ABSTRACTS

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

• Fats and Oils

FATTY ACIDS IN POLLEN OF SOME CONIFEROUS SPECIES. T. M. Ching and K. K. Ching (Seed Laboratory and Forest Research Lab., Oregon State Univ., Corvallis). *Science* **138**, 890–891 (1962). Fatty acids in pollen of five coniferous species were isolated and analyzed by gas-liquid chromatography. It was found that 0.76 to 0.89% of the dry weight of pollen was fatty acid in three species of *Pseudotsuga* and 1.25 to 1.33% in two species of *Pinus*. Major components in *Pseudotsuga* were oleic, palmitic, and linoleic acids, whereas in *Pinus* they were linolenic, oleic, palmitic, and stearic acids.

THE EFFECT OF SOME AMINO ACIDS ON THE AUTOXIDATION OF FATS. Z. Kwapniewski, A. Rutkowski, and J. Sliwick (Inst. of Fat Industry, Katowice, Poland). *Riv. Ital. Sostanze Grasse* **4**, 190–192 (1962). The effectiveness of several amino acids, alone or in combination with citric acid, in slowing down the autoxidation of fatty materials (as measured by the peroxide number) has been found to be generally small. Methionine, however, has a definite antioxidant effect, increasing the time required for a given increase in peroxide number by about 50%. Other amino acids (leucine, β-alanine, threonine, glycine, histidine) have been found to have a slight antioxidant effect when in the presence of citric acid.

ANALYTICAL DIFFERENTIATION OF LARD AND REFINED PORK FATS. E. Pascucci and F. Paolini (Chem. Lab. of Ital. Customs, Rome, Italy). *Riv. Ital. Sostanze Grasse* **6**, 294–301 (1962). It was found to be possible to differentiate lard from refined pork fats by means of U.V. spectrophotometry. Analysis of fifteen samples of pure, high quality lard showed absorption values at 268 mμ always below 0.13 and R ratios (K_{232}/K_{268}) always higher than 25. The corresponding values for refined pork fats are: $K_{268} > 0.4$, $R < 10$. Contamination of lard by as little as 15–20% of refined white grease can be identified by this method.

FATTY ACID COMPOSITION AND PHYSICO-CHEMICAL CHARACTERISTICS OF OIL EXTRACTED FROM TOMATO SEEDS. I. Cescon and G. L. Giovetti (Institute of Biochem., Univ. of Milan, Italy). *Riv. Ital. Sostanze Grasse* **7**, 349–52 (1962). The physico-chemical characteristics, the ultraviolet spectra and the fatty acid composition of five different tomato seed oil samples of known origin and purity are reported. The gas-chromatographic analysis, conducted on two stationary phases, one polar and the other one non-polar, revealed the presence in small amounts (up to 0.5%) of two C_{17} acids, one saturated and the other mono-unsaturated. Major constituents of the oil are: linoleic acid (56–57%), oleic acid (19–20%) and palmitic acid (19–20%).

THE EFFECT OF TEMPERATURE ON THE EFFICIENCY OF GAS CHROMATOGRAPHIC COLUMNS IN THE SEPARATION OF LINOLENIC, ARACHIDONIC, AND EICOSENOIC METHYL ESTERS. D. Buoncristiani, G. Taponeco, and R. Salvadorini (State Lab. for Chem. Control, Pisa, Italy). *Olearia* **3**, 99–112 (1962). Linolenic, arachidonic, and eicosenoic acids are always present in olive oils. At each temperature and on semilogarithmic paper, a straight line relationship is found to exist between column retention times and number of carbon atoms. This relationship gives useful indications both for the identification of peaks and also for estimating the column's operating possibilities. The reduction in retention times caused by an increase in operating temperature is larger for the higher fatty acids: in a particular case, increasing the temperature from 218C to 245C decreased the retention time of C_{10} by 10% and that of C_{18} by 30%.

DETERMINATION OF VERY SMALL AMOUNTS OF OXIDIZED ACIDS IN PEANUT OIL. M. Naudet and M. Lachamp (Nat. Lab. of Fatty Materials (ITERG) Marseille, France). *Rev. Franc. Corps Gras* **10**, 546–551 (1962). A column chromatographic method for the quantitative determination of oxidized fatty acids in peanut oil is described. The method is applicable to oils which have no lauric acid.

STUDIES ON THE DEGUMMING OF SUNFLOWER SEED OIL. R. Guillaumin and N. Drouhin (Lab. of Inst. of Fats and Oils, Paris, France). *Rev. Franc. Corps Gras* **10**, 557–565 (1961). Sunflower seed oil can easily be degummed with 5% solutions of trisodium phosphate or tripolyphosphate at 80C with agitation for 30 minutes. The authors determined that there was no change in the oil under these conditions.

FATTY ACID COMPOSITION OF LIPIDS PRESENT IN DIFFERENT PARTS OF THE OX EYE. W. Bartley, Ruth van Heyningen, Brenda M. Notton, and A. Renshaw (Univ. of Oxford). *Biochem. J.* **85**, 332–5 (1962). The fatty acid patterns of the different tissues of the eye (retina, lens, optic nerve, lens capsule, corneal stroma, sclera, corneal epithelium, acqueous humour, vitreous body, ciliary body plus iris, and choroid) were measured. Optic nerve had the highest content of fatty acids (76.2 μmoles/g wet wt.) whereas retina had 22.6 μmoles/g. The other tissues ranged between 8.8 (choroid) and 0.02 μmole/g (vitreous body). The retina was characterized by the high content of a C_{22} polyunsaturated acid (up to 30% of the total fatty acid). About 50% of the total fatty acids of the eye were unsaturated.

OCCURRENCE OF OCTADECA-*trans*-10,*trans*-12-DIENOIC ACID IN A SEED OIL. C. Y. Hopkins and M. J. Chisholm (National Research Council, Ottawa). *Chem. & Ind. (London)* **1962**, 2064. Freshly extracted oil of the seed of *Chilopsis linearis* had ultraviolet absorption equivalent to about 18% of conjugated triene acid. There was also a peak at 233 mμ with an intensity signifying a content of 5–10% of conjugated diene acid. These have been identified as octadeca-*trans*-9,*trans*-11,*cis*-13-trienoic and octadeca-10,12-dienoic acids. The conjugated triene acid was also found in the seed oil of *Catalpa ovata*, where it constituted about 40% of the fatty acids, but was not accompanied by any significant amount of conjugated diene acid.

PROCESS FOR ISOMERIZATION OF OLEIC ACID AND ITS DERIVATIVES. Louise H. Brown and R. Swidler (Tallow Research. Inc.). *U. S. 3,065,248.* A process for the *cis-trans* isomerization of oleic acid and its derivatives comprises the step of heating a material such as oleic acid, oleates or mixtures, in the presence of acid clay at a temperature in the range of room temperature to about 250C for periods of time varying inversely with the temperature. The reaction period is less than 2 hours at temperatures in excess of 180C.

PROCESS OF REFINING FATS AND OILS. M. Repapis. *U. S. 3,065,249.* A fatty glyceride stock is treated with aqueous alkali solution to neutralize the free fatty acids contained in the stock in the presence of from 0.1–0.5% by weight of urea based on the weight of the fatty glyceride. The soapstock is then separated from the refined oil.

REFINING TALL OIL FATTY ACIDS. B. L. Hampton (Glidden Co.). *U. S. 3,066,160.* A tall oil fatty acid composition containing unsaponifiable phenolic impurities is heated with agitation with from 0.2% to 5% by weight of an aldehyde in the presence of an acid catalyst at a temperature of from 50–150C. The treated fatty acids are then distilled.

SKIN TREATING METHOD AND COMPOSITION. A. M. Brown (Mt. Sinai Hospital, Los Angeles). *U. S. 3,067,106.* A composition for use in the removal of skin rhitides and blemishes comprises the combination of a major proportion of a phenolic compound (phenol, cresol, substituted cresols, or mixtures) with a surface active agent such as an alkali metal soap, and an oleaginous retardent such as a vegetable oil.

• Fatty Acid Derivatives

FUEL OILS HAVING IMPROVED BURNING CHARACTERISTICS. R. J. McGuire (Gulf Res. & Dev. Co.). *U. S. 3,066,018.* A fuel oil composition consists of a major amount of a hydrocarbon fuel oil that normally tends to form smoke and soot during combustion, and a small amount, sufficient to reduce the smoke and soot forming tendencies, of a material selected from the group consisting of a triester of a hexitan and a fatty acid containing 12 to 20 carbon atoms per molecule and a polyoxyethylene derivative of a partial ester of a hexitan and a fatty acid containing 12 to 20 carbons per molecule. The polyoxyethylene derivative contains 3 to 30 ethoxy groups per molecule.

VINYL CHLORIDE POLYMERS PLASTICIZED WITH MORPHOLIDES OF THE FATTY ACID CONSTITUENT OF COTTONSEED OIL. F. C. Magne, E. L. Skau, and A. R. Mod (Sec'y Agr., U.S.A.). *U. S. 3,066,111.* A plastic composition contains a vinyl chloride polymer (polyvinyl chloride or a vinyl chloride-vinyl acetate copolymer which contains a predominant amount of vinyl chloride) and a plasticizer. The plasticizer consists of a mixture of morpholides of selectively hydrogenated cottonseed oil fatty acids. Selective hydrogenation is performed under conditions which result in converting the polyolefinic acyls to monoolefinic acyls

Univ. of Washington, Seattle). *Proc. Soc. Exp. Biol. and Med.* 111, 412–416 (1962). Electrophoretic mobilities and thromboplastic activities of emulsions of mixtures of phospholipids derived from beef brain and egg yolk were determined. The studies included mixtures of varying amounts of phosphatidyl serine in lecithin, phosphatidyl serine in phosphatidyl ethanolamine, and phosphatidic acid in lecithin. It was concluded that the manifestation of "thromboplastic activity" by a particular phospholipid emulsion will depend largely upon the surface charge of the particles. The possibility of other factors involved was not excluded.

In vitro INHIBITION OF CHOLESTEROL BIOSYNTHESIS FROM ACETATE-1-C^{14} AND MEVALONATE-2-C^{14} BY HYPOGLYCEMIC COMPOUNDS. H. J. McDonald and J. E. Dalidowiez (Dept. of Biochem. and Biophysics, Graduate School of Stritch School of Medicine, Loyola Univ., Chicago). *Biochemistry* 1, 1187–1191 (1962). The action of the hypoglycemic compounds, tolbutamide, chlorpropamide, metahexamide, and phenethylbiguanide, on the biosynthesis of cholesterol has been investigated *in vitro* with both acetate-1-C^{14} and mevalonate-2-C^{14}. The results show that the incorporation of acetate-1-C^{14} and mevalonate-2-C^{14} into cholesterol is inhibited by all compounds studied. The maximal inhibition occurs when the concentration of hypoglycemic compound is 4×10^{-3} *M*. It has been found that the inhibition of cholesterol biosynthesis by phenethylbiguanide takes place between isopentenyl pyrophosphate and the formation of squalene. The inhibition of cholesterol biosynthesis by the arylsulfonylurea compounds, on the other hand, takes place after the formation of squalene.

EFFECT OF AMINO ALCOHOLS AND METHYL DONORS ON LIVER FAT OF RATS FED LOW-CHOLINE DIETS CONTAINING 2-AMINO-2-METHYLPROPANOL. W. J. Longmore, H. H. Kohl, J. W. Hume, and D. J. Mulford (Dept. of Biochem., The Univ. of Kansas, Lawrence). *J. Nutrition* 78, 295–300 (1962). When 2-amino-2-methylpropanol (2A2MP) was added to diets low in choline at a level of 1 mg./gm. of food both the incidence of kidney lesions and the amount of liver fat were elevated. At higher levels of 2A2MP the kidney lesions were even more severe but the liver fat was lower than that due to 1 mg. 2A2MP/gm. of food. The addition of N-methyl derivatives of ethanolamine, namely, monomethylethanolamine, dimethylethanolamine and choline was markedly effective in preventing the elevation of liver fat due to 1 mg. of 2A2MP/gm. of food.

LIPID COMPOSITION OF HUMAN CEREBROSPINAL FLUID. M. H. Hack and F. M. Helmy (Dept. of Med. and Anatomy, Tulane Univ. School of Med., New Orleans, La.). *Proc. Soc. Exp. Biol. and Med.* 111, 421–423 (1962). Freeze-dried chloroform-methanol extracted samples of human cerebrospinal fluid (CSF) were examined for various lipids by means of paper chromatography. Phosphatidyl ethanolamine and ethanolamine plasmalogen were characteristically high as compared with blood plasma. Sphingomyelin phosphatidyl choline and a small amount of choline plasmalogen were also present. The neutral lipids were composed of triglycerides, cholesterol, and cholesterol ester. A plasmalogen resembling cardiolipin was present in low concentration. The cerebrosides were not detected.

THE BIOSYNTHESIS OF SQUALENE IN GERMINATING SEEDS OF *Pisum sativum*. E. Capstack, Jr., D. J. Baisted, W. W. Newschwander, G. Blondin, N. L. Rosin, and W. R. Nes (Dept. of Chem., Clark Univ., Worcester, Mass., and the Worcester Foundation for Exptl. Biology, Shrewsbury, Mass.). *Biochemistry* 1, 1178–1183 (1962). The biosynthesis of squalene has been demonstrated in peas *(Pisum sativum)* in two different ways. The first of these involved germination of the seeds for a 5-day period in the presence of a large amount of mevalonic acid. The squalene, which was produced in a 40% yield, was identified by several physical and chemical properties. The second way in which squalene was experimentally biosynthesized was through a very short (24 hr.) germination in the presence of a small quantity of 2-C^{14}-mevalonic acid. The radioactive hydrocarbon was produced in a 38% yield and was identified by conversion to the hexahydrochloride and co-crystallization with a standard sample until constant specific activity was reached. Furthermore, the radioactive squalene was incubated with a rat liver homogenate, and radioactive cholesterol (purified through the dibromide) was produced in 7% yield. This work represents the first experimentally achieved biosynthesis of squalene in a flowering plant, and it gives credence to the previous assumption that the β-amyrin and β-sitosterol biosynthesized in press arise by hydroxylative cyclization of this hydrocarbon. Evidence is presented which indicates that isopentenoid biosynthesis is regulated physiologically by the control of mevalonic acid formation.

INHIBITION OF GLUCOSE OF THE ETHIONINE INDUCED FATTY LIVER. L. Campagnari-Visconti, F. Campagnari, D. Koch-Weser (Dept. of Med., Western Reserve Univ., School of Med., Cleveland, Ohio). *Proc. Soc. Exp. Biol. and Med.* 111, 479–482 (1962). Data are presented which support the hypothesis of Recknagel and Lombardi on the genesis of fatty livers in general and especially the triglyceride accumulation after ethionine, postulating that the release from the liver into the plasma is blocked. Data also indicate that triglyceride increase in the liver depends on both blocking of the release from, and fat mobilization into the liver from the periphery. Glucose seems to inhibit only the latter and by doing so prevents the increase of liver triglycerides by ethionine.

DIETARY FATTY ACIDS AND PLASMA ALKALINE PHOSPHATASE AFTER BILE DUCT LIGATION. O. Butenandt (The Ben May Laboratory for Cancer Research, Univ. of Chicago, Ill.). *Proc. Soc. Exp. Biol. and Med.* 111, 409–412 (1962). Unsaturated fatty acids in the diet exert a profound influence on the level of alkaline phosphatase in the plasma of rats with biliary obstruction as well as in normal rats. Following ligation of the common bile duct, alkaline phosphatase concentration was increased about 3-fold in rats fed a diet containing oleic acid. No rise of alkaline phosphatase occurred after biliary obstruction in rats fed the same diet containing no unsaturated fatty acids. Rise in plasma bilirubin occurred after ligation of the common duct regardless of the content or composition of fatty acids in the diet. In the dog with ligation of the bile duct no relation was detected between unsaturated fatty acids in the diet and the increased (about 60-fold) alkaline phosphatase of the plasma; the enzyme rose to very high and nearly similar levels in dogs fed diets with or without unsaturated fatty acids after ligation of the common bile duct.

In vitro ESTERIFICATION OF CHOLESTEROL BY PLASMA: THE EFFECT OF EVISCERATION. N. Brot, W. J. Lossow, and I. L. Chaikoff (Dept. of Physiology, Univ. of Calif., Berkeley). *J. Lipid Research* 3, 413–415 (1962). The capacity of plasma of eviscerated rats to esterify free cholesterol was compared with that of plasma of normal control rats by incubating the plasma of these rats with free cholesterol-4-C^{14} dispersed on Celite and by determining the percentage of labeled sterol in the esterified form at the end of 18 hr. Cholesterol esterification was severely restricted in incubation mixtures prepared with plasma of the eviscerated rats. The restriction could not be accounted for by the presence of inhibitors nor by the absence of heat-stable activators. On the basis of these as well as other observations, it is concluded that the reduced capacity of the plasma of eviscerated rats to esterify cholesterol resulted from removal of the source (probably the liver) of the plasma enzyme or of heat-labile cofactors responsible for the esterification, or both.

TURNOVER OF DEOXYCHOLIC ACID IN THE RABBIT. K. Hellström and J. Sjövall (Dept. of Med., Serafimerlasarettet, and Dept. of Chem., Karolinska Institutet, Stockholm, Sweden). *J. Lipid Research* 3, 397–404 (1962). A method for studying the turnover of deoxycholic acid in the rabbit is described. The mean values for half-life, pool size, and daily production of deoxycholic acid were 6.8 days, 700 mg., and 73.4 mg., respectively, in 26 rabbits on a diet of conventional commercial food pellets. Of the bile acid pool, 97–98% was present in liver, gallbladder, and gastro-intestinal tract. A comparatively large amount (10%) was present in the stomach. Fecal excretion was the main excretory pathway for bile acids. An amount corresponding to 10% of the daily synthesis of deoxycholic acid was excreted in the urine. The concentration of bile acids in blood was calculated to be 0.26–3.10 mg./100 ml. of whole blood.

INFLUENCE OF SEMISYNTHETIC DIET AND TYPE OF FAT ON THE TURNOVER OF DEOXYCHOLIC ACID IN THE RABBIT. K. Hellström, J. Sjövall, and G. Wigand (Dept. of Med., Serafimerlasarettet, Stockholm, Dept. of Chem. Karolinska Institutet, Stockholm, and Dept. of Med., Univ. of Lund, Sweden). *J. Lipid Research* 3, 405–412 (1962). The half-life, pool size, and daily synthesis of deoxycholic acid in ten rabbits were 7.0 days, 752 mg., and 75.8 mg., respectively, on the control diet; and 24.1 days, 1010 mg., and 30.2 mg., respectively, on a semisynthetic diet containing hydrogenated coconut oil. Corresponding values in eight rabbits on a diet in which the hydrogenated coconut oil was replaced by corn oil were 26.9 days, 1164 mg., and 30.6 mg., respectively, compared to 8.0 days, 910 mg., and 85.0 mg. during the control period. The marked drop in serum cholesterol level that occurred when the dietary coconut oil was replaced by corn oil was not accompanied by an increased bile acid synthesis or excretion. The fecal excre-

without substantially increasing the proportion of saturated acyls in the mixture. The proportion of the polyolefinic fatty acyls based on the total unsaturated acyls in the mixture is less than 1/10 by weight.

REACTION PRODUCT OF POLYOLS AND EPOXIDIZED FATTY COMPOUNDS. M. De Groote and Jen-Pu Cheng (Petrolite Corp.). *U. S. 3,066,159.* Described are products obtained by reacting at a temperature of 65–170C for 1 to 5 hours (a) an oxirane ring containing compound obtained by epoxidation of materials such as higher fatty acids containing 8–11 carbon atoms, lower alkanol esters of such acids, amides of such acids, or naturally occurring glycerides of such fatty acids and (b) oxyalkylation-susceptible polyols and oxyalkylated polyols which are characterized by freedom from any radical having at least 8 uninterrupted carbon atoms, freedom from functional groups other than hydroxy groups, and a molecular weight not in excess of 10,000. The proportions of (a) and (b) should be from about 0.5 to 1 mole of (b) per oxirane ring in (a).

METHOD OF PREPARING BREAD. N. H. Kuhrt and L. J. Swicklik (Eastman Kodak Co.). *U. S. 3,068,103.* The described method consists of incorporating into the baking mix prior to baking 0.1% to 3% by weight of a diglyceride having one acyl radical derived from lactic acid and one acyl radical derived from a saturated fatty acid having 16 to 18 carbon atoms.

PROCESS FOR PREPARING COMPLEX CALCIUM SALT-CALCIUM SOAP GREASE. J. R. Roach and T. B. Jordan (Texaco, Inc.). *U. S. 3,068,173.* The method of preparing an extreme pressure calcium base grease thickened with about 17–30% by weight of a calcium salt-calcium soap complex consists of (1) forming a mixture comprising a low molecular weight fatty acid material (saturated C_{1-3} fatty acids, their esters and calcium acid salts) and a high molecular wt fatty acid material (saturated unsubstituted and hydroxy-substituted C_{18} fatty acids and C_{12-18} fatty acid mixtures, their esters and calcium salts) in at least a portion of the lubricating oil contained in the finished grease, (2) adding to the mixture a basically reacting calcium compound in an amount sufficient for converting all of the fatty acid materials into their normal calcium salts, (3) heating the reaction mixture for a sufficient time to complete all saponification and neutralization reactions, (4) further heating at an elevated temperature until substantial thickening has occurred, and (5) cooling the mixture and adding any additional lubricating oil oil required to obtain a grease of the desired grade. The low molecular weight fatty acid material is used in an amount sufficient to give a ratio of calcium low molecular weight fatty acid salt to high molecular weight fatty acid soap of 7:1 to 25:1.

PROCESS FOR PREPARING COMPLEX CALCIUM SALT-CALCIUM SOAP GREASE. W. S. Pelton and N. R. Odell (Texaco, Inc.). *U. S. 3,068,174.* The described method consists of saponifying a material chosen from the class consisting of saturated unsubstituted and hydroxy substituted C_{12-18} fatty acids, mixtures thereof and their esters, with a basic reacting calcium compound in the presence of at least a portion of the lubricating oil contained in the finished grease containing a neutral calcium salt of a fatty acid containing 1–3 carbon atoms per molecule in an amount sufficient to give 15–26% by weight in the finished grease and a mol ratio of calcium salt to calcium soap of 7:1 to 20:1, and an estolide of a C_{10-24} hydroxy fatty acid having a molecular weight in the range 500–2500 in an amount sufficient to give about 0.1–2.5% of estolide in the finished grease. The mixture is heated at a temperature above 250 but below 400F until thickening has occurred and then cooled.

PROCESS FOR PREPARING COMPLEX CALCIUM SALT-CALCIUM SOAP GREASE. J. R. Roach and F. T. Crookshank (Texaco, Inc.). *U. S. 3,068,175.* The described grease consists of a lubricating oil as chief component, about 13–24% by weight of a calcium salt of a low molecular weight fatty acid, and about 4–10% of a calcium fatty acid soap. The improvement in the process comprises carrying out the heat treating step while shearing the mixture by continuously withdrawing a minor stream from a maintained body of the mixture, passing the stream through a shear valve with a pressure drop of about 25–200 pounds/square inch and returning the stream to the maintained body of the mixture.

PROCESS FOR THE PRODUCTION OF NOVEL CYCLOPENTENYL ETHERS OF EPOXIDIZED VEGETABLE OILS. E. Marcus and J. T. Fitzpatrick (Union Carbide Corp.). *U. S. 3,068,255.* An epoxidized vegetable oil is reacted with a 3-halocyclopentene in the presence of a Friedel-Crafts catalyst. Epoxidized soybean, corn, cottonseed, safflower, sunflower, sesame, poppyseed, walnut, or peanut oil may be used.

• Biology and Nutrition

PLANT LIPIDS. IV. THE GLYCERIDES AND PHOSPHATIDES IN CEREAL GRAINS. F. Aylward and A. J. Showler (Borough Polytechnic, London). *J. Sci Food Agr.* 13, 494–6 (1962). The phosphatides of barley, oats, and rye include lecithin, an ethanolamine phosphatide (probably phosphatidylethanolamine), and a serine-containing phosphatide, not yet identified. Palmitic acid was found to be the main saturated acid found in the cereal lipids studied. Linoleic acid was the most widely distributed unsaturated acid and was followed by oleic (especially large quantities in oats). Linolenic acid occurred to the extent of about 5–6% in most lipids. The crude oils and glycerides fractions differ from each other only slightly, since the phosphatide content of the original oil is comparatively low. The phosphatides appear to differ from the glycerides of the same cereal mainly in their content of palmitic and oleic acids; in general the lecithins show somewhat greater unsaturation and the cephalins more saturation than the corresponding glycerides. The cephalin fractions also contained traces of lower acids not found in the other lipids.

TABLET AND METHOD OF FORMING SAME. R. Goldman (Nysco Laboratories, Inc.). *U. S. 3,054,723.* A streak-free dicalcium phosphate-containing medicant tablet consists of an intimate admixture of a fatty-acid monoglyceride containing not more than about 10% by weight of polyglycerides and the dicalcium phosphate.

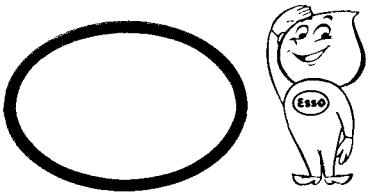
INFLUENCE OF DIET AND HUSBANDRY ON THE NUTRITIONAL VALUE OF THE HEN'S EGG. J. B. M. Coppock and N. W. R. Daniels (Spillers Ltd., Cambridge). *J. Sci. Food Agr.* 13, 459–67 (1962). The basal diet of hens was supplemented by 4% arachis oil or 4% tallow. The arachis ration supplied 2.52% essential fatty acid (E.F.A.) and 1.02% saturated fatty acids; the tallow ration supplied 1.45% F.F.A. and 2.32% saturated fatty acids. The amount of E.F.A. in the eggs from the experimental hens progressively fell for 6 months and then rose to a percentage less than the E.F.A. content of eggs from relatively young birds, and then fell again. Throughout the laying cycle of the birds, the 2 diets produced an almost uniform difference of 2% total E.F.A. in spite of a range in E.F.A. content in both groups of some 4% between maximum and minimum values. The saturated fatty acid content did not differ significantly in the 2 groups at any point in the laying cycle. After a slight fall during the first 3 months, the level of saturated fatty acids remained constant at 30%. There was a fairly early response to dietary E.F.A. shown by body fat, but subsequently there was little change in body fat E.F.A. with age. There was a consistent difference of about 7% in the saturated fatty acid content of body fat of the two groups of birds; there was no indication of variation with increasing age of the hen. There was no significant difference in E.F.A. content of eggs from free range or battery raised hens. Nor was there any significant difference in the appearance or lipid composition of the aorta of the free range or battery birds. These results indicate the importance of making egg lipid assays under strictly comparable conditions in the laying cycle.

INFLUENCE OF MER-29 ON EXPERIMENTAL ATHEROSCLEROSIS OF CHOLESTEROL-FED COCKERELS. H. Y. C. Wong and F. B. Johnson (Dept. of Physiology, College of Med., Howard Univ., Washington, D. C.). *Circulation Res.* 11, 843–846 (1962). The effects of MER-29 were studied to determine whether this drug will lower the blood lipids as well as the severity of aortic and coronary atherosclerosis of ten-week-old cockerels on a regimen of plain mash or on an atherogenic diet consisting of 2% cholesterol plus 5% cottonseed oil added to plain mash. After 10 weeks of treatment with 12.5 mg. or 25.0 mg. per kg. of MER-29, it was observed that the drug had no significant influence on the blood cholesterol or phospholipid levels. It was interesting to note that cockerels treated with 25.0 mg. of MER-29 per kg. body weight, whether on plain mash or on an atherogenic diet, demonstrated an increase of aortic atherosclerosis. The drug did not seem to lower the incidence of coronary atherosclerosis of the group fed an atherogenic diet. It appears that MER-29 causes aortic atherosclerosis of cockerels fed plain mash primarily by blocking the conversion of 24-dehydrocholesterol to cholesterol, thus increasing the amount of 24-dehydrocholesterol which was found in the aortae, as compared with little or none in the aortae of cockerels on plain mash.

INFLUENCE OF SURFACE CHARGE OF PHOSPHOLIPIDS ON THEIR CLOT-PROMOTING ACTIVITY. D. Papahadjopoulos, C. Houghie, and D. J. Hanahan (Dept. of Biochem. and Pathology,

Conducting ultraviolet spectrophotometric analysis.

An extremely sensitive system of analysis proves that Esso Hexane has no residue that could possibly contaminate extracted oils. The test procedure, developed by Humble research, can detect as little as one *hundredth* of a part per *million*. Samples of Esso Hexane were analyzed direct from the refinery, from storage, and after transportation to solvent extraction plants. In *no* case could any known polynuclear aromatic carcinogenic materials be found. High-purity Esso Hexane, like the new test procedure, is a development of the world's largest petroleum research organization. For more information about Esso Hexane, contact our sales representative. If you'd like a copy of the technical paper describing the test, write us at Houston, Texas.



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tion of bile acids was reduced in rabbits fed the semisynthetic diets, whereas the urinary excretion was the same as on the control diet. Urinary elimination corresponded to about 24% of the daily synthesis of deoxycholic acid in rabbits fed the semisynthetic diets. The concentration of bile acids in blood was calculated to be 1.15–3.04 mg./100 ml. of whole blood in four rabbits fed the hydrogenated coconut oil diet, and 0.33–2.02 mg. in four rabbits fed the corn oil diet. The dietary effects on bile acid metabolism are discussed, and it is concluded that the turnover of bile acids in rabbits is the same whether hydrogenated coconut oil or corn oil is fed.

THE BIOSYNTHESIS OF CHOLESTEROL IN THE DEVELOPING CHICK EMBRYO. P. W. Camerino and L. D. Wright (Dept. of Biochem. and Grad. School of Nutrition, Cornell Univ., Ithaca, N.Y.). *J. Lipid Research* 3, 416–420 (1962). Mevalonic acid-2-C^{14} was injected into the yolk of incubating fertile hens' eggs on the sixth day of incubation. A nonsaponifiable fraction (NSF) containing labeled components was isolated from the yolk sac and from the embryo throughout the remainder of the incubation. The specific activity of both the yolk sac and embryonic NSF increased during the first 3 days following injection of the labeled precursor and then decreased from the remainder of the incubation. The total activity of the yolk sac and embryonic NSF increased during incubation. The largest increment in total radioactivity of the yolk sac NSF occurred after the 12th day of incubation and that of the embryonic NSF after the 15th day. A high level of labeled squalene was found in the yolk sac NSF. Labeled cholesterol was found in both the yolk sac and embryo. About 3% of the recovered activity of the NSF was found in the brain tissue of chicks hatched from injected eggs.

RELATION BETWEEN INCORPORATION OF TRIGLYCERIDE FATTY ACIDS AND HEPARIN-RELEASED LIPOPROTEIN LIPASE FROM ADIPOSE TISSUE SLICES. A. Bezman, J. Felts, and R. J. Havel (Cardiovascular Research Inst. and Dept. of Med., University of California School of Medicine, San Francisco, California). *J. Lipid Research* 3, 427–431 (1962). The mechanism of the incorporation of plasma triglyceride fatty acids (TGFA) into adipose tissue was investigated. Slices of adipose tissue from rabbits in different nutritional states were incubated under various conditions with plasma very low-density lipoproteins ($d<1.006$), in which the TGFA had been biologically labeled with palmitate-1-C^{14}. Lipoprotein lipase activity, released into a heparin-containing medium, was assayed in the same tissues. The results show that the incorporation of TGFA into the slices is dependent on the nutritional state of the animal and is positively correlated with the lipoprotein lipase activity released from the tissue under the influence of heparin, which in turn probably correlates with the total lipoprotein lipase activity of the tissue.

EFFECT OF CASTRATION ON COMPOSITION OF THE DEPOT FATS OF MONOZYGOUS TWIN CATTLE. O. Dahl (Scan's Centrallaboratorium, Sweden). *J. Sci. Food Agr.* 13, 520–4 (1962). Castration is followed by a slight increase of the iodine value of perinephric, mesenteric, and subcutaneous fats. This increase is due to a somewhat higher content of oleic acid and a lower content of stearic acid in the steer fats than in the corresponding bull fats. The steers tend to deposit a slightly yellower external fat than the bulls. Steer carcasses contained 16% fat and those of the bulls 10%. Apart from castration, differences between the fatty acid composition of external and internal fats were observed. The external fats were considerably more unsaturated than the internal fats; the higher degree of unsaturation being due to a higher content of oleic and a lower content of stearic in the external fats. In addition, the content of palmitoleic is higher in the external fats.

INTERACTION OF LOW-DENSITY LIPOPROTEINS OF SERUM WITH HEMIN. T. Nishida and F. A. Kummerow (Dept. of Food Tech., Univ. of Illinois, Urbana). *J. Lipid Research* 3, 448–455 (1962). The interaction of low-density lipoproteins of human serum with hemin and the nature of the oxidative denaturation of low-density lipoproteins of serum catalyzed by hemin was studied by means of spectrophotometric and ultracentrifugal analyses and by manometric methods. The results indicated that a complex was formed *in vitro* between hemin and isolated serum low-density lipoproteins. The peroxidation of the low density lipoproteins was enhanced in the presence of low concentrations of hemin, approximately 1 to 10 mg. of hemin per gram of lipoproteins. At higher concentrations, the catalytic effect of the hemin was depressed. Progressive increases in the amount of hemin associated with the lipoproteins and progressive decreases in the flotation rate of the lipoproteins were noted as more hemin was added.

METABOLISM OF CHYLOMICRONS LABELED WITH C^{14}-GLYCEROL-H^3-PALMITIC ACID IN THE RAT. T. Olivecrona (Dept. of Physiological Chem. Univ. of Lund, Lund, Sweden). *J. Lipid Research* 3, 439–444 (1962). Chylomicrons labeled with C^{14}-glycerol-H^3-palmitic acid were obtained from the cannulated thoracic duct of a rat given C^{14}-glycerol triolein and H^3-palmitic acid. The chylomicrons were injected intravenously into male rats and the labeling of liver, heart, and adipose tissue was studied at various time intervals from 5 to 160 min. The conclusion is that the major part of the chylomicron glyceride leaves the circulating blood without hydrolysis. Evidence for this conclusion is that no appreciable amount of label was found in the plasma di- or monoglycerides and that the label passing through the plasma free fatty acid (FFA) pool during the clearing of the chylomicrons could not account for more than 10–15% of the total fatty acid label cleared. The liver triglycerides showed a C^{14}/H^3 ratio close to 1.0 during the first 10 min. The ratio then declined rapidly. The conclusion is that chylomicron glyceride is taken up intact by the liver, but is rapidly metabolized with re-esterification of the fatty acids to unlabeled glycerol. In the heart and the adipose tissue, the C^{14}/H^3 ratio decreased more rapidly. The suggestion is that in these tissues the loss of glycerol may occur during the penetration of the glyceride into the cell, but without mixing of the fatty acids into the plasma FFA pool. At 20 min., when most of the chylomicron label had disappeared from the blood, 35% of the recovered fatty acid radioactivity was found in the liver and 10% in the adipose tissue.

STABLE FAT-SOLUBLE VITAMIN COMPOSITIONS. M. Hochberg and C. Ely (Nopco Chemical Co.). *U. S. 3,067,104.* The described composition consists of a multiplicity of small, substantially solid spheroidal particles comprising (a) a normally solid wax-like material having a melting point of at least 45C. (b) a fat-soluble vitamin containing material, (c) an edible surface active material, (d) an edible antioxidant and (e) a hygroscopic polysaccharide produced by the controlled and catalyzed polymerization of special corn sugars and characterized by being water soluble and organic insoluble, having a pH of not less than 3.5 when in 10% solution and a viscosity of 20 to 100 poises at 70F when in a 40% aqueous solution. The composition is produced by forming (a), (b), (c), (d), and (e) into a uniform molten mass and then forming very small fluid droplets from the molten mass and projecting them through an inert atmosphere until they are substantially solidified. The quantity, by weight, of (a) in the spheroidal particles is between 10 and 70% of the weight of the particle, the quantity of (c) between 0.5 and 60.0%, and the quantity of (e) between 0.5 and 35.0%. The combined weight of (c) and (e) is between 20 and 80% of the total weight of the particle. Substantially all the spheroidal particles are passable through a 10 mesh screen and retainable on a 100 mesh screen.

VITAMIN COMPOSITIONS AND PROCESSES FOR PRODUCING SAME. H. D. Ratish and M. Hochberg (Nopco Chemical Co.). *U. S. 3,067,105.* Stable and biologically available and effective vitamin-containing compositions in discrete, particulate form consist of, in intimate admixture: (a) a fat-stable vitamin (A, D, E, or K); (b) a hydrophilic carrier which is a polysaccharide produced by the controlled and catalyzed polymerization of special corn sugars and characterized by being water soluble and organic solvent insoluble, having a pH of not less than 3.5 when in the form of a 10% aqueous solution and a viscosity of 20 to 100 poises at 70F when in the form of a 40% aqueous solution; and (c) zein. The material (b) is present in a ratio of from 0.5 part to 1.5 parts by weight for each part of (a), and (c) is present in a ratio of from 1.0 to 3.0 parts for each part of (a).

• Drying Oils and Paints

CELLULOSE ESTER COATING COMPOSITION. W. L. Clark, III (American Cyanamid Co.). *U. S. 3,066,033.* A coating composition consists essentially of: from about 55 to 95 parts by weight of an adduct obtained by combining, in aqueous media, 3 mol parts of epichlorohydrin and 1 mol part of an alkali metal soap of a long chain fatty acid containing at least 9 carbon atoms; and from 5 to 45 parts of a cellulose ester component having a hydroxyl content of from 0.5% to 2.5%, an acetyl content of from 6 to 32%, and from 15 to 50% of an aliphatic acyl radical of from 3 to 18 carbon atoms.

PAPER SIZING COMPOSITION. F. de Tienda y Ricon and A. A. Miranda. *U. S. 3,066,039.* A beater addition paper sizing composition consists of about 10 parts by weight of a hard,