1966). 2-C^{14}-Mevalonate was incorporated into squalene and the major phytosterols of pea and maize leaves; it was also incorporated into compounds belonging to the 4,4-dimethyl- and 4α-methyl-steroid groups which may be possible phytosterol intermediates. L-Methionine-Me-C^{14} was incorporated into the major sterols and also into the 4,4-dimethyl- and 4α-methyl-steroid groups. No radioactivity was detected in squalene. Under anaerobic conditions, incorporation of labeled mevalonate into the non-saponifiable lipid of pea leaves was drastically decreased but radioactive squalene was accumulated. Cycloartenol, 24-methylene-cycloartanol, 24-methyleneophenol, 24-ethylidenelophenol, fucosterol, β-sitosterol, stigmasterol and campestrol have been identified by gas-liquid chromatography in pea leaves. The significance of these results in connection with phytosterol and the introduction of the alkyl group at C-24 is discussed.

LIPID OXIDATION IN IRRADIATED COOKED BEEF. Barbara Greene and Betty Watts (Dept. of Food and Nutr., Florida State Univ., Tallahassee, Florida). *Food Technol.* 20, 111–4 (1966). Lipid oxidation in cooked meat exposed to air was found to be inhibited by radiation sterilization. Oxidation was measured by the thiobarbituric acid test for malonaldehyde and by manometric studies. This inhibition became more pronounced when the samples were stored in sealed cans at room temperature before exposure to air. Higher radiation doses produced lower TBA numbers. Added malonaldehyde disap-

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Soy Food Conference in Peoria

More than 100 persons have accepted invitations to the International Conference on Soybean Protein Foods at Peoria, Ill., Oct. 17–19, 1966.

Most speakers for the two and one-half day food research-coordinating meeting are scheduled, but plans of speakers from foreign countries are still tentative, according to the office of the program chairman, R. J. Dimler, director of the Department of Agriculture's Northern Utilization Laboratory, Peoria. Five US government agencies, two United Nations organizations, Soybean Council of America, National Soybean Processors Association and American Soybean Association are sponsoring the conference.

Canadian Conference on Membrane

A symposium on membrane structure and function is to be held at the Alpine Inn, Ste. Marguerite, Quebec, Feb. 27 to March 3, 1967.

The meeting is co-sponsored by the Biochemistry Division of The Chemical Institute of Canada, and the Canadian Biochemical Society. Sessions on Electron Microscopy, Chemistry and Composition, Membrane Structure, Model Systems and Surface Films, and Membrane Transport will be scheduled, and internationally known speakers have been invited to participate in the program.

Attendance at this symposium is limited; applications and conference programs may be obtained from The Chemical Institute of Canada, 151 Slater Street, Ottawa 4, Ontario, Canada. Deadline for submission of applications is Dec. 1, 1966.

GC and TLC Courses Offered by University of Wisconsin

A general gas chromatography course for beginning and practicing gas chromatographers will be given Nov. 7–9, 1966 at the University of Wisconsin, Madison. The course is presented in cooperation with F & M Scientific Division, Hewlett-Packard Co.

For further information, write: Mr. J. T. Quigley, Engineering Institute, University of Wisconsin, 432 N. Lake St., Madison, Wis. 53706.

Following the GC course, a TLC course is scheduled for Nov. 10–11, 1966. Workshop sessions are scheduled to dovetail with lecture discussions.

For further information, write: Mr. R. G. Schuenzel, Engineering Institute, at the address given above.

• *New Products*

American Gilsonite Company, Salt Lake City, Utah, has developed a commercial hydrogenated mixture of heterocyclic amines. These nitrogen heterocyclics are unusually good solvents, particularly for high molecular weight polymers. This may encourage their use in the rubber and plastics industry. Detailed data sheets are available upon request.

North American Fibre Co., Newark, N.J., has developed Tallow-Floc, a new settling agent for tallows and greases that effects separation of clear fat above tankage, moisture and other solids by means of gravity alone. Tallow-Floc also improves the quality of the fat product.

Liquid Dynamics, Chicago, Ill., has available a large capacity QUADRONIC for liquid-liquid extraction and separation in processing plants. The capacity of the QUADRONIC, Model No. 4824, is 275 to 350 gallons per minute, combined streams.

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peared during storage in sealed cans, suggesting further reaction of this compound. Spectrophotometric evidence was presented for the formation of a colored Maillard-type product between lysine and malonaldehyde in model systems. The results indicate that the low TBA numbers found in stored cooked irradiated meat are due to a combination of antioxidant development and further reaction of oxidation products.

Surface area of human erythrocyte lipids: Reinvestigation of experiments on plasma membrane. R. S. Bar, D. W. Deamer and D. G. Cornwell (Dept. of Physiolog. Chem., Ohio State Univ., Columbus, Ohio). *Science* **153**, 1010–12 (1966). Ratios of the lipid monolayer area to the erythrocyte surface area are 2:1 at low surface pressures and approach 1:1 at collapse pressures. Unsaturated phospholipids in cholesterol-phospholipid complexes of membrane extracts resemble their saturated derivatives at collapse pressures. Area ratio and phospholipid area data are related by an equation that tests hypothetical values for molecular areas used in membrane models.

Serum high-density lipoprotein: Effect of change in structure on activity of chicken adipose tissue lipase. A. Seanu (Depts. of Med. and Biochem., Univ. of Chicago, Chicago, Illinois). *Science* **153**, 640–41 (1966). The high-density (1.063 to 1.21 g/ml) lipoprotein in human serum was analyzed as activator for a lipoprotein lipase isolated from chicken adipose tissue. The activating capacity was lost when the lipoprotein was extracted with a mixture of ethanol and ethyl ether (3:2 by volume) at −10C and it was restored upon incubation of the extracted protein with aqueous sols of either whole phospholipids or the lecithin fraction prepared from the high-density lipoprotein. Since phospholipids sols alone proved ineffective as substrate activators, the complex which forms upon incubation of the extracted lipoproteins with phospholipids appears to be a necessary requirement for lipoprotein lipase activity.

Carbohydrate and lipid metabolism in animals treated with pyrrolidinomethyl tetracycline. S. Banerjee, K. S. Kumar and A. Bandyopadhyay (Res. Div., Dey's Med. Stores (Mfg) Private Ltd., Calcutta, India). *Proc. Soc. Exp. Biol. Med.* **122**, 652–57 (1966). Pyrrolidinomethyl tetracycline was administered to rats, rabbits and monkeys for 10 days and changes in the utilization of glucose and distribution of lipids in the tissues were studied. Treated animals showed diminished glucose tolerance. They had decreased glycogen and increased cholesterol and total lipids in the liver. There was a rise in plasma levels of lipids such as cholesterol, phospholipids, triglycerides and free fatty acids. Changes indicated impaired metabolism of carbohydrate and lipids. Tetracycline moiety of the antibiotic seemed responsible for the changes observed. The drug should be used with caution as its therapeutic effect might disturb the normal metabolic patterns in the body.

Effect of Triton ingestion on fat retention, blood lipids and growth in fats. S. S. Pawar and H. C. Tidwell (Dept. of Biochem., Univ. of Texas, Southwestern Med. School, Dallas). *Proc. Soc. Exp. Biol. Med.* **122**, 665–667 (1966). The effect of Triton on fat retention, blood lipids and growth in rats was studied by determining the amount of fed fat retained in the body, EFA levels of blood and increase in body weight, respectively, after its ingestion along with fat over a 12-week period. Triton does decrease fat retention. An increase in Triton concentration showed little, if any, change in per cent fat retention. EFA levels were decreased at the end of 12 weeks indicating that Triton itself was not absorbed from the intestinal tract but the feeding of polyunsaturated fatty acids did decrease the level of the blood lipids. Average growth per week in all the rats on the different diets was almost the same, which suggests that Triton has no toxic effect as indicated by normal growth and well-being of the rats.

Studies with acidulated cottonseed oil soapstock. 3. B. Lipstein and S. Bornstein (Div. of Poul. Sci., The Volcani Inst. Agr. Res., Rehovot, Israel). *Poultry Sci.* **45**, 651–661 (1966). The safety of supplementing layer rations with acidulated cottonseed oil soapstock (ACS) which had undergone hot alkaline saponification prior to acidulation, has been tested in 4 trials. The results obtained appear to justify the conclusion that such soapstock can be used safely as an oil supplement for layers up to a 3% dietary level, provided its gossypol content does not exceed 0.1%. Apparently the gossypol found in ACS is less active than that found in crude cottonseed oil (CCO). The danger of pink whites appearing in stored eggs, following the feeding of ACS, is even more remote than that of gossypol discoloration of yolks.

EFFECT OF DIETHYLSTILBESTROL AND CHOLESTEROL ON THE FATTY ACID METABOLISM OF COCKERELS. R. A. Chung, J. M. J. Ning and Y. C. Tsao (Dept. of Food Sci., and Technol., Tuskegee Inst., Tuskegee Inst., Alabama). *Poultry Sci.* **45**, 661–667 (1966). Cockerels on a hydrogenated coconut oil (HCO) or corn oil (CO) diet were treated with cholesterol (C), diethylstibestrol (DES) and C + DES. The most significant fatty acid changes occurred in the liver and plasma. HCO diet decreased the liver C-20:3 level compared with the CO diet regardless of C, DES or C + DES treatment, but the plasma C-20:3 level was unchanged. C, DES and C + DES greatly increased the C-18:1 content in the liver and plasma and the effect of DES and C + DES was greater than the effect of C. The fatty acid content of the plasma lipid of cockerels on both fat diets and of the liver lipids of cockerels on the HCO diet was similar for DES and C + DES. The brain, gonad, heart, thigh muscle, skin and abdominal adipose tissues were only slightly affected by C, DES and C + DES.

EFFECTS OF METHIONINE, MENHADEN OIL AND ETHOXYQUIN ON SERUM CHOLESTEROL OF CHICKS. E. G. Hill (The Hormel Institute, Univ. of Minnesota, Austin, Minnesota). *J. Nutr.* **89**, 143–8 (1966). A study was conducted to determine whether either a dietary antioxidant or a fish oil supplement would affect the hypercholesterolemic action of a suboptimal level of dietary methionine in chicks. A 2^3 factorial experiment was conducted with chicks fed a purified diet high in tallow, low in methionine and supplemented with methionine, ethoxyquin, and menhaden oil. Eight comparisons were made to determine how total serum cholesterol or fatty acid composition of tissue lipids were affected by the 3 variables, including interaction of one variable with another. Serum cholesterol determinations showed highly significant differences with high methionine resulting in lowered serum cholesterol values in all comparisons. The menhaden oil supplement also resulted in highly significant reductions of serum cholesterol values in all comparisons. These effects of menhaden oil and methionine supplementation were additive with no evidence of interaction. The reduction of cholesterol values by the added antioxidant was significant only when all 8 groups were compared. The added antioxidant did not counteract the hypocholesterolemic action of the fish oil, in contrast with a reported effect using rats. Fatty acid composition of tissue lipids were largely determined by composition of the dietary lipids although there were some minor effects ascribable to methionine supplementation.

NUTRITIONAL STUDIES ON HYSTERECTOMY-OBTAINED SPF BABY PIGS FED INFANT FORMULA PRODUCTS. D. L. Schneider and H. P. Sarett (Dept. of Nutrl. Res., Mead Johnson Res. Center, Evansville, Indiana). *J. Nutr.* **89**, 158-64 (1966). Three liquid formula products used for feeding human infants were fed to hysterectomy-obtained SPF (specific pathogen free) pigs from birth to 4 weeks of age to determine whether baby pigs could be raised with these low protein formulas and whether any differences in growth could be attributed to differences in formula composition. The baby pigs grew well but at a somewhat slower rate than those fed a simulated sow's milk formula. The lower weight gains, poorer caloric efficiencies and higher carcass fat levels observed with the infant formula products were related mainly to the low protein levels of the infant formulas. The lowest weight gain was noted with the infant formula which also contained levels of calcium and phosphorus below the requirements of the pig. Femur weights and ash content were also low in pigs fed this formula. Low hemoglobulin levels on one group of pigs were apparently related to the low copper level of the formula fed. Some of the other differences in organ weights and composition may also be related to nutritional factors in these diets. The results indicate that the newborn baby pig may be a useful experimental animal for studying human infant formula products and for determining the effects of limiting levels of specific nutritional factors in the diet.

EFFECT OF HORMONES ON THE TESTICULAR LIPIDS OF VITAMIN A-DEFICIENT RATS. D. Gambal (Veterinary Med. Res. Inst., Iowa State Univ., Ames, Iowa). *J. Nutr.* **89**, 203-9 (1966). The phospholipids of the testes from vitamin A-deficient rats and from vitamin A-deficient rats receiving injections of follicle-stimulating hormone (FSH), luteinizing hormone (LH), testosterone and various combinations of these hormones were determined quantitatively by silicic acid chromatography and thin-layer chromatography. A vitamin A deficiency decreased cardiolipin, phosphatidyl ethanolamine and phosphatidyl choline and increased phosphoinositides and sphingomyelin. Gonadotropins or testosterone, or both, altered the phospholipids in the testis of the vitamin A-deficient rat. FSH increased cardiolipins; FSH + LH restored phosphatidyl ethanolamine and phosphoinositides to normal; FSH + testosterone or FSH + LH restored phosphatidyl choline and testosterone and LH restored sphingomyelin to normal. The alterations in the testicular lipids accompanying sterility induced by a deficiency of vitamin A suggests a functional role of phospholipids in spermatogenesis and a hormonal control of testicular lipids via the pituitary gland. Vitamin A may be involved in the synthesis of gonadotropins by the pituitary gland.

EFFECTS OF PYRIDOXINE DEFICIENCY ON THE METABOLISM OF LINOLEIC ACID IN THE RAT. A. Goswami and J. G. Coniglio (Dept. of Biochem., School of Med., Vanderbilt Univ., Nashville, Tenn.). *J. Nutr.* **89**, 210–16 (1966). The influence of pyridoxine upon the metabolism of linoleic acid was studied in rats fed pyridoxine-free diet for several weeks and then supplemented for 1 or 6 days with zero, 10 or 50 μg pyridoxine hydrochloride and given an oral tracer dose of methyl linoleate-1-C^{14}. Supplementation with 50 μg for 6 days reduced the amount of radioactivity expired as $C^{14}O_2$. Supplementation also resulted in decreased amount of C^{14} in lipids of liver and of testes. In both organs most of the C^{14} was in the phosphatide lipid. Extensive catabolism of linoleate-1-C^{14} occurred in all groups with re-incorporation of C^{14} into saturated and unsaturated shorter chain fatty acids. In testicular phosphatides the amount of C^{14} in linoleate was significantly reduced and the amount in shorter chain fatty acids and in other polyunsaturated acids increased by pyridoxine supplementation. There was no effect on C^{14} distribution in hepatic fatty acids. Pyridoxine supplementation for 6 days resulted in the following changes in fatty acid composition: slightly reduced concentrations of linoleate and slightly increased concentrations of arachidonate in liver phosphatides; slight increase in concentration of stearic acid in liver triglycerides; increase in concentration of arachidonate, slight increase in linoleate, and an increase in concentration of docosapentaenoate in testicular phosphatides; and an increase in concentration of docosapentaenoate in testicular triglycerides.

EFFECTS OF TWELVE COMMON FATTY ACIDS IN THE DIET UPON THE COMPOSITION OF LIVER LIPID IN THE RAT. W. O. Caster, Hans Mohrhauer and R. T. Holman (Univ. of Minnesota, The Hormel Inst., Austin, Minn.). *J. Nutr.* **89**, 217–25 (1966). To test whether effects and interactions of fatty acids when fed singly also apply in complex dietary mixtures, a study was undertaken using natural fats and mixtures. Twenty-one dietary fatty acid ester mixtures were prepared from common fats and oils plus small amounts of purified fatty acid esters. The compositions of these mixtures were adjusted to allow independent but simultaneous study of 12 of the dietary fatty acids. The lipid mixtures were fed as 10% of the dietary calories to groups of weanling male rats for 66 days. The rats were killed and the liver lipids extracted and analyzed for fatty acid content by gas chromatography. Metabolic interactions and conversions were indicated by intercorrelations calculated with the aid of a digital computer. Equations for estimating the amounts of 4 dietary fatty acids from analysis of tissue, and of 7 tissue fatty acids from an analysis of diet are presented. The linolenate requirement of the rat is estimated from these latter equations to be 0.14% of caloric intake. There are high, positive diet-tissue correlations between acids of the linoleate family and between acids of the linolenate family. The amounts of certain saturated and monoenoic fatty acids in the diet had marked effects upon these correlations.

QUANTITATIVE DETERMINATION OF INDIVIDUAL TOCOPHEROLS BY THIN-LAYER CHROMATOGRAPHIC SEPARATION AND SPECTROPHOTOMETRY. Priscilla Sturm, R. M. Parkhurst and W. A. Skinner (Dept. of Pharmaceutical Chem., Stanford Res. Inst., Menlo Park, Calif.). *Anal. Chem.* **38**, 1244–7 (1966). The method described here was developed for the analysis of tocopherols in peanut oil and involves saponification of the oil sample and the separation of the tocopherols in the nonsaponifiable fraction by thin-layer chromatography. The α-, γ-, and δ-tocopherols were removed from the thin-layer plate and determined spectrophotometrically. This modification increases the sensitivity of the original Emmerie-Engel procedure 2.5 fold. The method was applied to peanut oil samples and the precision of the method was evaluated.

AUTOMATIC DETERMINATION OF WEAK ORGANIC ACIDS BY PARTITION COLUMN CHROMATOGRAPHY AND INDICATOR TITRATION. L. Kesner and E. Muntwyler (Dept. of Biochem., State Univ. of New York Downstate Med. Center, Brooklyn, N.Y. 11203). *Anal. Chem.* **38**, 1164–9 (1966). Quantitative determination of organic acids in the range of 0.05 to 3 μeq. per acid may be performed rapidly and automatically by partition chromatography on a silica gel column, followed by indicator titration. Developing fluid is pumped to the column at a constant rate and the effluent from the column is mixed with an excess of indicator salt delivered at a constant rate by a second pump. As acid appears, the indicator salt is converted to its hydrogen form, the absorbance of which is continuouosly monitored by a recording photometer. Complex mixtures from physiological sources may be analyzed with no preliminary extraction in about 5 hours. Less complex mixtures may be analyzed within an hour. Thirteen organic acids of biological interest can be completely resolved. Acids of a yet undetermined structure have been found in urine and tissue fluids. Ultra violet and radioactive detection may be included when desired.

GAS CHROMATOGRAPHIC DETERMINATION OF PYRUVIC AND LACTIC ACIDS AND KREBS CYCLE COMPONENTS. ESTERIFICATION AND RECOVERY. F. L. Estes and R. C. Bachmann (Surgical Res. Lab., The Univ. of Texas Med. Branch, Galveston, Texas). *Anal. Chem.* **38**, 1178–82 (1966). In addition to the components of the tricarboxylic acid (TCA) cycle, including the α-keto, α-hydroxy, and α,β-unsaturated acids, lactic, and pyruvic acids were esterified in good yields with diazomethane. Gas chromatographic separation on diethyleneglycol succinate gave single peaks for the esters of pyruvic, lactic, malonic, fumaric, succinic, malic, α-ketoglutaric, *cis*-aconitic and citric acids, in order of retention times. Oxalacetate gave a broad flat peak beyond citrate. The only peak observed for the methylation product of glutamic acid was identified as that of methanol. At column temperatures above 115C for pyruvate and above 90C for fumarate, thermal decomposition of the esters occurred and a methanol peak appeared. Recoveries of pyruvate, lactate, malonate, fumarate, succinate and malate were determined. The methylation of mixtures of lactic and pyruvic acids in varying proportions led to quantitative recoveries of each of the methyl esters.

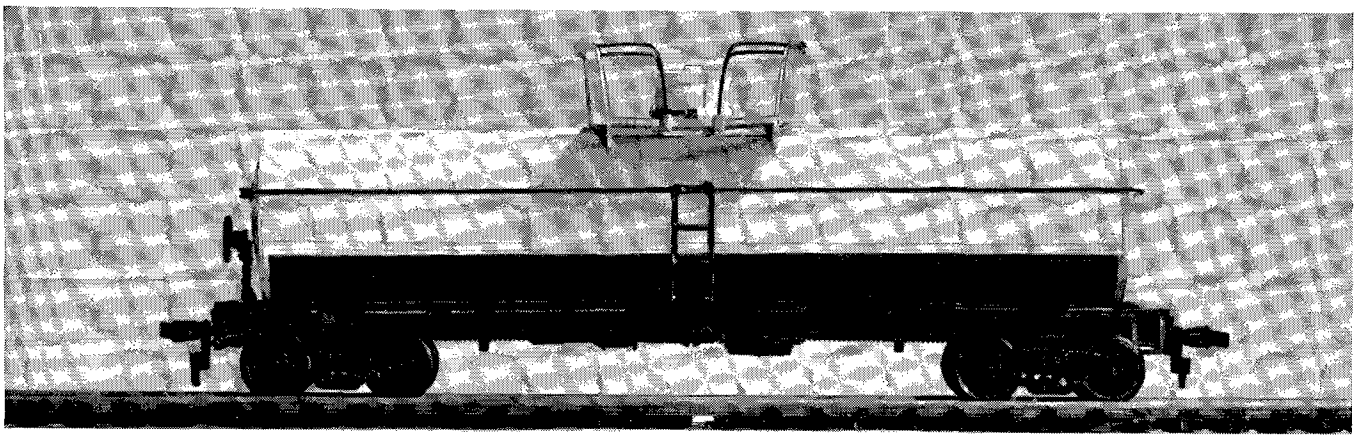
CHARACTERIZATION OF THE OCTADECENOIC ACIDS IN RUMEN DIGESTA AND RUMEN BACTERIA. I. Katz and M. Keeney (Dept. of Dairy Sci., Univ. of Maryland, College Park). *J. Dairy Sci.* **49**, 962–66 (1966). Analysis of the lipids from total rumen digesta with respect to time after feeding did not reveal any changes in total lipid, fatty acid concentrations, types of fatty acids or the concentraion of *trans*-octadecenoic acids. The octadecenoic acids from the rumen digesta consisted of 75% *trans* acids, *trans*-11-octadecenoic acid being the major acid. The rumen bacterial octadecenoic acids consisted of a mixture of 24 geometrical and positional isomers, the major acids being *trans*-11, *cis*-9, and *cis*-11-octadecenoic acids. The analyses indicate that the rumen bacteria preferentially esterify the *cis* isomer into polar lipid.

OCCURRENCE OF KETOSTEARIC ACIDS IN THE RUMEN. *Ibid.*, 967–70. Analysis of the lipid from total rumen digesta revealed the presence of ketostearic acids in concentrations of 45 μmoles per gram of lipid, or 120 μmoles per gram of long-chain fatty acid. As determined by chemical degradation, the major keto acid was identified as 16-ketostearic acid (75%); eight other ketostearic acids were present. By a combination of thin-layer chromatography and gas-liquid chromatography, hydroxystearic acid was tentatively identified as also being present in the rumen. The ruminal synthesis of ketostearic acid via the oxidation of 12-hydroxystearic acid was demonstrated *in vitro*. The absence of keto- and hydroxystearic acids in the dietary hay is considered as evidence for a ruminal synthesis of these oxygenated acids.

HORMONAL REGULATION OF PLASMA FREE FATTY ACID CONCENTRATION IN RUMINANTS. H. D. Radloff and L. H. Schultz (Dept. of Dairy Sci., Univ. of Wisconsin, Madison). *J. Dairy Sci.* 49, 971–5 (1966). The effects of seven hormones on plasma free fatty acids (FFA), blood ketones and blood sugar were studied, using goats as experimental animals. Of the hormones tested, growth hormone caused the most marked increase in plasma FFA. ACTH caused a significant increase in plasma FFA in female goats, but had no effect in castrate males. The catecholamines, epinphrine and norepinephrine caused an immediate increase in plasma FFA concentration, but the change was not as great as observed in monogastric animals. A glucocorticoid caused slight increases in plasma FFA. All of the above hormones caused increases in concentration of blood sugar, with epinephrine being the most potent. Insulin depressed blood sugar and caused an initial depression of plasma FFA, with the latter recovering to higher than the predicted levels, whereas blood sugar remained depressed. In the females, glucagon had a biphasic effect on plasma FFA, a depression followed by an increase above normal, with an opposite response in blood sugar. The blood sugar response to glucagon was the same in the castrate males, but the plasma FFA did not show the rebound effect. Despite the rather large increases in plasma FFA in some cases, blood ketones were not affected to any great extent by any of the hormones used.

THE ROLE OF PHOSPHOLIPIDS IN STIMULATING PHOSPHORYLCHOLINE CYTIDYLTRANSFERASE ACTIVITY. W. G. Fiscus and W. C. Schneider (Lab. of Biochem., National Cancer Inst., National Institutes of Health, Bethesda, Md.). *J. Biol. Chem.* 241, 3324–30 (1966). The phosphorylcholine cytidyltransferase activity of fresh rat liver supernatant fractions was observed to be stimulated by boiled, previously incubated particulate fractions of rat liver. This stimulation was shown to be mediated by the phospholipids present in the latter. Treatment of rat liver supernatant fractions with acetone and butanol to remove phospholipids resulted in very low transferase activity which could be increased up to 25-fold by the addition of suitable phospholipid preparations. Lipid extracts of fresh rat liver homogenates did not stimulate transferase activity unless they were exposed to a continuous flow of air for 15 hours leading to lipid oxidation. Fractionation of the phospholipids of fresh and incubated rat liver homogenates showed that lysophosphatides were present in higher concentrations in the latter and were the most active phospholipids in stimulating transferase activity. Similarly, highly purified egg lecithin showed little ability to stimulate transferase activity whereas egg lysolecithin was highly active. None of the individual isolated phospholipids stimulated to the same degree as unfractionated rat liver lipid preparations.

STUDIES ON THE ROLE OF PHOSPHOLIPIDS IN PHAGOCYTOSIS. P. S. Sastry and L. E. Hokin (Dept. of Physiolog. Chem., Univ. of Wisconsin, Madison, Wisc.). *J. Biol. Chem.* 241, 3354–61 (1966). The increased incorporation of P^{32} into phosphatidic acid and phosphatidylinositol in polymorphonuclear leukocytes undergoing phagocytosis is not secondary to an elevated specific activity of adenosine triphosphate during phagocytosis. The incorporation of labeled glycerol, oleic acid, and linolenic acid into the above phosphatides is not increased on stimulation of phagocytosis. These results suggest that the increased synthesis of phosphatidic acid on induction of phagocytosis may be brought about by diglyceride kinase or possibly monoglyceride kinase plus lysophosphatidic acid acylase. The incorporation of labeled inositol into phosphatidylinositol is increased in cells undergoing phagocytosis, indicating that the increased incorporation of P^{32} into this phosphatide is not solely a result of a higher specific activity of phosphatidic acid, which may be the precursor for phosphatidylinositol in this system.



INTERMEDIARY METABOLISM OF PHOSPHOLIPIDS IN BRAIN TISSUE. III. PHOSPHOCHOLINE-GLYCERIDE TRANSFERASE. R. E. McCaman and K. Cook (Inst. of Psychiatric Res., Indiana Univ. School of Med., Indianapolis, Indiana). *J. Biol. Chem.* 241, 3390–4 (1966). The conditions have been described for measuring quantitatively phosphocholine-glyceride transferase and choline phosphokinase activities in microgram quantities of nervous tissue. It was observed that the various parameters affecting enzyme activity in brain are quite similar to those previously reported for the liver enzyme. The enzymatic formation of labeled phosphatidylcholine from C^{14}-cytidine diphosphocholine was stimulated more than 20-fold on the addition of D-α,β-diglyceride to the incubation mixtures. Diglycerides having a high degree of unsaturated fatty acids were the most active substrates. Phosphocholine-glyceride transferase was predominantly located in the microsomal fraction of brain, but it is suggested that a significant portion of activity is also present in mitochondria.

BIOSYNTHESIS OF BRANCHED-CHAIN FATTY ACIDS. V. MICROBIAL STEREOSPECIFIC SYNTHESES OF D-12 METHYLTETRADECANOIC AND D-14 METHYLHEXADECANOIC ACIDS. T. Kaneda (The Res. Council of Alberta, Edmonton, Alberta, Canada). *Biochim. Biophys. Acta* 125, 43–54 (1966). The fatty acids produced by *Bacillus subtilis* (ATCC-7059) include the optically active fatty acids, D(+)12-methyltetradecanoic acid, and D(+)14-methylhexadecanoic acid. Tracer experiments have shown that the terminal portion of the anteiso fatty acids are synthesized from pyruvate and α-keto-butyrate (most likely derived from L-threonine) through α-keto-β-methylvalerate by a mechanism similar to that of the synthesis of L-isoleucine *de novo*. Furthermore, L(+)α-keto-β-methylvalerate, the α-keto acid of L-isoleucine, was incorporated into the terminal-C_5 portions with no change in stereo-configuration at the β-carbon. In all cases, the D isomer of the anteiso fatty acids was the only product regardless of whether the D or the L isomer of precursor was administered.

FATTY ACID DISTRIBUTION OF TRIGLYCERIDES DETERMINED BY DEACYLATION WITH METHYL MAGNESIUM BROMIDE. M. Yurkowski and H. Brockerhoff (Fisheries Res. Board of Canada, Halifax Lab., Halifax, Canada). *Biochim. Biophys. Acta* 125, 55–9 (1966). Triglycerides can be degraded with CH_3MgBr to yield partial glycerides. The α- and β-monoglycerides are partly isomerized, and the α,α-diglyceride contains a few per cent isomerized material, but the α,β-diglyceride obtained has the required composition and can be used to calculate the α-β fatty acid distribution on the triglyceride. The method is demonstrated on lard. A representative α,β-diglyceride has been prepared from seal oil.

FATTY ACID COMPOSITION OF SPHINGOMYELINS IN BLOOD, SPLEEN, PLACENTA, LIVER, LUNG AND KIDNEY. Elisabet Svennerholm, Stina Stallberg-Stenhagen, and L. Svennerholm (Inst. of Med. Biochem., Univ. of Gothenburg, Gothenburg, Sweden). *Biochim. Biophys. Acta* 125, 60–9 (1966). Sphingomyelins from red cells, plasma, serum, spleen, placenta, liver, lung and kidney were isolated in nearly quantitative yields by column chromatography, and their fatty acids were determined by gas-liquid chromatography. The fatty acid composition of these sphingomyelins was more uniform than those of brain sphinogomyelins and only eight fatty acids occurred in percentages more than 1. Two acids, 16:0 and 24:1, were about equally common. They usually consituted two-thirds of the total acids except in normal liver in which 16:0 constituted only 15-20%. The third most frequent acid was 22:0 which is a characteristic fatty acid in all extraneural sphingolipids. The fatty acid pattern of sphingomyelins showed small variations with age and seemed unchanged in arteriosclerotic diseases.

MOLECULAR AGGREGATION IN AQUEOUS DISPERSIONS OF PHOSPHATIDYL AND LYSOPHOSPHATIDYL CHOLINES. L. Saunders (Phys. Chem. Labs., School of Pharmacy, Univ. of London, Brunswick Square, London, Great Britain). *Biochim. Biophys. Acta* 125, 70–4 (1966). The nature of the molecular aggregates formed in aqueous lecithin, lysolecithin and mixed dispersions are discussed. The experimental results with these dispersions can be explained in terms of three forms of micelles, spherical, helical and folded laminar. Results obtained with synthetic isomeric lecithins are interpreted in terms of the three micellar types; the main factor governing the type formed appears to be the solid angle into which the molecule can be fitted. The effect of ultrasonic irradiation of lecithin sole is considered to be an expulsion of solvent from the aggregates and a rearrangement into folded laminae.

THE EFFECT OF CHAIN LENGTH ON THE ACTIVATION AND SUBSEQUENT INCORPORATION OF FATTY ACIDS INTO GLYCERIDES BY THE SMALL INTESTINAL MUCOSA. D. N. Brindley and G. Hubscher (Dept. of Medical Biochem. and Pharmacol., Univ. of Birmingham, Birmingham, Great Britain). *Biochim. Biophys. Acta* 125, 92–105 (1966). A modification of the hydroxamic acid method for determining acyl-CoA synthetase is described. Using cat intestinal mucosa, maximum reaction rates for acyl-CoA synthetase were obtained with palmitate and stearate, unsaturated fatty acids giving much lower reaction rates than their saturated analogues. The microsomal fraction of guinea-pig intestinal mucosa had maximum reaction rates for acyl-CoA synthetases with myristate, unsaturated acids having rates similar to their saturated analogues. The incorporation of fatty acids into glycerides by the total homegenate of cat intestinal mucosa was studied. Using L-3-glycerophosphate and single fatty acids, maximum incorporations were obtained with myristate, palmitate and stearate. A different pattern of incorporation was found with 2-monopalmitin, 1-monopalmitin and 1-monoolein, but again the preference was for long-chain acids. If equimolar mixtures of acids were substituted for the single fatty acids, then irrespective of glyceride-glycerol precursor, myristate was incorporated to the greatest extent.

THE REMOVAL AND METABOLISM OF CHYLOMICRON TRIGLYCERIDES BY THE ISOLATED PERFUSED RAT HEART: THE ROLE OF A HEPARIN-RELEASED LIPASE. M. F. Crass, III and H. C. Meng (Dept. of Physiol., Vanderbilt Univ. School of Med., Nashville, Tenn.). *Biochim. Biophys. Acta* 125, 106–17 (1966). Experiments were performed to demonstrate the ability of the myocardium to remove circulating dietary chylomicron triglyceride and to utilize the triglyceride fatty acid as an oxidizable substrate. Hearts from normal fed rats were perfused for various time intervals with a buffer-serum medium containing C^{14}-labeled chylomicra. The perfusions were carried out in the presence or absence of heparin to determine the effect of a heparin-released lipase (clearing factor lipase) on the removal of chylomicron triglyceride. Stimulation of the release of a lipase by exogenous heparin was not required for the removal and utilization of C^{14}-labeled chylomicron triglyceride fatty acids by the heart. The changes observed in triglycerides, free fatty acids and phospholipids in the tissue during perfusion with C^{14}-labeled chylomicra were essentially the same in the heparin-perfused and control groups.

THE STRUCTURE OF PEPTIDE LIPIDS ISOLATED FROM NOCARDIA ASTEROIDS, PEPTIDOLIPID NA. M. Guinand and G. Michel (Lab. de Chimie Biologique Faculte Catholique des Sciences, Lyon, France). *Biochim. Biophys. Acta* 125, 75–91 (1966). A mixture of peptidolipids has been extracted from *Nocardia asteroides* ATCC 9969. Countercurrent distribution gives peptidolipin NA, $C_{50}H_{80}N_7O_{11}$, m.p. 232–233C, $(\alpha)_D + 42.7°$ in chloroform. The peptide moiety of peptidolipin NA contains 7 moles of amino acids: one molecule of L-threonine and an hexapeptide Thr-Val-D-Ala-Pro-D-*allo*-Ile-Ala. The lipid moiety is composed of D-(−)-3-hydroxyeicosanoic acid which has never been found previously in natural products. The amino acid linked to fatty acid is established to be threonine and peptidolipin NA is shown to be a macrocyclic lactone. By treatment with alkali it was transformed to peptidolipic acid with a C-terminal threonine. The carboxyl group of this molecule of threonine esterified the hydroxyl group of 3-hydroxyeicosanoic acid in peptidolipin NA.

INTESTINAL ABSORPTION OF ERUCIC ACID CHAINS AND THEIR INCORPORATION INTO CHYLOMICRONS IN THE RAT. P. Savary and M. J. Constantin (Inst. de Chimie Biologique, Faculte des Sciences, Place Victor Hugo, Marseille, France). *Biochim. Biophys. Acta* 125, 118–28 (1966). When rats are fed either erucic acid or trierucin, the intestinal absorption of each of these compounds is non-quantitative; only reduced concentrations of triglycerides are found in thoracic duct lymph. These glycerides contain 30–40% of C-16 and C-18 chains, very likely of endogenous origin. These fatty acids were analyzed and their distribution between internal and external positions of the lymph triglycerides was studied. Erucic chains when ingested in the free form in admixture with oleic acid, are more numerous in external than in internal positions of lymph triglycerides. In this respect, the behaviour of erucic and stearic acids are somewhat analogous. Erucic acid seems to be an ex-

ample of a lipid which is badly absorbed, in spite of the fact that it is liquid at 37C and readily soluble in micellar bile salts solutions.

SIZE DISTRIBUTION OF THORACIC DUCT LYMPH CHYLOMICRONS FROM RATS FED CREAM AND CORN OIL. D. B. Zilversmit, P. H. Sisco, Jr., and A. Yokoyama (Dept. of Physiol. and Biophys., Univ. of Tennessee Medical Units, Memphis, Tenn.). *Biochim. Biophys. Acta* 125, 129–35 (1966). Thoracic duct lymph of rats fed corn oil or cream was subjected to centrifugation in a sucrose gradient. The median particle size of chylomicrons was between 150 and 200 mμ. An inverse relationship exists between the logarithm of particle number and particle size. Phase contrast microscopy, as well as centrifugation, failed to detect any difference in the size of chylomicrons obtained after feeding with cream or corn oil.

PHASE DISTRIBUTION OF STEROLS: STUDIES BY GEL FILTRATION. Elaine B. Feldman and B. Borgstrom (Dept. of Physiolog. Chem., Univ. of Lund, Lund, Sweden). *Biochim. Biophys. Acta* 125, 136–47 (1966). Gel filtration was used to study the behaviour of sterols in a two-phase oil-micellar system of glycerides and fatty acids in 6 mM sodium taurodeoxycholate. Application of bile salt-sterol-lipid emulsions to gel columns yielded an excluded emulsion phase and a partially included micellar phase. No micellar phase was present in emulsions without bile salt. The per cent distribution of cholesterol in the micellar phase increased in proportion to the logarithm of the bile salt concentration. Cholesterol esters had lower micellar distributions than free sterols. The logarithm of per cent distribution in the micellar phase varied inversely with the carbon-chain length in the homologous ether series methyl to amyl.

ABSORPTION OF STEROLS BY INTESTINAL SLICES IN VITRO. *Ibid.*, 148-56. The uptake of isotopically labeled cholesterol, sitosterol and cholesterol ethers emulsified in glyceride-fatty acid-sodium taurodeoxycholate solution was studied employing intestinal slices of rat and hamster. The uptake of cholesterol was reversible and required bile salt. Sitosterol uptake was quantitatively similar. No inhibition of absorption of either sterol was demonstrated when mixtures were used in the incubation studies. Uptake of intact cholesterol ethers was greater than that of the free sterol. In contrast to studies of glyceride and fatty acid absorption *in vitro*, these experimental results with sterols differed from absorption data derived in intact animals, and did not conform with their per cent distribution into a micellar phase. The results of the present studies indicate that the activity of the intestinal slices does not bear any direct relationship to that of the intact animal as regards sterol absorption.

TRANSPORT OF CHOLESTEROL DURING PHOSPHATIDE-INDUCED HYPERCHOLESTEROLEMIA. S. O. Byers and M. Friedman (Harold Brunn Inst., Mt. Zion Hosp. and Med. Center, San Francisco, Calif.). *Biochim. Biophys. Acta* 125, 157–65 (1966). Hypercholesterolemic serum containing C^{14}-labeled cholesterol was injected intravenously into rats in a state of rapidly increasing hypercholesterolemia brought about by infusion of lecithin, as well as into control rats infused with dextrose. The results obtained suggested that the hyperphospholipidemia induced by lecithin infusion alters the partition of cholesterol between vascular and extravascular tissues leading to a greater retention of labeled cholesterol in the plasma. However, the diffusion of isotopic cholesterol *per se* was not interfered with by lecithin infusion.

INHIBITION OF INTESTINAL PROTEIN SYNTHESIS AND LIPID TRANSPORT BY ETHIONINE. D. E. Hyams, S. M. Sabesin, N. J. Greenberger and K. J. Isselbacher (Dept. of Med., Harvard Med. School and Med. Services, Mass. General Hosp., Boston, Mass.) *Biochim. Biophys. Acta* 125, 166–73 (1966). Ethionine inhibits protein synthesis in the intestinal mucosa of female rats and interferes with the intestinal transport of triglycerides containing long-chain fatty acids presumably by reducing chylomicron formation. The absorption of triglycerides containing medium-chain fatty acids is unaffected. In contrast to its effects on the liver, ethionine does not lead to decreases in intestinal ATP levels and administration of ATP to the animals does not protect against the inhibitory effects of ethionine. The intestinal activity of methionine-activating enzyme is about one-sixth that of liver. This may account for

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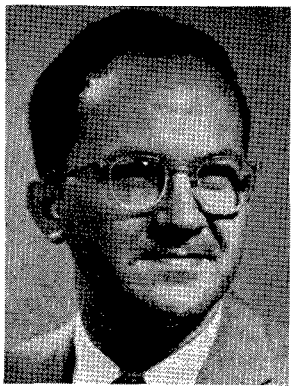
• *Names in the News*



Edwin Frankel

EDWIN FRANKEL (1956) has been granted a post-doctoral fellowship by the Department of Chemistry, Technion-Israel Institute of Technology, Haifa. Starting September 26, he began a year of work in collaboration with Professor Michael Cais.

Dr. Frankel joined the staff of the Northern Laboratory in 1956, after receiving his PhD degree in agricultural chemistry from the University of California at Davis.

L. W. LUPO has joined Reeve Angel as their new technical representative. With headquarters in Clifton, N. J., he will represent the midwestern and southwestern regions.

C. G. GOEBEL (1946) has been promoted to corporate technical director of Emery Industries, Inc., as announced by D. R. HINKLEY, President. H. F. OELSCHLAEGER (1952) has been promoted to director of research for Emery's Organic Chemicals Division, succeeding Dr. Goebel.

J. W. Lederer has been elected president of Cindet Chemicals, Inc., Greensboro, N. C., succeeding the late R. A. BRUCE. MRS. HELEN BRUCE has been elected chairman of the board. Mr. Lederer remains as president of Cindet Chemicals, Inc.

M. D. MCVAY, vice-president of Cargill, Inc., and head of the company's oil division, has announced three promotions: PHILLIP ST. CLAIR has been named manager of the company's newest soybean plant in Gainesville, Ga.; ADRIANUS BLANKESTIJN, formerly of Renkum, Holland, will replace Mr. St. Clair as manager in Memphis; THOMAS VEBLEN returns to Cargill from a Washington, D. C. post to be administrative assistant to Mr. McVay.

The Glidden Company's Durkee Foods Group has created the position of marketing manager—Industrial Products and has named three new regional managers and two sales managers for its industrial division, headquartered in Chicago. W. A. HAGEN has been appointed marketing manager responsible for all industrial division marketing operations; L. J. HEBEL has been named midwest regional manager in Chicago, succeeding Mr. Hebel; R. W. WOLFE becomes western regional manager, with offices in Berkeley, Calif.; J. W. BREMER, JR., has been appointed eastern regional manager in New York; E. E. LAND, JR., becomes industrial sales manager for the eastern region and L. C. WOODS for the midwest.

The Gillette Company has named R. E. REED as President and Director of Research of Harris Research Laboratories, Inc., in Washington, D. C. Mr. Reed served in various research capacities before joining Gillette's Toni Division in 1947.

G. W. BREGAR, 21-year veteran of Dicalite sales and research work, has been named assistant sales manager of the International Division of GREFCO, Inc. Bregar will cover Canada, assisting agents in the sale and promotion of products, and he will also be in charge of technical correspondence with all GREFCO International sales agents.

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the failure of ethionine to reduce intestinal ATP concentrations since with low activating enzyme levels in the intestine relatively little adenine would be trapped in the form of S-adenosylethionine. It is suggested that the inhibitory effect of ethionine on intestinal protein synthesis must involve a mechanism unrelated to reductions in cellular ATP levels.

CARCINOGENICITY OF EPOXIDES, LACTONES AND PEROXY COMPONDS B. L. Van Duuren *et al. J. Nat. Cancer Inst.* 31, 41–55 (1963). Attention is focused on epoxides, lactones, hydroperoxides and peroxides as carcinogens, as possible carcinogenic intermediates in the metabolism of aromatic hydrocarbons, and as environmental carcinogens. Available information about the carcinogenicity of these compounds is reviewed. To ascertain their carcinogenic activity, 14 compounds in acetone or benzene solutions were tested by skin painting on mice. Five epoxides, styrene oxide, 1-ethyleneoxy-3,4-epoxycyclohexane, 1,2-epoxybutene-3, and *dl*- and *meso*-1,2,3,4-diepoxybutane, and one hydroperoxide, 1-hydroperoxy-1-vinylcyclohexene-3, showed carcinogenic activity. Some aspects of the relationship between structure and carcinogenic activity are discussed. (Rev. Current Lit. Paint Allied Ind., No. 288).

PROTEOLISATES FROM OLEAGINOUS CAKES. A. Balath and R. J. Estola. *Informaciones sobre Grasas y Aceites (Buenos Aires)* 10, 28–33 (1965). Argentinian produced oleaginous cakes from soybean and sunflower and were studied for their application in the production of proteolisates. The analysis and nutritional values in chicks of proteolisates obtained using *Torulopsis utilis* and baking yeast are presented.

NOTES ON THE INVESTIGATION AND CONTROL OF ALFLATOXIN. Anon. *Informaciones sobre Grasas y Aceites (Buenos Aires)* 9, 9–15 (1965). Twelve condensed notes are given dealing with the main aspects of mycotoxins produced in peanuts by *Aspergillus flavus*. These notes have been approved by the Consulting Panel of the Technical Department of WHO-FAO.

GEOGRAPHIC PATHOLOGY OF ATHEROSCLEROSIS AND THROMBOSIS. K. T. Lee, D. N. Kim, Y. Keokarn and W. A. Thomas (Dept. of Pathology, Albany Med. College, Albany, N.Y.). *J. Atheroscler. Res.* 6, 203–13 (1966). The occurrence rate of thromboembolic phenomena is extremely low in Koreans in contrast to the high occurrence rate among Caucasians in the United States. Dietary surveys have indicated that Koreans in general eat an extremely low fat, low cholesterol diet as compared with a high fat, high cholesterol diet of North Americans. In the current study, in an attempt to obtain some insight into the mechanisms accounting for the significant difference in the occurrence rate of thromboembolic phenomena in the two populations groups, we have investigated various factors related to coagulation and clot-lysis in plasma of 41 male Korean farmers and have compared these with corresponding factors in 41 age- and sex-matched white American soldiers. Plasma prothrombin and serum cholesterol levels of the Korean farmer group were significantly lower than the American soldier group. Euglobulin lysis time and urokinase lysis times were also significantly shorter in the Korean group than in the American group. To what extent these statistically significant differences in prothrombin level and clot-lysis times in the Korean farmer and American soldier groups account for the biologically significant differences in the incidence of thromboembolic phenomena is difficult to determine with certainty.

EFFECTS OF MGEDTA ON THE MUCOPOLYSACCHARIDE METABOLISM IN THE ATHEROSCLEROTIC AORTA. T. Lacson, D. S. McCann and A. J. Boyle (Dept. of Chem., Wayne St. U., Detroit, Mich.). *J. Atheroscler. Res.* 6, 277–82 (1966). A quantitative comparison of mucopolysaccharides in the aortas of normal and atherosclerotic rabbits is presented. It is demonstrated that the parenteral injection of neutral magnesium ethylenediaminetetraacetic acid (MgEDTA) in the atherosclerotic animals tends to reverse chondroitin sulfate as well as neutral mucopolysaccharide levels toward normal concentrations. Serum studies show an increase of sulfated mucopolysaccharides in the atherosclerotic groups. A sulfate turnover study demonstrates a greatly reduced half life in the atherosclerotic animals in both aortic tissue and serum. MgEDTA injections in animals with atherosclerosis lengthen the half life of serum aortic mucopolysaccharides toward that characteristic of the normal situation.

THE INTERRELATIONSHIP OF BLOOD LIPIDS AND ESTROGENS. H. S. Kroman, S. R. Bender, A. N. Brest and M. L. Moskovitz (Katz Res. Lab., Hahnemann Med. College and Hospital, Philadelphia, Pa.). *J. Atheroscler. Res.* 6, 247–55 (1966). A relationship

appears to exist between the blood lipids and estrogenic hormones in control males and females and similar groups of patients having confirmed coronary artery disease. The control group of individuals with normal concentrations of serum lipids appear to have a higher concentration of 17-β-estradiol than estrone. Conversely, those individuals with coronary artery disease appear to have greater concentrations of estrone than 17-β-estradiol.

EFFECT OF HYPOPHYSECTOMY ON SERUM LIPIDS IN AMINONUCLEOSIDE NEPHROSIS. J. C. Hoak, W. E. Connor and D. B. Stone (Dept. of Med., Univ. of Iowa College of Med., Iowa City). *Proc. Soc. Exp. Biol. Med.* 122, 588–91 (1966). The effect of hypophysectomy upon the serum lipids was studied in rats in which nephrosis was produced by the aminonucleoside of puromycin. Hypophysectomy prevented the usual rise of the serum cholesterol and triglyceride in the nephrotic rats. It is postulated that the hyperlipemia of nephrosis may result from enhanced lipoprotein synthesis in the liver from an effect of pituitary hormones. The hypophysectomized rats with nephrosis had higher blood urea nitrogen values and less proteinuria than did the nonhypophysectomized rats with nephrosis.

THE RETARDATION BY PECTIN OF CHOLESTEROL-INDUCED ATHEROSCLEROSIS IN THE FOWL. H. Fisher, W. G. Siller and P. Griminger (Nutr. Lab., Dept. of Animal Sciences, Rutgers State Univ., New Brunswick, N.J.). *J. Atheroscler. Res.* 6, 292–8 (1966). Day-old Leghorn cockerels were given a diet containing egg powder and supplemented either with pectin or nonnutritive fiber. After 24 weeks on the diets, the pectin-fed birds had significantly lower blood levels of plasma cholesterol, eliminated more lipid and cholesterol in their excreta, and had a significantly lower incidence and severity of atherosclerosis as measured macroscopically and histologically. Using carmine as a marker, food was observed to pass faster through the alimentary tract of the pectin-fed birds. Throughout the study, the pectin-fed birds consumed more feed than the controls, despite the fact that the former grew more slowly during the early stages of development than the latter. The results suggest that pectin may be effective in reducing the incidence and severity of both spontaneous and cholesterol-induced avian atherosclerosis. The present study suggests that pectin acts by accelerating the transit of food through the alimentary tract resulting in an increased excretion of possible atherogenic substances, as well as of total nutrients.

THE SPECIES SPECIFICITY OF CHOLESTYRAMINE IN ITS EFFECT ON SYNTHESIS OF LIVER LIPIDS AND LEVEL OF SERUM CHOLESTEROL. D. G. Gallo, R. W. Hawkins, A. L. Sheffner, H. P. Sarett and W. M. Cox, Jr. (Dept. of Nutr. Biochem. and Nutritional Res., Mead Johnson Res. Center, Evansville, Ind.). *Proc. Soc. Exp. Biol. Med.* 122, 328–34 (1966). The effect of dietary cholestryamine on plasma and liver sterol levels, and on *in vitro* hepatic lipid synthesis from acetate-1-C^{14} were compared in the rat and chicken at intervals up to 35 days. The resin has no effect on *plasma or* hepatic cholesterol levels in the rat. In the chicken, plasma cholesterol levels were significantly reduced by cholestyramine although liver cholesterol was not changed. Sterol synthesis by rat liver homogenates was significantly increased within 24 hours after addition of cholestyramine to the diet, and a significant reduction in sterol synthesis occurred within 24 hours after removal of cholestyramine from the diet. Cholestyramine also stimulated sterol synthesis by chicken liver homogenates, but the increase was of considerably lesser magnitude than in the rat. The results are in accord with the hypothesis that cholestyramine significantly lowers plasma cholesterol levels in species which cannot increase hepatic sterol synthesis sufficiently to compensate for increased fecal loss of bile acids and other steroidal substances.

THE EFFECT OF A HEPARIN ANTAGONIST ON FASTING SERUM TRIGLYCERIDES IN MAN. H. Engelberg (Cedars of Lebanon Hospital, Los Angeles, Calif.). *J. Atheroscler. Res.* 6, 240–46 (1966). In 7 of 16 fasting patients who received polybrene in glucose, and in 12 of 18 who were given polybrene in normal saline, a steady rise in serum triglycerides occurred over a two hour period. No such rise was found in the same patients after control injections. In one individual, where the serum lipoproteins were ultracentrifugally analyzed, the increase after polybrene was in the S_f20–100 class of lipoproteins. The results suggest that lipoprotein lipase normally functions in the removal of endogenously synthesized triglycerides from the bloodstream in man, and that other removal mechanisms do not adequately compensate, at least in a short time.

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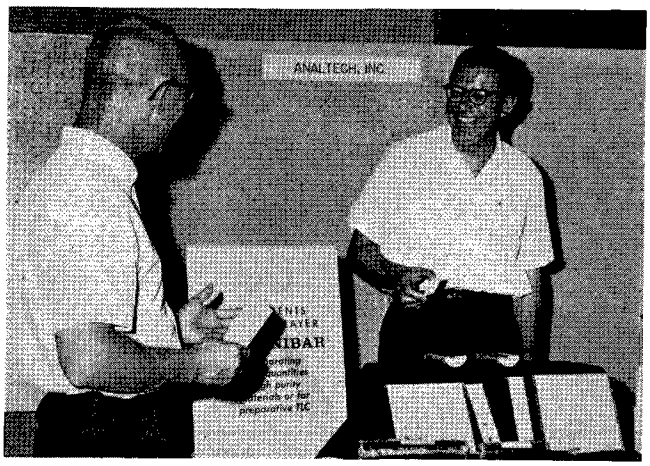
Penn State TLC Course. . .

(Continued from page 452A)

ticipants of the Short Course were hosted by Applied Science Laboratories. Displays of TLC equipment by Analtech, Applied Science Laboratories, Brinkmann Instruments, Distillation Products Industries, Mallinckrodt Chemical Works, and H. Reeve Angel were most helpful.

An added side feature that proved to be of special interest to all was the motion picture describing and illustrating the events of the AOCS Short Courses in Pomona, California and Milan, Italy. Both Short Courses were held in 1965 and featured laboratory demonstrations along with lectures. The moive was prepared, shown, and narrated by O. S. Privett, well known for his elegant movies dealing with procedures in lipid chemistry. Spaced between scenes from lectures and demonstrations of techniques were others showing the beauty of buildings and terrain in Southern California and Milan, Italy. The motion picture emphasized the active Short Course program of the AOCS. Short Courses are conducted each year in various parts of the US and extended to other countries when possible. Short Courses will soon be held in Michigan, Mexico, and Texas and others are being planned for other areas of the US and Canada. Anyone interested in the possibility of having a Short Course in their city, state, or country on general or special topics of interest to academic institutions, government laboratories, or industry should contact Noel Kuhrt, Chairman of the Education Committee. Inquiries are invited from the US and abroad.

H. Reeve Angel & Co., Inc.



Analtech, Inc.

ABSTRACTS: BIOCHEMISTRY AND NUTRITION

(Continued from page 481A)

CORONARY ANGIOGRAPHIC FINDINGS IN CORRELATION WITH AGE, BODY WEIGHT, BLOOD PRESSURE, SERUM LIPIDS, AND SMOKING HABITS. K. Cramer, S. Paulin and L. Werko (Med. Service I, and Roentgen Diagnostic Dept. I, Sahlgrenska Sjukhuset, Univ. of Goteborg, Goteborg, Sweden). *Circulation* 33, 888–900 (1966). Radiological findings by coronary antiography in 224 patients, 173 males and 51 females, were graded according to the rate of filling of coronary arteries and to the presence or absence of obstruction of vessel lumen. The material was then grouped according to age, diastolic blood pressure, serum total cholesterol, serum glycerides, and smoking habits. Age and diastolic blood pressure were not found to have any influence on frequency of coronary artery changes, presumably because of selection of patients. In the males, elevated total serum cholesterol had only a minor influence on the frequency of coronary artery changes, while elevated glycerides were found in high frequency in patients with obstructed coronary arteries, especially in those with severe obstruction. Smokers showed a frequency of coronary changes the same as or higher than patients with elevated glycerides. The influence of smoking was evident. While all conclusions must be interpreted with reference to the material selected as the source of our data, the importance of smoking as a causative agent independent of serum lipids appears conclusive.

TWO-DIMENSIONAL CHROMATOGRAPHY ON SILICA GEL-LOADED PAPER FOR THE MICROANALYSIS OF POLAR LIPIDS. R. E. Wuthier (Forsyth Dental Center, Harvard School of Dental Medicine, Boston, Massachusetts). *J. Lipid Res.* 7, 544–50 (1966). Two-dimensional chromatography on commercially available silica gel-loaded paper for the microanalysis of polar lipids from various tissues is described. All common phospholipids and their lyso derivatives can be reproducibly separated. As many as 22 lipid components were separated on a single chromatogram. Improved methods for staining lipids and for determining phosphorus in the chromatographic spots are reported.

PURIFICATION OF LIPIDS FROM NONLIPID CONTAMINANTS ON SEPHADEX BEAD COLUMNS. *Ibid.*, 558–61. A simple, rapid column procedure for the removal of nonlipid contaminants from lipid extracts is described. Lipid P is completely recovered and nonlipids completely removed.

THIN-LAYER ELECTROPHORESIS OF SERUM LIPOPROTEINS. P. K. Reissell, Lillian M. Hagopian and F. T. Hatch (Arteriosclerosis Unit, Medical Services, Massachusetts General Hosp. and Dept. of Med., Harvard Med. School, Boston, Mass.). *J. Lipid Res.* 7, 550–557 (1966). A method is described for semiquantitative study of serum lipoproteins, with particular reference to the very low density fractions involved in transport of triglycerides. Serum samples were subjected to electrophoresis in thin layers of starch granules; lipids were extracted from starch segments and subjected to thin-layer chromatography; lipid fractions were recovered from the adsorbent and quantified colorimetrically. The procedure is applicable to the study of alimentary and endogenous hyperlipidemias in man, and to radioactive tracer experiments. Over-all recoveries of lipids were variable and averaged 81% for cholesterol and 76% for triglycerides.

METHOD FOR RECOVERING SULFOLIPID FROM PLANT LIPID EXTRACTS. W. E. Klopfenstein and J. W. Shigley (Dept. of Biochem., The Pennsylvania State Univ., University Park, Penna.). *J. Lipid Res.* 7, 564–65 (1966). Sulfoquinovosyl diglyceride from plant tissues is recovered in sizeable quantities, free from phospholipids and galactolipids.

SIMULTANEOUS P^{32}- AND C^{14}- LABELING OF PHOSPHOLIPIDS BY GERMINATING SOYBEANS. J. Hoelzl and H. Wagner (Institut fur Pharmazeutische Arzneimittellehre, University of Munich, Germany). *J. Lipid Res.* 7, 569–70 (1966). Double labeled (P^{32} and C^{14}) phospholipids of high specific activity are obtained by incorporating the labels during germination of soybeans.

RAPID QUANTITATIVE MEASUREMENT OF LUNG TISSUE PHOSPHOLIPIDS. L. Gluck, Marie V. Kulovich and S. J. Brody (Dept. of Pediatrics, Yale Univ. School of Med., New Haven, Connecticut). *J. Lipid Res.* 7, 570–74 (1966). A rapid procedure for the separation of phospholipids of lung tissue into acidic and nonacidic fractions by means of diethylaminoethyl cellulose acetate microcolumns is described. The fractions are then resolved into individual phospholipids by thin-layer chromatography and quantified by transmission densitometry.

NEW SOLVENT SYSTEMS FOR THIN-LAYER CHROMATOGRAPHY OF BILE ACIDS. J. A. Gregg (Mayo Clinic and Mayo Found., Rochester, Minn.). *J. Lipid Res.* 7, 579–81 (1966). A modified thin-layer chromatographic technique separates small amounts of glycochenodeoxycholic from glycodeoxycholic acid and the major taurine conjugates and unconjugated bile acids from one another.

• Drying Oils and Paints

USE OF GRAPE SEED OIL IN THE PRODUCTION OF ALKYD RESINS. A. G. Zelenyi, E. S. Lavrinenko and R. G. Vainshel'Boim. *Lakokras Mat.* **1965,** No. 2, 81–2. The properties of this oil compare well with those of sunflower oil and the oil belongs to the semi-drying group. A series of coating compositions based on this oil was prepared and the results indicate that it can successfully replace some of the oils used in the food industry. (Rev. Current Lit. Paint Allied Ind., No. 288).

FRACTIONATIONATION OF LINSEED OIL. EPOXIDATION OF LINSEED OIL. F. I. Sameh and M. C. O. de Asensio. *Informaciones sobre Grasas y Aceites (Buenos Aires)* **9,** 36–38 (1965). Using bleached and neutralized linseed oil different ratios of furfural and oil were investigated. The composition of each equilibrium phase and the iodine number of the oil obtained in each phase were determined. The epoxy (oxirane) components were determined by titration with hydrobromic acid dissolved in acetic acid.

REACTION PRODUCTS OF CASTOR OIL WITH ARYLENEDIISOCYANATES. M. K. Smith (Baker Castor Oil Co.). *U.S. 3,262,952.* Described is the reaction product of castor oil and from 3–13 parts by weight of an arylene diisocyanate based on the combined weight of the castor oil and the diisocyanate. The arylene diisocyanate is selected from the class consisting of tolylene diisocyanate, m-phenylene diisocyanate, 1-chlorophenylene-2,4-diisocyanate, xenylene-4,4′-diisocyanate, napthalene-1,5-diisocyanate, 3,3′-bitolylene-4,4′-diisocyanate and diphenylene-4-4′-diisocyanate. The temperature of the reaction producing the product is below 100C.

ANTI-LIVERING AGENTS. C. T. Rairdon and W. E. Hanson (Johns-Manville Corp.). *U.S. 3,259,511.* An anti-skinning agent consists of an organic aliphatic amine of the general formula RNR′R″ in which R is a hydroxylated alkyl radical and R′ and R″ are selected from the group consisting of hydrogen and hydroxylated alkyl radicals.

• Detergents

SYNTHETIC DETERGENTS AND HEALTH. K. Motegi and T. Ono (Tokyo University Hospital). *Soap Chem. Specialties* **42** (8), 52–3 (1966). Liver function tests performed on workers exposed to alkyl benzene sulfonate for up to 12 years in a Japanese detergent plant showed no abnormality attributable to synthetic detergents.

SYNTHETIC DETERGENT BAR. W. A. Fessler. *U.S. 3,231,606.* Described is a synthetic detergent bar containing as the essential synthetic detergent agent a solid reaction product of a water-soluble bisulfite with an ethylene homopolymer containing predominantly 1-alkenes which are mainly linear in character and have a few per cent of branched chain materials and containing from 10–16 carbon atoms. The detergent agent is prepared by a process comprising forming a reaction mixture of the ethylene homopolymer, water, a water-soluble volatile polar organic solvent, a water-soluble bisulfite and an alkaline material, the aqueous phase of the reaction mixture having a pH between 6 and 7.5, the mol ratio of bisulfite to homopolymer being in the range of 1:1 and 3:1, and dispersing a gas containing molecular oxygen through the reaction mixture. The reaction mixture is maintained between room temperature and the reflux temperature of the reaction mixture and the pH maintained between 6 and 9.

METHODS FOR REDUCING CHOLESTEROL IN THE BLOOD. W. G. M. Jones, J. M. Thorp, and W. S. Waring (Imperial Chemical Ind., Ltd.). *U.S. 3,262,850.* The described method consists of orally administering to a patient an effective dose of at least one compound selected from the group consisting of compounds having the formula X–A–CR_1R_2COOH and compounds of the formula R_3C–A–XCOOH; A is oxygen or imino; R_1 is lower alkyl; R_2 is hydrogen or lower alkyl; R_3 represents the methylene groups necessary to form, together with the adjacent carbon atom, a cyclohexyl ring; and X is phenyl, halogenophenyl, alkylphenyl, alkenylphenyl, alkoxyphenyl, or the lower alkyl esters and alkali metal, alkaline earth metal and acid-addition salts thereof.

SKIN CLEANING COMPOSITION. J. B. Myers (Chemical Supplies, Inc.). *U.S. 3,262,884.* An antiseptic skin-cleaning composition consists of 30–99% by weight of a vegetable oil, 0–65%