

ABSTRACTS R. A. REINERS, Editor

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• Fats and Oils

SIMPLIFIED CHROMATOGRAPHIC SEPARATION AND ANALYSIS OF C₄ THROUGH C₁₂ DIBASIC ACID. E. D. Smith (The Chemstrand Corp., Decatur, Ala.). *Anal. Chem.* **32**, 1301-4 (1960). Columnar chromatographic methods have been developed for the separation and analysis of the C₄ through C₁₂ straight-chain dicarboxylic acids. While similar methods have been published, the present techniques are believed to be considerably easier to use. Separations were achieved on silicic acid columns modified by the addition of either water or aqueous citrate buffer solutions. Quantitative analyses of good precision (about \pm 5%) were obtained by simply weighing the sample residues after evaporation of the eluting solvent.

UREA COMPLEXES: PREPARATION OF OLEIC ACID FROM PEANUT OIL. N. A. Khan (Div. Food and Nutr., East Pakistan Council of Sci. and Ind., Tejgaon, Dacca, Pakistan). *Oleagineux* **15**, 155 (1960). The author describes a method for the preparation of oleic acid of 98 per cent purity containing about 2 per cent linoleic acid by means of urea complex formation. The isolated oleic acid had IV 89.9, acid value 281.8, and no *trans* isomers.

THE SYNTHESIS OF 1-MONOSORBIN. K. Tafel, Cl. Franzke, and P. Dietze (Inst. Food Chem., Humboldt Univ., Berlin). *Fette, Seifen, Anstrichmittel* **62**, 592-93 (1960). The authors have prepared 1-monosorbin from isopropylidene glycerol and sorbic acid by a partial modification of the E. Fischer procedure. The intermediate and end products were examined in the infrared regions of the spectrum and the spectra duplicated in the paper. The 1-monosorbin as prepared was reported to have a saponification number of 298 (th = 301), and a boiling point of 180-182° at 5 mm. pressure.

A CONTRIBUTION TO THE STUDY OF THE ALCOHOLYSIS OF FATS. J. Pore (Univ. Paris). *Oleagineux* **15**, 165 (1960). The author reviews the recent work concerning the alcoholysis of fats and discusses methods of separation of the major classes of methyl esters. The proposed mechanisms are thoroughly discussed and the influence of alcohol concentration, reaction selectivity, ester hydrolysis, heterogeneity of medium, and preferential alcoholysis of saturated glycerides on the rates of alcoholysis were evaluated. A reaction mechanism based upon measurements of the above variables is discussed (135 references).

FATTY ACID CHLORIDES IN INTERESTERIFICATION OF FATS. K. Tafel, P. Dietze, and Cl. Franzke (Inst. Food Chem., Humboldt Univ., Berlin). *Fette, Seifen, Anstrichmittel* **62**, 591 (1960). The authors have studied the interesterification of tristearin with butyl chloride and the interesterification of tributyrin with stearyl chloride, using infrared spectroscopy as a means of analytical control. It was concluded that acid chlorides can be used as a means of obtaining a reproducible and predetermined degree of interesterification or glycerolysis of fats.

CHROMATOGRAPHIC SEPARATION OF LIPIDS ON GLASS FIBER PAPER. M. Cernikova (Trybs Labty. of Biochem., Masaryk University, CSR). *Fette, Seifen, Anstrichmittel* **62**, 587 (1960). The author has studied the effects on the chromatographic analysis of lipid mixtures on glass fiber paper of various solvents, degree of impregnation of the paper with reversed phase, pH of both the paper and solvents, temperature of development, and the amount of material taken for analysis. The method has been applied to several natural lipids. It was found that a single solvent system could not separate all of the lipid classes, but that it could be done by three different systems.

INTERESTERIFICATION IN THE FIELD OF FATS. IV. CHANGES IN THE DROP POINT DURING INTERESTERIFICATION OF SINGLE AND MULTIPLE FATS. H. P. Kaufmann and B. Grothues (Deut. Inst. Fettforsch., Münster). *Fette, Seifen, Anstrichmittel* **62**, 489 (1960). The authors have described an empirical relationship between the saturated fatty acid content of a fat and its drop point (defined as the temperature at which the first drop of fat falls from the end of a standardized cup heated by a water bath) after a single phase interesterification. The changes in

drop point of a fat mixture during the single phase interesterification were related to the activity of the catalysts used.

THE AUTOXIDATIVE REACTIONS DURING THE FILM FORMATION OF IMPATIENS OIL. H. F. Kaufmann and R. K. Sud (Deut. Inst. Fettforschung, Münster). *Fette, Seifen, Anstrichmittel* **62**, 611 (1960). The authors have applied infrared spectroscopy to the study of film formation in Impatiens oil, and have concluded that in the initial stages of autoxidation of Impatiens oil a rearrangement of the double bonds from the all *cis* to the all *trans* form occurs. Hydroxyl groups continue to be formed in the oil long after the initial stages of film formation. The rate of uptake of oxygen by Impatiens oil both in the presence and absence of catalysts has also been investigated and reported.

THE ULTRAVIOLET SPECTROSCOPIC CHANGES DURING THE AUTOXIDATION OF FATS FROM SLAUGHTER HOUSES. A. Mirna (Inst. Chem. and Physik, Bundesforschungsanstalt Fleischwirtschaft, Kulmbach). *Fette, Seifen, Anstrichmittel* **62**, 577 (1960). The ultraviolet spectra of autoxidized beef tallow and pig lard show characteristic differences especially in the regions corresponding to triene absorption. The conjugated fatty acids in beef tallow are affected by autoxidation so that the extinction coefficient in these regions of the spectrum decreases at the beginning of the oxidation. Treatment of the fat with bleaching earth does not change the extinction coefficient at 268 m μ . The T values [defined as $T = 100 E_{268} - \frac{1}{2}(E_{261} + E_{272})$], however, behave differently as compared to lard. The strongly autoxidized tallow does not show any increase in absorption in the trienoic and tetraenoic regions of the spectrum after treatment with bleaching earths.

FATTY ACID COMPOSITION OF THE LIPIDS OF PASTURE GRASSES. G. A. Garton (Rowett Res. Inst., Bucksburn, Aberdeen). *Nature* **187**, 511-512 (1960). The total fatty acid composition resembles that of the leaf lipids of maize and also that of the lipids of clover-rich pasture. Linolenic acid is the outstanding component (61.3%); linoleic is present in an amount of 13.2%. Of the saturated fatty acids, palmitic acid predominates (15.9%).

ANTI-OXIDANT AND COMPOSITIONS CONTAINING THE SAME. L. R. B. Herve (John A. Manning Paper Co., Inc.). *U. S. 2,950,975*. The oxidation of a normally oxidizable fat-containing material is inhibited by the addition of a small amount of a dried extract of the mucilage-producing portion of okra pods.

PROCESS FOR A STABLE OIL SUSPENSION. H. G. Garman (Upjohn Co.). *U. S. 2,951,074*. The solid ingredients are blended and reduced in particle size prior to suspension in the oil vehicle. The particle size should be 99% less than 60 microns.

PROTOPECTIN COMPOSITION AND METHOD OF PREPARATION. L. T. Work. *U. S. 2,952,548*. Finely divided, dry protopectin is coated with a hydrophobic composition in an amount of from 4% to not more than 10% of the total weight of the protopectin. The coating contains about 100 parts of an edible fatty oil (animal or vegetable oil, hydrogenated animal or vegetable oil) and about 10-30 parts of an edible waterproofing material such as paraffin, microcrystalline wax, edible natural wax, shellac, or edible water insoluble calcium soap.

SEPARATION OF FATTY OIL SUBSTANCES. T. H. McGuire and W. E. Moss (Wilson & Co., Inc.). *U. S. 2,952,696*. A process is described for producing abnormally large crystals of fatty material from an unrefined mixture of crystallizable and non-crystallizable components.

PROCESS FOR MODIFYING POWDERED MILK PRODUCTS. A Sjollem (Cooperatieve Condensfabriek "Friesland"). *U. S. 2,953,458*. Milk product particles are made easily dispersible in water by coating the particles with an anhydrous liquid surface-active agent such as lecithin or oleic acid in an amount of 0.2% to 4% (by weight of milk product).

• Fatty Acid Derivatives

A CONTRIBUTION TO THE STUDY OF DERIVATIVES OF NAPHTHALENE AND FATTY ACIDS: HEPTANOYLNAPHTHALENES AND HEPTA-

NOYLNAPHTHOLS. J. Jorand (Lab. I.R.H.O.). *Oleagineux* 15, 185 (1960). The author discusses a general scheme for the preparation of alkylnaphthylcarbinols and alkylnaphthalenes. *Alpha*-heptanoylnaphthalene was prepared from the corresponding naphthyl bromide and heptyl nitrile through the Grignard reaction. *Alpha*-naphthylcarbinols were prepared in a similar manner. Aminoalkylnaphthalenes were prepared from the corresponding naphthyl ketones through the Leukert reaction.

THE COMPOSITION OF THE RESIDUE FROM THE PYROLYSIS OF METHYL RICINOLEATE IN INDUSTRY. M. Naudet and P. Vezinet (Lab. Chim. Corp. Gras, Fac. Sci., Marseille). *Rev. Franç. Corp. Gras* 7, 385 (1960). The residue resulting from the pyrolysis of methyl ricinoleate after exhaustive distillation consists of four principal fractions: a) methyl esters which represented 70% of the total amount and consisted of diunsaturated, oleic and ricinoleic acid esters; b) glycerides not alcoholysed (20% of total); c) polymeric material (6% of total); and d) unsaponifiables (5% of total).

GAS CHROMATOGRAPHY AND LIPID CHEMISTRY. I. ANALYSIS OF FATTY ALCOHOLS. C. Paquot, D. Lifort, and A. Pourchez (Lab. Lipochemie, C.N.R.S.). *Rev. Franç. Corp. Gras* 7, 341 (1960). The authors have determined the conditions necessary to separate fatty alcohols of C₆-C₁₈ carbons both as the free alcohols or as the acetate ester. The packing employed was firebrick coated with 20% diethylene glycol succinate polymer. A 4-mm. by 3.25-m. column was used. Helium was the carrier gas. Column temperatures ranged between 140-190°. A simple method for determining the composition of commercial fatty alcohols is presented.

OIL BASE FAT-LIQUOR COMPOSITION WITH POLYBASIC ACID ESTER AND METHOD OF USE. J. Plapper, R. Heyden, and G. Arnold (Bohme Fettechemie G.m.b.H., Dusseldorf). *U. S. 2,950,950*. A fat-liquoring composition for chrome-tanned hides and skins consists of an oil base and about 2 to 20% of a masking agent. This masking agent is a mono-ester of a tri- or tetra-basic acid in which the alcohol radical contains from 12 to 18 carbon atoms.

SYNTHETIC LUBRICANT COMPOSITION. C. E. Saunders (Sec'y. of the Navy, U. S. A.). *U. S. 2,951,041*. The desired composition consists of a water-soluble alkylene oxide oil of copolymerized ethylene oxide and propylene oxide and from 0.2 to 5.0% by weight of an additive which is a mono-, di-, or triethanolamine salt of an aliphatic acid having from 8 to 20 carbon atoms.

GERMICIDALLY ACTIVE SOAP CONTAINING SILVER ION EXCHANGE RESIN. G. A. Lutz and R. E. Sharpe (Permachem Corp.). *U. S. 2,951,811*. The desired composition consists of a water-soluble alkali metal higher fatty acid soap and a germicidal amount of a sulfonic acid cation exchange resin in silver form.

• Biology and Nutrition

INTERRELATIONSHIPS BETWEEN PHOSPHORUS, FLUORIDE AND FAT IN CHICK DIETS. J. D. Summers, S. J. Slinger, I. Motzok, and G. C. Ashton (Department of Poultry Husbandry, Ontario Agricultural College, Guelph, Ontario). *Poultry Sci.* 39, 664-71 (1960). Two randomized block design experiments using factorial arrangement of treatments were made to study the interrelationship between phosphorus, fluoride and fat in chicks. The toxicity of F⁻ as supplied by NaF and soft phosphate was also compared. The results indicate that F⁻ from NaF caused a growth depression in diets containing added fat while in the absence of added fat the results were variable. The effect of F⁻ in depressing chick weight appeared to be due to a reduction in feed intake and not to interference with feed utilization.

CORRELATION OF ARACHIDONIC ACID OF SERUM CHOLESTEROL ESTERS IN DIFFERENT SPECIES WITH SUSCEPTIBILITY TO ATHEROSCLEROSIS. L. Swell, H. Field, Jr., and C. R. Treadwell (Vet. Admin. Center, Martinsburg, W. Va.). *Proc. Soc. Exptl. Biol. Med.* 104, 325-28 (1960). Serum cholesterol ester fatty acid (CEFA) composition of 8 different species has been determined by gas-liquid chromatography. Different CEFA spectrums were found for each species. The outstanding variation was the proportions of arachidonic acid in CEFA of the serums. That of the rat had 50% of arachidonic acid and that of the dog had 17%. All species also had a large proportion of linoleic acid in the CEFA of their serums. The rat and the dog, with high arachidonic acid levels in CEFA of their serums, are known to be highly resistant to development of atherosclerosis. It remains open to investigation whether the proportion of arachidonic

acid in the CEFA is a characteristic of the species or whether it, and the susceptibility to atherosclerosis, can be altered by dietary measures.

BIOLOGY OF FATS. XI. LIPIDS FROM THE BLOOD OF NORMAL AND PATHOLOGIC HUMANS AND FROM TISSUES AFFECTED WITH XANTHOMATOSIS. H. P. Kaufmann and G. Schmidt (Deut. Inst. Fettforsch.). *Fette, Seifen, Anstrichmittel* 62, 399-411 (1960). The lipids from the serum of healthy persons as well as those of patients suffering from hyperlipemia, hypercholesterolemia, atherosclerosis, and xanthomatosis were analyzed for the following components: total lipid, iodine value, saponification value, total cholesterol, free cholesterol, and sterols, total P lipid, total N lipid, the N/P ratio, total phospholipid as lecithin, carotinoids, periodic acid oxidizables, unsaponifiables, and on the water-soluble materials in the fats—choline, phosphoric acid and glycerol. The fatty acid composition of the lipid fractions were determined and lauric, myristic, palmitic, stearic, oleic, linoleic, linolenic, arachidonic, pentaenoic, and hexaenoic acids were found. The authors have compared the lipid composition of the serum and tissue lipids of persons afflicted with the above mentioned diseases in very great detail. They found that in hyperlipemia the total cholesterol and linoleic acid content was greatly lowered; the phosphatide and monoenoic acid content was normal; the total fatty acid content increased, as did the saturated fatty acid and glycerin content. In atherosclerosis, the total cholesterol was slightly lowered, as was the monoene content; the phosphatide, saturated fatty acid, and glycerol content increased, the total fatty acid, and linoleic acid content was reported as normal. In hypercholesterolemia, the cholesterol content was low, as was the total fatty acid and linoleic acid content, the phosphatide and glycerol content was increased over the values found for the normal subjects studied.

FATTY OILS OF AQUATIC INVERTEBRATES. XXIV. FATTY OILS OF THE ASCIDIANS, SARCODIDEMNOIDES MISKIENSE (I) AND CYNTHIA KARASOJA (II) WITH PARTICULAR REFERENCE TO THEIR STEROLS. Suketaka Ito, Toru Takagi, and Yoshiyuki Toyama (Nagoya Univ.). *Nippon Kagaku Zasshi* 81, 662-4 (1960). Fatty oils from I (2 samples) and II showed, respectively, sapon. no. 140.4-142.0, 166.8, iodine no. 122.0-148.1, 178.7, unsaponifiable matter (%) 26.7-32.0, 21.3. Fatty acids of I and II, respectively, contained saturated 32.2, 36.9, dienoic 3.3, 6.8, trienoic 1.6, 4.1; tetraenoic 5.8, 9.7, pentaenoic 15.8, 20.1, and hexaenoic 6.1, 9.1%. I contained cholestanol and other saturated sterols as well as crionasterol, while II contained no saturated sterols but Δ^5 -sterols.

FATTY OIL AND UNSAPONIFIABLE MATTER FROM EGG MASS OF THE SEA-HARE, APLYSIA KURODAI. Tatsuo Tanaka and Yoshiyuki Toyama (Nagoya Univ.). *Nippon Kagaku Zasshi* 81, 831-2 (1960). This oil showed d_{40}^{20} 0.9607, n_{D}^{20} 1.4773, sapon. no. 178.9, iodine no. 110.1, and unsaponifiable matter 10.92%. The unsaponifiable matter showed iodine no. 66.9, sterol 24.31%, and Δ^5 -sterol/total sterol 0.75%. It contained cholesterol.

EFFECT OF THREONINE AND CHOLINE DEFICIENCIES ON THE METABOLISM OF C¹⁴-LABELED ACETATE AND PALMITATE IN THE INTACT RAT. A. Yoshida and A. E. Harper (Dept. of Biochem., Univ. of Wisconsin, Madison). *J. Biol. Chem.* 235, 2586-89 (1960). Incorporation of acetate-1-C¹⁴ and palmitate-1-C¹⁴ into liver fat and carcass fat and the conversion of these compounds into respiratory carbon dioxide have been studied in threonine-deficient and choline-deficient rats. Stimulation of fat synthesis accompanied the fat accumulation in the livers and carcasses of rats fed a low protein diet deficient in threonine. The effects of choline deficiency were less clear-cut. They included increased fat synthesis in the liver, but not in the carcass, and some evidence of impaired transport of fat from the liver.

STEROL METABOLISM. W. M. Stokes and W. A. Fish (Med. Res. Lab., Providence College, Providence, R. I.). *J. Biol. Chem.* 235, 2604-07 (1960). It has been shown by the use of reverse isotope dilution techniques that a significant quantity of activity, indistinguishable from desmosterol (24-dehydrocholesterol), is present in the higher counting companions of cholesterol in the livers of rats previously injected with sodium acetate-1-C¹⁴. The distribution of activity among cholesterol, desmosterol, and other higher counting companions at 5, 15, and 120 minutes after injection suggests that desmosterol is a final precursor of cholesterol.

FORMATION OF EXTRACELLULAR SPHINGOLIPIDS BY MICROORGANISMS. F. H. Stodola and L. J. Wickerham (Northern Reg. Res. Lab., Peoria, Ill.). *J. Biol. Chem.* 235, 2584-85 (1960). An extracellular crystalline product formed by the yeast *Han-*

senula ciferrii has been shown to consist largely of tetraacetylphosphingosine. Identity was established by comparison of acetone, N-benzoyl, and N-benzoyltriacyetyl derivatives of the free base with corresponding derivatives prepared from phosphingosine obtained from corn phosphatide.

THE UTILIZATION OF CORN OIL, LARD, AND TALLOW BY CHICKENS OF VARIOUS AGES. Ruth Renner and F. W. Hill (Dept. Poultry Husbandry and Ag. Experiment Station, Cornell Univ., Ithaca, N. Y.). *Poultry Sci.* 39, 849-54 (1960). The utilization of corn oil, lard, and tallow by growing chicks of various ages and by adult hens has been studied by determining the metabolizable energy value of the fats and their absorbabilities. Age affected only the utilization of tallow by the growing chick. In early life, utilization of this fat was lower than in the adult. By the time the chick was eight weeks of age it was able to utilize tallow equally as well as the adult hen.

FATTY ACID SYNTHESIS FROM ACETATE BY NORMAL AND DIABETIC RAT LIVER HOMOGENATE FRACTIONS. S. Abraham, K. J. Matthes, and I. L. Chaikoff (Dept. of Physiol., Univ. of California, Berkeley). *J. Biol. Chem.* 235, 2551-59 (1960). Homogenates prepared from normal and alloxan-diabetic rat livers were separated into a particle-free supernatant and a microsomal fraction. The capacity of these fractions, alone or in combination, to synthesize long-chain fatty acids from acetate-1-C¹⁴ was investigated. Under all conditions investigated, fatty acid synthesis by the diabetic system was one-third to one-fifth that observed with the normal systems. It is concluded that defective lipogenesis observed in the diabetic liver homogenate is not due to deficiency of a known cofactor. The affinity of the acetate-activating enzyme for CoASH is apparently higher than the pyruvic oxidase system in both normal and diabetic rat liver homogenate systems.

FATTY ACID SYNTHESIS FROM ACETATE BY NORMAL AND DIABETIC RAT LIVER HOMOGENATE FRACTIONS. K. J. Matthes, S. Abraham, and I. L. Chaikoff, *Ibid.*, 2560-68 (1960). Fatty acid synthesis from acetate by particle-free supernatant fractions of liver homogenates prepared from normal and diabetic rats was shown to be about the same. The addition of normal microsomes to the normal supernatant fraction caused a 5- to 10-fold stimulation of lipogenesis from acetate, whereas the addition of diabetic microsomes to the diabetic supernatant fraction stimulated 1½- to 3-fold. There appears to be two contributing causes for the decreased conversion of acetate to fatty acids by the diabetic rat liver supernatant plus microsomal fractions. The first is the ability of the diabetic microsomes to stimulate fatty acid synthesis up to the levels observed with the normal microsomes. The other lesion is located in the diabetic supernatant fraction, and its nature is unknown.

LIPID SYNTHESIS IN HUMAN LEUKOCYTES, PLATELETS, AND ERYTHROCYTES. P. A. Marks, A. Gellhorn, and C. Kidson (Dept. of Med., Columbia Univ., Coll. of Physicians and Surgeons, N. Y. 32, N. Y.). *J. Biol. Chem.* 235, 2579-83 (1960). Lipid synthesis in human blood cells has been studied by incubation of whole blood with acetate-1-C¹⁴. The leukocytes, platelets, erythrocytes, and plasma were replaced by the dextran flotation method. Mixed lipids were extracted from each of these fractions, separated into neutral lipids and phospholipids, and assayed for radioactivity. Acetate-1-C¹⁴ was incorporated into lipids of human blood by leukocytes and platelets, but only to a very limited extent, if at all, in mature erythrocytes. On a per-cell basis, leukocytes incorporated isotope into lipids at a rate 70-fold greater than that of platelets. However, per unit volume of blood, 25 to 30% of the total lipid synthesis in whole blood is attributable to platelets. Lipids formed by leukocytes and platelets are transferred to plasma lipids.

THE ENZYMATIC SYNTHESIS OF PLASMALOGENS. J. Y. Kiyasu and E. P. Kennedy (Dept. of Biochem., University of Chicago, Chicago, Ill.). *J. Biol. Chem.* 235, 2590-94 (1960). Prolonged enzymatic hydrolysis of the choline-containing plasmalogen of beef heart, catalyzed by the lecithinase D of *Clostridium perfringens*, leads to the complete removal of the phosphorylcholine portion of the molecule. The other product of the reaction is an aldehydogenic lipid closely resembling a D- α , β -diglyceride, except that one fatty acid ester bond is replaced by an α , β -unsaturated ether linkage. The name "plasmalogenic diglyceride" is suggested for compounds of this type. Methods for the purification of plasmalogenic diglycerides and the separation of these substances from conventional diglycerides by chromatography on silicic acid are described.

FUNCTIONAL PROPERTIES AND FLAVOR OF EGGS LAID BY HENS ON DIETS CONTAINING DIFFERENT FATS. Ruth Jordan, Gladys E. Vail, J. C. Rogler, and W. J. Stadelman (Dept. of Foods and

Nutrition, Purdue University, Lafayette, Ind.). *Food Tech.* 14, 418-422 (1960). Eggs from three groups of Leghorn hens on diets containing different kinds of fat were compared with respect to stability of whole-egg foams as measured by the percentage of drainage in a one-hour period, with regard to leavening power as indicated by the volumes of whole-egg sponge cakes, and with respect to flavor. The diets for the three groups of hens were, respectively, a stock ration supplemented with 10% corn oil, the same stock ration supplemented with 10% beef tallow, and the stock ration only. Whole-egg sponge cakes made from the eggs of the beef tallow group were significantly smaller than similar cakes made from the other two groups of eggs.

CHANGES IN THE INFRARED SPECTRUM OF THE LIVER LIPID OF THE CHICK. C. D. Jeffries, D. F. Holtman, and J. A. Cameron (Dept. of Bacteriology, Univ. of Tenn., Knoxville). *Poultry Sci.*, 39, 795-7 (1960). The changes in the infrared spectra of total liver lipids of chicks from two to five days of age have been described. The major changes appear to be related to an increase in the percentage of phospholipid in the liver lipid. A similar sequence of events was observed during infection with *Salmonella pullorum*.

GENETIC STUDIES OF SERUM CHOLESTEROL LEVEL IN THE CHICKEN. F. L. Chermis, Jr., F. H. Wilcox, and C. S. Shaffner (Dept. of Poultry Husbandry, Univ. of Maryland, College Park.). *Poultry Sci.* 39, 889-92 (1960). Serum cholesterol levels were measured at 6-9 weeks of age in random-bred White Leghorns as well as lines selected for differences in cholesterol. Significant differences between dam-families were noted in two successive years and heredity was estimated to be .30. After three generations of selection, two lines have been developed which differ markedly and significantly in their serum cholesterol level.

SOME EFFECTS OF TOCOPHEROLS AND THE STABLE FATS ON THE GROWTH OF THE MOUSE. N. A. Khan (Div. Foods and Nutr., East Regional Labs., Pakistan Council of Sci. and Ind. Res., Tejgaon, Dacca, East Pakistan). *Oleagineux* 14, 729 (1959). Weanling mice were fed diets containing olive oil, adsorbent treated olive oil, Criseo, 10% *trans* glycerides, and 30% *trans* glyceride (trichlaidin) for 54 weeks. In all cases growth was essentially similar. Animals fed fats containing various amounts of tocopherols gave results that indicated that the ingested tocopherols and stable fats did not cause an increased manifestation of cardiac accidents.

BIOGENESIS OF C₂₀ AND C₂₂ LIVER POLYENOIC FATTY ACIDS BY VERTEBRATES. E. Klenk and G. Kremer (Physiol. Chem. Inst., Univ. Cologne). *Z. Physiol. Chem.* 320, 111 (1960). Liver slices of various vertebrates (pigeon, turtle, frog, carp, trout, and the salt water fishes, flounder, dab, and smelt) were incubated with acetate-1-C¹⁴. Analyses of the products of oxidative and reductive breakdown of the ozonide of the polyenoic acids showed that the label always predominated in the dicarboxylic acids of the carboxyl ends of the polyenoic acids. Only low activity in malonic acid derived from the middle of the carbon chain was found. Propionic and caproic aldehyde from the methyl ends of the polyene acids were practically inactive. It was concluded that in all the vertebrates investigated syntheses of C₂₀ and C₂₂ polyenoic acids takes place as in the rat, essentially from exogenous precursors of linoleic and linolenic acids.

PHOSPHATIDES AND GLYCOLIPIDS. I. A RETINA LIPID EXTRACT OF PIGS' EYES. L. Horhammer, H. Wagner, and P. Wolff (Inst. Pharm. Arz. Univ. Munich). *Z. Physiol. Chem.* 319, 7 (1960). A total lipid extract from pigs' retina was analyzed quantitatively and qualitatively for phosphatides and glycolipids. The extract corresponded in its composition and occurrence of tetraenoic, pentaenoic, and hexaenoic acids to beef brain extract. An analog to the grey substance of the brain may be drawn in the almost total absence of diphosphoinositide in the retina. Analysis of the lecithin and cephalin of the retina revealed that the cephalin fraction had the highest levels of polyenoic acids.

BIOPHYSICAL STUDIES WITH SYNTHETIC LECITHIN. R. Hirt and R. Berchtold (Res. Inst., A. Wander, A. G., Bern, Switzerland). *Experientia* 15, 373 (1959). The authors have shown that lecithin when dissolved in an apolar solvent such as carbon tetrachloride and also when shaken with water, is present in the solution as an inactivated form of low water content. It is concluded that lecithin dissolved in other lipids is activated in some way by increasing its degree of hydration. The authors discuss the importance of activated lecithin in cell wall permeability and in the conduction of nerve impulses.

RADIOCHEMICAL PURITY OF β -SITOSTEROLS TRITIATED BY CATALYTIC EXCHANGE AND BY THE WILZBACH PROCEDURE. H. Werbin, I. L. Chaikoff, and M. R. Imada (Univ. of Calif., Berkeley). *Arch. Biochem. Biophys.* **89**, 213-217 (1960). Tritiation of commercial β -sitosterol by the Wilzbach procedure resulted in partial reduction (10%) of the double bond of the sterol. The dihydrositosterol contained 60% of the total H^3 of the tritiated sample. Tritiation by catalytic exchange resulted in negligible reduction of the double bond. The epoxide derivatives of β -sitosterol, which are easily prepared, were found to be useful in establishing the radiochemical purity of tritiated sitosterol. Three commercial, unlabeled samples of β -sitosterol were found to contain from 4 to 14% dihydrositosterol (β -sitostanol).

THE PRECIPITATION OF PLASMA PROTEINS BY SHORT-CHAIN FATTY ACIDS. A. Chanutin and R. R. Curnish (Univ. of Virginia, Charlottesville). *Arch. Biochem. Biophys.* **89**, 218-220 (1960). The precipitation of proteins from plasma by caproic, heptylic, caprylic, pelargonic, capric, and lauric acids was measured by means of electrophoresis. At low concentrations (0.04 M) these fatty acids form insoluble complexes, particularly with α - and β -globulins; at higher concentrations (0.1 M), albumin and all globulins were precipitated in appreciable amounts. Each of these fatty acid homologs had characteristic properties as a plasma protein precipitant.

AN INVERSE RELATION BETWEEN THE LIVER GLYCOGEN AND THE BLOOD GLUCOSE IN THE RAT ADAPTED TO A FAT DIET. P. A. Mayes (Royal Veterinary College, London). *Nature* **187**, 325-326 (1960). Female albino rats, fasted for 24 hours to reduce the liver glycogen content to negligible amounts, were fed with 2, 4, 5, or 6 g. of butterfat per day for a period of 5 days. Liver glycogen content rose proportionately to the quantity of fat fed. On the other hand, blood glucose level fell, establishing an inverse relationship between the liver glycogen content and the blood glucose concentration. Possible mechanisms for adaptation to a fat diet by the rat are discussed.

ENHANCED PHOSPHATIDE PRODUCTS. D. J. Hennessy and R. J. Mosby (American Lecithin Co.). *U. S.* **2,952,694**. The described product is a peracetylated sulfonated phosphatide having 15 to 20% of the double bonds sulfonated. It is soluble in water and in vegetable and mineral oils and will form stable emulsions while retaining the oily and lubricating properties and the surface contact effect of untreated phosphatide. It is a clear, fluid, honey-colored composition having the general appearance, bulk, and plasticity of untreated phosphatides. In aqueous solution it produces free sulfate ions.

VITAMIN EMULSION. W. A. Phillips (Upjohn Co.). *U. S.* **2,953,496**. A multiple-vitamin composition consists of a stable, fluid, oil-in-water emulsion having an oil dispersed phase and an aqueous continuous phase. A suggested formulation is as follows: (a) from 0.5% to 2% w/v of a solution of a non-toxic, orally acceptable oil and at least one oil soluble vitamin; (b) from 50 to 80% v/v of glycerin; (c) an aqueous solution of at least one water soluble vitamin; and (d) from 0.75% to 2% w/v of an emulsifier mixture containing an ethylene oxide-polypropylene glycol condensation product and another compound such as sorbitan monooleate or sorbitan monolaurate.

• Drying Oils and Paints

KINETIC STUDIES DURING THE OXIDATION OF DEHYDRATED CASTOR OIL. J. Morgner (V. E. B. Lack and Druckfarben, Berlin). *Fette, Seifen, Anstrichmittel* **62**, 496 (1960). The author has attempted to explain the film-forming properties of dehydrated castor oil with the aid of kinetic measurements at various stages during oxidation. The following measurements were made: degree of oxidation, reaction velocity, peroxide number, diene value, iodine value, acid value, and viscosity. The author has used results obtained from the above measurements to determine the course of autoxidation of castor oil. It was concluded that the oxidative behavior of castor oil lies between that of linseed and chinawood oil.

COATING COMPOSITIONS HAVING REDUCED ODOR ON DRYING. A. B. Eastlake and O. J. Grummitt (Sherwin-Williams Co.). *U. S.* **2,950,982**. The desired composition contains as one of the essential film-forming constituents a fatty acid derivative having an unsaturated fatty acid substituent and from about 0.001% to about 5% by weight of a metal sulphionate.

THE USE OF DIGLYCIDYL COMPOUNDS IN IMPROVED METHODS FOR PREPARING ALKYD RESINS. W. Kammerer, Jr. (American Cyana-

mid Co.). *U. S.* **2,951,049**. A process for producing an oil-modified alkyd resin consists of the following steps: (1) esterifying at a temperature above 200° a polyhydric alcohol, a polycarboxylic acid, and a mono-carboxylic modifier (fatty acid having 8 to 18 carbon atoms or a partial polyhydric alcohol ester of such an acid) until an acid number between 15 and 50 is obtained; (2) reacting the product of step 1 with a diglycidyl ester of a carboxylic acid at a temperature between 130 and 260° until an acid number not greater than 13 is obtained.

PROTECTIVE COATING COMPOSITIONS FROM ALIPHATIC CONDENSED POLYUNSATURATED FATTY ALCOHOLS AND THEIR ESTERS. L. E. Gast, J. C. Cowan, and H. M. Teeter (U. S. A., Sec'y. of Agriculture). *U. S.* **2,952,556**. An alcohol (oleyl, linoleyl, linolenyl) is heated in the presence of an alkaline catalyst and a boron compound to form a condensed alcohol having an average molecular weight of 600 to 800, an iodine value of 80 to 95, and a hydroxyl content of 2.5 to 3.5%. The condensed alcohol is reacted with an organic acid (soybean oil fatty acids, acrylic, sorbic, or maleic) and the resulting ester is dissolved in a solvent containing a cobalt naphthenate drier to form a coating composition.

PAINTS BASED ON PORTLAND CEMENT. K. W. Jones and P. J. Jackson (Associated Portland Cement Manufacturers Ltd.). *U. S.* **2,953,467**. A dry and free-running composition for use as a paint when mixed with water contains Portland cement, a stearate water-repellent compound, and 0.05 to 2.00% of a straight- or branched-chain aliphatic monohydric alcohol having 6 to 10 carbon atoms per molecule.

• Detergents

PENETRANT COMPOSITION. S. H. Salisbury and C. M. White (Olin Mathieson Chemical Corp.). *U. S.* **2,951,039**. The desired product has the following composition: (a) 50 to 95% water; (b) 0.5 to 5% of a sodium alkyl aryl sulfonate; (c) from 3 to 35% of a material such as an alkanolamine having at least 2 carbon atoms per molecule, an alkanolammonium hydroxide having 8 to 12 carbon atoms, or an ammonium salt of a hydroxy carboxylic aliphatic acid having from 4 to 18 carbon atoms.

CLEANER FOR PAINT APPLICATORS. R. E. Blank (Sherwin-Williams Co.). *U. S.* **2,951,043**. The cleaning composition is a clear, homogeneous mixture of: (a) from 9 to 20 parts by volume of a normally liquid hydrocarbon; (b) 1 to 3 parts of an organic phosphate ester; (c) 2 parts of a monoalkyl ether of a polymethylene glycol containing from 2 to 4 methylene groups; (d) 1 to 5 parts of a hydrophilic, non-ionic compound—an organic ester or organic ether of polyglycol; and (e) 1 to 5 parts of a lipophilic, non-ionic compound—an organic ester or ether of polyglycol.

LUBRICATING OIL ADDITIVES. P. J. V. J. Agius and P. R. Morris (Esso Res. and Eng. Co.). *U. S.* **2,951,050**. An oil soluble material which is useful as a detergent additive is a partial ester of a polyvinyl alcohol having a molecular weight of 500 to 50,000 and a carboxylic acid or an acyl halide having from 8 to 24 carbon atoms per molecule. About 30 to 95% of the hydroxyl groups of the alcohol are esterified and the remaining hydroxyl groups of the alcohol are replaced by cyanoethoxy radicals.

DEAERATION AND PURIFICATION OF ANIONIC DETERGENT COMPOSITIONS. R. P. Davis (Procter & Gamble Co.). *U. S.* **2,952,633**. A process is described for making a high-density spray-dried detergent composition from a homogeneous fluid slurry initially containing entrained air.

PURIFICATION OF DETERGENT COMPOSITIONS. V. A. Sullivan, Jr., and Z. J. Ptasinski (Stepan Chemical Co.). *U. S.* **2,952,639**. A method is described for producing an inorganic salt-free detergent from a composition consisting of a water-soluble alkali anionic sulfonated detergent salt having a long aliphatic chain of 8 to 22 carbon atoms and containing 1 to 20 weight percent of an alkali metal sulfate salt. The composition is mixed with an equal weight of ethanol and water in volume ratio of 50:50 to 60:40 and the mixture is held at a temperature of 120-150°F. for a time sufficient to completely dissolve the sulfonated detergent and crystallize the sulfate salt. The crystallized salt particles are removed, and the dissolved detergent is neutralized to a pH of at least 7.