ABSTRACTS

R.A. REINERS, Editor. ABSTRACTORS: N.E. Bednarcyk, J.E. Covey, J.C. Harris, Yoshio Hirano, S. Kawamura, D.A. Leo, F.A. Kummerow, E.G. Perkins, and R.W. Walker

• Fats and Oils

GLYCEROLYSIS OF MESUA FERRAE LINN. SEED OIL. N.D. Sharma and J.M.S. Mathur (Div. Genetics, Indian Agr. Res. Inst., New Delhi-12). *Oils Seeds J.* 24(3), 4 (1971). Economic importance of *Mesua ferrea* Linn. family Guttiferae seed investigated. Kernels amount to 53–75% of the seeds and yield 60–77% of a viscous, reddish or dark brown, non-edible oil with disagreeable odor and bitter taste. Glycerolysis using sodium hydroxide catalyst indicated the optimum reaction temperature for α-monoglycerides formation was 200C. Monoglycerides formed during early stages of the reaction were richer in unsaturated acids.

THERMIC CONSTANTS OF FATS AND WAXES. T. Kunzmann. *Seifen-Öle-Fette-Wachse* 98, 215–8 (1972). Many methods are available for the determination of the aggregate states of transition from solid-liquid, which are more or less subjective. An automatic method producing objective and accurate values is reported.

SEPARATION AND ISOLATION OF UNSATURATED FATTY ACIDS BY MULTIPLE LIQUID/LIQUID PARTITION. P. Hynninen. *Acta Chem. Fenn.* 43, 431–5 (1970). The solvent system light petroleum/dimethyl sulphoxide is more suitable than the system heptane/methanol/formamide/acetic acid for the fractionation of unsaturated fatty acids. It is more selective, has a higher capacity and gives separations more in accord with theory. Separations of mixtures of oleic, linoleic and linolenic acids are reported. (World Surface Coatings Abs. No. 357)

EVALUATION AND PREDICTION OF PALM OIL QUALITY. G. Johansson and U. Persmark (Karlshamns Oljefabriker). *Oleagineux* 27, 95–9 (1972). The principal qualities for palm oil, on which its organoleptic acceptability and its stability depend, were examined. The amounts of oxidation products present in the oil are a reflection of the quality, and the tendency to form such compounds is related to the stability. The benzidine value, combined with the peroxide value, permits estimation of the quality. The Totox value (BV + 2 × PV), which estimates the total level of oxidation, is related to the usual spectrophotometric determinations of quality. Small amounts of oxidation occur during processing and handling, from the fruit to delivery by pipeline. Care must be taken to minimize this oxidation. Bleachability is another essential quality factor and is related to the degree of oxidation of the oil.

AGENTS FOR IMPROVING THE FILTRATION OF HYDROGENATED OIL. I. Kaganowicz (Inst. of the Fats and Oils Industry, Warsaw). *Tluszcze Jadalne* 16(1), 10–16 (1972). The effects of addition of Celite and of Czech decolorizing earth on the filtration rate of hydrogenated oil were studied. The mean filtration rate of the oil to which 0.3% Celite had been added was 2.4 times greater than that to which the earth had been added. Since the useful life of the filter press between cleanings was doubled with the Celite, the total increase in throughput was five times what it was with the earth. Additional savings through decreased usage of filter paper were also obtained. (Rev. Franc. Corps Gras)

CONCENTRATION OF SOLVENTS AND SPEED OF SEPARATION OF THE PHASES DURING NEUTRALIZATION OF ANIMAL FATS IN THE MISCELLA. J. Batura and A. Rutkowski (Nutr. Inst., Olsztyn, Poland). *Rev. Franc. Corps Gras* 19, 163–8 (1972). Neutralization of residual animal fats in a mixture of gasoline and isopropanol has been investigated. Isopropanol concentrations greater than 45% are effective for neutralization. Optimal concentration of miscella and alcoholic soap solution was determined as were the amounts of solvent mixture and its isopropanol content in terms of the amount of free fatty acids. A close dependency between concentration of solutions and the time for separation of the phases was established.

CHROMATOGRAPHIC AND COLORIMETRIC METHOD FOR DETERMINING PHYTOSTEROLS IN VEGETABLE OILS AND IN STEROL CONCENTRATES. St. A. Ivanov, P.I. Bitcheva and B.T. Konova (Ecole Normale Superieure de Plovdiv, Bulgaria). *Rev. Franc. Corps Gras* 19, 177–80 (1972). The authors have developed an accurate (±2.63%) and rapid method for determining phytosterols. The method was worked out on tall oil unsaponifiables. TLC using petroleum ether/ethyl ether (1:1) was employed to separate the phytosterols. Then they were extracted from the plate and determined colorimetrically with sulfosalicylic acid.

TRACE METAL DETERMINATION IN MILK BY ATOMIC ABSORPTION. FLAMELESS ATOMIZATION PROCEDURE. J. Logathu and J. Desirant (Soc. SOREDAL, Saint-Ouen). *Rev. Franc. Corps Gras* 19, 169–75 (1972). An improved method for determining traces of Cu, Fe, Co, Mn and Sr in milk by atomic absorption was studied. A graphite oven technique was used. Comparable results were obtained with standard aqueous solutions and by standard addition to the milk. The coefficients of variation were of the order of 2–5.5%, except for Sr where it was 10%. Greater sensitivity than with flame atomization was obtained. The choice of carrier gas (argon or nitrogen) did not affect the results.

THE ZENITH AND THE KAMINSKIJ PROCESSES AND IMPROVEMENT OF THE NEUTRALIZATION COEFFICIENTS OF VEGETABLE OILS. B. Solomon (ITERG, Paris). *Rev. Franc. Corps Gras* 19, 107–11 (1972). Descriptions of continuous refining processes, e.g., Westfalia, Podbielniak, Alfa-Laval, and Sharples, are briefly given, and the refining losses obtained on various oils are presented. The Zenith and the Kaminskij processes are based on the continuous addition of alkali. A detailed description of a typical installation is given. Even lower refining losses are obtained with these latter processes.

RESEARCH AND THE FAT INDUSTRY IN THE U.S.S.R. AND IN POLAND. J.-P. Helme and B. Solomon (Inst. des Corps Gras, Paris). *Rev. Franc. Corps Gras* 19, 83–8 (1972). The authors report on their trip to the All Union Institute for Fat Research (VNIIZ) in Leningrad and the Institute of the Fat Industry in Warsaw. They discuss the structure of the fat industry in each country as well as the organization and mission of the laboratories. Some details concerning the research carried out are also given.

COTTONSEED PHOSPHOLIPIDS. II. ISOLATION AND CHARACTERIZATION OF CEPHALINS BOUND TO GOSSYPOL. A.S. El-Nockrashy and Y. El-Shattory (Lipid Lab., Nat. Res. Center, Cairo, U.A.R.). *Rev. Franc. Corps Gras* 19, 89–94 (1972). Phosphatidyl ethanolamine (PE) and phosphatidyl serine (PS) have been isolated from mixed cottonseed phospholipids by column chromatography. TLC of the isolated cephalins, paper chromatography of their acid hydrolysates, chemical analysis to find their N:P:gossypol ratios, and IR analysis revealed that the isolated cephalins are di-PE-monogossypol and di-PS-monogossypol. GLC analysis of the fatty acid methyl esters showed that the saturated/unsaturated fatty acid ratios range from 1:1.58 to 1:1.89. Palmitic acid comprises more than 88% of the total saturated fatty acids. Oleic and linoleic acids are found in higher percentages in PS than in PE.

METHOD OF MANUFACTURING COTTONSEED OIL. I.A. Bashkutskaya et al. *U.S. 3,654,325.* The method comprises removing 60–80% of gossypol from the seed into the oil followed by separating the two by a specific reagent. Specifically, the seed is conditioned and decorticated. The meats are crushed, heated, and processed to obtain the oil containing up to 2% gossypol and the cake which contains 0.2–0.4% of combined gossypol and up to 0.01% of free gossypol. The cottonseed oil is then treated with an aromatic amino acid such as anthranilic acid.

SPREADABLE FATS. H.-U. Menz, J.E. Rost and T. Wieske (Lever Bros.). *U.S. 3,658,555.* A mixture of C_8 and C_{10} glycerides in a specified crystal form may be used in margarine and other fat compositions, which may be used as the sole or principal fat in food spreads suitable for consumers whose ordinary fat metabolism may be impaired. The glycerides may also be used as an additive to confer a marked cooling effect to conventional edible fat blends, and as a component in other fat compositions which is more resistant to autoxidation.

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• The Philippine coconut oil industry . . .

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The duty-free quota of 200,000 long tons under the U.S. Internal Revenue Act of 1934 was continued under the Laurel-Langley Agreement of 1955 which revised and superseded the Bell Trade Act of 1946. Under the terms of the Revised Trade Agreement, coconut oil entering the U.S. has been made subject to a progressively decreasing tariff quota until 1974. From 1955-62 the quota was never filled. In 1963 the quota of 160,000 was filled by November. The 1964 quota was filled by August, the 1965 quota by May and the 1966 quota by March. As it decreased, therefore, and as the capacity of the Philippine copra crushers increased, the quota was more easily and sooner filled.

The current duty-free quota is 40,000 long tons indicating this to be the terminal period of the quota which started at 200,000 long tons in 1955. Between now and December 31, 1973, Philippine coconut oil in the U.S. market is subject to one cent tax for exports in excess of the existing quota. After December 31, 1973, there is no certainty as to whether the basic duty of one cent per pound on coconut oil export to the U.S. will be maintained or will be raised dependent on new negotiations between the Philippines and the U.S. Unless the present trade agreement is replaced by another based on the historically liberal terms of trade relations between the Philippines and the U.S. we shall have quite a problem on our hands.

The tariff problem of Philippine coconut oil is not confined to the U.S. In the EEC a 5% ad valorem duty is levied on coconut oil for inedible uses and 10% for edible uses. In addition, Regulation No. 2077/71, adopted by the EEC in 1971, imposes a compensatory tax on imports of vegetable oil whose prices fall below the normal or stable levels established by the Community for this product category. In Japan, there is a similar tariff of 10% on coconut oil imports.

Today there are 23 coconut oil mills in the Philippines; these range in capacity from 30-600 tons of copra per day. Sixteen are relatively big mills with capacities of 100-600 tons/day, and seven with capacities of 30-60 tons/day. These oil mills have a combined crushing capacity of 1.46 million tons of 91% of the average past 5 years' annual production of 1.6 million tons.

At present there are five other oil mills approved for construction by our Board of Investments. The additional capacities will bring the total Philippine annual capacity to 1.79 million tons or 112% of the average past 5 years' production.

With the encouragement given by the Philippine Government, and barring untoward pressures from the marketing field or the elements, the coconut oil industry of the Philippines may be expected to increase its production for both local and foreign consumption in the forthcoming years.

In 1971, 287,582 long tons oil were exported to the U.S.; 106,264 long tons to Europe, and 4940.98 long tons to other countries, for a grand total of 398,786.98 long tons with total FOB value of $105 million. Those of the Philippine coconut oil industry hope and are determined to improve on this performance.

[Received June 7, 1972]

• Abstracts. . .

(Continued from page 281A)

INJECTABLE LAURIC ACID. J.M. Carroll. *U.S. 3,658,970.* A process for preparing crystalline lauric acid in dosage form suitable for parenteral injection into mammalian tissue is disclosed. An aqueous suspension of lauric acid crystals of particle size between 0.01 and 5 microns is formed by mixing lauric acid and water, and preferably a dispersing agent or surfactant, and subjecting the mixture to intense agitation.

EXTRACTION OF LIPID AND CELLULAR FRACTIONS FROM THE STRATUM CORNEUM OF ANIMAL SKIN. L.J. Vinson and T. Masurat (Lever Bros.). *U.S. 3,660,567.* A method for extracting stratum corneum from epidermis and separating it into a lipid-rich fraction and a cellular fraction is described. Compositions of matter containing the lipid fraction and cellular fraction are also described.

PHOSPHATIDE EMULSIFIERS. H. Pardun (Lever Bros.). *U.S. 3,661,795.* An emulsifying agent suitable for use in margarine and preparable as dry flakes or pellets comprises from 10 to 50 parts of a partially hydrolyzed vegetable phosphatide having a lysophosphatide content of 2–15%. The remainder of the composition consists of a saturated mono/diglyceride having a monoglyceride content of 35-90%.

PHOSPHATIDE EXTRACTION. H. Pardun (Lever Bros.). *U.S. 3,661,946.* In the separation of vegetable phosphatide fractions from mixtures containing them by extracting the mixture with a lower aliphatic alcohol with 1–3 carbon atoms, the efficiency of the extraction process is increased without adversely affecting the selectivity by carrying out the extraction in the presence of 10–20% of a monoglyceride which is liquid at the temperature of extraction.

MARGARINE CONTAINING DIACYLGLYCEROPHOSPHATIDE. H.-U. Menz, H.O.A. Trapp, and T. Wieske (Lever Bros.). *U.S. 3,663,235.* Improved stability of margarine emulsions is attained by using an emulsifying agent of the structure $RCOOCH_2CHOCORCH_2OPO_3HCH_2CH_2R^1$. RCO represent fatty acid acyl groups containing 8–32 carbon atoms. R^1 is a methylamino, dimethylamino or trimethylamino group, or an acylamino group whose fatty acid acyl residue has 2–12 carbon atoms. Margarine is made by phase inversion.

BUTTER FLAVORED COMPOSITION. M.J. Holloway (Beatrice Foods). *U.S. 3,663,236.* A low butterfat, butter flavored composition of sugar, condensed buttermilk and a vegetable oil cooked together to produce a solid solution is disclosed.

FLAVOR IMPROVEMENT OF FATS. W.H. Feenstra and J.G. Keppler (Lever Bros.). *U.S. 3,664,851.* Fatty products of enhanced flavor characteristics contained autoxidation flavor counteractants of the formula RCH:CHCH:CHZ, where R is an alkyl group containing up to 9 carbon atoms and Z is an organoleptically acceptable polar group. The fatty products include edible fats and oils, particularly tallow and soybean oil, and their products such as margarine. The counteractants may be free or combined fatty acids or aldehydes, which are effective in minute amounts. They may be incorporated, in part, by means of precursors which convert to the counteractant during storage.

• Fatty Acid Derivatives

CARBOXYLIC ACID DERIVATIVES FOR LOWERING THE CONCENTRATION OF TRIGLYCERIDES IN THE BLOOD. T. Leigh and L.A. McArdle (Imperial Chem. Ind., Ltd.). *U.S. 3,658,967.* The disclosure relates to a method for lowering the concentration of cholesterol, triglycerides, or fibrinogen in the blood by administering a pharmaceutical composition containing as active ingredient a phenylbenzyloxyalkanoic acid derivative, for example, α-[4-(p-chlorophenyl)benzyloxy]-α-methylpropionic acid.

GREASE COMPOSITIONS CONTAINING MAGNESIUM SALTS OF UNSATURATED FATTY ACIDS AS RUST INHIBITORS. E. Hansen (Chevron Research Co.). *U.S. 3,660,288.* The compositions comprise a major proportion of an oil of lubricating viscosity, a minor amount of a grease thickener; and a minor portion of a magnesium salt of an unsaturated unsubstituted or hydroxy-substituted fatty acid of 14–24 carbon atoms.

• Biochemistry and Nutrition

COMPARISON OF THE PROTEIN NUTRITIONAL VALUE OF TVP, METHIONINE ENRICHED TVP AND BEEF AT TWO LEVELS ON INTAKE FOR HUMAN ADULTS. C. Kies and H.M. Fox (Dept. of Food and Nutr., Nebr. Agr. Exp. Sta. and College of Home

Ec., Univ. of Nebr., Neb. 68503). *J. Food Sci.* 36, 841–5 (1971). The objective of this study was to compare the protein nutritive value for adult men of beef, an extruded soybean product resembling beef (TVP) and a 1% DL-methionine-fortified TVP product at two levels of nitrogen intake. Experimental diets were adequate in calories, vitamins and minerals. Although none of the test protein sources fully met the protein needs of the subjects at the level tested, beef was superior to TVP on the basis of nitrogen balance data. DL-methionine fortification at the 1% level of the TVP was demonstrated to be partially effective in improvement in nitrogen balance.

THE PATTERN OF FATTY ACID SYNTHESIS IN LACTATING RABBIT MAMMARY GLAND STUDIED IN VIVO. E. Carey and R. Dils (Dept. of Biochem., Med. School, Univ. of Nottingham, Nottingham NG7 2RD, U.K.). *Biochem. J.* 126, 1005–7 (1972). The biosynthesis of fatty acids has been studied in lactating rabbits at 6 hr. after intravenous injection of sodium acetate-1-^{14}C. The specific radioactivities of the individual fatty acids (6:0 to 14:0) and the proportions of these fatty acids synthesized were similar in mammary tissue and milk. Hexanoic acid has the highest specific radioactivity and the 8:0 to 14:0 fatty acids had similar specific radioactivities, which were about five times those of C_{16} and C_{18} acids. No radioactivity was detected in fatty acids of chain length $<C_{14}$ in the liver, blood or adipose tissue and the specific radioactivities of fatty acids of chain length $>C_{14}$ in these tissues were similar to those of the long-chain fatty acids in the milk and mammary gland. The results show that the 4:0 to 14:0 fatty acids are synthesized within the mammary gland rather than by fatty acid uptake from circulating blood or by oxidation of long-chain fatty acids with the gland. We conclude that de novo synthesis of esterified fatty acids in vivo by this tissue has a high degree of chain-length specificity.

EFFECT OF SPINACH AND WAKAME ON CHOLESTEROL TURNOVER IN THE RAT. N. Iritani and J. Nogi (Tezukayama-Gakuin College, Osaka 558, Japan). *Atherosclerosis* 15, 87–92 (1972). The influence of feeding spinach or wakame on the turnover of cholesterol was studied in rats with a high plasma cholesterol level. The half-lives of cholesterol were estimated by measuring the faecal excretion of (^{3}H)-cholesterol injected intraperitoneally, and were found to be 28.2, 15.2 and 20.5 days, respectively, for rats fed the control sucrose diet, that supplemented with 5% spinach powder and that supplemented with 5% wakame powder. It is suggested from the analysis of faecal cholesterol metabolites that spinach stimulated the intestinal microflora to form more coprostanol from cholesterol, while wakame suppressed the reabsorption of cholesterol in the enterohepatic circulation.

CARNITINE PALMITYLTRANSFERASE. C.L. Hoppel and R.J. Tomec (Depts. of Pharmacol. and Med., Case Western Reserve Univ., School of Med. Cleveland, Ohio 44106). *J. Biol. Chem.* 247, 832–41 (1972). Carnitine palmityltransferase in rat liver was investigated by three different assay methods. Intracellular distribution studies showed that carnitine palmityltransferase was an exclusively mitochondrial enzyme. The enzymatic activity catalyzing the formation of palmityl-L-carnitine from palmityl-CoA and L-carnitine, designated carnitine palmityltransferase A, was loosely bound to the external surface of the inner membrane. Digitonin treatment released this enzymatic activity from mitochondria resulting in a preparation which had a severely limited ability for carnitine-dependent palmityl-CoA oxidation, but retained the ability to oxidize palmityl-L-carnitine. The designations, carnitine palmityltransferase A and B, represent enzymatic activities in two different intramitochondrial compartments with different functional roles. Further evidence is needed to determine if these are isoenzymes.

PROSTAGLANDIN E_1 IN PLATELET HARVESTING: AN IN VITRO STUDY. H. Shio and P.W. Ramwell (Inst. of Biological Sci., Alza Corp., Palo Alto, Cal. 94304). *Science* 175, 536–8 (1972). Prostaglandin E_1 (10^{-8} to 10^{-7} molar) is effective in improving the preparation of human platelet concentrates from plasma rich in platelets and from whole blood. A procedure has been developed for the use by blood banks on a trial basis.

THE EFFECT OF PALMITIC AND OLEIC ACIDS ON THE PROPERTIES AND COMPOSITION OF THE VERY LOW DENSITY LIPOPROTEIN SECRETED BY THE LIVER. M. Heimberg and H.G. Wilcox (Dept. of Pharmacol., Vanderbilt Univ., School of Med., Nashville, Tenn. 37203). *J. Biol. Chem.* 247, 875–80 (1972). Livers from normal fed male rats were perfused *in vitro* with equimolar quantities of either palmitic acid or oleic acids, and, after an experimental period of 4 hr, the very low density lipoprotein (VLDL) was isolated from the perfusate by ultracentrifugation in zonal rotors. The VLDL was characterized by rate-zonal mobility, by lipid composition and by electrophoretic mobility on paper. Approximately 50% more VLDL triglyceride was secreted by the liver when oleate was the substrate than when palmitate was the substrate.

THE EFFECT OF DIETARY FAT ON AFLATOXICOSIS IN TURKEYS. P.B. Hamilton, H.T. Tung, J.R. Harris, J.H. Gainer and W.E. Donaldson (Dept. of Poultry Sci., Dept. of Microbiol., N.C. St. Univ., Raleigh, N.C. 27607). *Poultry Sci.* 51, 165–70 (1972). Graded concentrations of aflatoxin incorporated into the feed of turkey poults resulted in a decreased growth rate, an enlarged spleen and pancreas and a smaller liver and bursa of Fabricius. Analysis of the liver showed that the lipid content increased significantly. The effect of 1.0 p.p.m. aflatoxin on the growth rate was the same in diets containing 2, 6 or 18% fat. However, the 18% fat diet ameliorated the lethal effect of the aflatoxin and restored the relative bursal weight to a normal value. Aflatoxin at 1.0 p.p.m. depressed the serum total lipid and phospholipid at all concentrations of dietary fat, but the values on the 18% fat diet were significantly nearer the normal values. These data suggested that aflatoxin has two separate effects on turkeys, that of growth inhibition and interference with lipid metabolism.

ERYTHROCYTE MEMBRANE LIPIDS AND RH ANTIGEN ACTIVITY. F.A. Green (Dept. of Med., State Univ. of New York at Buffalo, and Veterans Admin. Hosp., Buffalo, N.Y. 14215). *J. Biol. Chem.* 247, 881–7 (1972). The Rh antigens have never been totally and reproducibly obtained in free solution. Indirect evidence, based among other observations on the reversible loss of Rh antigen activity of lyophilized Rh-positive erythrocyte membranes with mercurial sulfhydryl reagents, suggests that the activity may depend on membrane protein. With the hypothesis that this membrane protein may be associated perhaps structurally with membrane lipid, studies were undertaken on the effects of organic solvents on lyophilized membrane Rh antigen activity. The antigen activity was abolished after extensive extraction with 100% 1-butanol, but could be regenerated to approximately 50% of the unextracted membranes by the addition of certain lipids. The present investigations establish that phospholipids are the only class of lipids which result in such regeneration. Thus, the Rh antigen activity is dependent on the presence of bound phospholipid, containing at least one unsaturated fatty acid, with neither the polar nor the nonpolar portion of the molecule alone satisfying this requirement.

RAT BRAIN BINDS ADRENAL STEROID HORMONE: RADIOAUTOGRAPHY OF HIPPOCAMPUS WITH CORTICOSTERONE. J.L. Gerlach and B.S. McEwen (Rockefeller Univ., N.Y., N.Y. 10021). *Science* 175, 1133–1136 (1972). Tritiated corticosterone injected subcutaneously into adrenalectomized male rats 1 hour before killing produced intense labeling of the hippocampus in radioautograms prepared by a method that reduced or prevented diffusion of the radioactive material. The pyramidal neurons of the cornu ammonis and the granule neurons of