ABSTRACTS

R.A. REINERS, Editor. Abstractors: N.E. Bednarcyk, J.E. Covey, J.C. Harris, S.F. Herb, F.A. Kummerow, Biserka Matijasevic, E.G. Perkins, and R.W. Walker

• Fats and Oils

ON THE CRYSTALLIZATION OF WATER IN MARGARINES. M. Naudet, E. Sambuc and G. Reymond (Lab. National Matieres Grasses, ITERG, Univ. Provence, Marseille). *Rev. Franc. Corps Gras* 20, 323–8 (1973). Water crystallization in margarine is evidenced by an increase of specific volume after prolonged storage below 0C. The crystallizable water at −10C may be measured from the increase of the specific volume which occurs during dilatometry at this temperature. It is known to within ±0.5%. Sixteen samples of margarine of different quality, available on the market, were examined and the proportion of crystallizable water given. Some additives, especially salt and lactose, influence the proportion of crystallizable water.

CHANGES OF LIPIDS AND FATTY ACIDS IN SUNFLOWER SEEDS DURING THE SEASON OF ITS TREATMENT. A.M. Malysev et al. *Pishchevaya Tehnol.* 1973(1), 28–30. Bound lipids of sunflower seed are qualitatively different from the free lipids. Bound lipids have a lower triglyceride content but more free fatty acids and phosphatides. The longer the seeds are stored, the more triglycerides is bound. The content of oil, at the same time, is lower. It is the same for linoleic acids in bound lipids which proves the tendency of unsaturated fatty acids to complex with proteins. (Rev. Franc. Corps Gras)

OPTIMAL CONDITIONS FOR DETERMINING THE DEGREE OF LIPID OXIDATION BY THIOBARBITURIC ACID METHOD WITH ALKALINE HYDROLYSIS. T. Witas. *Rozniki Technol. Chem. Zywn.* 22, 271–88 (1972). Optimum conditions for the thiobarbituric acid test (TBA) using alkaline hydrolysis have been established. This method is applied to determine the oxidative rancidity of fats in food products during the storage and during thermal treatment. (Rev. Franc. Corps Gras)

NATURAL TOCOPHEROL-LIKE ANTIOXIDANTS IN REFINED RAPESEED OIL. K. Pilat. *Prace Inst.* 22, 565–79 (1972). Influence of tocopherol content on the stability of refined rapeseed oil during the storage under different conditions has been studied. Tocopherols have good antioxidant properties in concentrations between 10 and 35 mg per 100 g. Both phosphoric acid and citric acid are good synergists for tocopherols. These results were obtained on oils stored at a temperature lower than 15C and away from direct light. (Rev. Franc. Corps Gras)

METHODS FOR METAL TRACES DETERMINATION IN EDIBLE FATS. *Z. Rudzka. Tluszcze jad.* 17, 39–49 (1973). The Codex Committee of Food Additives of OMS gives the quantity of some metals in mg/kg in oils and margarine which is: Fe max. 1.5, Cu max. 0.1, Pb max. 0.1 and As 0.1. The quantity of nickel is not given in this list. Regarding the Polish standards, margarine may contain maximum Ni 0.2 mg/kg, As 1.0 mg./kg and Pb 2.0 mg/kg. These metals have been determined in margarine and oils and the results are discussed. (Rev. Franc. Corps Gras)

QUALITY OF SUNFLOWERSEED OIL AND THE WAY FOR ITS IMPROVEMENT. A.P. Rabota et al. *Maslozir. Prom.* 1973(2), 8–11. In Ukraina, the following varieties of sunflowerseed are cultivated: Armavirskij 3497, VNIIMK 6540, Peredovik, Zelenka 368, Majak and VNIIMK 1646. The seed and oil quality are not very different as can be seen from the values for quality given. For example, 1000 seeds have a weight of 50–70g, a volume mass of 400–440 g/l and a specific mass of 0.70–0.75 g/l. The hull content of the seeds varies from 20% to 22%, the oil content is about 50%, the crude protein content is 15–18%, total phosphorus amounts to 1.0–1.5% and the total ash content is about 2.5%. (Rev. Franc. Corps Gras)

CHANGES IN THE CONTENT OF SULFUR AND PHOSPHORUS COMPOUNDS DURING INDUSTRIAL TREATMENT OF WINTER RAPESEED. K. Babuchowski et al. *Tluszcze. jad.* 16, 298–305 (1973). During the refining process sulfur and phosphorus compounds are not completely eliminated and reduce the rate of oil hydrogenation. The method used today for selective hydrogenation in which fresh and used catalyst are mixed may not be the best one. It should be helpful to determine the sulfur and phosphorus content of the oil and take these data into consideration in evaluating catalyst performance. (Rev. Franc. Corps Gras)

DECOMPOSITION OF PIGMENTS OF THE CHLOROPHYLL GROUP DURING THE DEACIDIFICATION OF RAPESEED OIL. I. Bratkowska et al. *Rocznik Technol. Chem. Zywn.* 22, 315–26 (1972). The fate of chlorophyll A and B and of pheophytine A and B during deacidification of rapeseed oil has been studied in oils of different free fatty acids contents (low, medium, and high). These pigments are partially decomposed during deacidification; the lower the alkali concentration, the less the pigments are changed. (Rev. Franc. Corps Gras)

STUDY OF IRON AND COPPER CONTENT IN RAPESEED OIL DURING THE INDUSTRIAL REFINING PROCESS AND INFLUENCE OF THESE METALS ON THE STABILITY OF EDIBLE RAPESEED OIL. Z. Rudzka. *Prace Inst.* 22, 581–96 (1972). Refined rapeseed oil with the iron content till 0.5 mg/kg, deodorized with the addition of 0.01% of citric acid has a good stability. If the crude oil with iron content over 5 mg/kg goes directly to neutralization, it is not possible to obtain refined oil with the iron content lower than 0.5 mg/kg. If the oil is degummed before neutralization, it is possible to obtain an iron content of 0.5 mg/kg in the refined oil even if the iron content in crude oil is as high as 20 mg/kg. (Rev. Franc. Corps Gras)

CALORIMETRIC STUDY OF A MIXTURE OF COCOA BUTTER AND SOLID FAT IN PASTRY PRODUCTS. I.V. Nikonov. *Pishchevaya Tehnol.* 1972(6), 125–9. Mixtures of the triglycerides of cocoa butter and a solid fat based on palm kernel oil did not give a solid solution but solidified and melted separately. Eutectic mixtures formed have a relatively low melting point. At the same temperature, the content of solid phase of the mixture is lower than that of the pure cocoa butter. The heat for melting of this mixture corresponds to the content of 20% of solid fat. (Rev. Franc. Corps Gras)

STUDY OF THE HYDROGENATION PROCESS OF RAPESEED OIL WITH A FIXED CATALYST. F.M. Kancepol'skaja et al. *Maslozir. Prom.* 1973(2), 22–4. The addition of 2% of chromium to a nickel-aluminum-copper catalyst increases the catalyst activity and it is possible, in this case, to lower the hydrogenation temperature. The degree of isomerism increases with the raising of temperature during the process. (Rev. Franc. Corps Gras)

PRODUCTION OF HAZELNUT OIL. T.D. Kostyrkina et al. *Maslozir. Prom.* 1973(2), 17–19. There are two methods for shell separation: wet and dry. The dry method is considered better. The optimal temperature to obtain oil of high quality by pressing is 50–60C. The oil content in the cake is 9.8% (calculated on dry matter) and these cakes can be used in pastry products. Oil had light yellow color, density at 20C, 0.912, refractive index at 20C 1.471, saponification value 190.3 and iodine value (Hanus method) 87. (Rev. Franc. Corps Gras)

INFLUENCE OF THE TEMPERATURE ON THE MATURING AND STORAGE OF SOYBEAN. V.V. Kljuckin et al. *Pishchevaya Tehnol.* 1973(2), 14–17. During maturing of soybeans and during storage, changes of some chemical parameters can be seen. Of these changes, the most sensitive and the most important is the change in the acidity of lipids. For the maturing of soybean, the low positive temperature is necessary, but for storage, negative temperature is needed. The lowest acidity value is obtained at 3.35C with the maturing time of 150 days. (Rev. Franc. Corps Gras)

DETERMINATION OF NEW CHEMICAL SPECIES FORMED DURING OIL HEATING. R. Guillaumin (Inst. des Corps Gras, ITERG, Paris). *Rev. Franc. Corps Gras* 20, 285–9 (1973). The new chromatographic method is described for determination of new chemical species (NCS) formed during deep fat frying. Fatty acids from examined fats or oils are transformed to methyl esters and then examined by column chromatography. The solvents used for eluation were n-hexane, n-hexane/ethyl ether (98–2), n-hexane/ethyl ether (50/50), ethyl ether and methanol/chloroform (50/50). Fatty acids not changed by thermal oxidation were eluated by hexane. NCS formed during heating were in polar fractions and their quantity was determined by weighing after the solvents were evaporated. The reproducibility of the determination is better than ±5%.

COMPARATIVE STUDY OF DEEP FAT FRYING CONDITIONS ON THE PERCENT OF NEW CHEMICAL SPECIES (NCS) FORMED: INVESTIGATION ON DIFFERENT OILS. R. Guillaumin, M. Gente and M.

Desrieux (Inst. des Corps Gras, ITERG, Paris). *Rev. Franc. Corps Gras* 20, 413–9 (1973). Different pure oils (sunflower, rapeseed, peanut, Canbra, soybean and hydrogenated soybean) and blends of peanut + sunflower and of peanut + sunflower + rapeseed have been employed for deep fat frying of potatoes. Frying conditions were well defined; the temperature was 220C, up to 20 fryings, one each day, were done. Oil change was followed by the percentage of NCS formed. The quantity of NCS seems related to the unsaturated (polyunsaturated content) and to the conditions of frying.

RESEARCH ON THE ANALYSIS OF POSITIONAL ISOMERS OF OLEIC ACID. I. REVIEW AND PRELIMINARY TESTS. E. Ucciani and A. Pelloquin (Lab. National des Matieres Grasses (ITERG), Univ. de Provence, Marseille). *Rev. Franc. Corps Gras* 20, 397–404 (1973). The main qualities of different methods for analysis of oleic acid isomers are compared. It appears that with modern physical methods the analysis of the 16 octadecenoic isomers in a mixture is not possible. Methods involving a chemical degradation followed by an identification and a determination of fragments are better. Among the latter, reductive ozonolysis holds great promise. Two ways to simplify the operations are described. The principle consists in separating monofunctional from bifunctional fragments after reduction of the ozonides.

LIPID AUTOXIDATION. II. STUDY OF SOME PARAMETERS AFFECTING LIPID OXIDATION. R. Marcuse (Swedish Inst. for Food Preservation Res. SIK, Goteborg, Sweden). *Rev. Franc. Corps Gras* 20, 391–6 (1973). The effect of amino acids (alone or in presence of metals) is elaborated and the effects of metals and metal-containing enzymes are discussed. The influence of the oxygen pressure on lipids oxidation and the work the author has done in this field are also given.

STUDY OF THE BLEACHING PROCESS ON A SAMPLE OF LINSEED OIL. B.Ja. Sterlin et al. (VNIIZ). *Maslozir. Prom.* 1973(4), 15–17. Crude linseed oil sometimes has a color of 100 mg of iodine; the color of refined oil must be 5–20 mg of iodine. The color of the oil is due to the presence of chlorophyll and carotenoids and these pigments must be eliminated during the bleaching process. The authors examined five different samples of bleaching earths and compared the quality of these earths with the Czech bleaching earth. The physicochemical properties of these bleaching earths are given. To obtain the oil with the color of 5–10 mg of iodine, 3–4% bleaching earth is necessary. (Rev. Franc. Corps Gras)

CONDITIONAL LINEARIZATION APPLIED TO FAT PRODUCTS BLENDING. M.B. Rajeb, H. Hinnekens and M. Loncin. *Rev. Franc. Corps Gras* 20, 343–50 (1973). The authors show, how, from the solid fat content determined at different temperatures by NMR, it is possible to linearize with a good approximation the chosen constraints. This linearization allows, in such cases, prediction of the nature and the characteristics of a fat product from analyses which are done on the oils before blending. This kind of a study opens new ways for the utilization of linear programming.

INTRODUCTION AND ACCLIMATIZATION IN FRANCE OF SOYBEAN BY LEON ROUEST AND CONCLUSIONS TO BE DRAWN FOR THE DEVELOPMENT OF ITS CULTIVATION IN FRANCE. M.Th. Francois (Faculte de Pharmacie, Univ. de Nancy, France). *Rev. Franc. Corps Gras* 20, 335–41 (1973). Some decades ago a French agronomist, Leon Rouest, tried with some success to introduce soybean cultivation in European countries. This period of time is recalled and the main observations of this forerunner in cultivation and agricultural techniques are pointed out. The main uses of soybean and its products (oil, meal, milk, etc.) are described. The quantity of soybeans processed in France is 482,000 tons; at the same time, 930,000 tons of soybean meal are imported.

STUDY OF UNSAPONIFIABLE MATTER OF OLIVE OIL AND EVIDENCE OF NEW COMPONENTS. H. Kallel and C. Paquet (CNRS, 2 Rue Henry-Dunant, 94320 Thiais). *Rev. Franc. Corps Gras* 20, 329–33 (1973). By liquid-liquid extraction with the mixture methanol-benzene the authors obtained an extract from olive

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Call for Nominations Award in Lipid Chemistry

Sponsored by Applied Science Laboratories

In April 1964 the Governing Board of the American Oil Chemists' Society established an Award in Lipid Chemistry under the sponsorship of the Applied Science Laboratories Inc., State College, Pa. Previous awards were presented as follows: Erich Baer, August 1964; Ernest Klenk, October 1965; H.E. Carter, October 1966; Sune Bergstrom, October 1967; Daniel Swern, October 1968; H.J. Dutton, October 1969; E.P. Kennedy, September 1970; E.S. Lutton, October 1971; A.T. James, September 1972; and F.D. Gunstone, September 1973.

The award consists of $2500 accompanied by an appropriate certificate. It is now planned that the 11th award will be presented at the AOCS Fall Meeting in Philadelphia, September 29-October 3, 1974.

Canvassing Committee Appointees

Policies and procedures governing the selection of award winners have been set by the AOCS Governing Board. An Award Nomination Canvassing Committee has been appointed. Members are: C.D. Evans, Chairman; C.W. Williams; D.L. Berner; G. Fuller; and R.J. Buswell. The function of this committee is to solicit nominations for the 11th award. Selection of the award winner will be made by the Award Committee whose membership will remain anonymous.

Rules

The rules prescribe that nominees shall have been responsible for the accomplishment of original research in lipid chemistry and must have presented the results thereof through publication of technical papers of high quality. Preference will be given to individuals who are actively associated with research in lipid chemistry and who have made fundamental discoveries that affect a large segment of the lipid field. For award purposes, the term "lipid chemistry" is considered to embrace all aspects of the chemistry and biochemistry of fatty acids, of naturally occurring and synthetic compounds and derivatives of fatty acids, and of compounds that are related to fatty acids metabolically, or occur naturally in close association with fatty acids or derivatives thereof. The award will be made without regard for national origin, race, color, creed or sex.

Letters of nomination together with supporting documents must be submitted in octuplicate to C.D. Evans, Northern Regional Research Center, 1815 N. University, Peoria, Ill. 61604 before the deadline of April 1, 1974. The supporting documents shall consist of professional biographical data, including a summary of the nominee's research accomplishments, a list of his publications, the degrees he holds, together with the names of the granting institutions, and the positions held during his professional career. There is no requirement that either the nominator or the nominee be a member of the American Oil Chemists' Society. In addition, letters from at least three other scientists supporting the nomination must be submitted in octuplicate.

Remember the DEADLINE, April 1, 1974

• Abstracts. . .

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oil which was nine times enriched with unsaponifiable matter. This extract was analyzed and in addition to the normal components (β-sitosterol, campesterol, β-amaryne, butyrespermol, cycloartenol, 24-methylenecycloartanol, squalene, and α-tocopherol) two aliphatic alcohols, $C_{30}H_{50}O$, were found having the hydrocarbon sequence of squalene.

VARIATION OF TOTAL AND RESIDUAL OIL CONTENT IN SUNFLOWERSEEDS AND MEALS DURING THE TREATMENT IN ONE SEASON. V.G. Scerbakov et al. (Polytechnical Inst. of Krasnodar, USSR). *Maslozir. Prom.* **1973**(3), 11–12. During storage physicochemical variations occur in oilseeds. This influences the quality and quantity of lipoproteins, which affects the yield of oil. These experiments have been done in the oil factory in Rostov from September to June. The seeds were dried at 45–60C to 6–7% moisture. The results show that the oil content in the seeds didn't change until May–June. The highest oil yield was obtained in January–February. (Rev. Franc. Corps Gras)

THERMOPHYSICAL PROPERTIES OF VEGETABLE OILS AND FATS. M.A. Gromov (Inst. G. V. Plehanov of National Economy, Moscow). *Maslozir. Prom.* **1973**(3), 15–17. For calculating the thermal conductivity of a normal liquid, Predvoditelev gives theoretically this equation: $\lambda = B\ \gamma^{4/3}$, where λ is thermal conductivity, B is constant for a given liquid and γ is density of a liquid. Constant B can be determined through the equation: $B = ACM^{-1/3}$, where A is invariant determined only by the temperature. After the data of Predvoditelev, the invariant is 5395 at 30C, C is heat of mass and M molecular mass. With these equations and other data, the thermophysical characteristics of vegetable oils and fats may be calculated. (Rev. Franc. Corps Gras)

LIPID AUTOXIDATION. STUDY OF METHODS OF ANALYSIS AND OF PARAMETERS. I. R. Marcuse (Swedish Inst. for Food Preservation Res., SIK, Goteborg, Sweden). *Rev. Franc. Corps Gras* **20**, 277–83 (1973). After discussing the problems of oxidation products determination, two methods are described at length: the first is the anisidine or benzidine test and the second, the TBA test. For this latter the chemistry of the formation of the red pigment is described and the TBA-reactive compounds in oxidized fats identified. Other methods of analysis, such as gas-liquid chromatography and measuring the amount of absorbed oxygen (modified Warburg apparatus) are also surveyed.

FATS IN COSMETOLOGY. M.R. Cornon (Ecole Sup. d'Application des Corps Gras á l'Institut Sup. International du Parfum, Paris). *Rev. Franc. Corps Gras* **20**, 271–6 (1973). For centuries some vegetable oils have been used in cosmetics. Oils used today may be divided into three categories: oils without specific action, always good for skin softening (pure sweet almond oil); oils having special properties like castor oil used in lipsticks for its solvent power; and oils having a special action due to some of their components (avocado oil and wheat germ oil). In modern cosmetology other oils are also used (pistache oil, oil of vison, etc.). Recently, some components of the unsaponifiable matter of vegetable oil have been used such as phytosterols whose action on the skin is particularly good.

PREPARATION OF RAPE OIL FATTY ACIDS AND USE OF THE PRODUCT. A. Rutkowski (Inst. Foodstuffs and Nutr., and M. Bedowicz, Inst. of General Chem., Warsaw, Poland). *Seifen-Öle-Fette-Wachse* **99**(21), 591–5 (1973). The industrial uses of rapeseed oil, obtained abundantly world wide, are described. The preparation of oleic acid and erucic acid fraction is illustrated in detail.

PRECAUTIONARY MEASURES TO BE TAKEN WHEN TREATING SEEDS SO AS TO PREVENT DETERIORATION OF THE QUALITY WHEN PRODUCING EDIBLE OILS AND GRITS. G. Loew. *Seifen-Öle-Fette-Wachse* **99**(21), 595–601 (1973). The quality of a vegetable oil is influenced by the storage of the seed, the preliminary treatment and pressing or extraction by the refineries. The type of plant and the cultivation are also of significance. The precautionary measures to be taken at all stages of the harvesting and processing of soya and peanut seeds are described.

ESTERIFICATION OF FATTY ACIDS AT ROOM TEMPERATURE BY CHLOROFORM-METHANOLIC HCL-CUPRIC ACETATE. Motonori Hoshi, M. Williams and Y. Kishimoto (E.K. Shriver Center for Mental Retardation, Waltham, Mass. 02154, and Dept. of Neurology, Mass. General Hosp., Boston, Mass. 02114). *J. Lipid Res.* **14**, 599–601 (1973). A new procedure for the preparation of methyl esters from free fatty acids under mild conditions was investigated. Free fatty acids are dissolved in a mixture of chloroform-methanolic HCl-cupric acetate and kept at room temperature for 30 min for complete esterification. The method is suitable for esterification of long-chain acids, such as 18:0, and for very long chain acids, such as 24:0. Fatty acids from brain glycerophosphatides, which included a high concentration of polyenes such as 20:4(n − 6), 22:4(n − 6), and 22:6(n − 3), were also esterified by the same procedure, and neither artifact formation nor loss of unsaturated acids was observed.

HYOCHOLIC ACID AS INTERNAL STANDARD FOR QUANTITATION OF HUMAN FECAL BILE ACIDS. M.T. Ravi Subbiah (Mayo Clinic and Mayo Found., Rochester, Minn. 55901). *J. Lipid Res.* **14**, 692–4 (1973). After hyocholate is added to a fecal homogenate, the bile acids are extracted, purified by thin-layer chromatography and quantitated by gas-liquid chromatography as methyl ester trifluoroacetates on QF-1 columns.

NEW COLORIMETRIC METHOD FOR THE QUANTITATIVE ESTIMATION OF PHOSPHOLIPIDS WITHOUT ACID DIGESTION. R.K. Raheja, C. Kaur, A. Singh and I.S. Bhatia (Dept. of Chem. and Biochem., Punjab Agr. Univ., Ludhiana 141004, India). *J. Lipid Res.* **14**, 695–7 (1973). A unique colorimetric method for the quantitative determination of phospholipids that does not involve the acid digestion of the lipid is described. The phospholipids, after separation by thin-layer chromatography and elution from the silica gel, are heated with a chromogenic solution that is a modification of a spray reagent formulated by Vaskovsky and Kostetsky (*J. Lipid Res.* **9**, 396). The absorbance of the colored complex was read at 710 nm, and it followed Beer's law in the range of 1–10 μg of phospholipid phosphorus.

RESEARCH CONCERNING SOY BEAN OIL HYDROGENATION. O. Popescu, H. Antoni, A.M. Ille, C. Ille and B. Freier. *Lucrari de Cercetare* **9**, 25–43 (1972). A study on soy bean oil hydrogenation was performed with the aim of turning the oil to good account as a hydrogenated fat, having the physiochemical characteristics needed for shortening and margarine manufacture. Experiments were carried out in an industrial plant by forced recirculation hydrogenation of the reactant mix (oil, hydrogen, catalyst) at 180C and a pressure of 2 atm. using a catalyst containing 20% metallic nickel. The hydrogenation process was controlled by following the change in composition of fatty acids (trienes, dienes, monoenes, saturated fatty acids), of the trans-isomers and of the

Northeast Section members tour USDA center

Members of the Northeast Section of AOCS toured the Eastern Regional Research Center, USDA, in suburban Philadelphia recently. The tour was arranged by Francis E. Luddy, meeting chairman and a researcher at the Center. Talks and demonstrations were held at the edible tallow research lab, the food pilot plant, the food appraisal laboratory, and the detergents, nitrosamines in meat and exploratory organic reactions stations.

Afterwards the oil chemists and their guests met for a dinner meeting at the Treadway Inn, Willow Grove, Pa., where Alfred Henick presented a talk on "Antioxidants—Current Technology and New Trends." Henick, a research leader from the U.S. Army Food Laboratories at Natick, Mass., and a nationally known expert in food preservation and oxidation studies, gave a brief outline of oxidation mechanisms, types of antioxidants, theoretical and practical aspects in selecting antioxidants, and a summary of recent studies involving water and fat-protein systems.

Vig Babayan, vice president of research, Stokely-Van Camp Inc. and a member of the faculty of Indiana University School of Medicine, was the featured speaker at the ladies' night meeting. The December meeting was chaired by H.P. (Bud) Gormley.

Babayan's topic was "Nutritional Aspects of Saturated-Polyunsaturated Fats and Oils." Babayan recently chaired the Balanced Nutritional Therapy Symposium in Germany in association with another Northeast Section member Hans Kaunitz. ■

positional isomers from the reaction mixture. On the basis of Albright charts, it was established that the selectivity values were in the range 20–35. The existing relation between the change during hydrogenation of the iodine number and of the refractive and melting index was also studied. It was established that for constant hydrogenation conditions a linear proportionality exists between the refractive index values and the melting points. The soybean bean oil, hydrogenated in a batch installation was used with good results in margarine manufacture at 25, 50 and 75% of the fatty phase, thus broadening the range of raw materials that may be used for indigenous margarine production.

REFINING OF FISH OILS FOR USE IN THE LEATHER INDUSTRY AND IN THE LACQUER AND PAINT INDUSTRY. A.M. Ille and A. Poboran. *Lucrari de Cercetare* 10, 71–80 (1972). A flow sheet is given for refining raw fish oils, produced on oceanic fishing vessels, to oils to be used in the leather industry and in the paint industry. The influence of technological parameters on the main stages of refining was established, that is of clarification from mucilaginous matter (the kind and quantity of this clarification agent, the working temperature), of neutralization (the concentration and the excess of NaOH as a function of the previous clarification) and of decolorization (the nature and the amount of the decolorizing agent).

SOME RESULTS CONCERNING THE INDUSTRIAL TESTING OF CONTINUOUS NEUTRALIZING IN ALKALINE MEDIUM OF VEGETABLE OILS. B. Freier, M. Cotutiu, Gh. Illiescu, A.M. Ille, H. Antoni, A. Poboran and C. Nitu. *Lucrari de Cercetare* 10, 81–94 (1972). A new neutralizing process worked out by our Institute, was applied to the refining of soybean and sunflower oil, good results being obtained. After neutralization, the oil showed a residual acidity of 0.03–0.14% and a soap content, expressed as oleate, of 0.01–0.03%. The soapstock contained 8–11% total fat of which 6–11% was neutral oil. Compared to the refining by batch neutralization, greater yields of refined oil were obtained, 1.3% for soy bean oil and 2.3–2.7% for sunflower oil. The introduction of the continuous neutralization to other oil plants is being considered. Characteristics of the neutralizing equipment are presented as well as flow sheet of the installation.

DEGRADATION OF LINOLEIC ACID IN DEEP-FRIED POTATOES. L. Kilgore and F. Windham (Home Economics Dept., Mississippi State Univ., State College, Miss.). *J. Am. Dietetic Assoc.* 63, 525–7 (1973). The changes in the linoleic acid content of frozen, deep-fried potatoes were studied by frying potatoes in a repeatedly used retail blend of cottonseed and soybean oils; then freezing. After 6 months' frozen storage, the potatoes were reheated by one of three methods: in fresh oil at 205C for 1 min.; in a conventional oven (400F for 10 min.); or in a microwave oven (3 min.). The mean percentage of linoleic acid (expressed as percentage of total fatty acids) changed from 51.8% to 45.9% from the first batch of potatoes to the twelfth. The effect of method of reheating on linoleic acid content was not significant although there were some measurable differences in the cases of products fried in fresher oil. The microwave oven treatment gave slightly lower values than the other two treatments, which were not different from each other.

PROCESS FOR TREATING A POWDERED, FAT-CONTAINING MILK PRODUCT. J. Pisecky and V. Westergaard (Aktieselskabet Niro Atomizer). *U.S. 3,773,519.* The cold water reconstitution whole milk powder, are improved by applying a coating of properties of a powdered, fat-containing milk product, especially lecithin, possibly dissolved in a fat. The quantities of lecithin and fat as well as the melting characteristics of the fat are critical to the process.

AOCS member completes voluntary overseas assignment in Turkey

AOCS member John M. Bodman, retired engineering development manager of Lever Brothers Co., recently completed an overseas assignment in Turkey for the International Executive Service Corps. His assignment was to advise a food oil manufacturer in Adana, Turkey, on margarine and shortening processing. IESC, a nonprofit corporation, arranged for retired (and occasionally mid-career) executives to share their managerial know-how with enterprises in the developing nations. While travel and living expenses are paid for the executive, and for his wife if she accompanies him, he serves without other compensation. The foreign firm makes a substantial contribution toward the costs of its project.

In operation since January, 1965, IESC has approved requests for assistance from about 4000 enterprises in 54 countries of Latin America, the Middle East, Southeastern Europe, Africa, South and East Asia. Information about current recruiting needs can be obtained from the Vice President for Executive Recruitment, IESC, 545 Madison Avenue, New York, N.Y. 10022. ■

• Fatty Acid Derivatives

MONOGLYCERIDE EMULSIFIERS AND DEFOAMING AGENTS FOR THE FOOD INDUSTRY. A.M. Ille, A. Poboran and C. Ille. *Lucrari de Cercetare* 9, 45–56 (1972). Parameters have been established for the glycerolysis of fats that yield emulsifiers having the maximum concentration of monoesters. These include the characteristics of the raw materials, temperature and time of reaction and kind and amount of catalyst. Manufacturing processes, tested at the plant level, have been developed for a number of emulsifier types such as liquid emulsifiers, emulsifiers from sunflower oil or from soya with defoaming properties and of non-self emulsifiers and self emulsifiers (with 3% soap) from hydrogenated sun flower or soy bean oils or from hydrogenated lard. The efficiency of the obtained products was verified by experiments with various food products.

PREPARATION OF AN AQUEOUS ALPHA-MONOGLYCERIDE OINTMENT BASE. K. Larsson. *U.S. 3,772,446.* An aqueous ointment base containing 50–90% water and hydrophilic crystals of an alpha-monoglyceride of a C_{12}–C_{18} fatty acid may be prepared by keeping an aqueous dispersion of particles of the alpha-monoglyceride above its transition temperature until the particles have absorbed water and been transformed into microscopic liquid crystalline particles and slowly cooling the dispersion under stirring to ambient temperature.

SHORTENING SPARING PROCESS FOR WHEAT FLOUR BASED DOUGHS. C.C. Tsen and W.J. Hoover (Kansas State Univ. Research Found.). *U.S. 3,773,521.* Shortening may be decreased or eliminated by incorporating in the dough 0.1–3% of an additive selected from the group consisting of sodium or calcium salts of acyl lactylates of C_{14}–C_{22} fatty acids. The preferred additives are sodium stearoyl-2-lactylate or calcium stearoyl-2-lactylate, each added at a concentration of 0.5%. The additive may be used in yeast or chemically leavened bread, baked or fried dough, or batter products.

PROCESS FOR POLYMERIZING UNSATURATED FATTY ACIDS AND THEIR ESTERS. M. Morimoto, M. Saito. and A. Goukon (Kao Soap Co.). *U.S. 3,773,806.* Aryl sulfohalide is added to the reaction system as catalyst in order to increase the reaction rate and reduce the content of trimer and higher polymers in the product. The resulting polymerizate is composed mainly of dimer having cyclohexene structure. The starting material is conjugated unsaturated fatty acid or its ester.

GEL-FORMING MONOGLYCERIDES OF CYCLIC CARBOXYLIC ACIDS. G. Guhr, J.D. von Mikusch-Buchberg, W. Heinrich, A. Bandzauner and Y.T. d'Audiffret (Lever Bros.). *U.S. 3,775,448.* The monoglycerides, on addition to water, form clear stable gels which are suitable for incorporation into cosmetic and toilet preparations.

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REGULATION OF DE NOVO FATTY ACID BIOSYNTHESIS IN THE N-ALKANE-UTILIZING YEAST, CANDIDA 102. C.O. Gill and C. Ratledge (Dept. Biochem., The Univ. of Hull, Kingston upon Hull, England). *J. Gen. Microbiol.* 78, 337–47 (1973). Growth of *Candida* 107 on n-alkanes (C_{10}, C_{16} or a mixture) completely repressed formation of acetyl-CoA carboxylase and partially repressed the fatty acid synthetase complex. Since all fatty acids are derived from the substrate, the yeast is able to elongate even chain acids and modify odd chain acids to even chain acids. Short term regulation of fatty acid biosynthesis occurs by fatty acyl-CoA ester feed back inhibiting the activities of both acetyl-CoA carboxylase and fatty acid synthetase. Extracts from n-alkane grown yeast inhibited the

carboxylase in extracts of glucose-grown yeast, the pattern of inhibition being similar to that observed with hexadecyl-CoA.

TURNOVER OF PHOSPHATIDYL GLYCEROL IN ESCHERICHIA COLI. J.P.G. Ballesta, C.L. de Garcia and M. Schaechter (Dept. Molec. Biol. and Microbiol., Tufts Univ. Sch. Med., Boston, Mass. 02111). *J. Bacteriol.* 116, 210–4 (1973). In growing cultures of *E. coli*, the nonacylated glycerol of phosphatidyl glycerol (PG) is labeled more rapidly than is the acylated glycerol. This is, in part, due to a rapid exchange reaction of the nonacylated glycerol. Only some of the PG molecules undergo this reaction, while others are stable. Using a mutant unable to make glycerophosphate, it was shown that the nonacylated glycerol of PG can exchange with non-phosphorylated glycerol.

REGULATION OF PHOSPHOLIPID SYNTHESIS IN ESCHERICHIA COLI BY GUANOSINE TETRAPHOSPHATE. J.P. Merlie and L.I. Pizer (Dept. Microbiol., Sch. Med., Univ. of Penn., Phil. Penn., 19174). *J. Bacteriol.* 116, 355–66 (1973). A strict correlation between guanosine tetraphosphate accumulation and inhibition of phospholipid synthesis was found. Experiments suggest that regulation occurs at the glycerol-3-phosphate acyltransferase step. With a cell-free preparation, guanosine tetraphosphate was found to inhibit the glycerol-3-phosphate acyltransferase as well as *sn*-glycerol-3-phosphate phosphatidyl transferase. The findings provide a biochemical basis for the stringent control of lipid synthesis as well as regulation of steady-state levels of phospholipid in growing cells.

METABOLISM OF CHOLESTERYL PALMITATE BY RAT BRAIN IN VITRO; FORMATION OF CHOLESTEROL EPOXIDES AND CHOLESTANE-3β,5α,6β-TRIOL. C.M. Martin and H.J. Nicholas (Inst. of Medical Educ. and Res. and Dept. of Biochem., St. Louis Univ. Schl. of Medicine, St. Louis, Mo. 63104). *J. Lipid Res.* 14, 618–24 (1973). Incubation of [4-^{14}C]cholesteryl palmitate with the 12,000 g supernatant fraction of adult rat brain fortified with an NADPH-generating system and β-mercaptoethylamine resulted in formation (2–5%) of more polar metabolites characterized as a mixture of cholesterol-5,6-epoxides. Under extended incubation conditions, cholestane-3β,5α,6β-triol was isolated as the major end product of the incubations. Free [4-^{14}C]cholesterol incubated under similar conditions was not oxidized, whereas oxidation of [4-^{14}C]-cholesteryl palmitate appeared to be dependent upon hydrolysis of the ester by the rat brain microsomal subcellular fraction. Elimination of the NADPH-generating system or the addition of EDTA to the incubation mixture inhibited epoxide formation, suggesting that the products are derived from an NADPH-dependent enzymatic lipoperoxidation mechanism. The in vitro conversion of [4-^{14}C]cholesterol-5α,6α-epoxide to cholestane-3β,5α,6β-triol was also demonstrated in rat brain subcellular fractions in the absence of added cofactors.

CELLULARITY OF BOVINE ADIPOSE TISSUE. R.L. Hood and C.E. Allen (Dept. of Animal Sci., Meat Sci. Lab., Univ. of Minn., St. Paul, Minn. 55101). *J. Lipid Res.* 14, 605–10 (1973). Subcutaneous and perirenal adipose tissue from bovine animals that had different fat deposition patterns were characterized in terms of the weight of the adipose tissue organ and adipose cell number and mean cell size as determined by electronic counting of osmium-fixed adipose cells. Similar parameters were also measured in the interfascicular adipose tissue dissected from four muscles. Adipose tissue from animals of the leaner Holstein breed contained smaller cells than the respective tissues from the fatter Hereford X Angus animals. The small subcutaneous deposit in the Holstein animals was due to a small number of adipose cells that were small in size. During growth of the bovine animal, an increase in adipose tissue mass was accompanied by cellular hypertrophy and hyperplasia. However, by 14 months of life hyperplasia was complete in all but the interfascicular adipose tissue. In the 14-month-old Hereford X Angus steers, interfascicular adipose tissue had an appreciable number of small cells and a bimodal distribution for cell diameter. The results of this study suggest that interfascicular adipose tissue is a late developing depot and that hyperplasia is still an active process in this depot at 14 months of life, whereas hyperplasia appears to be nearly complete in the subcutaneous and perirenal depots of bovine animals by about 8 months of life or shortly thereafter.

SIMPLIFIED SPECTROPHOTOMETRIC ASSAY FOR MICROSOMAL 3-HYDROXY-3-METHYLGLUTARYL CoA REDUCTASE BY MEASUREMENT OF COENZYME A. F.H. Hulcher and W.H. Oleson (Dept. of Biochem. and the Arteriosclerosis Res. Center, Bowman Gray Schl. of Med., Winston-Salem, N.C. 27103). *J. Lipid Res.* 14, 625–31 (1973). A new assay for 3-hydroxy-3-methylglutaryl CoA reductase (mevalonate:NADP oxidoreductase [acylating CoA], EC 1.1.1.34) is based upon the measurement of released coenzyme A (SH) during the reduction of 3-hydroxy-3-methylglutaryl CoA to mevalonate. Coenzyme A was measured in the presence of dithiothreitol, required for activity, by reaction with 5,5′-dithiobis(2-nitrobenzoic acid). Sodium arsenite forms a complex with the dithiol, but not with monothiols. Thus, reduced coenzyme A reacts instantaneously with the reagent and dithiothreitol reacts slowly. The absorbance due to the coenzyme A-5,5′-dithiobis (2-nitrobenzoic acid) reaction is determined by extrapolating the linear (dithiol) absorbance-time curve to the time of addition of the reagent. After substraction of control absorbance (deletion of NADPH), the concentration of CoA-SH is calculated from $\epsilon_{max} = 1.36 \times 10^4$ at 412 nm. The method of protein removal and reduction of sulfhydryl groups on the enzyme are critical. This method provides an immediate assay. Recovery of reduced coenzyme A was 98.7%. The assay is applicable for microsomes or purified enzyme and has an effective range of 0.5–50 nmoles of coenzyme A. It was applied to kinetic measurement of the pigeon liver microsomal enzyme reaction.

CELL-ASSOCIATED NONESTERIFIED FATTY ACID LEVELS AND THEIR ALTERATION DURING LIPOLYSIS IN THE ISOLATED MOUSE ADIPOSE CELL. S.W. Cushman, J.J. Heindel and B. Jeanrenaud (Lab. de Recherches Medicales and Inst. de Biochim. Clinique, Univ. de Geneve, and Dept. of Med., Dartmouth Med. Schl., Hanover, N.H. 03755). *J. Lipid Res.* 14, 632–42 (1973). A rapid and flexible method has been developed for measuring cell-associated, probably intracellular, nonesterified fatty acids (CAFA) in isolated mouse adipose cells. A variety of lipolytic agents as well as various concentrations of epinephrine elevate CAFA levels in rough proportion to their stimulation of glycerol and fatty acid release. Insulin reduces epinephrine-elevated CAFA levels. A detailed, quantitative study of the relationship among lipolytic activity, CAFA levels, and the extracellular molar ratio of fatty acids to albumin has been carried out. Epinephrine-elevated CAFA levels rise linearly with, while epinephrine-stimulated lipolytic activity is independent of, fatty acid to albumin ratios below 2–3. As the ratio increases from 3 to 5, CAFA levels continue to increase, whereas lipolytic activity decreases. Above ratios of 5, fatty acid release almost completely ceases; CAFA levels increase dramatically with residual glycerol release. A temperature-dependent efflux of epinephrine-elevated CAFA can be elicited through blockade of stimulated lipolysis with propranolol, but only in the presence of extracellular fatty acid to albumin ratios below 3.

LIVER DEHYDROGENASE LEVELS IN RAINBOW TROUT, SALMO GAIRDNERI, FED CYCLOPROPENOID FATTY ACIDS AND AFLATOXIN B_1. S.L. Taylor, M.W. Montgomery and D.J. Lee (Dept. of Food Sci. and Technol., Oregon State Univ., Corvallis, Oregon 97331). *J. Lipid Res.* 14, 643–6 (1973). Cyclopropenoid fatty acids in the diet of rainbow trout caused significant reductions in liver protein and activity of glucose-6-phosphate dehydrogenase, NADP-linked isocitrate dehydrogenase, lactate dehydrogenase and malate dehydrogenase. Changes in total activity were usually accompanied by similar changes in specific activity. The activity of glucose-6-phosphate dehydrogenase appeared to be more sensitive to the ingestion of cyclopropenoid fatty acids than the other dehydrogenases studied. Feeding 20 ppb aflatoxin B_1 to rainbow trout did not significantly change the activity of the dehydrogenases except for a small increase in the activity of glucose-6-phosphate dehydrogenase after 21 days of feeding. Relationships of these changes to the co-carcinogenicity of cyclopropenoid fatty acids and the carcinogenicity of aflatoxin are discussed.

BIMODAL EFFECT OF INSULIN ON HORMONE-STIMULATED LIPOLYSIS: RELATION TO INTRACELLULAR 3′,5′-CYCLIC ADENYLIC ACID AND FREE FATTY ACID LEVELS. K.S. Desai, K.C. Li and A. Angel (Dept. of Med., Univ. of Toronto, Can.). *J. Lipid Res.* 14,

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647–55 (1973). The present study was undertaken to determine the relationship between the antilipolytic and lipolytic effects of insulin on hormone-stimulated lipolysis and the mechanisms of these reactions. The dose-response curve of norepinephrine-stimulated lipolysis in rat adipocytes was not sigmoidal but biphasic in nature. Intracellular free fatty acid levels were linearly related to lipolytic rate and also described a biphasic profile in response to increments in norepinephrine concentration. Intracellular 3′,5′-cyclic AMP levels measured 10 min after addition of increasing concentrations of norepinephrine showed a rise and a plateau followed by a secondary rise. Insulin was antilipolytic at low concentrations of noreprinephrine and distinctly lipolytic at high concentrations. The combined antilipolytic and lipolytic effect of insulin is termed the "bimodal" effect of insulin on hormone-stimulated lipolysis. The bimodal effect of insulin correlated positively with changes in peak intracellular 3′,5′-cyclic AMP levels. In the presence of glucose, insulin invariably enhanced lipolysis. It is suggested that the antilipolytic effect of insulin is achieved by both inhibition of adenyl cyclase activity and activation of low-K_m 3′,5′-cyclic AMP phosphodiesterase, the net effect being a low accumulation of 3′,5′-cyclic AMP.

PHOSPHOLIPIDS AND ACYL GROUPS IN SUBCELLULAR FRACTIONS FROM HUMAN CEREBRAL CORTEX. G.Y. Sun (Lab. of Neurochem., Cleveland Psychiatric Inst., Cleveland, Ohio 44109). *J. Lipid Res.* **14**, 656–63 (1973). Subcellular fractionation of human brain cortex obtained at autopsy yielded microsomal and synaptosome-rich fractions from the gray matter and microsomal and purified myelin fractions from the white matter. The phospholipids of myelin were high in plasmalogens, and the molar ratio of alkenyl acyl *sn*-glycero-3-phosphorylethanolamine to diacyl *sn*-glycero-3-phosphorylethanolamine was 4. The acyl groups of the myelin phosphoglycerides were enriched in monoenes (mainly 18:1 and 20:1) and a tetraene, 22:4(n − 6). The phospholipids in the synaptosome-rich fraction were high in diacyl *sn*-glycero-3-phosphorylcholine, and the molar ratio of the alkenyl acyl *sn*-glycero-3-phosphorylethanolamine to diacyl *sn*-glycero-3-phosphorylethanolamine was 0.88. The acyl groups of synaptosomal ethanolamine phosphoglycerides were rich in 22:6(n − 3) but contained a very low amount of 20:1. The lipid composition of microsomes from the gray matter was different from that of microsomes from the white matter but was nearly identical with that of the synaptosome-rich fraction. Except for a slightly lower proportion of alkenyl acyl *sn*-glycero-3-phosphorylethanolamine and sphingomyelin, the lipid composition of microsomes from the white matter was also similar to that of the myelin.

LIPID BIOSYNTHESIS BY ISOLATED PLASTIDS FROM GREENING PEA, PISUM SATIVUM. R.A. Panter and N.K. Boardman (Div. of Plant Industry, CSIRO, Canberra, A.C.T. 2601, Australia). *J. Lipid Res.* **14**, 664–71 (1973). Isolated etioplasts from 8-day-old dark-grown pea seedlings incorporated [1-^{14}C]acetate into lipid at a relatively low rate. Plastids from seedlings that had been illuminated for at least 2 hr showed an enhanced incorporation provided the plastids were illuminated during incubation with the labeled acetate. Dark incubation or the addition of 3-(3,4-dichlorophenyl)-1,1-dimethylurea (DCMU) decreased the acetate-incorporating activity of the developing chloroplasts to the level observed with etioplasts. Light had a marked effect on the type of fatty acid into which acetate was incorporated by the developing chloroplasts. Unsaturated fatty acids (mostly oleic acid) accounted for 60–80% of the incorporated label if the plastids were illuminated, but in the dark or in the presence of DCMU the unsaturated acids accounted for only 0–15% of the label incorporated into lipid. The effect of ATP on incorporation was dependent on the maturity of the chloroplasts; mature pea chloroplasts were inhibited by ATP, whereas in developing plastids there was a slight stimulation by ATP. Inhibition of acetate incorporation into lipid by DCMU appears to be due to inhibition of noncyclic phosphorylation. Incorporation was restored by reduced 2,3,5,6-tetramethylphenylenediamine, which restored phosphorylation, but not by reduced N,N,N′,N′-tetramethylphenylenediamine.

PREPARATION AND ANALYSIS OF BENZOYLATED CEREBROSIDES. R.H. McCluer and J.E. Evans (E.K. Shriver Center for Mental Retardation, W.E. Fernald State Schl., Waltham, Mass. 02154). *J. Lipid Res.* **14**, 611–7 (1973). The benzoylation of cerebrosides with benzoyl chloride and with benzoic anhydride is described, and the derivatives that contained hydroxy and nonhydroxy fatty acids were isolated by high pressure liquid chromatography (HPLC). Studies on the structures of these derivatives and the products formed by mild alkaline hydrolysis are reported. Reaction of cerebrosides containing nonhydroxy fatty acids with benzoyl chloride results in amide-acylation in addition to normal O-acylation. Mild alkali treatment of the N-diacyl derivative results in the formation of N-benzoyl psychosine. Derivatization with benzoic anhydride avoids amide-acylation. These derivatives are useful for the HPLC analysis of cerebrosides.

EVIDENCE FOR CENTERS IN THE CENTRAL NERVOUS SYSTEM THAT SELECTIVELY REGULATE FAT MOBILIZATION IN THE RAT. V.L. Teixeira, J. Antunes-Rodrigues, and R.H. Migliorini (Dept. of Physiol., Schl. of Med., Ribeirao Preto, Sao Paulo, Brazil). *J. Lipid Res.* **14**, 672–3 (1973). The blood sugar and plasma free fatty acid responses to administration of 2-deoxyglucose were determined in normal rats and in rats subjected to adrenodemedullation and/or hypothalamic deafferentation, as well as in rats with bilateral hypothalamic lesions. Adrenodemedullation of both intact and deafferentated rats reduced the 2-deoxyglucose-induced increase of blood sugar but did not affect the plasma free fatty acid response to 2-deoxyglucose in normal rats. The increases in blood sugar levels induced by the drug in intact rats were not significantly affected by deafferentation, but, in marked contrast, plasma free fatty acid mobilization after 2-deoxyglucose administration was completely suppressed in deafferentated rats, both in the presence and in the absence of the adrenal medulla. These results confirm previous observations indicating that the sympathetic nervous system and adrenalin release from the adrenal medulla participate in the production of hyperglycemia by 2-deoxyglucose. They provide, in addition, evidence for the existence, in the anterior hypothalamus or in limbic structures, of centers that can specifically influence mobilization of free fatty acids through a direct activation of the sympathetic fibers of adipose tissue without intervening in glucose homeostasis.

GAS-LIQUID CHROMATOGRAPHY OF OLIGOSACCHARIDES RELEASED FROM RED CELL GLYCOSPHINGOLIPIDS BY OZONOLYSIS. Masako Ohashi and Tamio Yamakawa (Dept. of Biochem., Faculty of Med., Univ. of Tokyo, Hongo, Bunkyo-ku, Tokyo, Japan). *J. Lipid Res.* **14**, 698–700 (1973). A method for the analysis of glycosphingolipids in mammalian erythrocyte membranes is described. It consists of ozonolysis and alkaline treatment of the crude lipid extract to obtain oligosaccharides from glycosphingolipids and then gas-liquid chromatography of trimethylsilyl derivatives of glycitols derived from the oligosaccharides. Typical gas-liquid chromatographic patterns of oligosaccharide components were obtained with various mammalian erythrocytes; these corresponded to the glycosphingolipid compositions. The analysis could be carried out on 10 ml of packed erythrocytes.

FATTY ACID OXIDATION AND ESTERIFICATION IN ISOLATED RAT HEPATOCYTES: REGULATION BY DIBUTYRYL ADENOSINE 3′,5′-CYCLIC MONOPHOSPHATE. C.J. Money and S. Margolis (Clayton Labs., Dept. of Med., and Dept. of Physiolog. Chem., Johns Hopkins Univ., Baltimore, Md. 21205). *J. Lipid Res.* **14**, 678–87 (1973). Isolated rat hepatocytes rapidly utilized [^{14}C]-palmitate and, in particular, synthesized large amounts of neutral lipids from palmitate. Incorporation into cellular lipids occurred at a linear rate proportional to the medium concentration of fatty acids. Oxidation of [^{14}C]palmitate to CO_2 increased with time and was much slower than palmitate esterification. Since [^{14}C]acetate and [^{14}C]glucose were oxidized to CO_2 at a linear rate, the lag in fatty acid oxidation to CO_2 did not involve enzymatic steps subsequent to acetate formation. The relative contribution of palmitate to esterification and to CO_2 formation depended upon the molar ratio of palmitate to albumin (v) and the length of incubation. Dibutyryl cyclic AMP (1 mM) reduced the oxidation of palmitate and acetate to CO_2 by about 50 and 90%, respectively, but did not alter palmitate esterification. However, equivalent concentrations of sodium butyrate produced similar decreases in CO_2 formation. Dibutyryl cyclic AMP (1 mM) also stimulated palmitate oxidation to water-soluble products, principally ketone bodies, by 50–100%. Sodium butyrate exerted no effect, while monobutyryl cyclic AMP and cyclic AMP both stimulated this pathway significantly.

LACK OF EFFECT OF CHRONIC NICOTINE ADMINISTRATION ON FATTY ACID DISTRIBUTION IN THE LIVER, TESTIS AND ADIPOSE TISSUE OF MALE FISCHER-344 RATS. R.G. Brindis, B.J. Petersen, J.H. Thompson, and R.G. Alfin-Slater (Depts. of Public Health and of Pharmacol. and Exptl. Therapeutics, Univ. of Calif. Schl. of Med., Los Angeles, Cal. 90024). *J. Lipid Res.* **14**, 688–91 (1973). A comparison is made of the percentage compositions of major fatty acids in liver and testis phos-

pholipids, liver and abdominal adipose tissue triglycerides, and liver sterol esters in male Fischer-344 rats administered a physiological saline control or a "smoking" dose of nicotine (1000 μg base/kg/day, subcutaneously) for 2 or 22 months. Results indicate that there is no major trend, or significant difference, between nicotine- or saline-treated rats with respect to major fatty acid distribution. Some differences in fatty acid distribution in the various lipid fractions were found between young and old rats.

COMPARATIVE STUDIES OF RETINOL TRANSPORT IN PLASMA. Y. Muto, F.R. Smith and D.S. Goodman (Dept. of Med., Columbia Univ., Coll. of Physicians and Surgeons, N.Y. 10032). *J. Lipid Res.* 14, 525–32 (1973). The comparative immunology and biochemistry of plasma retinol transport were studied using radioimmunoassays previously developed for human and for rat retinol-binding protein (RBP). Serum or plasma from 25 species of vertebrates from the mammalian orders Primates, Artiodactyla, Perissodactyla, Carnivora and Rodentia and from the classes Aves, Amphibia and Pisces, were assayed. There was a high degree of immunological specificity within a given mammalian order. Sera from seven subhuman primate species tested reacted in the human RBP immunoassay, and sera from four of five rodents reacted in the rat RBP immunoassay. Primate sera failed to react in the rat RBP immunoassay, and rodent sera failed to react in the human RBP immunoassay. Except for a slight reactivity of canine serum in the human RBP immunoassay, other sera showed no immunoreactivity. Using gel filtration, apparent molecular weights were estimated at 60,000–80,000 for the retinol transport systems in whole serum from cow, swine, chicken, and dog. Canine RBP was isolated and partially characterized.

REGULATORY EFFECTS OF STEROLS AND BILE ACIDS ON HEPATIC 3-HYDROXY-3-METHYLGLUTARYL CoA REDUCTASE AND CHOLESTEROL 7α-HYDROXYLASE IN THE RAT. S. Shefer, S. Hauser, V. Lapar and E.H. Mosbach (Dept. of Lipid Res. of Public Health Res. Inst. of the City of N.Y., Inc., N.Y. 10016). *J. Lipid Res.* 14, 573–80 (1973). Specific activities of the hepatic microsomal enzymes, 3-hydroxy-3-methylglutaryl CoA (HMG CoA) reductase and cholesterol 7α-hydroxylase, were studied in rats fed sterols and bile acids. The administration of bile acids (taurocholate, taurodeoxycholate, taurochenodeoxycholate) at a level of 1% of the diet for 1 wk reduced the activity of HMG CoA reductase. Taurocholate and taurodeoxycholate, but not taurochenodeoxycholate, inhibited cholesterol 7α-hydroxylase. Dietary sitosterol produced increases in the specific activity of HMG CoA reductase (3.6-fold) and cholesterol 7α-hydroxylase (1.4-fold), and biliary cholesterol concentrations in this group more than doubled. Compared with controls fed the stock diet, the simultaneous administration of sitosterol and taurochenodeoxycholate resulted in a 60% decrease of HMG CoA reductase activity and no change in cholesterol 7α-hydroxylase activity or biliary cholesterol concentration. Rats fed sitosterol plus taurocholate had nearly normal HMG CoA reductase activity, but cholesterol 7α-hydroxylase was inhibited and biliary cholesterol remained high.

FAT ABSORPTION IN ESSENTIAL FATTY ACID DEFICIENCY: A MODEL EXPERIMENTAL APPROACH TO STUDIES OF THE MECHANISM OF FAT MALABSORPTION OF UNKNOWN ETIOLOGY. S.B. Clark, T.E. Ekkers, A. Singh, J.A. Balint, P.R. Holt and J.B. Rodgers, Jr. (Gastrointestinal Div. of the Med. Service, St. Luke's Hosp. Center, N.Y. 10025). *J. Lipid Res.* 14, 581–8 (1973). Male rats were made deficient in essential fatty acids by feeding them a fat-free diet supplemented with 4% tripalmitin for 8–12 wk from the time of weaning. After feeding 0.5 ml of [^{14}C] triolein or [^{3}H] oleic acid, 72-hr stool recoveries of radioactivity were significantly greater in deficient rats than in chow-fed controls. Essential fatty acid deficiency did not reduce the absorptive capacities for triolein or for a medium-chain fat, trioctanoin, measured after 3 and 2 hr of maximal-rate duodenal infusion. In everted jejunal slices from essential fatty acid-deficient rats, uptake of micellar [^{14}C] oleic acid at 0–1C was similar to that of controls, but the rate of incorporation of fatty acid into triglyceride after rewarming to 37C was significantly reduced. The specific activities of the microsomal esterifying enzymes, acyl CoA:monoglyceride acyltransferase and fatty acid CoA ligase in jejunal mucosa were 30% lower in essential fatty acid-deficient rats.

A METHOD FOR THE RAPID QUALITATIVE AND QUANTITATIVE ANALYSIS OF 4,4-DIMETHYL STEROLS. G.F. Gibbons, K.A. Mitropoulos and K. Ramananda (Med. Res. Council Lipid Metabolism Unit, Hammersmith Hosp., London, W120HS, England). *J. Lipid Res.* 14, 589–92 (1973). A simple and relatively rapid technique has been developed for the separation of several 4,4-dimethyl steryl acetates, some of which contain sterically hindered nuclear double bonds. The method involves thin-layer chromatography on silver nitrate-impregnated silica gel and silver nitrate-impregnated alumina. The separated steryl acetates may then be analyzed quantitatively by gas-liquid chromatography.

EFFECTS OF GLYCEROL ON HUMAN ADIPOSE TISSUE TRIGLYCERIDE LIPASE ACTIVITY. H. Giudicelli and J. Boyer (Lab. de la Clinique Endocrinol., Hopital de la Conception, 13005, Marseille, France). *J. Lipid Res.* 14, 592–5 (1973). Glycerol fully protects the human adipose tissue triglyceride lipase against the denaturing effects of high and low temperatures. Under such protection, storage of crude preparations at −10C or incubation at 50C resulted in a 1.5–3-fold increase of the measured lipase activity. This increase was shown to be related to enzyme newly released from tissular microparticles present in the samples. Advantage may be taken of these observations to improve greatly the conditions of extraction and storage of this lipase activity.

NEW SENSITIVE ASSAY FOR PHOSPHATIDYLSERINE DECARBOXYLASE BASED ON THE DETECTION OF CO_2 FROM NONRADIOLABELED PHOSPHATIDYLSERINE. T.G. Warner and E.A. Dennis (Dept. of Chem., Univ. of Cal. at San Diego, LaJolla, Cal. 92037). *J. Lipid Res.* 14, 595–8 (1973). A new rapid assay for phosphatidylserine decarboxylase, which is sensitive in the nanomolar range, is described. Synthesis of radiolabeled phosphatidylserine for use as a substrate is not required, since the assay, unlike previous ones, is based on the detection of CO_2 liberated from unlabeled phosphatidylserine. The assay employs a gas chromatographic procedure for the analysis of methane formed by catalytic conversion of the CO_2 produced as a product of the enzymatic reaction.

REGULATION BY DIETARY CHOLINE OF HEPATIC FATTY ACID SYNTHETASE IN THE RAT. B. Rosenfeld (Banting and Best Dept. of Med. Res., Univ. of Toronto, Toronto 101, Ontario, Can.). *J. Lipid Res.* 14, 557–62 (1973). Fatty acid synthetase activity was measured in the high-speed supernatant fraction of liver homogenates from rats fed a semisynthetic diet low in lipotropic factors. If choline was omitted from the diet, a significant increase of fatty acid synthetase activity was observed after two feedings of the deficient diet. Compared with controls, the increase of fatty acid synthetase activity was of a magnitude that could account for the amount of triglyceride accumulating in the hepatic floating lipid fraction. Gas-liquid chromatographic analysis of the floating lipid triglycerides showed an increased content of palmitic acid due to choline deficiency; this increase could be predicted from the increased fatty acid synthetase activity and its characteristic yield of palmitic acid.

STUDIES ON THE FORMATION OF C_7-OXYGENATED CHOLESTEROL AND β-SITOSTEROL METABOLITES IN CELL-FREE PREPARATIONS OF

McClung elected chairman of Northern California Section

Dave McClung, CPC International, was elected chairman of the Northern California Section of the AOCS. Other officers elected were: Chairman-elect, Dick Purdy, PVO International; program chairman, Lloyd Smith, University of California, Davis; treasurer, Betty Miller, Curtis & Tompkins; secretary, Cameron Lyon, USDA; and membership chairman, Sherman Lee, Glidden-Durkee.

About 60 members and guests heard Lloyd Smith, the newly-elected program chairman, speak on polyunsaturated steak at the Section's last meeting of 1973 held at Veneto's in San Francisco.

The University of California professor's talk, "Good Grief–Polyunsaturated Steaks!" concerned the possible relationship between heart disease and intake of saturated fats and the progress in the production of meat and dairy products containing greatly increased ratios of polyunsaturated to saturated fatty acids. Methods for accomplishing this by feeding protected or encapsulated polyunsaturated oils were described. ■

RAT LIVER. L. Aringer and P. Eneroth (Dept. of Chem. Karolinska Inst., and the Hormone Lab., Dept. of Obstetrics and Gyn., Karolinska Sjukhuset, S-104 Stockholm 60 Sweden). *J. Lipid Res.* **14**, 563–72 (1973). The microsomal fraction and the 18,000 g supernatant fluid obtained from livers from normal rats, from cholestyramine-treated rats or from rats with a bile fistula have been used to compare the 7α-hydroxylation of [4-^{14}C] cholesterol and β-[4-^{14}C] sitosterol (24α-ethyl-cholesterol). It was not possible to increase the specific formation of 7α-hydroxy-β-sitosterol above 0.05% with any of the preparations. This conversion was less than 1% of that found for cholesterol. The inhibitory effect of added 7-oxo- and 7β-hydroxy-β-sitosterol on the 7α-hydroxylation of cholesterol was found to be much less than that of the corresponding cholesterol compounds. 7α-Hydroxy-β-sitosterol was without effect. It is concluded that the activity of the cholesterol 7α-hydroxylase is dependent upon the structure of the steroid side chain.

SPECTROPHOTOMETRIC METHOD FOR DETERMINATION OF TOCOPHEROL IN RED BLOOD CELLS. H.J. Kayden, C.K. Chow and L.K. Bjornson (N.Y. Univ. Med. Center, N.Y. 10016). *J. Lipid Res.* **14**, 533–40 (1973). A relatively rapid procedure is described for the spectrophotometric determination of total tocopherol in red blood cells (RBC) based on a modification of the original Emmerie-Engel reaction. The critical feature in this method is the presence of a large amount of an added antioxidant, pyrogallol or ascorbic acid, during the saponification and extraction stages and the use of thin-layer chromatography for tocopherol purification. The total tocopherol levels of plasma and erythrocytes were determined for a number of human subjects, for patients with abetalipoproteinemia and for rats. It was found that these levels had a wide range in normal human subjects but that the ratio of RBC to plasma tocopherol was relatively constant and equal to 0.18, uncorrected, and 0.21 when both RBC and plasma values were corrected to 100% recovery. The RBC-to-plasma ratio for rats was 0.39. The accuracy of this ratio determined by the spectrophotometric procedure was verified by measuring the distribution of [^{14}C] tocopherol in RBC and plasma when radioactive vitamin E was introduced into the blood by both in vitro and in vivo techniques.

ALTERATIONS IN BILIARY LIPIDS OF MICE DURING DEHYDROCHOLIC ACID FEEDING. N.W. DiTullio and E.J. Stack (Smith Kline & French Lab., Philadelphia, Penn. 19101). *J. Lipid Res.* **14**, 552–6 (1973). Mice were fed a lithogenic diet consisting of Purina chow and 0.5% dehydrocholic acid (DHA group). Controls received Purina chow. Every 2 wk. for 20 wk. animals were killed, and biliary phospholipid, cholesterol and bile salt concentrations were determined, as well as the extent of gallstone formation. With time there was a gradual, significant decline in the concentration and the relative composition of phospholipid in both groups compared with initial values. There was a significant increase in biliary cholesterol concentration and relative amount in the DHA group compared with the control. No significant differences were found in the relative amounts of bile salt or phospholipid between the two groups. Feeding DHA resulted in an increased concentration of bile salts and the sum of measured lipid compared with controls. After 8 wk., gallstones were found in approximately 60% of autopsied animals and correlated with increased cholesterol concentration. Our data support the hypothesis that there is a component of cholesterol secretion that may not be bile salt- or phospholipid-dependent. Our data also suggest that biliary phospholipid secretion decreases with age.

GLYCEROLIPID SYNTHESIS IN RAT ADIPOSE TISSUE. II. PROPERTIES AND DISTRIBUTION OF PHOSPHATIDATE PHOSPHATASE. S.C. Jamdar and H.J. Fallon (Depts. of Med. and Pharmacol., Univ. of North Carolina Sch. of Med., Chapel Hill, N.C. 27514). *J. Lipid Res.* **14**, 517–24 (1973). The properties and subcellular distribution of phosphatidate phosphatase (EC 3.1.3.4) from adipose tissue have been investigated. The enzyme was assayed using both aqueous phosphatidate and membrane-bound phosphatidate as substrates. When measured with aqueous substrate, activity was detected in the mitochondria, the microsomes and the soluble fraction. Mg^{2+} at low concentration stimulated the phosphatidate phosphatase from soluble and microsomal fractions but had no effect on the mitochondrial phosphatidate phosphatase. At higher concentration Mg^{2+} was inhibitory. In the presence of Mg^{2+}, the phosphatidate phosphatase from soluble and microsomal fractions was active against membrane-bound phosphatidate. No activity was demonstrated with membrane-bound substrate in the absence of Mg^{2+}. Mitochondria did not contain activity toward the membrane-bound substrate. The rate of utilization of aqueous phosphatidate was always higher than that of membrane-bound substrate. These results indicate that there are at least two different phosphatidate phosphatases in adipose tissue.

Tess elected president of PRI trustees

Roy W. Tess, an AOCS member since 1948, was recently elected president of the Paint Research Institute of the Federation of Societies for Paint Technology. He is employed by Shell Chemical Co., Houston, Tex. ■

A REGIONAL SURVEY OF MYELIN DEVELOPMENT: SOME COMPOSITIONAL AND METABOLIC ASPECTS. M.E. Smith (Neurology Service, Veterans Admin. Hosp., Palo Alto, Calif.). *J. Lipid Res.* **14**, 541–51 (1973). A survey of differences in composition and metabolism of myelin from five areas of the central nervous system was made in brain and spinal cord slices of the rat from 20 days to 20 months postnatal age. Purified myelin from the forebrain areas showed a composition characteristic of immaturity longer than did myelin from the hindbrain and spinal cord. The trend of chemical maturity is in agreement with the anatomical observations that myelination begins in the hindbrain and proceeds rostrally. Myelin recovery per 100-mg slice increased continually from 20 days to 20 months of age, while the uptake of [1-^{14}C] acetate into myelin lipid and of [1-^{14}C] leucine into myelin protein decreased precipitously with age. The metabolic characteristics of myelin from the cerebral cortex (including the corpus callosum), the thalamic area, and the cerebellum were very similar, while myelin from brainstem and spinal cord was metabolically more active, especially at the early ages. Synthesis of lipid in the myelin sheath represents about 50% of the lipid synthesis of the whole brain and about 75% of that of the spinal cord.

NEONATAL IMPRINTING OF LIVER MICROSOMAL HYDROXYLATION AND REDUCTION OF STEROIDS. K. Einarsson, J.-Å. Gustafsson, and Å. Stenberg (Dept. of Med., Serafimerlasarettet, Dept. of Germfree Res. and Dept. of Chem., Karolinska Inst., Stockholm, Sweden). *J. Biol. Chem.* **248**, 4987–97 (1973). The metabolism of 4-[4-^{14}C]androstene-3,17-dione, 4-[4-^{14}C]pregnene-3,20-dione, 5α-[4-^{14}C]androstane-3α,17β-diol, 4,16-[7α-^{3}H]androstadien-3-one, [4-^{14}C]cholesterol and 7α-hydroxy-4-[6β-^{3}H]-cholesten-3-one was studied in the microsomal fraction of livers from adult male and female rats which had been castrated neonatally or postpubertally. Based on these findings the microsomal steroid-metabolizing enzyme activities may be grouped into three classes with regard to the mechanisms regulating their activity: (a) enzymes with a basal activity level regulated by nongonadal factors but reversibly inducible by androgens; (b) enzymes irreversibly "imprinted" or "programmed" by androgens during the prepubertal period and reversibly stimulated by androgens postpubertally; and (c) enzymes primarily regulated by nongonadal factors and only slightly affected by androgens.

THE PLASMA MEMBRANE OF ISOLATED FAT CELLS. I. IDENTIFICATION OF TRYPSIN-SENSITIVE MEMBRANE PEPTIDES BY SODIUM DODECYL SULFATE POLYACRYLAMIDE GEL ELECTROPHORESIS. M.P. Czech and W.S. Lynn (Dept. of Biochem., Duke Univ. Medical Center, Durham, N.C. 27710). *J. Biol. Chem.* **248**, 5081–8 (1973). Analysis of purified plasma membranes from isolated fat cells by sodium dodecyl sulfate polyacrylamide gel electrophoresis resolved at least 11 major peptide components which ranged in apparent molecular weights from 168,000 to 22,000. The isolated fat cell plasma membrane fraction consisted of approximately 40% protein, 40% phospholipid, 16% cholesterol and 4% neutral carbohydrate. Essentially complete removal of phospholipid and cholesterol from membranes could be attained by extraction with ethanol at room temperature for 15 min.

POSITIONAL SPECIFICITIES OF ACYL COENZYME A: GLYCEROPHOSPHATE AND ACYL COENZYME A:MONOACYLGLYCEROPHOSPHATE ACYLTRANSFERASES IN ESCHERICHIA COLI. H. Okuyama and S.J. Wakil (Dept. of Biochem., Baylor Coll. of Med., Houston, Tx. 77025). *J. Biol. Chem.* **248**, 5197–205 (1973). A particulate preparation isolated from *Escherichia coli* B catalyzes the acylation of 1-acyl-*sn*-glycerol 3-phosphate (1-acyl-GP) with both oleoyl-CoA and palmitoyl-CoA. The optimum conditions were determined for the acyl-CoA: 1-acyl-GP acyltransferase. The acyltransferase is specific for the 1-acyl-GP and does not acylate 2-acyl-*sn*-glycerol 3-phosphate (2-acyl-GP)

under the conditions used. During the acylation of radioactive glycerophosphate with unsaturated acyl-CoA, radioactive monoacyl-GP is trapped effectively by the addition of nonlabeled 1-acyl-GP but ineffectively by adding nonlabeled 2-acyl-GP. The monoacyl-GP trapped in the presence of either 1-acyl-GP or 2-acyl-GP is mostly the 1-acyl-GP isomer. Thus, the pathway of diacyl-GP synthesis from glycerophosphate in *E. coli* is primarily via the 1-acyl-GP as intermediate regardless of whether the substrate is saturated or unsaturated acyl-CoA.

TWO FORMS OF A STRUCTURAL LIPOPROTEIN IN THE ENVELOPE OF ESCHERICHIA COLI. FURTHER CHARACTERIZATION OF THE FREE FORM. A. Hirashima, H.C. Wu, P.S. Venkateswaran and M. Inouye (Dept. of Biochem., State Univ. of N.Y. at Stony Brook, Stony Brook, N.Y. 11790). *J. Biol. Chem.* 248, 5654–9 (1973). A major envelope protein of *Escherichia coli* was previously found to exist in two different forms in the cell envelope: the free form and the bound form which is covalently linked to the peptidoglycan. Chemical properties of the free form were further investigated and compared with those of the bound form. The envelope fraction labeled with both [^{14}C]palmitic acid and [^{3}H]arginine was analyzed by sodium dodecyl sulfate-polyacrylamide gel electrophoresis after removal of phospholipid by extensive extraction with the mixture of chloroform and methanol (2:1). The palmitic acid content of the free form was found to be identical with that of the bound form on the basis of their arginine contents. As in the case of the bound form, palmitic acid was released from the free form by both alkali and acid hydrolysis. This suggests that palmitic acid attaches to the free form by both ester and amide linkages. It was found that the free form contained neither diaminopimelic acid nor glucosamine. Preliminary purification of the free form of the lipoprotein is also reported.

SUBCELLULAR LOCALIZATION OF ACETOACETYL-CoA DEACYLASE AND ITS ROLE IN ACETOACETATE SYNTHESIS. R.E. Burch and A.R. Wertheim (Veterans Admin. Hosp., 4101 Woolworth Ave., Omaha, Neb. 68105). *Am. J. Clin. Nutr.* 26, 814–22 (1973). We have shown that acetoacetyl-CoA deacylase activity resides in both the mitochondria and supernatant of rat liver cells. Mitochondrial damage was not responsible for supernatant deacylase activity. This was shown in two ways. First, failure to demonstrate appreciable activity of the mitochondrial marker, glutamic dehydrogenase, in supernatant fractions and, second, lack of change in the specific activity of supernatant deacylase when varying concentrations of sucrose were used to prepare homogenates.

GANGLIOSIDES AND MEMBRANE RECEPTORS FOR CHOLERA TOXIN. P. Cuatrecasas (Dept. of Med. and the Dept. of Pharmacol. and Experimental Therapeutics, Johns Hopkins Univ. Sch. of Med., Baltimore, Md. 21205). *Biochemistry* 12, 3558–66 (1973). Brain gangliosides and the glycoprotein, fetuin, inhibit the lipolytic response of fat cells to cholera toxin but not to epinephrine. The ability of various concentrations of ganglioside G_{M1} to inhibit the binding of ^{125}I-labeled cholera toxin to fat cells or liver membranes parallels the inhibition of toxin-induced lipolysis by G_{M1}. During prolonged periods of incubation the ganglioside inhibition of toxin binding is reversed and binding can then exceed that observed in the absence of gangliosides. When isolated fat cells or liver membranes are preincubated with gangliosides and then washed, there is a very large increase in the binding of cholera toxin to these tissues. Gangliosides thus appear to be the normal membrane receptors for cholera toxin. These receptors can be experimentally manipulated to study the nature of the toxin-receptor interaction and its relationship to activation of the biological response.

CHOLERA TOXIN-FAT CELL INTERACTION AND THE MECHANISM OF ACTIVATION OF THE LIPOLYTIC RESPONSE. *Ibid.*, 3567–77. The possible mechanisms by which the interaction of cholera toxin with isolated fat cells leads to an enhancement in the rate of lipolysis were examined, with special emphasis on the biochemical basis of the marked lag phase which exists before the onset of the lipolytic response is evident. Cells exposed to cholera toxin can be washed and replaced with fresh medium after 8 min or after 60 min of incubation at 37C without altering the characteristic 1-hr lag phase or the subsequent course of the lipolytic response. During the lag phase lipolytic metabolites or products are not secreted and accumulated in the incubation medium. It is suggested that cholera toxin initially forms an inactive toxin-ganglioside receptor complex on the cell membrane, and that this complex is transformed into a biologically active complex by a special transition which involves a major, spontaneous relocation of the complex within the two-dimensional structure of the membrane.

INACTIVATION OF PIG HEART THIOLASE BY 3-BUTYNOYL COENZYME A, 3-PENTYNOYL COENZYME A AND 4-BROMOCROTONYL COENZYME A. P.C. Holland, M.G. Clark and D.P. Bloxham (Inst. for Enzyme Res., Univ. of Wisc., Madison, Wisc. 53706). *Biochemistry* 12, 3309–15 (1973). The unsaturated thio esters, 3-pentynoyl-, 3-butynoyl- and 4-bromocrotonyl-CoA, have been investigated as affinity labels of pig heart thiolase and their properties compared with a known affinity label, 2-bromoacetyl-CoA. Incubation of thiolase with low concentrations of all of these compounds produced a rapid and irreversible loss of enzyme activity. Inactivation by 3-pentynoyl- and 4-bromocrotonyl-CoA obeys first-order kinetics. Acetoacetyl-CoA affords excellent protection against inactivation by all acyl-CoA esters tested whereas acetyl-CoA protects only against inactivation by 4-bromocrotonyl- and 2-bromoacetyl-CoA. In contrast to the 3-acetylenic CoA esters, 2-butynoyl- and 4-pentynoyl-CoA are relatively weak inactivating agents.

LIPID CHARACTERIZATION OF BOVINE SERUM LIPOPROTEINS THROUGHOUT GESTATION AND LACTATION. B.C. Raphael, P.S. Dimick and D.L. Puppione (Lipids Lab., Pennsylvania State Univ., University Park, Pa. 16802). *J. Dairy Sci.* 56, 1025–32 (1973). Lipid composition of serum lipoproteins was studied in Holstein cows throughout gestation and lactation. Blood serum lipids varied with stage of gestation or lactation; however, the percent lipid distributed in the cholesteryl esters, phospholipids and unesterified cholesterol did not vary. Cholesteryl esters and phospholipids accounted for approximately 90% of the lipid content of whole serum. The lipid composition of the bovine serum lipoproteins was discussed in relation to gestation and lactation. A role of the very low density lipoproteins in the transport of triglyceride for milk fat synthesis was postulated from their high triglyceride content.

BIOSYNTHESIS OF ERGOSTEROL IN YEAST. EVIDENCE FOR MULTIPLE PATHWAYS. M. Fryberg, A.C. Oehlschlager and A.M. Unrau (Dept. of Chem. Simon Fraser Univ., Burnaby 2, British Columbia, Canada). *J. Amer. Chem. Soc.* 95, 5747–57 (1973). The conversion of lanosterol to ergosterol in *Saccharomyes cerevisiae* has been investigated. Time-course analysis of the sterol content and feeding-trapping experiments with suspected intermediates led to the discovery of several alternative pathways in the latter stages of ergosterol biosynthesis. Maintenance of the yeast under anaerobic conditions depleted the sterol content of the organism. The sterols most rapidly consumed under these conditions were those possessing $\Delta^{5,7}$ unsaturation. During anaerobic maintenance squalene accumulated. A subsequent change to aerobic conditions was accompanied by accelerated sterol production. Time-course analysis of the changing sterol composition during aeration indicated that the initial structural modifications following the formation of lanosterol involved nuclear demethylation at C_4 and C_{14} as well as alkylation at C_{24}.

COMPARISON OF SERUM CHOLESTEROL VALUES IN AMERINDIANS FROM SURINAM WITH THOSE OF DUTCH CONTROLS. R.A. Geerdink, P.M. Breel, P.C. Sander and J.M. Schillhorn-Van Veen (Dept. of Med., Univ. Hosp. Utrecht and St. Elisabeth Hosp., Amersfoort, The Netherlands). *Atherosclerosis* 18, 173–8 (1973). A description is given of a comparative study of serum cholesterol values in 250 Indians of the Trio and Wajana tribes in Surinam, and in a Dutch control group. From childhood on, these values are higher in the Dutch controls than in the Indians. No increase of serum cholesterol levels with increasing age is demonstrable in the Indians.

ACID MUCOSUBSTANCES UNDERLYING LIPID DEPOSITS IN AGEING TENDONS AND ATHEROSCLEROTIC ARTERIES. C.W.M. Adams and O.B. Bayliss (Dept. of Pathol., Guy's Hosp. Med. Schl., London, Great Britain). *Atherosclerosis* 18, 191–5 (1973). Esterified cholesterol is deposited focally in ageing tendons and

AIChE elects 1974 officers and directors

Officers and directors recently elected by the American Institute of Chemical Engineers are: President, Irving Liebson; vice president, Kenneth E. Coulter; secretary and executive secretary, F.J. Van Antwerpen; treasurer, A.S. West; and directors, John A. Babcock, David M. Himmelblau, Harold L. Hoffman, and James G. Knudson. ■

atherosclerotic arteries; in both cases it is probably mainly derived from plasma low-density lipoprotein. Underlying these deposits at both sites, is a mixture of acid mucopolysaccharides (glycosaminoglycans), comprising hyaluronic acid and chondroitin sulphates. These mucosubstances are normally masked but can be detected histologically when the lipid has been removed with a suitable solvent. These observations provide direct histological support for the previously-expressed view that acid mucopolysaccharides in the arterial wall entrap and bind plasma low-density lipoprotein.

STUDIES ON CHOLESTEROL METABOLISM IN RATS BY APPLICATION OF D_2O AND MASS SPECTROMETRY. Shi-Kaung Peng, Kang-Jey Ho, B. Mikkelson and C.B. Taylor (Dept. of Pathol., Albany Med. Col. of Union Univ., Albany, N.Y. 12208). *Atherosclerosis* 18, 197–213 (1973). The experiment was designed to study the dynamic aspects of cholesterol metabolism in rats by application of D_2O and mass spectrometry. Thirty-six control rats were fed a cholesterol-free diet and 34 experimental rats were on a 2% cholesterol diet for 3 months and were then given a constant concentration (0 to 20%) of D_2O in their drinking water. Deuterium in atom percent of body water, serum, tissue and fecal cholesterol was determined. Daily fecal output of neutral and acid sterols was also measured. The results showed no change in serum and tissue cholesterol concentration in control and experimental groups in spite of the fact that the latter had a mean daily cholesterol absorption of 182 mg/kg and a dietary contribution of 76% of the body exchangeable cholesterol. The experimental group also exhibited a 2–3 fold shorter turnover time and a 40% suppression of endogenous synthesis which compensated perfectly for the intestinal influx of dietary cholesterol. Cholesterol metabolism was disturbed only when a high level (20%) of D_2O was given to the animal.

THE EFFECT OF HYPERTENSION ON THE ACCUMULATION OF LIPIDS AND THE UPTAKE OF [^{3}H]-CHOLESTEROL BY THE AORTA OF NORMAL-FED AND CHOLESTEROL-FED RABBITS. D.J. Campbell, A.J. Day, S.L. Skinner and R.K. Tume (Dept. of Physiol., Univ. of Melbourne, Parkville, Vic., Australia). *Atherosclerosis* 18, 301–19 (1973). The relationship between blood pressure and arterial wall lipids was studied in normal-fed and cholesterol-fed rabbits with and without renal hypertension. In normal-fed animals hypertension had little effect on intimal phospholipid fatty acid composition, but was associated with a shift towards unsaturation in the fatty acid composition of intimal cholesterol ester and triglyceride similar to that produced by cholesterol feeding alone. In addition, cholesterol feeding alone produced a significant increase in the linoleic (18:2) and decrease in the arachidonic (20:4) acid components of the intimal phospholipids. In cholesterol-fed rabbits hypertension did not have any further effect on cholesterol ester and triglyceride fatty acids, but was associated with a significant increase in the palmitic (16:0) and decrease in the arachidonic (20:4) acid components of the intimal phospholipids.

LIPID ABSORPTION AND SECRETION IN THE CHICK: EFFECT OF RAW SOYBEAN MEAL. D. Sklan, P. Budowski, I. Ascarelli and S. Hurwitz (Faculty of Agr., Hebrew Univ. of Jerusalem, Rehovot, Israel). *J. Nutr.* 103, 1299–1305 (1973). Lipid absorption was measured in 19-day-old chicks after feeding diets containing raw or heated soybean meals for 4 days. ^{91}Y served as an unabsorbed reference substance. There was considerable secretion of total fatty acids, lipid phosphorus, cholesterol and bile acids into the duodenum, accompanied by rapid absorption of all components between the duodenum and upper jejunum. Absorption of residual lipids and bile acids decreased steadily in the lower jejunum and ileum. Raw soybean meal caused greatly enhanced secretion of total fatty acids, lipid phosphorus, cholesterol and bile acids into the duodenum as compared to chicks fed heated soybean meal. There was also a markedly increased absorption of lipids and bile acids between the duodenum and upper jejunum, but a reduced rate of disappearance of the residual amounts of these compounds in the ileum and colon. The overall net absorption of fatty acids was slightly reduced by raw soybean meal, but quantitatively this effect was very small compared to the increased secretion and absorption.

BIOSYNTHESIS OF MILK FAT. R.S. Emery (Dept. of Dairy Sci., Michigan State Univ., East Lansing, Mich. 48823). *J. Dairy Sci.* 56, 1187–95 (1973). Milk fat represents a loss of energy to the cow. This energy is potentially available for production of more milk when secretion of milk fat is suppressed by diet or by fatty acids unsuited to formation of milk glycerides. Full realization of this potential for greater milk production depends upon energy limiting milk production and upon preventing deposition of the extra energy in adipose tissue. Dietary magnesium oxide seems to inhibit fat deposition by decreasing adipose lipoprotein lipase and glyceride synthesis. Lactation inhibits these same reactions more dramatically, and a fuller understanding of lactational inhibition of fattening could manifest ways to facilitate diversion of fatty acids to the mammary gland. Evidence for lipoproteins in blood which preferentially transfer fat to mammary rather than adipose tissue offers one possible control while the effect of prolactin on mammary lipoprotein lipase offers another.

POTENTIAL PRECURSORS OF N-NITROSOPYRROLIDINE IN BACON AND OTHER FRIED FOODS. D.D. Bills, K.I. Hildrum, R.A. Scanlan and L.M. Libbey (Dept. of Food Sci. and Technol., Oregon State Univ., Corvallis, Oregon 97331). *J. Agr. Food Chem.* 21, 876–80 (1973). The possibility of producing N-nitrosopyrrolidine from several compounds in a system designed to simulate the frying of fatty foods containing small amounts of water was investigated. With the exception of tests on N-nitrosoproline, equimolar amounts of the compound to be tested and sodium nitrite were added to the system prior to heating. With a heat-up time of 10 min plus 10 min at 170C, N-nitrosopyrrolidine was produced from N-nitrosoproline, pyrrolidine, spermidine, proline and putrescine in yields of 2.6, 1.0, 1.0, 0.4 and 0.04% theoretical, respectively.

STEROID STRUCTURE AND ANDROGENIC ACTIVITY. SPECIFICITIES INVOLVED IN THE RECEPTOR BINDING AND NUCLEAR RETENTION OF VARIOUS ANDROGENS. S. Liao, T. Liang, S. Fang, E. Castaneda and T.C. Shao (Ben May Lab. for Cancer Res. and the Dept. of Biochem., Univ. of Chicago, Chicago, Ill. 60637). *J. Biol. Chem.* 248, 6154–62 (1973). Most of the highly active synthetic androgens that could bind to β-protein were Δ^4-3-ketosteroids without an angular methyl group at C-10. Since they can bind to β-protein tightly, their androgen action may bypass the action of Δ^4-3-ketosteroid-5α-oxidoreductase that appears to be necessary for the action of testosterone. These findings, together with molecular model building, indicate that the bulkiness and flatness of the steroid molecule play a more important role in receptor binding than the detailed electronic structure at the Δ^4 bond of Ring A.

STIMULATORY AND INHIBITORY EFFECTS OF GUANYL NUCLEOTIDES ON FAT CELL ADENYLATE CYCLASE. J.P. Harwood, H. Low and M. Rodbell (Section on Membrane Regulation, Natl. Inst. of Arthritis, Metabolism and Digestive Diseases, Bethesda, Md. 20014). *J. Biol. Chem.* 248, 6239–45 (1973). Two independent effects of guanyl nucleotides are observed on the activity and response of fat cell adenylate cyclase to hormones (glucagon, adrenocorticotropin and epinephrine). GTP inhibits markedly basal activity, giving maximal effects at 10^{-6} M, in either fat cell ghosts or highly purified plasma membranes prepared from rat adipocytes. It is suggested that the inhibitory effects of GTP on basal activity combined with the stimulatory effect of GTP on hormone action may play an important regulatory role in the fat cell by inhibiting the production of adenosine 3′,5′-monophosphate by adenylate cyclase in the absence of the lipolytic hormones and by enhancing the responsiveness of the system to these hormones.

BLOOD GROUP A ACTIVE GLYCOLIPIDS OF HOG GASTRIC MUCOSA. ISOLATION AND PARTIAL CHARACTERIZATION. A. Slomiany and M.I. Horowitz (N.Y. Med. College, Basic Sci. Bldg., Dept. of Biochem., Valhalla, N.Y. 10595). *J. Biol. Chem.* 248, 6232–8 (1973). Glycolipids with blood group A activity were purified from hog stomach mucosa powder. The active lipids were isolated by chloroform-methanol extraction, partition with aqueous KCl followed by precipitation of the polar lipids with

Taber named assistant research director at Armour-Dial

AOCS member David Taber was named assistant research director of Armour-Dial, Inc., Phoenix, Ariz. Formerly associate research director, he will continue to head all activities in the areas of research service, government liaison, safety and clinical testing.

Taber's appointment, along with a research and development staff realignment and several personnel appointments, was announced by another AOCS member, Eric Jungermann, vice president and director of research. ■

acetone. Then the A active glycolipids were purified by DEAE-cellulose and Florisil column chromatography. Final purification of the A active compounds was achieved by sequential preparative thin-layer chromatography in two solvent systems. Sphingenine and heptadecasphinganine were the major long chain bases found in both fractions. The carbohydrate composition of Fractions L and U was identical and was found to be (in moles per 1 mole of glucose): galactose, 3.04; fucose, 1.09, N-acetylglucosamine, 0.99, N-acetylgalactosamine, 0.93.

NUCLEAR MAGNETIC RESONANCE STUDIES OF THE INTERACTION OF VALINOMYCIN WITH UNSONICATED LECITHIN BILAYERS. M. Hsu, and S.I. Chan (A.A. Noyes Lab. of Chemical Physics, Calif. Inst. of Technol., Pasadena, Cal. 91109). *Biochemistry* 12, 3872–6 (1973). The interaction of valinomycin with *unsonicated* lecithin bilayers has been investigated by delayed Fourier transform proton magnetic resonance and pulsed nuclear magnetic resonance spectroscopy. The results indicate that valinomycin interacts with dipalmitoyllecithin bilayers predominantly in the region of the polar head groups. No evidence was obtained for gross disruption of the hydrophobic region of the phospholipid bilayer in this case.

EFFECT OF IMMUNOGLOBULIN CLASS AND AFFINITY ON THE INITIATION OF COMPLEMENT-DEPENDENT DAMAGE TO LIPOSOMAL MODEL MEMBRANES SENSITIZED WITH DINITROPHENYLATED PHOSPHOLIPIDS. H.R. Six, K. Uemura and S.C. Kinsky (Depts. of Pharmacol. and Microbiol., Washington Univ. Sch. of Med., St. Louis, Mo. 63110). *Biochemistry* 12, 4003–11 (1973). The principal goal of this investigation was to examine some of the factors that determine how much antigen must be incorporated into liposomal model membranes to render them susceptible to immune damage by the classical complement pathway. Control experiments are described using a mouse myeloma IgA protein which has anti-Dnp specificity; this immunoglobulin does not promote glucose release in the presence of guinea pig serum consistent with the fact that IgA antibodies are unable to activate the classical complement pathway. Interaction of this IgA protein with liposomes was, however, demonstrated by loss of marker which occurred upon subsequent addition of rabbit anti-myeloma protein antiserum; this represents the first case of passive liposomal sensitization to antibody-complement by an antigen that is not an amphipathic lipid.

NATURAL ABUNDANCE ^{13}C NUCLEAR MAGNETIC RESONANCE SPECTRA OF THE LIPID IN INTACT BOVINE RETINAL ROD OUTER SEGMENT MEMBRANES. F. Millett, P.A. Hargrave and M.A. Raftery (Dept. of Chem., Univ. of Ark., Fayetteville, Ark.). *Biochemistry* 12, 3591–2 (1973). Natural abundance ^{13}C nmr spectra for intact bovine retinal rod outer segments have been recorded. Resonances due only to the lipid components of the disk membranes were observed and these resonances have been assigned. Presumably resonances due to rhodopsin and other proteins are not observed due to their low intensity and broad line widths. ^{1}H nuclear magnetic resonance spectra of intact disks were extremely broad with little definition; ^{13}C T_1 values for the lipid resonances were measured for both unbleached and bleached rod outer segments. No changes were observed for the T_1 values on bleaching, nor were any chemical-shift changes observed. These findings are discussed in terms of the role played by the lipid phase in functional properties of rod outer segments.

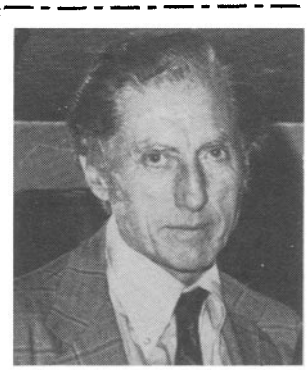
STUDIES ON THE TOPOGRAPHY OF THE FAT CELL PLASMA MEMBRANE. M.P. Czech and W.S. Lynn (Dept. of Biochem., Duke Univ. Med. Center, Durham, N.C. 27710). *Biochemistry* 12, 3597–601 (1973). Purified plasma membranes from isolated fat cells are composed of at least 13 major peptide components including two major glycopeptides, as determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis. Gel electrophoresis of the isolated plasma membranes derived from catalytically iodinated intact fat cells revealed that essentially all the label was associated with the glycopeptide of 94,000 molecular weight and, to a lesser extent, the lighter glycopeptide. These studies indicate that the two major membrane glycopeptides represent most of the protein on the exterior of the isolated fat cell surface. Procedures used to isolate the plasma membrane fraction from these cells apparently severely disrupt the highly organized structure of the intact cell surface which may account, at least in part, for the relative insensitivity of isolated membranes to effects of insulin and other hormones.

LIVER FAT AND EGG PRODUCTION OF LAYING HENS AS INFLUENCED BY CHOLINE AND OTHER NUTRIENTS. R. Schexnailder and M. Griffith (Dept. of Poultry Sci., Louisiana State Univ., Baton Rouge, La. 70803). *Poultry Sci.* 52, 1188–94 (1973). Two trials were conducted to determine the effect of several nutrients on liver fat, egg production and egg weight of White Leghorn hens. One trial used a diet containing adequate protein and supplemented with methionine, while the other used a 15.9% protein basal diet unsupplemented with methionine. A third trial was conducted to study the effect of temperature on liver fat. Choline supplementation or a combination of choline and vitamin B_{12} caused an increase in egg production and egg weight, and a decrease in liver fat. A combination of methionine and vitamin B_{12} caused a decrease in liver fat, but the decrease was not as large as that obtained by feeding choline. Supplementing the diet with inositol, riboflavin, pyridoxine, Ca pantothenate, vitamin E, folic acid, biotin or terramycin had no effect on liver fat. Liver fat was significantly higher in hens kept at a high temperature than for those kept cool. Supplementing the diet with a combination of vitamins reduced liver fat in hens kept under hot conditions, but not when they were kept under cool conditions.

ZINC: A TRACE ELEMENT ESSENTIAL IN VITAMIN A METABOLISM. J.C. Smith, Jr., E.G. McDaniel, F.F. Fan and J.A. Halsted (Vet. Admin. Hosp., Washington, D.C. 20422). *Science* 181, 954–5 (1973). Zinc is necessary to maintain normal concencentrations of vitamin A in plasma. By using animals deficient in both zinc and vitamin A, it was demonstrated that zinc is necessary for normal mobilization of vitamin A from the liver. These results suggest that cases of depressed vitamin A in plasma, unresponsive to vitamin A therapy, may respond to zinc supplementation.

GAS CHROMATOGRAPHIC ASSAY OF EPOXIDE HYDRASE ACTIVITY WITH 3-METHYLCHOLANTHRENE-11,12-OXIDE. T.A. Stoming and E. Bresnick (Dept. of Cell and Molec. Biol., Med. College of Georgia, Augusta, Ga. 30902). *Science* 181, 951–2 (1973). Epoxide hydrase has been measured in rat tissue with 3-methylcholanthrene-11,12-oxide as substrate; diol formation was assayed by gas chromatographic separation of the trimethyl-silylated derivative of trans-11,12-dihydro-11,12-dihydroxy-3-methyl-cholanthrene from the corresponding derivative of the 11 (or 12)-hydroxy-3-methylcholanthrene on 3% OV-17, which is formed from the 11,12-oxide during the derivatization. The polycyclic hydrocarbons were extracted initially from the incubation mixture with ethyl acetate. The assay is simple, inexpensive and sensitive.

LOW AND HIGH ERUCIC ACID RAPESEED OILS IN RATIONS FOR LAYING HENS. H. Vogtmann, D.R. Clandinin and A.R. Robblee (Dept. of Animal Sci., Div. of Poultry Sci., Univ. of Alberta, Edmonton, Alberta, Canada). *Poultry Sci.* 52, 955–62 (1973). The effects of including 10% of different types of rapeseed oil in rations for White Leghorn pullets nearing peak of production on energy intake, egg production, egg weight, lipid content of egg yolk and distribution of fatty acids in egg yolk lipids were studied. Daily energy intake increased in all groups from pretreatment to treatment periods. It was highest in the groups fed the control ration and the ration containing 10% soybean oil. In these two groups egg production and egg weight were increased during the treatment period. Feeding regular rapeseed oil led to a marked decrease in egg weight. In this group a tendency for decreasing yolk weight occurred whereas for the soybean oil fed group the reverse was true. Although the total lipid content of egg yolk



AOCS member Meyer Yablonsky was one of five long-time employees of Nopco Chemical Division, Diamond Shamrock Chemical Co., Morristown, N.J., honored at an annual service awards party. Yablonsky worked at Nopco for 46 years.

remained constant, the fatty acid pattern changed significantly while feeding the oil-containing diets. Oleic levels of egg yolk fat were higher in eggs produced by hens fed the rapeseed oil containing diets than in eggs from hens fed the control or soybean oil containing diet. When diets containing rapeseed oils were fed, the amount of gadoleic acid in egg yolk lipids was increased whereas the contents of palmitic and stearic acid were decreased markedly. No substantial amounts of erucic acid were found in the eggs.

RELATIONSHIP BETWEEN PLASMA CHOLESTEROL LEVELS AND FECAL STEROID EXCRETION OF COCKERELS FED LOW-CHOLESTEROL-CONTAINING DIETS. I. Bartov and R. Reiser (Dept. of Biochem. and Biophys., Texas A&M Univ., College Station, Tx. 77843). *Poultry Sci.* 52, 992–7 (1973). Cockerels having relatively high plasma cholesterol levels when fed a commercial diet low in cholesterol, excreted significantly higher amounts of bile acids in their feces than those with low plasma cholesterol levels on the same diet. Neutral steroids balance in these birds was not consistent. Plasma cholesterol levels of all the chickens and the amount of bile acids excreted by those with the high plasma cholesterol levels both decreased slightly when 2.5% stripped lard was added to the diet. No relationship was observed between plasma cholesterol levels of individual chickens before and after feeding 0.25% cholesterol. The differences in plasma cholesterol levels observed among individuals fed cholesterol did not seem to be due to differences in neutral steroids retention or fecal bile acid excretion. Excretion of bile acids was increased five-fold when cholesterol was fed, while the amount of fecal neutral steroids increased only two-fold. The chickens seemed to partially control the high positive balance of neutral steroids observed when they had been fed cholesterol, by considerably increasing the amount of bile acids excreted. Hyodeoxycholic acid was the main fecal bile acid. During high cholesterol ingestion a considerable amount of fecal lithocholic acid was also observed.

METABOLISM OF FREE AND ESTERIFIED CHOLESTEROL BY LEYDIG-CELL TUMOUR MITOCHONDRIA. W.R. Moyle, R.L. Jungas and R.O. Greep (Lab. of Human Reproduction and Reproductive Biol. and the Dept. of Biol. Chem., Harvard Med. Schl., Boston, Mass. 02115). *Biochem. J.* 134, 415–24 (1973). Experiments were designed to localize intracellularly the enzymes and sterol substrates required for steroidogenesis in leydig-cell tumours. Subcellular fractions were prepared by differential centrifugation of tumour homogenates. Both free and esterified cholesterol were associatel primarily with the fractions sedimenting at 1400g and the lipid layer floating on the surface of the isolation tubes; they were not found in the mitochondria, where the conversion of cholesterol into pregnenolone occurred. Hydrolysis of esterified cholesterol was required before it could be oxidized to pregnenolone. The findings suggest that cholesterol was not rapidly accumulated by the mitochondrial fraction in vitro and that mechanisms may be required to facilitate cholesterol transport into mitochondria in intact tumour cells during the periods in which steroidogenesis is stimulated maximally.

EFFECTS OF ETHANOL AND FAT ON THE TRANSPORT OF REDUCING EQUIVALENTS INTO RAT LIVER MITOCHONDRIA. A.I. Cederbaum, C.S. Lieber, A. Toth, D.S. Beattie, and E. Rubin (Depts. of Biochem., Med., and Pathol., Mt. Sinai Schl. of Med. of the City Univ. of N.Y., N.Y. 10029). *J. Biol. Chem.* 248, 4977–86 (1973). Chronic ethanol intoxication in rats accelerated the rate of ethanol metabolism, but decreased the activity of alcohol dehydrogenase. Chronic consumption of ethanol decreased the activities of cytochrome oxidase and succinic dehydrogenase in mitochondria and in cell-free homogenates, whereas total hepatic mitochondrial protein was not altered by ethanol feeding. Reconstituted malate-aspartate, fatty acid, and α-glycerophosphate shuttles were equally effective in transporting reducing equivalents into the mitochondria from ethanol-fed and control rats. The activities of enzymes involved in the shuttles, such as cytoplasmic and mitochondrial α-glycerophosphate dehydrogenase and glutamic oxalacetic transaminase, were either decreased or unchanged by chronic ethanol consumption.

BIOGENESIS OF MITOCHONDRIA. THE EFFECTS OF ALTERED MEMBRANE LIPID COMPOSITION ON CATION TRANSPORT BY MITOCHONDRIA OF SACCHAROMYCES CEREVISIAE. J.M. Haslam, T.W. Spithill, A.W. Linnane and J.B. Chappell (Dept. of Biochem., Monash Univ., Clayton, Vic. 3168, Australia). *Biochem. J.* 134, 949–57 (1973). The fatty acid composition of the membrane lipids of a fatty acid desaturase mutant of *Saccharomyces cerevisiae* was manipulated by growing the organism in a medium containing defined fatty acid supplements. Mitochondria were obtained whose fatty acids contain between 20% and 80% unsaturated fatty acids. Mitochondria with high proportions of unsaturated fatty acids in their lipids have coupled oxidative phosphorylation with normal P/O ratios, accumulate K^+ ions in the presence of valinomycin and an energy source, and eject protons in an energy-dependent fashion. The loss of energy-linked reactions is accompanied by an increased passive permeability of the mitochondria to protons. Free fatty acids uncouple oxidative phosphorylation in yeast mitochondria and the effect is reversed by bovine serum albumin. It is suggested that the loss of energy-linked reactions in yeast mitochondria that are depleted in unsaturated fatty acids is a consequence of the increased passive permeability to protons, and is caused by a change in the physical properties of the lipid phase of the inner mitochondrial membrane.

EFFECTS OF DICHLOROACETATE ON THE METABOLISM OF GLUCOSE, PYRUVATE, ACETATE, 3-HYDROXYBUTYRATE AND PALMITATE IN RAT DIAPHRAGM AND HEART MUSCLE IN VITRO AND ON EXTRACTION OF GLUCOSE, LACTATE, PYRUVATE AND FREE FATTY ACIDS BY DOG HEART IN VIVO. A. McAllister, S.P. Allison and P.J. Randle (Dept. of Biochem., Univ. of Bristol, Medical Schl., Univ. Walk, Bristol BS8 1TD, U.K.). *Biochem. J.* 134, 1067–81 (1973). The extractions of glucose, lactate, pyruvate and free fatty acids by dog heart in vivo were calculated from measurements of their arterial and coronary sinus blood concentration. Elevation of plasma free fatty acid concentrations by infusion of intralipid and heparin resulted in increased extraction of free fatty acids and diminished extractions of glucose, lactate and pyruvate by the heart. It is suggested that metabolism of free fatty acids by the heart in vivo were reversed by injection of dichloroacetate, which also improved extraction of lactate and pyruvate by the heart in vivo in alloxan diabetes. Possible mechanisms for the changes in cell citrate concentration and for inhibitory effects of dichloroacetate on the oxidation of acetate, 3-hydroxybutyrate and palmitate are discussed.

ON THE ORGANIZATION AND MECHANISM OF PROSTAGLANDIN SYNTHETASE. P. Wlodawer and B. Samuelsson (Dept. of Chem., Karolinska Inst., S-104 01 Stockholm 60, Sweden). *J. Biol. Chem.* 248, 5673–8 (1973). The organization and mechanism of prostaglandin synthetase in the vesicular gland of sheep was studied by determining the isotope effects in the transformation of [5,6,8,9,11,12,14,15]-octadeutero-arachidonic acid into prostaglandin E_2 (PGE_2), 11-dehydroprostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$), $PGF_{2\alpha}$, and 12-hydroxy-5,8,10-heptadecatrienoic acid. The first two products were formed from deuterated arachidonic acid by cleavage of carbon-deuterium bonds at C-9 and C-11, respectively, whereas the last two products were formed without carbon-deuterium cleavage. Elimination of the hydrogen (deuterium) at C-9 in the intermediate endoperoxide is the rate-limiting step in the formation of PGE_2 from the endoperoxide. The high relative D:H ratio of $PGF_{2\alpha}$ excludes the existence of a separate synthetase for $PGF_{2\alpha}$ and indicates that a common synthetase provides the endoperoxide precursor for both PGE_2 and $PGF_{2\alpha}$.

REGULATION OF FATTY ACID UTILIZATION IN ISOLATED PERFUSED RAT HEARTS. J.F. Oram, S.L. Bennetch and J.R. Neely (Dept. of Physiol., Milton S. Hershey Med. Center, Penn. State Univ., Hershey, Pa. 17033). *J. Biol. Chem.* 248, 5299–5309 (1973). Regulation of fatty acid utilization was studied in the isolated, perfused rat heart. The effects of increasing the concentration of perfusate fatty acid and the level of ventricular pressure development on the rates of fatty acid uptake and oxidation and on the tissue levels of CoA and carnitine derivatives were

Polish symposium proceedings available

Four Corners correspondent H. Niewiadomski reports that the proceedings of a 1971 symposium on deterioration of lipids held in Gdansk, Poland, are available. In addition, JAOCS Abstracts Editor, R.A. Reiners, is in the process of abstracting some of the papers for the *Journal's* abstracts section.

For more information on this international symposium, the first scientific meeting of this type believed to have taken place in Europe, contact: Prof. dr. inz. H. Niewiadomski, Technical University, Gdansk, Poland. ■

determined. The tissue content of long chain acyl-carnitine increased with acceleration of oxidative metabolism even though the levels of both acyl-CoA and acetyl-CoA decreased. The mass-action ratio for the carnitine palmityl-transferase system shifted toward acylcarnitine formation. In contrast to palmitate, oxidation of octanoate was fast enough to maintain high levels of acetyl-CoA when fatty acid oxidation was accelerated by increased cardiac work. These results suggested that the rate of translocation of acyl units across the inner mitochondrial membrane limited the rate of long chain fatty acylcarnitine oxidation at high levels of ventricular pressure development.

STUDIES ON THE URIDINE DIPHOSPHATE-GALACTOSE:LIPOPOLYSACCHARIDE GALACTOSYLTRANSFERASE REACTION USING A FATTY ACID MUTANT OF ESCHERICHIA COLI. I.R. Beacham and D.F. Silbert (Washington Univ. Schl. of Med., Dept. of Biol. Chem., St. Louis, Mo. 63110). *J. Biol. Chem.* 248, 5310–18 (1973). The UDP-galactose:lipopolysaccharide galactosyltransferase reaction has been studied using an unsaturated fatty acid auxotroph of *Escherichia coli*. The unsaturated fatty acid residues of the *E. coli* membrane phospholipid have been varied with respect to chain length, position, number and configuration (cis versus trans) of the ethylenic bond. Although the galactose content of the lipopolysaccharide from cells with membrane phospholipid altered in this way is not appreciably reduced, the reaction itself is found to be sensitive to changes in the fatty acid structure of the phospholipid. In general, the activity was greater under conditions known to restrict the packing of the fatty acid residues of phospholipid; for example, shorter chain length, an ethylenic bond near the carboxyl terminus, and cis- rather than trans-unsaturated fatty acids.

EFFECT OF GROWTH HORMONE ON PLASMA TRIGLYCERIDES IN MAN. F. Azizi, W.P. Castelli, M.S. Raben and M.L. Mitchell (L. Shattuck Hosp., Framingham Heart Study, New England Med. Center Hosp. and the Dept. of Med., Tufts Univ. Schl. of Med., Boston, Mass. 02111). *Proc. Soc. Exp. Biol. Med.* 143, 1187–90 (1973). Twelve hours after the intramuscular administration of a single 10 mg dose of human growth hormone (HGH), fasting blood samples were obtained and analyzed for levels of triglycerides and cholesterol. Growth hormone was found to raise fasting plasma triglycerides significantly in a group of 6 middle-aged and elderly diabetic subjects but not in 10 nondiabetic middle-aged and elderly controls. Smaller and less consistent increases were also observed in a group of 6 normal young men and in 6 young women who were taking contraceptive pills at the time. In no groups was there any significant change in plasma cholesterol level 12 hr following growth hormone administration.

RESPONSE OF PLASMA LIPIDS AND PLATELET AGGREGATION TO INTRAVENOUS ARGININE. R. Caren and L. Corbo (Cedars-Sinai Med. Res. Inst. and the Div. of Med., Cedars-Sinai Med. Center, Los Angeles, Cal. 90048). *Proc. Soc. Exp. Biol. Med.* 143, 1067–71 (1973). Intravenous administration of 400 ml 5% arginine in distilled water to 7 men and 10 women caused depression of plasma lipids and inhibition of epinephrine-induced platelet aggregation in men only. There was no depression of plasma lipids (except FFA) nor inhibition of platelet aggregation in women. Saline (0.45%) had no effect on plasma lipids or platelet aggregation. The similarity of response of plasma lipids and platelet aggregation in men following arginine with that after glucagon administration indicates the findings in men were probably due to stimulation of pancreatic glucagon secretion by arginine. No explanation can be given for the lack of response in women.

ANTICOMPLEMENTARY ACTIVITY OF LIPID A ISOLATED FROM LIPOPOLYSACCHARIDES. D.C. Morrison and P. Verroust (Dept. of Experimental Pathol., Scripps Clinic and Res. Found., La Jolla, Cal. 92037). *Proc. Soc. Exp. Biol. Med.* 143, 1025–30 (1973). We have examined in detail the relationship between the solubility of the isolated lipid A portion of bacterial lipopolysaccharides and biological activity. Lipid A, isolated by mild acid hydrolysis of the LPS of *E. coli* 0111:B4, was shown to be an inactivator of complement. We conclude that the biological activity of lipid A is highly dependent upon its solubility.

THE EFFECT OF VITAMIN A DEFICIENCY AND NEWCASTLE DISEASE ON LYMPHOID CELL SYSTEMS IN CHICKENS. B.G. Bang, M.A. Foard and F.B. Bang (Johns Hopkins Univ. Schl. of Hygiene and Public Health, Dept. of Pathobiol., Baltimore, Md. 21205). *Proc. Soc. Exp. Biol. Med.* 143, 1140–6 (1973). A diet without vitamin A but otherwise nutritionally complete was given to chicks from time of hatching. Control diets with adequate vitamin A were given to two other groups. At age 21 days, Newcastle disease virus (NDV) was nasally inoculated into all 3 groups; controls of each group remained uninoculated. Between Days 1 and 3 after NDV inoculation the A-depleted chicks showed significant loss of lymphocytes from the cortex of both the thymus and the bursa of Fabricius, while those on control diets did not show any loss.

DIET-INDUCED ATHEROSCLEROSIS IN THE MARMOSET. S. Dreizen, B.M. Levy and S. Bernick (Univ. of Texas Dental Sci. Inst., Houston, Tx. 77025). *Proc. Soc. Exp. Biol. Med.* 143, 1218–23 (1973). Atherosclerosis has been produced in captive cotton top marmosets fed a purified diet containing 5% cholesterol and 23% lard. The animals exhibited both site-specific and time-related differences in vascular susceptibility to the disease. Atherosclerotic lesions in the lingual arteries and distal extensions of the coronary arteries antedated those in the aorta and other vulnerable vessels. The tongue arteries were particularly prone to atherosclerosis under the experimental conditions as demonstrated by the extent and severity of atheroma formation throughout the course of these vessels.

INFLUENCE OF THEOBROMINE MAGNESIUM OLEATE ON FORMATION OF EXPERIMENTAL ATHEROMA. R.L. Woosley and D.H. Will (Dept. of Medicine, Vanderbilt Univ. Sch. of Med., Nashville, Tenn. 37205). *Proc. Soc. Exp. Biol. Med.* 143, 1098–1105 (1973). Forty-five rabbits were fed an atherogenic diet for three months. One group (23 rabbits) received theobromine magnesium oleate (TMO) orally in two equal doses daily (60 mg/kg/day). The control group received a placebo. Plasma cholesterol levels were determined at 0, 1, 2 and 3 months after the rabbits were placed on the atherogenic diet. The atherogenic diet increased the plasma total cholesterol in both groups of animals and for the first month the mean values were similar in both groups but by the end of the second month the group receiving TMO showed a lower level of plasma cholesterol. These results have been interpreted as evidence that TMO is capable of impeding atherogensis.

HUNGER DRIVE DURING STARVATION IN RATS ENRICHED WITH ODD-CARBON FATTY ACIDS. D. Quartermain, M.E. Judge, and T.B. Van Itallie (Dept. of Neurology and Milbank Res. Labs., New York Univ. Schl. of Med., New York, N.Y. 10016). *Proc. Soc. Exp. Biol. Med.* 143, 929–31 (1973). Rats with depot fat enriched with undecanoate maintain significantly higher concentrations of liver glycogen and plasma glucose during prolonged starvation than do conventionally fed controls. When food motivated behavior was tested by means of a progressive ratio schedule of reinforcement, the undecanoate-enriched rats exhibited a significantly lower drive for food after 48 hr of starvation than did their nonenriched controls.

ANALYSIS OF TRIGLYCERIDE MIXTURES BY GAS CHROMATOGRAPHY-MASS SPECTROMETRY. T. Murata and S. Takahashi (Analytical Appl. Lab., Kyoto Lab., Shimadzu Seisakusho Ltd., Nakagyo-ku, Kyoto, Japan). *Anal. Chem.* 45, 1816–23 (1973). A combined system of a gas chromatograph and a mass spectrometer permits rapid analysis of triglyceride samples. A sample is first separated on the carbon number basis by a gas chromatograph and the constituent fatty acids are identified by a mass spectrometer. Thus the fatty acid composition and the molecular weight distribution were determined. The fatty acid composition of 14 groups of 78 types of triglycerides, ranging from 28 to 54 in carbon number were determined and the results compared with those of preparative gas chromatography.

Lanolin manufacturers form trade association

A group of American companies engaged in the manufacture of lanolin and lanolin derivatives have formed the U.S. Lanolin and Derivative Manufacturers Association, a nonprofit trade association. Purposes of the association are possible representation of industry position in tariff and regulatory matters, the gathering and dissemination of industry statistics, and the promotion of increased use of the industry's products in cosmetics, pharmaceuticals, and industrial applications. Membership is open to any organization or individual whose major activity in the lanolin industry is the manufacture of lanolin and lanolin derivatives. ■

TRIGLYCERIDE LOWERING COMPOSITIONS. P.L. Creger (Parke, Davis & Co.). *U.S. 3,773,946.* Pharmaceutical compositions comprise a carrier and an $\alpha,\alpha,\alpha',\alpha'$-tetramethylalkanedioic acid having a total of 10–14 carbon atoms, or a salt or alkyl ester of such an alkanedioic acid. Methods for lowering serum triglyceride levels by administering the compounds are also described.

• Edible Proteins

AMINO ACIDS COMPOSITION OF PROTEINS FROM SOME OILSEEDS. J. Janicki et al. *Roczniki Technol. Chem. Zywn.* 22, 251–60 (1973). Three chromatographic techniques (column, paper, and thin-layer) were applied to determine amino acids composition of proteins of rapeseed, sunflower seed, soybean. The proteins of examined seeds have a high content of arginine, aspartic acid and lysine. Only sunflower seed has a low content on lysine. (Rev. Franc. Corps Gras)

USE OF SUNFLOWER PROTEINS IN BAKERY PRODUCTS. V.N. Sirko. *Pishchevaya Tehnol.* 1973(2), 129–30. The water soluble fraction of sunflower proteins cannot be separated from the meal because this fraction is denaturated during pressing and extraction. The fraction dissolved in sodium chloride can be separated by triple extraction with 5% NaCl solution. Crystallized proteins are obtained. This fraction was mixed with wheat flour. Using 5–10% of sunflower protein in bread, organoleptic changes were not observed; at the same time, the nutritional value of the bread was increased. (Rev. Franc. Corps Gras)

CONTRIBUTIONS TO A METHOD FOR ISOELECTRIC POINT DETERMINATION IN SOYBEAN PROTEIN EXTRACTS. C. Sandulescu. *Lucrari de Cercetare* 10, 289–93 (1972). A method is described for isoelectric point determination in soybean protein extracts by minimum solubility estimation of the proteins at different pH values on the basis of absorbance measurement at 280 nm of unprecipitated proteins.

PREPARATION OF ALCOHOLIC BEVERAGES FROM OIL SEED WHEY. A. Pour-el, and G.V. Reddy (Archer Daniels Midland Co.). *U.S. 3,769,437.* Alcoholic beverages are produced by fermenting with an alcohol producing yeast under anaerobic conditions a mixture containing oil seed whey obtained as a waste material from the isolation of oilseed protein, and a carbohydrate.

METHOD OF MAKING A SIMULATED MEAT PRODUCT. A.E. Carp and D.D. Mohar (General Mills, Inc.). *U.S. 3,772,035.* Bundles of spun protein fibers are impregnated with an edible serum containing a heat coagulable binder. The outside of the bundles is heat set while the interior is not. Many of these bundles are put together, compressed and completely heat set.

• Drying Oils and Paints

INDUSTRIAL FATS IN PAINTS AND VARNISHES IN 1971–1972—PROSPECTS IN THE FUTURE. G. Bosshard and J.P. Helme (ITERG, Paris). *Rev. Franc. Corps Gras* 20, 405–11 (1973). In 1971, French production of paints was 730,376 tons. The French paint industry is the second in Europe behind West Germany but ahead of Great Britain. The phenomena of drying and formation of polymers are reviewed. The quality of different industrial fats and oils used in paint industry is discussed; the uses of fats in this field is restrained by powerful tides. Nevertheless, derivatives of unsaturated fats should be able to maintain their position, provided that they remain competitive.

POLYMER-SOLVENT INTERACTIONS FROM GAS-LIQUID CHROMATOGRAPHY. R.D. Newman and J.M. Prausnitz (U. of Calif., Dept. of Chem., Berkeley, Calif. 94720). *J. Paint Technol.* 45(585), 33–45 (1973). To increase fundamental understanding of the drying of polymer coating films, it is necessary to know the volatility (vapor pressure) of the solvent over the coating film at small solvent concentrations. A rapid and convenient method is presented for obtaining data on the volatility of solvents in coating films when the solvent concentration is very low. Infinite-dilution gas chromatography is used for fast characterization of a large number of polymer-solvent systems. Experimental data are presented for 91 binary polymer-solvent systems in the temperature range 50 to 200 C. The binary systems investigated include seven polymers commonly used in coatings applications and 21 solvents, both polar and non-polar. A simple relation exists between the experimentally-determined retention volume and the infinite-dilution volatility. That volatility can be used to calculate the equilibrium solvent content of a polymer film during the drying process.

THERMAL INVESTIGATIONS OF VARNISHES AND PAINTS WITH THE DERIVATOGRAPH (3). ON THE IDENTIFICATION OF PAINT MEDIA IN PAINTING MATERIALS. E. Talas-Rohoncy and F. Horkay (Budalakk Farben-u. Kunstharzfabriken, Budapest). *Farbe u. Lack* 79(10), 944–47 (1973). Identification of paint media by means of the thermoanalytical method was investigated. Judging by the results the thermoanalytical method alone, without additional investigations, will suffice for numerous systems and supply adequate information on the media types.

POLYISOCYANATES MODIFIED WITH FATTY ACIDS. D. Dhein and L. Fleiter (Bayer AG, Krefeld-Uerdingen). *Farbe u. Lack* 79(10), 957–9 (1973). Polyisocyanates modified with fatty acids were developed which are readily soluble in or compatible with varnish solvents of moderate strength and which therefore may be used as "system-suitable" curing additives in air-curing alkyd resin varnishes.

CURABLE EPOXIDIZED FATTY COMPOUND/POLYESTER COATING COMPOSITIONS. D.D. Taft (Ashland Oil, Inc.). *U.S. 3,770,675.* The compositions which may, preferably, exist as a two package system prior to use, are improved as to pot life and gloss, adhesion, and toughness in the cured film by combining the polyester curing agent with a modified epoxy component such as a vinyl modified component.

• Detergents

RECENT PHYSICOCHEMICAL DATA ON ALKALI SOAPS. R. Perron and C. Madelmont (C.N.R.S., 2 rue Henry-Duvant, 94320 Thiais). *Rev. Franc. Corps Gras* 20, 261–8 (1973). The new knowledge and certain less recent results not pointed out in preceding reviews are analyzed according to the physical methods used to obtain them. X-ray diffraction, DTA, DSC and dilatometry, then NMR and IR spectrometry, are successively considered. From this analysis the need to study the "liquid state" of chains in mesomorphous phases stands out. Probably by improvements in NMR techniques a better description may be obtained of this very particular liquid state. The authors will soon publish the results of their research in this field.

LAUNDRY DETERGENTS BASED ON TALLOW SOAP. G. Maerker, W.M. Linfield (Eastern Reg. Res. Lab., ARS, USDA, Philadelphia, Pa.). *Rev. Franc. Corps Gras* 20, 255–60 (1973). Home laundry detergents whose principal ingredient is tallow soap and which are effective over a wide range of water hardness and temperatures are described. The detergents are formulations of soap, tallow derived lime soap dispersing agents, and mildly alkaline sodium silicates. The products are rapidly biodegradable, non-toxic and contain no phosphate. In effectiveness and cost, they resemble commercial products containing phosphate builder. In the paper, the data about the inedible tallow and fat produced and used in USA, from 1950 to 1970, are given.

METHODS OF TESTING THE PERFORMANCE OF WASHING MACHINES. H. Brüschweiler (Materials Testing Inst. (EMPA), St. Gallen, Switzerland). *Tenside Detergents* 10(5), 229–38 (1973). Existing standards, descriptions and terms of performance testing of washing machines are reviewed. General conditions under which comparative testing of washing machines are carried out are described. This includes the installation of the machine, power supply, water, detergent, load and reference washing processes. Methods to test cleansing efficiency, mechanical wear and rinsing effects are given. Cleansing

(Continued on page 268A)

Horan named president-elect of AACC

Francis E. Horan, an AOCS member since 1968, was named president-elect of the American Assn. of Cereal Chemists at its 58th annual meeting in St. Louis, Mo. Horan, director of research, Archer-Daniels-Midland Co., Decatur, Ill., will succeed John H. Nelson of Peavey Co., Chaksa, Minn.

The meeting was attended by more than 800 members and about 140 guests. The technical program featured close to 200 technical papers, symposia, and round table discussions. ■

Abbreviations. Without period or degree sign, e.g., ml, g, sec, 100 C or 373 K (for others see CBE Style Manual, Third Edition, Am. Institute of Biological Sciences, Washington, D.C., 1972).

Other Items of Form. Metric system wherever feasible; decimals in preference to fractions; per cent symbol (%) only after numbers; characters subject to misinterpretation, e.g., Greek letters, spelled in margin, formal name and E.C. number for enzymes at first mention–trivial name subsequently, if more convenient; commercial products expressed by common name or scientific name (if one exists) followed by trade names in parentheses only if essential; promotional statements concerning commercial products are not accepted.

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FOR THE AUTHOR'S THOUGHT

The experienced reader appreciates the additional effort an author puts forth to present his work concisely and clearly because it permits the reader to gain the greatest return for the time he invests in reading. The author's success in this effort is a primary determinant of the time interval in which editors and reviewers complete their tasks, the alacrity with which acceptable manuscripts are published and the effectiveness of the service provided for progress in lipid science. ■

• Abstracts. . .

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efficiency is evaluated with artificially soiled fabrics containing different types of soilings. Mechanical and chemical wear are measured with an unsoiled standard fabric and the rinsing effects by analyzing substances remaining on the washed textiles. Methods to test washing programs for woolens, synthetic fibers and wash and wear articles are described as well as some special tests including one for water extracting efficiency. Results of washing, bleaching, whiteness retention, wear and rinsing tests under different washing conditions are given. Methods described may be used to test detergents and textiles.

MODEL EXPERIMENTS ON THE BEHAVIOR OF NONIONIC RAW MATERIALS IN SPRAY DRYING. G. Hohfeld (Farb. Hoechst AG, vorm. Meister Lucius & Brüning, Frankfurt/M). *Seifen-Öle-Fette-Wachse* **99**(21), 601–2 (1973). The effects of antioxidants on determination of constants and of polyglycol content is discussed.

ORGANIC BUILDER SALTS AS REPLACEMENTS FOR SODIUM TRIPOLYPHOSPHATE (II). E.A. Matzner, M.M. Crutchfield, R.P. Langguth and R.D. Swisher (Monsanto Ind. Chems. Co., St. Louis, Mo. 63166). *Tenside Detergents* **10**(5), 239–245 (1973). Technical factors involved in developing satisfactory replacements for sodium tripolyphosphate in detergents are reviewed. The difficulty of this task has probably been underestimated by those urging removal and those seeking substitutes. The obvious requirements for any substitute are that it be safe, functionally effective, environmentally acceptable and economically practical. The technical implications of these deceptively simple requirements with respect to acceptable molecular structures are discussed in greater detail. The classes of compounds which have been considered by many investigators in the continuing search are reviewed. Monsanto has now evaluated many hundred different chemical structures. The approach to the selection of potential candidates is described including screening tests and pass-fail standards. The importance of certain key tests such as sequestration, detergency performance, biodegradability, toxicity and physical characteristics is highlighted.

GERMICIDAL ACTION OF MEDICATED BAR SOAPS. G. Singh (Inst. of Medical Sciences, Banaras Hindu Univ., Varanasi-5, India). *Soap/Cosmetics/Chemical Specialties* **49**(10), 34–6, 74 (1973). A study was carried out to determine the value of medicated soaps in preventing skin infections. An experimental model of producing skin infections with *Staph. aureus* in humans was employed. Washing with medicated soaps prevented the development of lesions when the skin was challenged with the organism. Bar soaps containing hexachlorophene were as effective as those containing halogenated salicylanilides. The effect of a germicidal soap gradually diminishes and does not last beyond 48 hours if not replenished by subsequent use of the soap.

BIODEGRADABLE HARD WATER DETERGENTS. El-A. I. Heiba and A.L. Williams (Mobile Oil Corp.). *U.S. 3,770,643.* The detergents are the water soluble ionic salts or nonionic esters or amides of alkanoic acids which are substituted by at least one group containing an electronegative atom. The substitutent is attached to a carbon atom 2 to 5 positions from the carboxyl group. Gamma substituted alkanoic acid derivatives are preferred. The detergents are biodegradable and have improved resistance to precipitation in hard water.

SODIUM TRIPOLYPHOSPHATE. W. Huttinger, H. von Almasy and J. Buchwald (Chemische Werke Albert). *U.S. 3,770,644.* A process for increasing the hardness of sodium tripolyphosphate hollow spheres comprises spray drying a solution of mono- and disodium phosphate which has been adjusted to a ratio of Na:P of approximately 5:3 to yield a product containing more than 10% condensed phosphate. The product is calcined and then treated at a temperature of less than 80C with sufficient moisture to yield a product having an ash loss of 0 2-7%. A detergent composition containing this sodium tripolyphosphate hollow spheres as an essential ingredient is also claimed.

NONIONIC SURFACTANTS HAVING ENHANCED DETERGENCY. M. Cenker and E.A. Weipert (BASF Wyandotte Corp.). *U.S. 3,770,701.* Liquid, biodegradable, water miscible, nonionic surfactants are prepared from straight chain aliphatic alcohols having 8–22 carbon atoms in the aliphatic chain and a mixture of ethylene oxide and propylene oxide.

MANUFACTURE OF SCOURING CLEANSER. R.A. Insignares (Colgate-Palmolive). *U.S. 3,772,204.* Scouring cleansers are made by neutralizing a detergent acid with an excess of calcium carbonate, whereby a calcium-detergent salt is produced together with calcium carbonate scouring material. Such cleansers have improved foaming power, and bleaches present in them are more stable on storage than in similar products containing a corresponding sodium-detergent salt.

IMPROVED PROCESS FOR WASHING POLYESTER MATERIALS. R.P. Berni and R.A. Grifo (GAF Corp.). *U.S. 3,771,951.* A soil anti-deposition agent for use in laundry applications is disclosed. The agent comprises a synergistic mixture of polyvinylpyrrolidone and polyvinyl alcohol.

PRODUCTION OF GRANULAR MIXTURES. A.G.M. Hussain (Colgate-Palmolive Co.). *U.S. 3,773,671.* A process for making a granular enzyme product comprises mixing an aqueous slurry of powdered enzyme preparation with hydrated pentasodium tripolyphosphate while agitating.

SOAP INSERT. E.A. Bredice. *U.S. 3,773,672.* A plate-like insert adapted to keep the soap from breaking as it is used is positioned within the center of a bar of soap. The insert is preferably resilient and designated to stick to the soap.

BLEACHING COMPOSITION. P.A. Jenkins and A. Ritchie (Procter & Gamble). *U.S. 3,773,673.* The compositions comprise mixtures of persulfate bleaching compounds and organic peroxy-compounds in proportions such that the weight ratio of avail-

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able oxygen from the persulfate to that from the organic peroxy compounds is up to 3:1. The compositions are particularly useful for washing and bleaching at lower temperatures.

DETERGENT COMPOSITION CONTAINING ENZYMES. W.E. Adam and C. Barrat (Procter & Gamble). *U.S. 3,773,674.* The granular detergent composition contains (a) an organic detergent, (b) an alkaline builder, (c) glucose polymers with an α-1,4 main linkage, (d) a compound of the general formula R_1–$(CHOH)_n$–Y, wherein Y represents a salt or an ester radical derived from a carboxylic radical, n is 3 or 4, and R_1 is CH_2OH or CHO, and (e) an α-amylase. The glucose polymers and the compound of the general formula R_2–$(CHOH)_n$–Y protects the α-amylase against denaturation and degradation.

LIPOPHILIC DETERGENT COMPOSITIONS. E.C. Ford, Jr. and J.D. Zech (Atlas Chemical Inds., Inc.). *U.S. 3,773,804.* The detergent compositions comprise salts of partial fatty acid-phosphoric acid esters of polyalkoxylated polyols having 4–6 carbon atoms. Amine salts of compositions having 1–8 polyoxyalkylene groups, 1–4 fatty acid ester groups, and 1–2 phosphoric acid groups per mol of polyol are particularly useful as ashless fuel oil sludge dispersants.

SURFACTANTS FOR SOLVENT/WATER SYSTEMS AND TEXTILE TREATING COMPOSITIONS. K.W. Graff (ICI America Inc.). *U.S. 3,775,051.* Disclosed are (a) a surfactant composition comprising a blend of a cationic surfactant and an anionic surfactant; (b) a fluid carrier composition for the treatment and processing of textile materials which comprises water, an organic liquid and the surfactant composition; (c) textile treating compositions comprising the fluid carrier composition and a textile treating agent. Also disclosed is a blend of a textile softening agent and the surfactant composition.

DETERGENT COMPOSITIONS FOR CARPETS. N.A.I. Van Paassen (Chem-y, Fabriek Van Chemische Produkten N.K.). *U.S. 3,775,052.* The carpet shampoo contains as the essential ingredient a mixture of 10–70% of a detergent and 90–30% of a finely divided adsorbent solid. The shampoo can be prepared in the form of an aqueous concentrate dilutable for actual use and conveniently in the form of an aerosol.

SOFTENING FINISHES FOR WASHED LAUNDRY. M. Berg, W. Fries, J. Hartenstein and C. Werner (Henkel & Cie). *U.S. 3,775,316.* The compositions comprise 92–10 of a fatty acid-hydroxyalkylpolyamine condensation product and 8–90% of a quarternary ammonium compound mixture of 0–100% of textile softeners and 100–0% of a germicidal quaternary ammonium compound which is water dispersible.

CLEAR-RINSE AGENTS FOR MECHANICAL DISHWASHING. H. Batka and T. Altenschöpfer (Henkel & Cie). *U.S. 3,775,330.* The clear-rinse agents comprise an aqueous solution of an adduct of 5–20 mols of ethylene oxide and 1–10 mols of propylene oxide with alkanediols having a linear alkane chain of 10–20 carbon atoms and vicinal, nonterminal hydroxyls.

MANUFACTURE OF ENZYME SPHERES. G. Borrello (Colgate-Palmolive Co.). *U.S. 3,775,331.* The process consists of mixing the enzyme with a synthetic organic surface active agent to form a homogeneous mixture, compressing the mixture and mechanically working it to make it plastic, forcing the worked mixture through small openings to produce filaments, and rolling the filaments to break off pieces and round the edges to form spheres. The composition so-formed has increased stability upon storage and upon exposure to oxidizing agents.

SOLID ACTIVATED PER-COMPOUND COMPOSITIONS AND METHOD OF ACTIVATING THEM. A. Heins, D. Kuhling and H. Bloching (Henkel & Cie). *U.S. 3,775,332.* The method utilizes diacylated 2,5-diketopiperazine as an activator.

N-ACYL AZOLINONES AS PEROXYGEN BLEACH ACTIVATORS. F. Fred and R.E. Misner (American Cyanamid Co.). *U.S. 3,775,333.* The compounds are effective bleach activators in compositions comprising hydrogen peroxide or a hydrogen peroxide releasing compound. The activated bleaching compositions are useful for various applications, particularly when incorporated in detergent laundering compositions in which they show good storage stability and high effectiveness at low temperatures (*i.e.*, 50–70C).

WASHING AND CLEANSING COMPOSITIONS. G. Jakobi and P. Berth (Henkel & Cie). *U.S. 3,775,348.* The compositions comprise one part of surface active agent and 0.5–20 parts of a mixture of builder salts consisting of (1) 25–75% of pentasodium triphosphate, (2) 10–50% of sodium citrate and (3) 10–60% of sodium carbonate.

DETERGENT FORMULATIONS CONTAINING ALKYL POLYETHOXY SULFATE MIXTURES. M.E. Tuvell, C.F. Yancey and R.D. Gorsich (Ethyl Corp.). *U.S. 3,775,349.* Certain mixtures of alkyl sulfate and alkyl alkoxy sulfate detergents have superior properties when used in hard water where the alkyl groups of the sulfates range from 10 to 20 carbon atoms and 10–50% of the alkyl groups are decyl. ■

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Northeast Section to hold symposium April 9

The Northeast Section of the AOCS will hold its 13th annual symposium April 9 at the Robert Treat Hotel, Newark, N.J. Registration will be held from 8:30 until 9 a.m. Manny Eijadi is chairman and Jack Marcus co-chairman.

The program is: 9-9:45 a.m., Market and Availabilities for Short Chain Monobasic Acid, C_5-C_{14}; 9:45-10:30 a.m., coffee; 10:30-11:15 a.m., Synthetic Lubricants for Aviation, Automobiles, and Industrial Uses; 11:15-12 noon, Selecting Emulsifiers by the Cohesive Energy Ratio System; 12-1:30 p.m., lunch recess; 1:30-2:15 p.m., The Outlook for Energy in the U.S. and the Rest of the Non-Communist World; 2:15-3 p.m., Operating Experience with Biological Cooling Towers; 3-3:45 p.m., Optimization of Caustic Refining. ■