ABSTRACTS

R.A. REINERS, Editor. Abstractors: N.E. Bednarcyk, J.E. Covey, J.C. Harris, Yoshio Hirano, S. Kawamura, D.A. Leo, F.A. Kummerow, E.G. Perkins, Biserka Matijasevic

• Fats and Oils

PERFECTION OF PREPARATORY PROCESSES FOR TREATMENT OF SUNFLOWER SEED WITH HIGH OIL CONTENT. P. Macuk et al. (V.N.I.I.Z.). *Trudy V.N.I.I.Z.* 28, 32–40 (1972). The sunflower seed with high oil content cannot be decorticated with good results on the equipment normally used for sunflower seed of low oil content. The construction of a new decorticating machine is described in this paper. Model A1-MRC was examined with sunflower seed in which oil content was 47.36–48.98%, moisture 5.10–10.76%. The results obtained are very good; the content of oil lost in the hull is greatly diminished. (Rev. Franc. Corps Gras)

AMINO ACID AND FATTY ACID COMPOSITION OF DIFFERENT KINDS OF SUNFLOWER, SOYBEAN, PEANUT AND SESAME SEEDS. D.I. Kuznecov et al. (Inst. of Nutrition Med. Science Academy USSR). *Maslozhir. Prom.* 1972(6), 8–9. In this paper, data about protein and oil content, amino acid and fatty acid composition are given for different oilseeds. Sunflower Armavirskij 3497, soybean Nepolegajuscaja 2, peanut Adyg and sesame VNIIMK-76 are examined. From the results, it may be seen that sunflower, peanut, and sesame contain more than 50% oil and 20–25% protein; soybeans contain 22.6% oil and 36.9% protein (calculated on dry matter). (Rev. Franc. Corps Gras)

ECONOMY OF THE SUNFLOWER CULTURE AND ITS PRODUCTION. J. Jensma (Unilever Research Duiven, Zevenaar, Benelux). *Rev. Franc. Corps Gras* 19, 629–31 (1972). In this paper, the author discusses the price of sunflower oil on the international market. The price of sunflower seed is very unstable and varies from $92 to $198 per ton. This price is calculated from the price of sunflower oil and meal. The author thinks that the price of seed shouldn't be more than $150 per ton. In this case, he feels that there will be a further increase of sunflower oil production in the future.

ABOUT WIDE-LINE NUCLEAR MAGNETIC RESONANCE USE FOR STUDYING MARGARINE CONSISTENCY. E. Sambuc, G. Reymond and M. Naudet (Lab. National Matières Grasses (ITERG), Univ. Provence-Marseille). *Rev. Franc. Corps Gras* 19, 613–27 (1972). Wide-line NMR is a simple and rapid technique for determination of solid content of plastic fats. The results are as reproducible as those obtained by dilatometry and DTA after a suitable thermal treatment. However, after crystalline form stabilization, the NMR values are lower than those obtained by dilatometry.

MODERN TECHNOLOGY OF TABLE MARGARINES. L. Faur (Astra-Calvé-Asnières). *Rev. Franc. Corps Gras* 19, 599–611 (1972). This paper describes technological problems of margarine manufacture, especially that packed in plastic pots. Table margarines are discussed in relation to the new EEC regulations and at the same time to the production of a good, new-type of product. Different types of fat mixtures used for margarine production and the quality of obtained margarine are described. The use of interesterified blends is discussed as are some new additives.

ANIMAL FATS: SINGLE OR MIXED INTERESTERIFICATION. R. Duterte (Soc. Ind. Oléagineux, Saint-Laurent-Blangy, 62002 Arras). *Rev. Franc. Corps Gras* 19, 587–97 (1972). Types of interesterification are described in the paper, especially regarding the improvement of the physical properties of fats prepared by this process. In single interesterification attention is directed, mostly, to prime steam lard (random and directed transesterification). In combined transesterification, mixtures of hydrogenated lard and tallow are transesterified with edible vegetable oils. The influence of interesterification on the chemical changes of fats and oils and their nutritional values are discussed. Until now in France, interesterified lard is allowed only in the industrial production of biscuits; the state of legislation in EEC is also specified.

SOME ASPECTS OF ANIMAL FAT REFINING DEVELOPMENT. P. D. Droste (Société Hyfran, 31 Boussens). *Rev. Franc. Corps Gras* 19, 575–86 (1972). Technological aspects of animals fats refining processes—degumming, neutralization, bleaching and deacidification by distillation—are discussed. Different factors for and against deacidification by distillation versus classical neutralization are investigated. Quality of resulting refined fat and fatty acids is given. Operating conditions for these processes are given and causes for the bad quality of fatty acids in some cases are discussed. The data are given about the quality of the fatty acids distilled from tallow at different plants.

QUALITY OF SUNFLOWER SEED OIL DEPENDS ON THE TEMPERATURE IN THE CAKE DURING PRESSING. L. P. Zozulja et al. (Polytech. Inst. of Krasnodar). *Izv. vuzov. Pishchevaya Tehnol.* 1972(5), 69–71. To see how the temperature during the pressing influences the quality of sunflower oil, experiments were done at the pressing temperatures from 70 to 105C. The material had a hull content of 7–8%, moisture content before heating of 7.5–8.5%, and before pressing of 4.5–5.5%. The results obtained showed that oil derived from the pressing at 75–80C had half the oxidative changes found in oil obtained 200–105C. The same results hold true for the wax and phosphatide contents. The oil obtained by pressing at 70–80C had no more than 0.3% phosphatides, while the oil obtained at 100–105C had 0.45–0.49%. By pressing at 75–80C, the oil content in the cake was a little higher. (Rev. Franc. Corps Gras)

RAPESEED OIL HYDROGENATION WITH NICKEL CATALYST ON A SUPPORT. I. Kaganowicz. *Tluszcze jad.* 16, 248–54 (1972). The supported catalyst, RCH 55/5, was studied for rapeseed oil hydrogenation. This catalyst is selective; in hydrogenated fat the difference between softening and solidification point was 1.8–6.3C, average 4.3. The only exception was an oil hydrogenated to a softening point of 36.9C, where the difference from the solidification point was 7.7C. The industrial hydrogenation was done with 632 tons of rapeseed oil, using 0.253 kg of RCH catalyst per ton of oil. (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, 238–47 (1972). During the refining process used in the oil industry, about 98% of the sulfur compounds and about 95% of phosphorus compounds are eliminated, compared to the quantity of these compounds present in crude, extracted oil. The fatty acid composition is not changed at all during the refining processes. The sulfur and phosphorus compounds remaining in the oil after refining, make the hydrogenation of rapeseed oil difficult. (Rev. Franc. Corps Gras)

KINETICS OF EXTRACTION OF ACCESSORY SUBSTANCES FROM RAPESEED. IV. COLORING MATTER AND FATTY ACID COMPOSITION OF OIL FRACTIONS OBTAINED BY THE EXTRACTION. A. Katzer. *Tluszcze jad.* 16, 227–37 (1972). Moisture content of the raw material has no influence on the quantity and velocity of carotenoid extraction. Moisture accentuates the extraction of the chlorophyll group of pigments. When the seeds are very humid, the quantity of extracted chlorophyll pigments is several times higher than when the extraction is done on seeds of low moisture content. The temperature has an influence on the extraction of pigments; with the rising temperature, the quantity of extracted pigments is higher. Temperature has less influence on carotene than on chlorophyll extraction. (Rev. Franc. Corps Gras)

METAL CORROSION IN THE HIGHER FATTY ACIDS. T. Ostrowska. *TSPK Pollena* 16, 9–12 (1972). Because fatty acids change color in contact with plain carbon steel, the use of this material is limited. Steel 1H 18N 9T, aluminium 99.5 or blending PA-2 (AlMg 2 Mn) can be used for equipment to be used between 80 and 125C. Two last ones are better than the first for construction of fatty acids stills. (Rev. Franc. Corps Gras)

THE ENZYME LIPOXYGENASE—ITS PROPERTIES AND ACTION IN FOODS. W. Grosch (Deutsche Forschungsanstalt fur Lebensmittelchemie, 8 Munchen 40, Leopoldstrase 175). *Fette Seifen Anstrich.* 74, 375–81 (1972). The results of research on lipoxygenase since 1963 are compiled. The topics reported include occurrence and detection of the enzyme in foodstuffs, its substrate- and action-specificity, isolation and purification, as well as experiments on the characterization of its active center, and also other enzymes that catalyze the subsequent reactions. Participation of lipoxygenase in chemical processes in foods is discussed (e.g. dough preparation, degradation of chlorophyll and carotene, formation of aroma substances).

A SIMPLE LIPASE ASSAY USING TRICHLOROACETIC ACID. M.C. Schotz and Arlene S. Garfinkel (Res., Vet. Admin, Wadsworth Hosp. Center, Los Angeles, Cal. 90073). *J. Lipid Res.* 13, 824–826 (1972). An extremely rapid and sensitive assay for lipoprotein lipase activity, suitable for routine determinations, is described. The substrate for the assay is emulsified [2-^{3}H] glyceryl trioleate, activated by serum. The method is based on trichloroacetic acid precipitation of unreacted substrate and measurement of ^{3}H-labeled glycerol.

PREPARATIVE LAYER CHROMATOGRAPHY OF LIPIDS CONTAINING PHOSPHATIDES. S.R. Eder (Unilever Forschungsgesellschaft mbH, 2 Hamburg, Behringstrase 154). *Fette Seifen Anstrich.* 74, 519–24 (1972). According to the method described by H. Halpaap, the separations of microgram amounts of lipids containing phosphatides on precoated silicagel plates have been scaled up to milligram level using 2 mm precoated layers. Following this procedure the composition of lipid mixtures containing phosphatides, such as those from soybean and some commercial preparations, was determined by gravimetry. In order to check the fractionation by preparative layer chromatography, the isolated fractions were rechromatographed on thin-layer plates, following the dry transfer technique. This simple technique combined with gas chromatography was employed for the determination of fatty acid composition of bile lipid fractions.

DETERMINATION OF OXIDATION STABILITY OF OILS AND FATS BY AN AUTOMATED VERSION OF SWIFT-TEST. H. Pardun and E. Kroll (Margarine-Union GmbH, 419 Kleve (Ndrh.). *Fette Seifen Anstrich.* 74, 366–75 (1972). An automated method has been developed for the determination of the duration of induction period in SWIFT-Stability test. The method is based on following principle: If air current, emerging from SWIFT-tubes, is bubbled into a vessel containing water in which a zinc/copper element is immersed, voltage of the latter increases as soon as it comes in contact with the low molecular acids that are formed during the process of oxidation. The termination of the induction period is indicated by a sudden alteration in the direction of the time-voltage curve. The method can be carried out without constant supervision; it is suitable for the determination of quality of edible oils and fats, assessment of the effect of refining processes and of pro- and antioxidants, as well as for the optimum selection of fat blends.

INFLUENCE OF LIGHT ON OXIDATIVE DETERIORATION OF EDIBLE OILS. IV. DEPENDENCE OF RATE OF OXIDATION ON WAVE-LENGTH OF INCIDENT LIGHT. G. Paul, R. Radtke, R. Heiss and K. Becker (Inst. fur Lebensmitteltech. and Verpackung an der Tech. Univ. Munchen, 8 Munchen 50, Schragenhofstrase 35). *Fette Seifen Anstrich.* 74, 359–66 (1972). A distinct decrease in the rate of oxidation with increasing wave-length is observed for soybean, sunflower and peanut oils when these oils are irradiated with various coloured lights having the same quantum-density. While studying the causes of this behaviour, pure absorption curves for the aforesaid oils were determined. Light of short wave was completely absorbed, whereas long-wave light was barely absorbed to any measurable extent. A considerable increase in quantum yield during oxidation occurs with increasing wave-length. Inspite of this, the oxidation of oils is catalysed most strongly by short-wave light, because the influence of pure absorption exceeds the increase in quantum yield. Pure absorption is therefore considered as the decisive factor with regard to the dependence of photo-oxidation on wave-length. Finally, the rate of oxidation, as determined in darkness, was found to increase with decreasing wave-length of light used for pre-oxidation of the oil.

RECOVERY OF SOLVENTS FROM THE VENT AIR. K. Weber (Extraktionstechnik, Gesellschaft fur Anlagenbau GmbH, 2 Hamburg 76, Humboldtstrase 58–60). *Fette Seifen Anstrich.* 74, 605–8 (1972). The economic, safety and hygienic aspects of the recovery of solvents from the vent air of plants that handle solvents are dealt with. Physical laws that enable the quantitative determination of solvent content of vent air are discussed. In an example, the amount of vent air in a solvent extraction plant and its solvent content have been determined. The physical and technical scopes for the recovery of solvent from vent air are outlined and the various systems are compared with special reference to the absorption technique.

A NEW PROCESS FOR THE CONTINUOUS DEACIDIFICATION OF EDIBLE OILS AND FATS BY EXTRACTION WITH DILUTE ALKALI SOLUTION. H. Enchelmaier and H. Simonis (Feld & Hahn KG, 5413 Bendorf/Rhein, 5 Koln 21, Thusneldastrase 3). *Fette Seifen Anstrich.* 74, 603–5 (1972). The known technical process for the deacidification of natural oils and fats and hardened fats, using dilute alkali in batch operation, is associated with certain difficulties. Ziehl's extraction column provided with moving elements permits a continuous operation of the afore-said process with short hold-up time, low space requirement and considerably less saponification loss. The different operations involved, e.g. deacidification, washing with salt solution and with water, are carried out in the same unit.

INVESTIGATION OF ARTIFACTS FORMED IN FRYING FATS. K. Aitzetmuller (Unilever Forschungsgesellschaft mbH, 2 Hamburg 50, Behringstrafe 154). *Fette Seifen Anstrich.* 74, 598–602 (1972). The investigation of frying fats and artifacts formed in edible oils both under actual industrial frying conditions and under experimental conditions is discussed. The potential importance of instrumental liquid chromatography for the characterization and identification of oxidized oils is shown. Separation schemes and methods for the isolation and identification of fractions are discussed. Classes of artifacts consisting of dimeric fatty acids and more polar monomeric fatty acids may be isolated by preparative column, thin-layer, and gel permeation chromatography and further characterized by GLC, TLC, derivatization and mass spectrometry. The use of methoxylation, silylation and labeling techniques for double bond and hydroxy group position determination in artifact classes by mass spectrometry is discussed.

QUICK DETERMINATION OF RADIO-ACTIVE CONTAMINATION IN FOODS. A. Seher and G. Zippel (Bundesanstalt fur Fettforschung, 4400 Munster/Westf., Piusallee 76). *Fette Seifen Anstrich.* 74, 595–8 (1972). β-rays have been measured in foods contaminated with radio-activity by the use of a methane-argon counting tube having a large surface, in which the γ-rays are eliminated. The observed impulse rates are not only dependent on the activity present, but also on the energy of β-irradiation. If the contamination is due to an unknown mixture of nuclides, the degree of contamination can be determined by measurements with and without the insertion of suitable aluminium foils. The resulting decrease in impulse rate, which is dependent on energy, yields the data required for the calculation of activity that reveals the composition of the mixture with respect to low and high energetic components. By this procedure activity of a radio-active contamination in foods can be determined with fairly good accuracy in 20 g samples of the desintegrated material without chemical treatment.

CHEMICAL, BIOCHEMICAL AND NUTRITIONAL ASPECTS OF SOYBEAN OIL. W.O. Lundberg (Hormel Inst., Univ. of Minn., Austin, Minn.). *Fette Seifen Anstrich.* 74, 557–65 (1972). Soybean oil appears to be a very good oil for food purposes for several reasons. First, and most important, it has various good nutritional qualities. Second, it is economical to use because it is associated in soybeans with protein that also has considerable value for food purposes, and with substances in less amounts such as "lecithin" that have value in food applications. Third, it is a versatile oil that can be adapted for use in a variety of products such as margarines, shortenings, cooking oils, salad oils and other food products. Fourth the principal problems of development of undesirable odor and flavor are now satisfactorily overcome by modern hydrogenation techniques which at the same time convert it to various food products of desired texture and other desirable physical, chemical and biochemical properties. Its value in the foregoing respects is demonstrated by the continuing growth in its production and displacement of other oils for food uses, and this trend will continue as producers of fat and oil products become more educated in the latest developments in soybean oil technology.

LIGHT COLOURED MONTANA WAX DERIVATIVES. F. Mader, K. Stetter and F. Zinnert (Farbwerke Hoechst AG vorm. Meister Lucius & Bruning Werk Gersthofen, D-8900 Augsburg 1, Postfach 101 567). *Fette Seifen Anstrich.* 74, 570–4 (1972). Light coloured or almost colourless montana wax derivatives are obtained by careful bleaching of raw montana wax with varying amounts of chromic acid according to a new process. In these products, the ratio of wax acid to wax ester differs from the well-known products obtained by oxidation. The characteristic physical and chemical data are compared, and their impact on practical properties, such as emulsion formation with water, formation of wax/solvent mixtures, and compatibility with other waxes, is shown. The light coloured products obtained by oxidation of raw montana wax can be used as raw materials for cleansing agents and cosmetics, and as auxiliaries for the processing of plastics.

DISTILLATION OF VOLATILE FATTY ACIDS IN THE RUMEN LIQUOR. V.K. Kakkar, S.R. Marwaha and A.K. Chopra (Dept. of Chem.-Biochem., Punjab Agr. Univ., Ludhiana-4, Punjab). *Ind. J. Nutr. Dietet.* 8, 329–32 (1971). A modified apparatus for the distillation of VFA from rumen liquor has been described. A collection of 400 ml distillate per sample was sufficient to furnish complete recovery of VFA. The present modified apparatus was found to be more efficient, simple in design and much cheaper and can also be practised under simple laboratory conditions.

PROCESS FOR SELECTIVE HYDROGENATION. H. Lindlar and R. Dubuis (Hoffmann-La Roche, Inc.). *U.S. 3,715,404.* Unsaturated organic compounds having at least four carbon atoms are selectively hydrogenated by carrying out the reaction in the liquid phase in the presence of an organic sulfur compound utilizing a partially deactivated palladium catalyst.

DETERMINATION OF RESIDUAL SOLVENT IN OILSEED MEALS AND FLOURS. S.P. Fore, E.T. Rayner, and H.P. Dupuy (United States of America). *U.S. 3,715,910.* A sample of meal or flour and water are weighed into a serum bottle. The bottle is sealed and heated in an oven to volatilize the residual solvent. An aliquot of the headspace gas is then analyzed by gas chromatography.

PREPARATION OF FOODSTUFFS CONTAINING A HIGH CONCENTRATION OF EMULSIFIED FAT. A. Bratland. *U.S. 3,716,378.* The process for preparing such foodstuffs as cream substitutes and margarine involves emulsifying fat and fat-poor milk constituents containing membrane substances which enclose the fat globules in milk.

Calgon promotes John Siebert

John M. Siebert, has been named manager of Developmental services for Calgon Consumer Products Co. Inc., which holds a corporate membership in AOCS. Siebert will be responsible for the testing and evaluation group and pilot plant operations, and will coordinate their activities with research and development, marketing services, quality assurance, and manufacturing.

Earlier, Siebert was an assistant manager in the company's research and development group. He holds an M.SC. in chemistry from Wichita State University and a Ph.D. in chemistry from the Unviersity of Missouri, and is a member of the American Chemical Society and the American Association for the Advancement of Science. ■

• Biochemistry and Nutrition

INFLUENCE OF THE HULL CONTENT IN THE SUNFLOWER MEAL ON THE QUALITY OF PROTEIN PRODUCTS. L.M. Gorskova et al. (Ukranien Inst. for Scien. Res. of Food Ind., Polytech. Inst. of Krasnodar). *Izv. vuzov. Pishchevaya Tehnol.* 1972(5), 67–8. The protein extracted from sunflower meals, with different hull contents has been examined to see how much influence the hull content has on the quality of edible protein obtained from the oilmeal. Data are given about the quality of protein extracted from oilmeal containing 1, 3, 5 and 10% hull. The protein in oilmeal varied from 50.65–57.75% and the protein extracts obtained from these meals contained 82.60–92.86% protein. Other components in the protein fractions were: ash content 1.90–2.21%, cellulose 0.15–0.84%, and carbohydrates 4.78–14.66%. (Rev. Franc. Corps Gras)

RAPESEED OIL IN RAT AND MOUSE NUTRITION, SOME CONSIDERATIONS ABOUT LIPID METABOLISM. T. Staron and J.P. Moreau (I.N.R.A.). *Bull. Acad. Vet.* 45, 215–26 (1972). Mice and rats were fed for 18 months with both refined and crude rapeseed oil. The rapeseed oil contained 51% of erucic acid. Other groups were fed with six different fats: butter, tallow, sunflower, corn, peanut and soybean oil. Mice fed with rapeseed oil showed no change compared to those fed the other fats. Changes on the hearts of rats were observed; triglycerides accumulated in the heart muscle. Even though rapeseed oil gives some defects on certain animals, it cannot be considered toxic. The results cannot be applied to man, but the methods used can be helpful for making progress in this field. (Rev. Franc. Corps Gras)

AMIDOHYDROLASES FOR N-SHORT AND LONG CHAIN FATTY ACYL-L-AMINO ACIDS FROM MYCOBACTERIA. Junjiro Matsumoto and Sadamu Nagai (Res. Lab. of Biochem., Toneyama Hosp., Natl. Sanatorium, Toyonaka 560). *J. Biochem.* (Jap.) 72, 269–79 (1972). Two aminoacylases [EC 3.5.1] from *Mycobacterium smegmatis* were purified as single protein components, based on analysis by ultracentrifugation and electrophoresis. The enzyme, "short acyl aminoacylase" which exhibited hydrolytic activity toward N-short chain fatty acyl amino acids, had a sedimentation coefficient $s_{20,w}$ = 5.83S and a molecular weight of 88,000 or 90,000 as determined by the method of Archibald or by gel filtration, respectively. Another enzyme, "long acyl aminoacylase," exhibited hydrolytic activity toward N-long chain fatty acyl amino acids, was found in a soluble state in extracts from Mycobacteria. It had a sedimentation coefficient $s_{20,w}$ = 4.74S and a molecular weight of 40,000 or 48,000 as determined by the procedures described above. Other properties of the enzymes which were studied were optical specificity, stoichiometry, activation and inhibition. In these studies acetyl-amino acids and palmitoyl-amino acids were used as the substrates for short and long acyl aminoacylases, respectively.

SOME PROPERTIES OF LONG FATTY ACYL-COENZYME A THIOESTERASE IN RAT ORGANS. Shigeru Kurooka, Kanoo Hosoki and Yoshio Yoshimura (Res. Labs., Dainippon Parmaceutical Co., Ltd., Enoki-cho, Suita-shi, Osaka). *J. Biochem.* (Jap.) 71, 625–34 (1972). Long fatty acyl-Coenzyme A thioesterase [EC 3.1.2.2] is widely distributed in mammalian tissues. The enzyme activity (per g wet weight of tissue) in rats was found to be 8 to 10 times higher in brain and testis than in liver, kidney, heart or blood cells (erythrocytes). The enzyme was purified 40 to 60 fold from these tissues and the substrate specificities of preparations from the various tissues were compared using C_6- to C_{18}-acyl-Coenzyme A thioesters. The enzyme hydrolyzed C_8 to C_{18} thioesters, C_{14} and C_{16} thioesters being the best substrates, with K_m values 3 to 5 × 10^{-6}M. Preparations from the various tissues had similar substrate specificities. Moreover the molecular weights of enzymes from these tissues were all estimated to be about 50,000 by sucrose density gradient centrifugation. However, the gel filtration patterns of the enzymes from different tissues were not similar and the patterns were classified into three types: 1) liver type, (2) heart, kidney and spleen type, and 3) brain, testis and blood cell type. The enzyme activity was detected in blood plasma in rats intoxicated with CCl_4 and the gel filtration pattern showed that this enzyme was released into the blood plasma only from the cytoplasm of the liver.

THE METABOLISM IN VIVO AND IN VITRO OF 3-OXO-7α-HYDROXYCHOL-4-ENOIC ACID-24-^{14}C AS AN INTERMEDIATE OF CHENODEOXYCHOLIC ACID BIOGENESIS. Shiro Ikawa, Y. Ayaki, Michio Ogura and Kazumi Yamasaki (Dept. of Biochem., Tottori Univ. Schl. of Med., Yonago). *J. Biochem.* (Jap.) 71, 579–87

(1972). 3-Oxo-7α-hydroxychol-4-enoic acid-24-^{14}C was effectively converted to chenodeoxycholic acid together with α- and β-muricholic acids by rats furnished with a bile fistula. It was also transformed to chenodeoxycholic acid by the supernatant of a rat liver homogenate fortified with NADPH. These results are discussed on the basis of the new biogenetic pathway of chenodeoxycholic acid proposed by Ayaki and Yamasaki.

In vivo conversion of 7α-hydroxycholesterol-^{14}C to $3\beta,7\alpha$-dihydroxychol-5-enoic-^{14}C and -4-enoic-^{14}C acids as well as to allocholic-^{14}C acid in the hen. Hajime Yamasaki and Kazumi Yamasaki (Dept. of Biochem., Tottori Univ. Schl. of Med., Yonago). *J. Biochem.* (Jap.) 71, 77–83 (1972). It was demonstrated that 7α-hydroxycholesterol-^{14}C administered to a hen furnished with a bile fistula was converted not only to the common primary bile acids but also to $3\beta,7\alpha$-dihydroxychol-5- and -4-enoic acids, the latter of which has recently been isolated from bladder bile of hens. As a metabolite of the 7α-hydroxy sterol-^{14}C, allocholic acid was also identified and its natural occurrence in bladder bile once reported was confirmed.

Identification of $3\beta,7\alpha$-dihydroxychol-5-enoic acid in fistula bile of the rat given cholesterol-4-^{14}C and dl-mevalonate-2-^{14}C. Yoshikazu Ayaki and Kazumi Yamasaki. *Ibid.*, 85–89. A Lifschutz positive compound was found in the bile of bilefistula rats injected with mevalonate-^{14}C or with cholesterol-^{14}C. This compound was identified as $3\beta,7\alpha$-dihydroxychol-5-enoic acid by thin-layer chromatography and radio-isotope dilution experiments. This finding was taken for a further evidence favorable for a new pathway of chenodeoxycholic acid biogenesis proposed by the authors.

Inhibition of L-glycerol 3-phosphate acyltransferase from Escherichia coli by cis-9,10-methylenehexadecanoic acid. Makoto Kito, Shigeo Aibara, Kiyozo Hasegawa and Tadao Hata (Res. Inst. for Food Sci., Kyoto Univ., Kyoto). *J. Biochem.* (Jap.) 71, 99–105 (1972). Acyl-CoA: L-glycerol 3-phosphate acyltransferase [EC 2.3.1.15] from *E. coli* is a particulate enzyme, which was found to be inhibited by cis-9,10-methylenehexadecanoate. The inhibition was noncompetitive with respect to L-glycerol 3-phosphate. Palmitate, elaidate and trans-vaccenate showed no inhibition of the acyltransferase, whereas palmitoleate, oleate and cis-vaccenate inhibited. cis-9,10-Methylenehexadecanoate was approximately twice as inhibitory as mono-olefinic acids. The free fatty acids in the cells were also found to vary with different growth phases. There was a ten-fold increase in the amount of free cis-9,10-methylenehexadecanoic acid in the cells from the early exponential to the stationary phase.

Studies on the cellular mechanism of free fatty acid uptake using an analog, hexadecanol. A.A. Spector and Janice M. Soboroff (Depts. of Biochem. and Internal Med., Univ. of Iowa, Iowa City, Iowa 52240). *J. Lipid Res.* 13, 790–6 (1972). Hexadecanol was employed as a fatty acid analog in an attempt to elucidate the role of the carboxyl group in free fatty acid uptake. Large quantities of albumin-bound [1-^{14}C]hexadecanol were taken up by Ehrlich ascites cells during in vitro incubation. More than 90% of the ^{14}C that was taken up remained as hexadecanol even after 1 hr of incubation at 37C. Addition of unlabeled hexadecanol did not appreciably alter the rate of [U-^{14}C]glucose oxidation or incorporation into total lipids, suggesting that the slow rate of hexadecanol metabolism was not due to a toxic effect of this analog. However, more of the labeled glucose was incorporated into phospholipids and less into glycerides, indicating that hexadecanol did exert some metabolic effect on the cells. Uptake was temperature dependent but relatively unresponsive to the presence of glucose or fluoride and cyanide. Hexadecanol was incorporated into exchangeable and nonexchangeable cellular pools as determined by its availability for release to a medium containing albumin. These results indicate that a mammalian cell can rapidly take up large amounts of a long-chain hydrocarbon derivative that does not contain a carboxyl group. Furthermore, the data are compatible with the hypothesis that free fatty acids are taken up by a nonenzymatic process such as diffusion into the lipid phase of the cell membrane.

Stimulatory effect of dietary lipid and cholestyramine on hepatic HMG CoA reductase. S. Goldfarb and H.C. Pitot (Depts. of Oncology and Pathology, Med. Schl., Univ. of Wisc., Madison, Wisc. 53706). *J. Lipid Res.* 13, 797–801 (1972). The diurnal cycle of hepatic HMG CoA reductase activity was studied under conditions of controlled feeding where the percentage of dietary lipid, alone or in combination with 2% cholestyramine, was varied. Cholestyramine caused an increase in HMG CoA reductase activity that began soon after feeding started and peaked 6 hr later. In contrast, a diet containing 20% corn oil was a much weaker inducer of the enzyme but caused a prolonged elevation that began late in the fasting part of the cycle. These patterns suggest two different mechanisms of action.

Calculation of lipolysis and esterification from glycerol metabolism in rat adipose tissue. E. Herrera and A. Ayanz (Dept. de Endocrinologia Exp., Inst. G. Maranon del CSIC, Velazquez, 144, Madrid-6, Spain). *J. Lipid Res.* 13, 802–9 (1972). Pieces of epididymal fat pad from fed and 48-hr fasted rats were incubated for various periods of time in Krebs-Ringer bicarbonate containing [1-^{14}C]-glycerol. The radioactive substrate taken up by the tissue increased linearly with time in both groups and was mainly converted to glyceride-glycerol and CO$_2$. The slopes of the regressions of ^{14}C-labeled glyceride-glycerol with time were not different between the groups, while those of ^{14}CO$_2$ were smaller in the fasted than in the fed animals. Because the radioactive glycerol in the medium is being continuously diluted with the glycerol coming out of the tissue, it is necessary to take account of this factor in calculating the actual amount of glycerol utilized by the tissue. The glycerol produced by the tissues is higher in the fasted than in the fed animals, and in both groups it increases hyperbolically with time. As negligible amounts of the ^{14}C-labeled glycerol taken up by the tissue recirculates to the medium, the rates of glycerol release (lipolysis), esterification and oxidation to CO$_2$ were calculated.

Rabbit muscle gangliosides. F.E. Lassaga, I. Albarracin de Lassaga and R. Caputto (Dept. de Quimica Biol., Facultad de Ciencias Quimicas, Univ. Natl. de Cordoba, Ciudad Univ., Cordoba, Argentina). *J. Lipid Res.* 13, 810–5 (1972). Four ganglioside fractions were isolated from rabbit muscle: one hematoside and three hexosamine-containing species. They were analyzed for hexoses, hexosamine, sialic acid, fatty acids and long-chain base content. The molar ratios of sphingosine-hexose-hexosamine-sialic acid were: for hematoside, 1:2:0:1; for the disialogangliosides, 1:3:1:2 and for trisialoganglioside, 1:3:1:3. The carbohydrates were studied by thin-layer and paper chromatography. The hexoses were glucose and galactose; the hexosamine was N-acetylgalactosamine and the sialic acid was N-acetylneuraminic acid. Fatty acids and long-chain bases were analyzed by gas-liquid chromatography. The fatty acid composition was similar in all of the four gangliosides. The most abundant fatty acids were 16:0 and 18:0, but significant amounts of 16:1, 18:1, 20:0 and 22:0 were also found. Hydroxy fatty acids were not detected. In all of the muscle gangliosides the main long-chain bases were C$_{18}$-sphingenine and C$_{20}$-sphingenine. In hematoside there were also measurable amounts of C$_{18}$-sphinganine and C$_{20}$-sphinganine, whereas in the major gangliosides only traces of C$_{18}$-sphinganine were detected.

New device for preparing thin slices of adipose tissue for metabolic studies in vitro. J.D. Faulhaber, H.U. Klor and H. Ditschuneit (Univ. of Ulm, Center of Med. and Pediatrics, Div. of Metabolism and Nutr., 79 Ulm, Germany). *J. Lipid Res.* 13, 816–9 (1972). A new microtome is described which allows the rapid preparation of equal slices of well-defined thickness of fresh human tissue, especially adipose tissue. Presetting the microtome for a section thickness of 500 μm, we found a variation of about 5% with human adipose tissue. Slices of human adipose tissue sliced by the microtome showed a higher sensitivity to insulin and a better reproducibility of results than slices prepared freehand.

Comparison of two methods for determining human adipose cell size. U. Smith, L. Sjostrom and P. Bjorntorp (Depts. of Med. I and II, Univ. of Gothenburg, Sahlgren's Hosp., Gothenburg, Sweden). *J. Lipid Res.* 13, 822–4 (1972). The mean cell sizes of specimens of human adipose tissue were determined on sectioned slices according to the method de scribed by Sjostrom *et al.* and on adipocytes isolated after treatment of the tissue with collagenase. The average mean cell sizes from 11 biopsy specimens were 94.4 and 94.0 μm, respectively ($r = 0.964$; $P(t_b) < 0.001$; $y = 0.90x + 9.74$), for the two methods. There was no indication of an increased rupture of isolated large human adipose cells. Thus, with precautions (freshly siliconized glassware and omitting the centrifugation of the isolated cells), the collagenase method may be used for metabolic as well as morphologic studies of human adipose tissue.

Oxidative desaturation of eicosa-8,11-dienoic acid to eicosa-5,8,11-trienoic acid: comparison of different diets on oxidative desaturation at the 5,6 and 6,7 positions. J.C. Castuma, Angel Catala and R.R. Brenner (Catedra de Bioquimica, Inst. de Fisiologia, Facultad de Ciencias Med., U.N.L.P., Calle 60 y 120, La Plata, Argentina). *J. Lipid Res.* 13, 783–9 (1972). The oxidative desaturation of [1-^{14}C]eicosa-8,11-dienoic acid to eicosa-5,8,11-trienoic acid by rat liver microsomes was studied, and the kinetic conditions appropriate to measure the specific activity of the enzyme were determined. A comparative study of the effects of a balanced diet and essential fatty acid-free diets on the oxidative desaturation of oleic and linoleic acids at the 6,7 position and the oxidative desaturation of eicosadienoic acid at the 5,6 position were made. Eicosadienoic acid showed a higher conversion than oleic acid for all the diets. The conversion of oleic and linoleic acids to $\Delta 6$ acids was equally increased by fat-free diets with or without added methyl palmitate, whereas the oxidative 5-desaturation of eicosadienoic acid at the 5,6 position was not changed. The effect was apparently independent of the amount of endogenous free fatty acids. The results suggest that the rate-limiting and principal regulatory step in the biosynthesis of eicosa-5,8,11-trienoic acid is the 6-desaturation of oleic acid. The 5-desaturation of eicosadienoic acid was increased by a protein diet and decreased by alloxan diabetes to a lesser extent than the 6-desaturation of linoleic acid. The 5-desaturation of eicosadienoic acid would constitute a secondary regulatory step.

Digestion in vitro of erythritol esters by rat pancreatic juice enzymes. F.H. Mattson and R.A. Volpenhein (Procter & Gamble Co., Miami Valley Labs., Cincinnati, Ohio 41239). *J. Lipid Res.* 13, 777–82 (1972). The mechanism of the digestion of erythritol esters was determined using rat pancreatic juice and purified pancreatic lipase (EC 3.1.1.3). Conditions of hydrolysis were used that would selectively activate or inactivate nonspecific lipase or lipase. It was shown that erythritol tetraoleate was hydrolyzed by nonspecific lipase but not by lipase. The initial digestion product was a triester, predominantly erythritol-1,2,3-trioleate. Thus, nonspecific lipase preferentially hydrolyzed the ester of a primary alcohol. In contrast to the results obtained with the tetraester, lipase could remove a fatty acid from the triester but the resulting erythritol-2,3-dioleate was not hydrolyzed by lipase. The selectivity of this hydrolysis and the inability to hydrolyze the diester are attributed to the known specificity of this enzyme to act only on esters of primary alcohols. Nonspecific lipase completely hydrolyzed erythritol tetraoleate to free erythritol in a step wise manner. The relative rates of these reactions were tetraester $\overset{0.1}{\rightarrow}$ triester $\overset{1.1}{\rightarrow}$ diester $\overset{0.8}{\rightarrow}$ monoester $\overset{0.1}{\rightarrow}$ erythritol. Because of the specificity of pancreatic lipase and the lack of specificity of nonspecific lipase it is likely that this latter enzyme is the primary agent for the hydrolysis of erythritol esters in the intact animal.

Effect of electrical stimulation of the hypothalamus on plasma free acid concentration in cats. A. Barkai and C. Allweis (Rogoff Lab. of Physiology, Hebrew Univ., Hadassah Med. Schl., Jerusalem, Israel). *J. Lipid Res.* 13, 725–32 (1972). The effect of electrical stimulation of various hypothalamic regions on levels of plasma free fatty acids, glucose, triglycerides and cholesterol was studied in fasted cats. Appreciable changes were observed in plasma free fatty acids and glucose but not in plasma triglycerides or cholesterol. These changes appeared to be dependent upon small differences in the placement of electrodes and could not be related to a distinct hypothalamic locus. The results indicate that there is a dissociation between hypothalamic neurons that may affect plasma glucose concentration and those that may affect the plasma free fatty acids. It is suggested that the hypothalamus of the cat contains neurons that may influence autonomic discharge to adipose tissue and thus affect the plasma free fatty acid level and other neurons that may influence autonomic discharge to the liver and thus affect glucose output into the circulation. The distribution of both types of neurons is not limited to a distinct region of the hypothalamus in cats.

Artifacts in ultracentrifugal estimation of aqueous fatty acid concentration. K.Y. Lee (Dept. of Physiology, Univ. of Western Australia, Nedlands, Western Australia, 6009). *J. Lipid Res.* 13, 745–9 (1972). Ultracentrifugation for determination of isotropic concentrations of fatty acids is widely used. However, several artifacts, which would affect the isotropic concentration, could occur if care is not taken. These include sedimentation of micelles, incomplete flotation of unsolubilized oil and uptake of labeled fatty acid by the walls of centrifuge tubes. The first artifact can be overcome by sampling large volumes from the ultracentrifuged sample, and the second by ultracentrifugation for long periods; a force-duration of 7.2×10^7 g-min is suitable. The third artifact cannot be eliminated but may be made constant if the duration of exposure of lipid mixtures to centrifuge tubes is kept constant.

Hypolipidemic effect of pregnancy in the rabbit. D.B. Zilversmit, L.B. Hughes and Margot Remington (Grad. Schl. of Nutr., and Sect. of Biochem. and Molecular Biol., Div. of Biol. Sci., Cornell Univ., Ithaca, N.Y. 14850). *J. Lipid Res.* 13, 750–6 (1972). New Zealand white rabbits showed large decreases in plasma cholesterol and phospholipid concentrations during the second half of pregnancy. All lipoproteins (very low density, low density and high density) participated in the decrease. Very large decreases in plasma cholesterol concentrations were observed even when the animals were maintained on high cholesterol diets. Increases in plasma cholesterol concentrations, after the intravenous administration of Triton WR 1339, were at least as great in pregnant as in nonpregnant animals. It is concluded that the decrease in plasma cholesterol concentrations is not the result of impaired plasma lipoprotein production.

Hydrolysis of glyceryl tri[1-^{14}C]octanoate and glyceryl tri[1-^{14}C]oleate monolayers by postheparin lipolytic activity. L.C. Smith (Dept. of Biochem., Baylor College of Med., Houston, Texas 77025). *J. Lipid Res.* 13, 769–76 (1972). The hydrolysis of monomolecular films of glyceryl tri[1-^{14}C] octanoate and glyceryl tri[1-^{14}C]oleate has been demonstrated by measurement of the decrease in surface radioactivity that occurs in the presence of postheparin plasma. The hydrolysis displayed first order kinetics and was proportional to enzyme concentration over a 10-fold range. No hydrolysis was observed in the absence of enzyme, and only slight activity (1%) was found in plasma taken from subjects before heparin administration. The hydrolysis was stimulated to a variable extent by Ca^{2+}. The first product of hydrolysis of the monolayer was identified as 1,2-diglyceride, which was subsequently converted to 2-monoglyceride. Inhibition of triglyceride hydrolysis was observed when postheparin plasma was preincubated in 2M NaCl, 10^{-4} M protamine, 10 mM $Na_4P_2O_7$ and 0.1 M NaF. Monolayer techniques avoid some but not all of the problems associated with emulsified lipid substrates and appear to be applicable for study of postheparin lipolytic activities.

Movement of cholesterol in vitro in rat blood and quantitation of the exchange of free cholesterol between plasma and erythrocytes. F. d'Hollander and F. Chevallier (Lab. de Physiologie de la Nutr., Univ. de Paris-Sud, 91405-Orsay, France). *J. Lipid Res.* 13, 733–744 (1972). After administration of [4-^{14}C]cholesterol to rats, blood was obtained and incubated for 6 hr or less. Incubation resulted in a net loss of erythrocyte cholesterol and, simultaneously, in an increase of esterified cholesterol in plasma and α-lipoproteins. Erythrocyte labile cholesterol was shown to be the sole precursor of esterified cholesterol. However, the relation between loss and esterification was not absolute. Loss of erythrocyte cholesterol could be inhibited without affecting esterification and vice versa. A catenary turnover model is proposed, which links in vivo erythrocyte labile cholesterol and plasma esterified cholesterol. Free cholesterol also exchanged between erythrocytes and lipoproteins. The topological model, as tested by analog computer, appears to be a bicompartmental system governed by nonconstant exchange fluxes. They are exponential functions of time and vary from 0.065 to 0.020 mg/hr/g of blood. The initial value of the measured flux in vitro is identical with the in vivo value, and the turnover time of erythrocyte cholesterol is 9.2 hr.

UPTAKE AND METABOLISM OF CIRCULATING CHYLOMICRON TRIGLYCERIDE BY RABBIT AORTA. A. Vost (McGill Univ. Med. Clinic, Montreal Gen. Hosp., Montreal 109, Canada). *J. Lipid Res.* 13, 695–704 (1972). To determine if chylomicron triglycerides are taken up and metabolized by the arterial wall, rabbit abdominal aortas were perfused in situ for various times up to 2 hr with blood-buffer containing isotopically labeled substrates. Labeled chylomicrons were obtained by feeding [^{3}H]palmitic acid or [^{3}H]glyceryl trioleate to rats and rabbits with cannulated thoracic ducts. After aortic perfusion with these chylomicrons, more than 85% of aortic lipid ester radioactivity was in triglyceride; when labeled glycerol or palmitic acid was perfused, most aortic ester lipid radioactivity was in diglycerides and phospholipids. This indicated that, during perfusion with chylomicrons, intact triglyceride molecules were taken up by aorta. The rate of triglyceride fatty acid uptake by the inner avascular segment approached maximal values at low concentrations of perfusate triglyceride fatty acids (2 mM), whereas uptake in the outer capillary perfused segment increased with increasing triglyceride fatty acid concentration (0.4–25 mM). By double-radioisotope techniques it was shown that aortic free fatty acid was derived from both perfusate free fatty acids and from hydrolysis of lipoprotein glycerides within the aortic wall. Uptake of chylomicron triglyceride by perfused aorta was independent of triglyceride hydrolysis, which was quantitatively small.

EFFECTS OF PLASMA LIPOPROTEINS FROM CONTROL AND CHOLESTEROL-FED GUINEA PIGS ON RED CELL MORPHOLOGY AND CHOLESTEROL CONTENT: AN IN VITRO STUDY. C. Sardet, Helen Hansma and Rosemarie Ostwald (Dept. of Nutr. Sci., Univ. of Cal., Berkeley, Cal. 94720). *J. Lipid Res.* 13, 705–15 (1972). When guinea pigs are fed cholesterol, the cholesterol content of their red cells increases progressively, a large number of cells become spurred and a hemolytic anemia develops. Unesterified cholesterol is readily transferred from plasma, HDL or LDL of cholesterol-fed, anemic guinea pigs to normal red cells in vitro. This transfer is reversible and is proportional to the concentration of unesterified cholesterol in the incubation medium. Red cells loaded in vitro with cholesterol develop spurs identical with those on red cells in the circulation of cholesterol-fed, anemic guinea pigs. Neither the cholesterol content nor the morphology of normal red cells is altered by incubation in control plasma or in concentrated control lipoproteins. Plasma infranates ($d > 1.21$ g/ml) of either group do not cause spurring of control red cells. We conclude that accumulation of cholesterol by guinea pig red cells in vitro requires an increased concentration of unesterified cholesterol in lipoprotein rather than an increased concentration of normal lipoproteins, and that an increased cholesterol content in guinea pig red cell membranes is necessary for their abnormal morphology. The flux of cholesterol between cholesterol-loaded cells and plasma from cholesterol-fed guinea pigs is three times greater than that between control red cells and control plasma, and the fractional exchange rates are altered.

COMPARTMENTAL AND SEMICOMPARTMENTAL APPROACHES FOR MEASURING GLUCOSE CARBON FLUX TO FATTY ACIDS AND OTHER PRODUCTS IN VIVO. N. Baker and R.J. Huebotter (Radioisotope Res., Vet. Admin., Wadsworth Hosp. Center, Los Angeles, Cal. 90073). *J. Lipid Res.* 13, 716–24 (1972). We have attempted to estimate the flux of glucose carbon to total body fatty acids and to other metabolic end products in Bar Harbor 129/J mice fasted 5–8 hr. Tracer [U-^{14}C]glucose was injected intravenously, and the following data were obtained at various times up to 180 min: plasma glucose C specific activity, plasma glucose concentration, total body glycogen, and ^{14}C in total body fatty acid, total body lipid, unsaponifiable lipid, expired CO$_2$, and in hepatic and extrahepatic glycogen. The data were analyzed by three techniques, namely, multicompartmental, semicompartmental and noncompartmental analyses. All three methods yielded comparable rates of glucose C conversion to total body fatty acids (2–3 μg of glucose C/min/20 g of body weight). Although the semicompartmental approach is extremely simple (it only requires analyses of plasma glucose specific activity as a function of time and ^{14}C-labeled fatty acid at one point in time), it gives an apparently valid approximation for the flux of glucose C to fatty acids. Other quantitative aspects of glucose metabolism in postabsorptive mice are also considered.

CHARACTERIZATION OF SUBFRACTIONS OF TRIGLYCERIDE-RICH LIPOPROTEINS SEPARATED BY GEL CHROMATOGRAPHY FROM BLOOD PLASMA OF NORMOLIPEMIC AND HYPERLIPEMIC HUMANS. Teizo Sata, R.J. Havel and A.L. Jones (Cardiovascular Res. Inst. and Depts. of Med. and Anatomy, Univ. of Cal. Schl. of Med. and the Cell Biol. Sect., Vet. Admin. Hosp., San Francisco, Cal. 94122). *J. Lipid Res.* 13, 757–68 (1972). As judged from measurements of the diameters of particles fixed with osmium tetroxide and shadowed with platinum, gel chromatography on 2% agarose has been shown to be an effective quantitative method for separating triglyceride-rich lipoproteins according to particle size. Particles in the size range of chylomicrons, uncontaminated by lipoproteins smaller than about 700 Å or by other serum proteins, emerged in the void volume of the column, and very low density lipoproteins with diameters between 400 and 700 Å were separated into fractions with average standard deviation of 71 Å from the mean. Systematic comparison of the relationship between diameter and chemical composition of fractions obtained from subjects with various hyperlipoproteinemic disorders demonstrated a precise correlation consistent with a spherical model for these lipoproteins in which phospholipids, free cholesterol, and protein occupy a surface monolayer with an invariant thickness of 21.5 Å surrounding a liquid core of triglycerides and cholesteryl esters. The chemical composition of very low density lipoproteins of given particle size in most recognized types of hyperlipemia was similar to that of normolipemic subjects.

CHOLESTEROL LOWERING DIETS. J.T. Anderson, F. Grande and A. Keys (Univ. of Minnesota, Minneapolis). *J. Am. Dietetic Assoc.* 62, 133–42 (1973). Young college men were fed moderate and strict cholesterol-lowering diets in which butter was eliminated, only skim milk was used, corn oil replaced vegetable oil and other shortenings, meat was reduced and replaced by fish, and eggs were limited. On the moderate test diet, serum cholesterol was reduced 17%; on the strict test diet, cholesterol was reduced by an average of 29%. Serum phospholipids were not reduced. Neither diet increased serum triglycerides. A third, cholesterol-raising, diet, prepared by increasing eggs and butterfat over the amount used in the regular house diet of a state hospital, resulted in a 9% rise in serum cholesterol and a 25% increase in serum triglycerides. The authors also discuss several long-term trials designed to reduce serum lipids, as reported elsewhere in the literature.

TOCOPHEROLS AND FATTY ACIDS IN AMERICAN DIETS. J.G. Bieri and R.P. Evarts (Nat. Inst. of Arthritis, Metabolism, and Digestive Diseases, N.I.H., Bethesda, Maryland). *J. Am. Dietetic Assoc.* 63, 147–51 (1973). Analyses were made of representative breakfasts, lunches, and dinners, ranging from 1900 to 3300 kcal daily, for their contents of alpha-, delta- and gamma-tocopherols and their fatty acids. Daily intakes of alpha-tocopherol ranged from 4.4 to 12.7 mg, with an average of 9.0 mg (13.5 I.U.). Content of gamma-tocopherol was 2.5 times that of alpha-tocopherol, and delta-tocopherol was about equal to alpha-tocopherol. Polyunsaturated fatty acids ranged from 12.7 to 31.2 g daily, with an average of 21.2 g.

CHOLESTEROL ASSAY AND REAGENTS THEREFOR. J.W. Denney (American Monitor Corp.). *U.S. 3,715,188.* Formamide is used to destroy the cholesterol chromophore of a blank which is then compared with the unaltered sample. The formamide also keeps the alcohol, which is used to prevent turbidity, from blocking the formation of the bilirubin portion of the non-cholesterol chromogenic substances.

REDUCING FATTY ACID SYNTHESIS WITH A DIET CONTAINING XYLITOL. O.N. Miller (Hoffmann-La Roche). *U.S. 3,717,711.* The inhibition of fatty acid synthesis in biological systems is obtained by utilizing xylitol as a replacement for other carbohydrates in the diet. This method involves the inhibition of lipogenic enzyme activities and is useful in the treatment of obesity and other lipid abnormalities.

LOW CHOLESTEROL EGG PROCESS. J.A. Fioriti, H.D. Stahl, R.J. Sims, and C.H. Spotholz (General Foods). *U.S. 3,717,474.* Wet egg yolk is combined with edible oil by high energy, high shear mixing. During mixing, cholesterol is extracted from the yolk by the oil. Simultaneously the ratio of polyunsaturated fat to saturated fat in the yolk is increased. The wet yolk is separated from the oil and can be made a constituent of various egg products.

• Drying Oils and Paints

FREE FATTY ACIDS CONTAINED IN ALKYD RESINS. M. Nagakura and Y. Ogawa. *J. Jap. Soc. Col. Mat.* **45** No. 1, 10–7 (1972). The determination of free fatty acids in alkyd resins was carried out for olive, safflower and soyabean oils and their fatty acid-modified alkyd resins of oil length 40–70%. The free fatty acid contents were separated by TLC of the alkyd resin and their methyl esters analysed by GLC for free fatty acid composition. The TLC conditions were: developing solvent, petroleum ether/diethyl ether/formic acid (70/30/2 by vol.); indicator, I_2 vapour; R_f value of fatty acid content, about 0.47. The contents of total free fatty acid were about 1% for resins of oil length of 40% and 2–3% for oil lengths of 55–70%, but there were no differences between the fatty acid-modified and whole oil-modified alkyd resins. The ratio of polyunsaturated fatty acid (linoleic and linolenic acids) in the free fatty acid composition contained in the alkyd resin was smaller than in the oil or the fatty acid of the raw materials. Moreover, it was found that in the TLC fractionation of alkyd resins, different patterns were shown between pentaerythritol and glycerol alkyds. (World Surface Coatings Abs. No. 365)

COMPOSITION OF POLYMERIZED LINSEED OIL BODIED BY A MOLTEN EUTECTIC SALT MIXTURE. A.E. Rheineck and S.N. Koley (Polymers and Coatings Dept., College of Chem. and Physics, N.D. State Univ., Fargo, N.D.). *Fette Seifen Anstrich.* **74**, 347–53 (1972). Quantities of alkali refined linseed oil, ARLO, were passed through molten eutectic mixtures of salts, KNO_3, $NaNO_2$ and $NaNO_3$ or KNO_3 and $NaNO_3$ in the temperature range of 280C to 320C at various flow rates. The oils increased in viscosity, colour degradation was very slight and the acidity increased to as high as 5 mg KOH/g. The bodied oils were readily separated into two fractions on the basis of solubility in acetone. Acetone solubility decreased with the increase in bodying temperature in the eutectic salt mixture. Both fractions were analyzed for fatty acid composition and structure. Spectroscopic techniques, NMR and chromatographic studies indicated that there was an absence of nitrogen compounds, some degradation [to shorter than 18 carbon atom acids], formation of "oxy" groups and some cyclization in a single acid and in the formation of polymers which were di- and trimeric structures.

• Fatty Acid Derivatives

SYNTHESIS OF (±)-PROSTAGLANDIN E_1, (±)-11-DEOXYPROSTAGLANDINS E_1, $F_{1\alpha}$, AND $F_{1\beta}$, AND (±)-9-OXO-13-CIS-PROSTENOIC ACIDS BY CONJUGATE ADDITION OF VINYLCOPPER REAGENTS. F.S. Alvarez, D. Wren and A. Prince (Syntex Res. Inst. of Org. Chem., Palo Alto, Cal. 94304). *J. Amer. Chem. Soc.* **94**, 7823–7 (1972). The syntheses of (±)-PGE_1 and (±)-11-deoxyprostaglandins in the E_1 and F_1 series have been carried out by conjugate addition of bis(triethyl phosphite)copper(I) cyanide vinyllithium to the substituted cyclopentenones 1a and 1b, and subsequent elaboration of vinylamylcarbinol side chain *via* the intermediate carboxaldehydes 3b and 3d. The intermediate 3d was also converted to (±)-9-oxo-13-*cis*-prostenoic acid (6c). These transformations are characterized by high yields and ease of operation.

PRECIPITATION COPOLYMERIZATION OF METAL SALTS OF UNSATURATED FATTY ACIDS. K. Kuwahara and M. Ishii (Mitsui Mining and Smelting Co.). *U.S. 3,705,137.* A method of preparing copolymers of metal salts of unsaturated carboxylic acids suitable for use as stabilizers for chlorine-containing resins is described. The method involves precipitation copolymerization in an aqueous alcohol solution. The stabilizer composition mixed with the resin is also claimed.

SYNTHESIS OF CERAMIDES USING N-HYDROXYSUCCINIMIDE ESTERS. D.E. Ong and R.N. Brady (Dept. of Biochem., Vanderbilt Univ. Schl. of Med., Nashville, Tenn. 37232). *J. Lipid Res.* **13**, 819–22 (1972). Fatty acyl esters of N-hydroxysuccinimide have been used to N-acylate sphingenine or sphinganine, forming the corresponding ceramides. The reaction proceeds in excellent yield (84–96%) from small amounts of starting material (10–20 mg). The product ceramides are pure after one recrystallization.

SYNTHESIS OF DECYL, DODECYL, TETRADECYL AND NONYLPHENYL MONOETHERS OF HEXA- TO NONAETHYLENEGLYCOL. Y. Abe and S. Watanabe (Keio Univ., 832 Hiyoshi-cho Kohoku-ku, Yokohama, Japan). *Fette Seifen Anstrich.* **74**, 534–537 (1972). Tri-, tetra- and pentaethyleneglycol monochlorides were prepared from ethylene oxide and ethylene chlorohydrin in the presence of sulfuric acid. Decyl, dodecyl and tetradecyl alcohols and nonylphenol reacted with the monochlorides prepared above to produce monoethers which were then condensed with the monoethers again to give the corresponding alkyl and nonylphenyl monoethers of hexa- to noaethyleneglycol. Their characteristics on thin layer chromatography were mentioned.

1,y-DIHYDROXY PARAFFINS. I.A. Baser (Chem. Inst. der Univ. Istanbul, Istanbul, Turkey). *Fette Seifen Anstrich.* **74**, 524–7 (1972). 1,y-Dihydroxy paraffins were prepared from the corresponding hydroxy- or keto-fatty acids by reduction with $LiAlH_4$. Melting points of the series of isomers having the same carbon number show parallelity with those of the keto-fatty acids.

COMPARATIVE STUDIES ON THE EPOXIDATION TECHNIQUES OF VEGETABLE OILS. A. Upendrarao, T. Chandrasekhararao and R. Subbarao (Regional Res. Lab., Hyderabad-9, India). *Fette Seifen Anstrich.* **74**, 353–7 (1972). Concentrated hydrogen peroxide as well as stronger peracetic acid were prepared by simple methods. Commercial hydrogen peroxide (ca. 30%) was concentrated up to 60% by removing water slowly at low temperature and low pressure. Starting from 60% hydrogen peroxide, strong peracetic acid of 17.2% strength was obtained by a simple operation. Batch epoxidations of vegetable oils such as castor, safflower and linseed oils were carried out for different reaction periods from 2 to 10 hours and the formation of oxirane oxygen was determined in order to study the effect of epoxidation time, catalyst employed and concentration of hydrogen peroxide as well as of preformed peracetic acid on the extent of epoxidation. The optimum conversions were obtained with 4 hrs reaction period at 50C by the in situ epoxidation technique using 60% hydrogen peroxide and acid-form of Amberlite-120 resin (chemical grade) as catalyst; the mole ratio of the reactants was unsaturation:hydrogen peroxide:acetic acid (1:1.5:0.5).

COMPARATIVE MONOGLYCERIDE DETERMINATIONS: METHOD ACCORDING TO BROKAW AND ENZYMATIC ANALYSIS OF GLYCERINE. G. Guhr and G. Berner (Unilever Forschungsgesellschaft mbH, 2 Hamburg 50, Behringstrase 154). *Fette Seifen Anstrich.* **74**, 335–8 (1972). For the determination of $\alpha + \beta$-monoglycerides according to the method of Brokaw, α-monoglyceride is determined titrimetrically after attaining equilibrium between the α- and β-isomers, and this value is multiplied with the factor 1.15 to give the total monoglyceride content. Brokaw determined this factor by investigating the equilibrium of C_{16}-monoglycerides. In the analysis of monoglycerides of fatty acids having varying chain lengths, the results obtained by the method of Brokaw were compared with the values determined by the enzymatic method which does not involve an adjustment of the equilibrium by isomerization. The deviations between the mean values by the two methods were insignificant.

RETRO-FATS. F.L. Breusch and Y. Pelister (Aus dem zweiten Chem. Inst. der Univ. Istanbul). *Fette Seifen Anstrich.* **74**, 321–4 (1972). Retro-fats are, in contrast to triglycerides, trialcoholesters of propane-1,2,3-tricarboxylic acid and tetraalcoholesters of butane-1,2,3,4-tetracarboxylic acid. In the homologous series, the melting points are in the same order as in triglycerides. In contrast to triglycerides, inverse fats are not split by plant or pancreas lipases; they are not suitable as food.

NATURAL WAXES XXII: WAX KETONES. M. Streibl and K. Stransky (Inst. for Org. Chem. and Biochem. der Tschechoslowakischen Acad. der Wissenschaften, Flemingovo namesti 2, Praha 6/CSSR). *Fette Seifen Anstrich.* **74**, 566–9 (1972). Possible approaches are discussed for the isolation and identification of wax ketones by chromatographic and spectroscopic methods, and by chemical reactions. Gas chromatographic retention data, given as Kovats-indices, have been obtained for ten isomeric tricosanones (C_{23}) that were synthesized. Similarly, the retention values for tricosanols and their acetates were determined. Tricosanols were prepared from synthetic tricosanones by reduction. The investigations revealed that the highest difference between the retention volumes of ketones and acetates of the corresponding alcohols is achieved on polar phases.

COLUMN CHROMATOGRAPHIC SEPARATION OF POLYGLYCOL ESTERS OF FATTY ACIDS. R. Wickbold (Abteilung Analytik der Chemische Werke Huls AG, Marl, Postfach 1180) *Fette Seifen*

Anstrich. 74, 578–80 (1972). A method is described for the investigation of polyglycol esters of fatty acids, which is based on column chromatographic separation of the various components.

BIODEGRADABLE COMPOSITION FOR DETECTING SURFACE DISCONTINUITIES. B.C. Graham and I.Z. Ducats (Magnaflux Corp.). *U.S. 3,716,492.* The water washable, non-gelling colored liquid penetrant consists of a methyl ester of a fatty acid, a nonionic surfactant, and a fluorescent dye. The methyl ester and the surfactant are readily biodegradable, thereby rendering the penetrant non-polluting.

POLYAMIDE COMPOSITIONS. E.R. Rogier (General Mills, Inc.). *U.S. 3,717,598.* There is disclosed polyamide compositions of fractionated polymeric fatty acids and diamines. Illustrative compounds are 4,4′-diaminodicyclohexylmethane and 4,4′-diamino-3,3′-dimethyldicyclohexylmethane. Copolymerizing dibasic acids such as suberic, sebacic or dodecanedioic acids may also be present. The polyamides find utility as molding powders, adhesives, and in the form of films or sheets.

COMPOSITION FOR FORMING STRIPPABLE AND ANTI-CORROSIVE FILM. K. Miyata (Kurita Water Industries, Ltd.). *U.S. 3,717,599.* An anti-corrosive film forming composition for protecting corrodable metal objects comprised of a synthetic resin emulsion containing a minor amount of corrosion inhibitor is improved by incorporating 0.5–3% of oleic acid or its alkali metal, ammonium, and amine salts, thus rendering the emulsion capable of forming an anti-corrosive and strippable film.

• Detergents

CHEMISTRY AND TECHNOLOGY OF SURFACTANTS. M.K. *TSPK Pollena* 16, 23–32 (1972). The Scientific Conference of Surfactants, organized by the Institute of Organic and Plastic Technology, was held from 21–23 September, 1972 in Karpacz (Poland). The summaries of two plenary conferences and 24 communications presented on this Conference are given in this paper. In the summaries, attention is brought to the properties and uses of different surfactants. (Rev. Franc. Corps Gras)

SOME METHODS FOR STUDYING THE PROPERTIES OF TOILET SOAP USE. L. Bolinski et al. *TSPK Pollena* 16, 13–16 (1972). Different methods of determination of soap properties are discussed. The standard methods like RFA, RDA, Bulgarian, Czechoslovakian and USA are mostly for determination of foaming properties of soap. Some other methods, described by different authors in papers published in the scientific literature, are very good for examining the utility of soap in various applications. (Rev. Franc. Corps Gras)

SYSTEMS CONTAINING SURFACTANTS. IX. THE SODIUM N-DODECYL SULPHATE/AgI SYSTEM. R. Despotovic and Z. Grabaric, Zagreb (Dept. of Physical Chem., Inst. "Ruder Boskovic," Zagreb, Yugoslavia). *Tenside* 8, 313–8 (1971). The influence of the surface active substances of the anionic type sodium n-dodecylsulphate, SDS, on the characteristics of the stable $AgI\text{-}I^-$ sols was investigated. The results obtained by microelectrophoresis, adsorption measurements (by means of radioactive tracer technique), particles size determination (electron micrography), crystallite size determination of the cubic/hexagonal ratio (X-ray diffractometry) by tyndallometry and by observation of the heterogeneous $AgI\text{-}I^-$ exchange (radiometric technique) indicate that SDS influencing in the "embryos-nucleus" and the "nucleus-primary AgI particles" equilibria cause the change of the colloido-chemical properties of the stable AgI sols. It has been shown that the phenomena observed lie in the concentration region at which there is the maximum change of surface tension of solution/air plotted against SDS concentration. The results obtained are discussed in the light of the van der Waals attractive forces, the Ostwald maturing process and the Grimley-Mott model of the adsorption.

RESEARCH ON WASHING ACTION AGENT ANALYSIS (III): IDENTIFICATION AND DETERMINATION OF ORGANIC BUILDERS IN WASHING AGENTS THROUGH NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY. T. Nagai, S. Hashimoto, H. Tokuwaka and T. Shige (Lion Fat and Oil Co., Ltd, Hirai, Edogawa-ku, Tokyo, Japan). *Tenside* 9(6), 317–22 (1972). Organic builders in heavy duty detergents designed as substitutes for tripolyphosphate are detected only with difficulty especially when in combinations. The chemical shift of the organic builders depends on pH, but becomes constant above pH 11. In the case of sodium citrate and trisodium nitrilotriacetate the best results were obtained using ethanol or sodium acetate as internal standards. Small amounts of tetrasodium ethylene diaminetetraacetate were determined using averaging multiscan NMR spectra.

THE EFFECT OF SURFACE ACTIVE AGENTS ON COALESCENCE. J.D. Robinson and S. Hartland (Swiss Fed. Inst. of Tech., Dept. of Ind. and Eng. Chem., 8006, Zurich). *Tenside* 9(6), 301–8

Howard Temin noted for work in enzyme chemistry

Howard M. Temin, professor of oncology at the University of Wisconsin's McArdle Laboratory for Cancer Research, is the recipient of the 1973 American Chemical Society Award in Enzyme Chemistry.

Sponsored by Pfizer Inc. since 1945, the award is presented annually to an American scientist, not over 40 years of age and engaged in noncommercial work, who has distinguished himself by outstanding achievement in enzyme chemistry.

Selection of Temin, who is 38, was in recognition of the work titled "RNA-Dependent DNA Polymerase in Virions of Rous sarcoma Virus." First published in *Nature* in 1970, this development led to "an extremely exciting and fruitful era in cancer research," according to Temin's associates.

"Dr. Temin's discovery stimulated workers in many laboratories throughout the world to further explorations of the meaning of this finding which opens a new chapter in molecular genetics," the nomination stated.

Consisting of a gold medal and a $2000 prize, the award was presented at the general ACS meeting here today by K.E. Jensen, executive director of cancer research at Pfizer's Groton, Conn., research center.

Temin, whose discovery is considered by many to be the most important yet made in the field of cancer virology, has been WARF professor of cancer research since 1971.

In 1964, he hypothesized the presence of RNA-directed DNA synthesis in RNA tumor virus replication. The young scientist approached this hypothesis by several lines of experimentation, and it proved correct.

Born in Philadelphia, Temin received a B.A. degree from Swarthmore College in 1955. In 1959 he was awarded a Ph.D. by California Institute of Technology, where he was a postdoctoral fellow. He was appointed assistant professor of oncology at the University of Wisconsin in 1960, becoming associate professor in 1964 and full professor of oncology in 1969.

Temin is currently serving as a member of the National Institute of Health Virology and Rickettsiology Study Section. He is on the editorial boards of four publications: *The Journal of Cellular Physiology, Cancer Research, Intervirology* and *The Journal of Virology.*

Temin has won several previous awards, including the U.S. Steel Foundation Award in Molecular Biology, National Academy of Sciences, 1972; Modern Medicine Award for Distinguished Achievement, 1973; Warren Triennial Prize of Massachusetts General Hospital, 1971; the Papanicolaou Award of the Papanicolaou Institute, Miami, Florida, 1972, and the Bertner Award, M.D. Anderson, Houston, 1972. He received a special commendation from the State Medical Society of Wisconsin in 1971, and was New Horizons for Radiologists Lecturer, Radiological Society of America, in 1968.

Purpose of the ACS Award is to stimulate fundamental research in enzyme chemistry. Members of the ACS may submit one nomination each. Pfizer has no voice in the selection of candidates. ■

(1972). The shape of a fluid drop approaching a liquid-fluid interface, the rate of thinning between the drop and the interface and rupture of the film are all affected by surfactants. Experimental and predicted drop dimensions usually do not agree when surfactants are present. The discrepancies may be explained in terms of the non-uniform interfacial tension gradients which are caused by drainage of the film and circulation within the drop. The rate of film thinning in surfactant systems is usually much slower than in pure systems and this is due partly to the increased area of the draining film, partly to the immobility of the interfaces and partly to interfacial tension gradients in the surfaces of the film induced by the drainage. Furthermore, any tendency for unsymmetrical drainage is opposed by the immobility of the interfaces and by the interfacial tension gradients. Rupture of the draining film may be caused by local interfacial tension gradients which induce local thinning and can occur at any position since symmetrical drainage makes the film more uniform in thickness. The velocity of the receding edge of the ruptured film progressively decreases since surface active molecules are concentrated there and decrease the interfacial tension force responsible for the motion.

CONTRIBUTION TO THE KNOWLEDGE OF THE SOLUBILIZATION CHARACTERISTICS OF NONIONIC TENSIDES. M.J. Schwuger (Labs. of Henkel & Co., GmbH, Düsseldorf). *Koll.-Z. u. Z. Polymere* **250**, 703–710 (1972). For solubilization of condensed aromatics in dilute aqueous solutions of defined dodecyl polyglycols, it is shown that the kinetics are independent of concentration. It decreases with an increasing molecular size of the condensed aromatic. The rate determining step in solubilization is the diffusion of the solubilizate into the micelle. Mathematically this can be expressed as a diffusion into a homogeneous sphere. Calculated and measured values are in very good accord. The solubilization rate exhibts a maximum at about 7C below the cloud point of the surfactant. This effect of temperature may be explained in terms of a special diffusion equation, relating different temperature dependence of the diffusion coefficient and the micelle radius. The log of the substance solubilized in equilibrium is inversely proportional to the solubilization temperature. Above and below the cloud point the solubilization in equilibrium is influenced by temperature in exactly the same way. The solution enthalpy decreases with an increasing number of oxyethyl groups in the surfactant molecule.

INFLUENCE OF TENSIDES ON THE COLLOID CHEMICAL STATE OF HIGHLY DISPERSED SILICIC ACID IN POLAR AND NONPOLAR SOLVENTS. H. Rupprecht and H. Liebl (Pharmaceutical-Tech. Div., Inst. for Pharmacy and Food Chem., Univ. München). *Koll.-Z. u. Z. Polymere* **250**, 719–23 (1972). Colloidal silica Aerosil is much used as a thickening agent in pharmaceutical suspensions, lotions and ointments. Cationic and nonionic surfactants, which serve as the preservatives or wetting agents respectively, react with the colloidal silica, influencing drug availability as well as the colloidal chemical properties of these dosage forms. So changing of sedimentation, flocculation and viscosity of the silica suspensions can be observed in the presence of these surfactants. The reactions are caused by adsorption phenomena on the surface of the Aerosil particles. In aqueous media the cationic surfactants are bound by ionic exchange and ion pair adsorption, while nonionic surfactants are adsorbed by hydrogen bonding and hydrophobic interactions. In weak polar solvents the hydrogen bonding between PEG-derivatives and the Aerosil surface is evaluated from IR-spectroscopic data.

NONIONIC SURFACE ACTIVE AGENTS DERIVED FROM FATTY CHAIN DIOLS. G. Kalopissis and G. Vanlerberghe (Societe l'Oreal). *U.S. 3,708,364.* The agents are high temperature stable and water soluble. They contain 8–22 carbon atoms in the lipophilic group.

DETERGENT BARS. R.E. Compa, C.F. Fischer, R.T. Hunter, Jr. and R.C. Odioso (Colgate-Palmolive). *U.S. 3,708,425.* The bars are made by working a detergent such as soap or alkylbenzenesulfonate with puffed borax. Other ingredients such as tripolyphosphates may also be used.

WASHING AND CLEANING COMPOSITIONS. G. Jakobi and P. Berth (Henkel & Cie). *U.S. 3,708,427.* The compositions comprise (a) one part of a capillary active compound selected from the group of anionic, nonionic or amphoteric surface active compounds and (b) 0.5–20 parts of a mixture of builder salts consisting of (1) 20–75% of pentasodium triphosphate, (2) 10–60% of sodium citrate, and (3) 3–50% of sodium metasilicate having a ratio $Na_2O:SiO_2$ of 1:1.

DETERGENT COMPOSITIONS CONTAINING SILICA COLLOIDS. L. McDonald. *U.S. 3,708,428.* The silica colloid is formed *in situ* as a sol by the reaction of alkali silicates with a variety of anionic, detergent-forming organic acids, such as fatty acids containing 8–12 carbon atoms or alkyl aryl sulfonic acids. The colloidal silica has a ratio of alkaline oxide to SiO_2 of 1:4–1:2000 or more. Detergents containing the silica have enhanced cleaning and soil removing properties.

CONDENSATION PRODUCTS FROM β-HYDROXYETHYLENEDIAMINE AND FATTY ACIDS OR THEIR ALKYL ESTERS, AND THEIR APPLICATION AS TEXTILE SOFTENERS IN WASHING AGENTS. H.-W. Eckert (Henkel & Cie GmbH, 4 Dusseldorf 1, Postfach 1100). *Fette Seifen Anstrich.* **74**, 527–34 (1972). Condensation of β-hydroxyethylenediamine with fatty acids or their alkyl esters yields a mixture of substances having textile softening properties, which depend strongly on the mole ratio of amino: fatty acid (-ester). The relationship between the aforesaid mole ratio and softening properties has been determined by investigations on isolated products, such as N-acyl-N′-(β-hydroxyethyl)-ethylenediamine, N,N′-diacyl-N′-(β-hydroxyethyl)-ethylenediamine, and N,N′,O-triacyl-N′-(β-hydroxyethyl)-ethylenediamine, as well as on model systems of known composition. From the results obtained, guidelines have been derived for the preparation of technical condensation products having softening properties.

PRODUCTS FORMED BY THE ADDITION OF EPICHLOROHYDRIN TO LONG CHAIN AMINES. P. Nikolaus (Aus den Labs. der Henkel & Cie GmbH, Dusseldorf). *Fette Seifen Anstrich.* **74**, 328–31 (1972). Long chain amines and ammonium compounds having reactive chlorohydrin and epoxy groups respectively were of interest as potential reactive softeners for textiles. Methods for the preparation of such compounds have been sought in extensive studies. The author describes the reaction of secondary and tertiary long chain amines with epichlorohydrin and glycerindichlorohydrin respectively, and deals with the structure of the resulting products. The mechanism of formation of certain classes of compounds, which were obtained unexpectedly, is discussed.

AMINOLYSIS OF LONG CHAIN ALKYL SULFATES BASED ON SECONDARY ALCOHOLS. A. Struve, W. Stein and W. Umbach (Aus den Lab. der Henkel & Cie GmbH, Dusseldorf). *Fette Seifen Anstrich.* **74**, 331–5 (1972). Sulfates of secondary alcohols in contrast to those of primary alcohols give poor yields on aminolysis. Olefins and the alcohols, from which the sulfates are derived, are formed as by-products. Otherwise sulfates of pure homologous ethoxylates based on secondary alcohols give etheramines in good yields. When impure homologous sulfates are employed, the formation of by-products during aminolysis can be strongly suppressed if the ethoxylation is carried out in the presence of cationic catalysts such as tertiary oxonium or carbonium salts.

THE APPLICATION OF THE THERMODYNAMIC THEORY OF IDEAL MULTI COMPONENT MICELLES TO IONIC MICELLES. D.G. Hall (Unilever Res. Port Sunlight Lab., Port Sunlight, Wirral, Cheshire, England). *Koll.-Z. u. Z. Polymere* **250**, 895–9 (1972). The thermodynamic theory of ideal multi component micelles is applied to solutions of a single ionic surfactant plus electrolyte with common counterion. It is assumed that the activity coefficients of all micellar species are equal, that counterions can be regarded as bound or free and that non-surface active simili-ions are absent from the micelles. Expressions are presented for the free energy, enthalpy and volume changes on micellization, for the dependence of the latter two on counterion activity and for the individual contribution of surfactant ions and counterions to them. The dependence of the micellar degree of dissociation on counterion and micellar activities is also discussed. The use of an apparent degree of dissociation to incorporate all deviations from ideal behavior is criticized.

EMF MEASUREMENTS IN CELLS CONTAINING ION EXCHANGE MEMBRANES AS A MEANS OF DETERMINING ACTIVITIES OF IONIC SURFACTANTS IN SOLUTION. C. Botre, D.G. Hall and R.V. Scowen (Inst. of Chemistry Pharmacy and Toxicol., Univ. of Rome, Italy; Unilever Res., Port Sunlight Lab., Port Sunlight, Cheshire, England). *Koll.-Z. u. Z. Polymere* **250**, 900–3 (1972). The EMF was measured on a cell in which the test solution was separated from the reference solutions by a cation and an anion exchange membrane. The reference solution and the test solution contained either sodium dodecyl sulfate (SDS) or cetyl pyridinium bromide (CPB). For SDS and CPB alone and for SDS in the presence of menthol, octanol and decanol Nernstian response was obtained below the critical micelle concentration but non-Nernstian response was obtained for DS plus hexamethylene tetramine. SDS and CPB both appear to interact with the polyethylene glycol Carbowax 4000.

RESEARCH ON THE INTERACTION OF POLYMER-TENSIDES. II. SOLUBILIZATION IN THE SYSTEM POLYVINYLPYRROLIDONE-ANIONIC TENSIDE. M. Radu, G. Popescu and D. Anghel ("P. Poni" Inst. for Macromolecular Chem., Colloid Div., Bucharest, Rumania). *Koll.-Z. u. Polymere,* 250, 875–82 (1972). The interaction of polyvinylpyrrolidone with anionic surfactants of the sodium salt of fatty acid type in the presence of solubilized admixtures was investigated by viscosimetric, conductometric and spectrofluorimetric behavior studies of the complex polymer-surfactant solubilizate systems. The presence of the PVP-surfactant absorption complex basically changed the course of viscosity curves: instead of the viscosity maximum, a characteristic effect for the micellar solubilization ("Angelescu effect") viscosity minima were obtained. Conductivity maxima were found in the region of these minima, which shows an increase of micellar dispersion and the release of a number of counter-ions with the solubilization in the PVP-surfactant complex. The viscosity decrease and the electric conductivity increase in the 0.5% PVP + 0.1% palmitate upon addition of solubilizates varied in the order n-butyl alcohol < n-amyl alcohol < o-cresol. Fluorescence spectra obtained upon cresol solubilization in the PVP-surfactant system (palmitate, laurate or dodecyl sulfate) were discussed depending on the concentrations of polymer and of surfactant. It was concluded the cresol molecule distribution between surfactant micelles and polymer complex depends on the concentration of the system's components. Solubilization in the polymer-surfactant complex takes place both by hydrophobic bonds and by hydrogen bridges. By the fluorescence extinction effect surfactant concentration and its critical micellar concentrations could be determined.

CALCULATION OF THE THERMODYNAMIC PARAMETERS CONTROLLING MICELLIZATION, MICELLAR BINDING AND SOLUBILIZATION. P. Molyneux and C.T. Rhodes (Dept. of Pharmacy, Chelsea Coll. Sci. and Tech., Univ. of London and Dept. of Pharmaceutics, State Univ. of New York, Buffalo). *Koll.-Z. u. Z. Polymere* 250, 886–90 (1972). The theory underlying the calculation of the thermodynamic parameters controlling micellization, micellar binding and solubilization has been explored. Some erroneous methods of calculation have been corrected and some problems in this field discussed.

NEW SUBSTITUTE FOR POLYPHOSPHATE IN WASHING AGENTS. G.P. Lauhus (GAF (Germany) GmbH, Hamburg). *Seifen-Öle Fette Wachse,* 98(26), 869–75 (1972). Use of the copolymer Gantrez AN as polyelectrolyte brings a solution for the polyphosphate problems in detergents. It has been proved true in various formulae and is well suited for European and American conditions. An exchange of polyphosphates against 1/10 Gantrez AN gives good detergency and prevents soil redeposition. With hard water the copolymer produces a good chelating effect.

THE EFFECT OF SODIUM LAURYLSULFATE ON THE PENETRATION OF ELECTROLYTES INTO THE SKIN. G. Kiss and I. Horvath. *J. Soc. Cosmet. Chem.* 23, 803–6 (1972). Sodium laurylsulfate, commonly found in detergents, changes the electric impedance of the skin and thus increases its permeability for electrolytes. Presumably, the penetration of other substances present in detergents is also facilitated by this phenomenon.

CLEANING DISINFECTANTS FOR HOUSEHOLD, INDUSTRY AND AGRICULTURE. W. Holler. *Seifen-Öle-Fette-Wachse* 98(26), 875–80 (1972). Discussed are cleaning disinfectants containing quaternary ammonium bases and nonionic surfactants. Given are formulae for household, industry (beverage and food industries, hospitals, swimming pools) and agriculture. For effectiveness a good cleaning disinfectant must produce a considerable reduction of germs and also guarantee inhibition of new germ growth for a certain period.

HYDROPHILIC OILS—NEW COSMETIC FORMULAE. K.-G. Ludwig, P. Hameyer, V. Cianchini (Atlas Chemie GmbH, Essen and Atlas Chem. Ind. S.A., Brüssels). *Seifen-Öle-Fette-Wachse* 98(26), 889–91 (1972). Hydrophilic oils are interesting and promising possibilities for many cosmetic branches. The use possibilities of these self-emulsifying oils are very interesting because there are possibilities of formulating new products without an application of customary emulsifying systems and auxiliary substances. A series of fundamental formulae with hydrophilic oils is given.

NEW ROUTE TO BIODEGRADABLE DETERGENTS. C. Marty, J. Maurin and E. Weisang (C.F.R., LeHavre). *Soap/Cosmetics/Chemical Specialties* 49(1), 31–4, 52–6 (1973). The patented (French patent 2,079,877) process of the Compagnie Francaise de Raffinage is described. It consists in dehydrogenating a normal paraffin fraction in the range of C_{15}-C_{21} under certain specific operating conditions. The reaction products are composed of linear internal olefins and orthodialkylbenzenes, mixed with the unreacted paraffins. This mixture, following removal of the lighter by-products, is then sulfonated with SO_3 (1% in nitrogen) without paraffin removal. The sulfonation effluent is neutralized by excess aqueous sodium hydroxide at 250C. An aqueous phase containing all the sulfonates with some sodium sulfate is removed. This phase is neutralized with sulfuric acid and dried. An organic phase, principally composed of *n*-paraffins, is desulfurized and recycled to the dehydrogenation reactor. Use of isopropanol during the saponification step results in significant bleaching and makes a separate bleaching step with hypochlorite unnecessary. In performance, the C.F.R. detergent is equivalent or slightly superior to L.A.S. in detergency, does not foam as much as other detergents, is more than 90% biodegradable, but is somewhat more toxic than conventional products. The long chain sulfonates (C_{16}-C_{21}) appear to be more toxic than the shorter chain (C_{15}-C_{19}) ones.

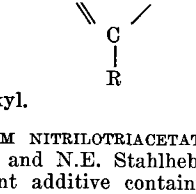
ENZYME CONTAINING GRANULES. D. Milesi and R. Natali (Colgate-Palmolive). *U.S. 3,714,051.* A granular, free-flowing, non-dusting, non-tacky, enzyme-containing detergent composition is made by (a) forming a fluidized bed of enzyme particles and a particulate hydratable builder salt; (b) contacting the fluidized particles with an aqueous liquid to form agglomerates; (c) recovering the agglomerates; and (d) tumbling the agglomerates for 3–30 minutes.

PRODUCTION OF SUCROSE ESTERS OF FATTY ACIDS. R.O. Feuge, H.J. Zeringue and T.J. Weiss (U.S. Sec'y of Agriculture). *U.S. 3,714,144.* The process involves interesterifying sucrose with fatty acids of 2–22 carbon atoms in the presence of certain alkali metal soaps which function as catalysts. The mixed reactants without solvent are heated quickly above the melting point of sucrose and held there while the reaction takes place.

MONO- AND DIPHTHALIMIDO DERIVATIVES AND THEIR USE IN DETERGENTS AND BLEACHING COMPOSITIONS. W.I. Lyness (Procter & Gamble). *U.S. 3,714,151.* There is specified the use of mono- and diphthalimido derivatives of fluorescent, aromatic amines in laundry detergent compositions and in aqueous and granular hypochlorite bleach compositions.

METHOD OF SULFONATING AN OLEFIN MIXTURE. M. Nagayama and H. Okada (Lion Fat and Oil Co., Ltd.). *U.S. 3,714,238.* An olefin mixture consisting mainly of α-olefin of 10–20 carbon atoms is mixed with a vinylidene type olefin having 10–20 carbon atoms in a ratio of 95:5 to 70:30 and then sulfonated with an inert gas mixture of SO_3. By this method it is possible to keep the formation of disulfonates extremely low, and the olefin sulfonated thus obtained have excellent biodegradability, detergency and foaming properties. When granulated, the olefin sulfonates have excellent preservability.

TERNARY FOAM CONTROL COMPOSITION. J.T. Inamorato (Colgate-Palmolive). *U.S. 3,716,499.* A built anionic detergent composition having an inverse foam to temperature relationship is disclosed as well as a ternary composition for accomplishing this relationship when added to a detergent system. This relationship is provided by a synergistic mixture of a C_8-C_{30} fatty acid, a polyethoxylated mono higher fatty alkyl quaternary ammonium halide, nitrate, or sulfate having 10–50 mols of ethylene oxide and an oxazoline having the formula:



where R is C_{15}-C_{21} alkyl.

PRODUCTION OF SODIUM NITRILOTRIACETATE. W.A. Filer, H.E. Feierstein, C.Y. Shen and N.E. Stahlheber (Monsanto). *U.S. 3,717,589.* A detergent additive containing sodium nitrilotriacetate prepared by spray drying and which may be post-added to dry detergent formulations is disclosed. ■

$15 million program to improve emergency medical communications

A national program to improve emergency medical assistance was announced jointly, April 9, by the National Academy of Sciences and The Robert Wood Johnson Foundation.

The central purpose of the 2 year $15 million program is to provide basic support for the establishment of regional emergency medical communications systems. The Foundation will provide individual grants ranging from $200,000 to $400,000 to support approximately 50 regional projects across the country. The Academy will receive and review grant applications for the Foundation.

The National Academy of Sciences has been involved in emergency medical care planning for more than 10 years. According to studies made by NAS and other institutions, an estimated 115,000 persons die from accidents each year, and more than 50 million are injured. Accidents are the leading cause of death for individuals under 38 years old. In addition, of the more than 700,000 deaths from heart disease in recent years, more than half occur before the individual reaches the hospital.

The Foundation grants could go to principal county or city governments; regional hospitals or hospital consortia; and regional nonprofit corporations with multiple memberships from hospitals, local government agencies, emergency ambulance services and other organizations.

The funds will be used for initiation and development costs of organizing a new or improved system; training professional emergency medical communications dispatchers and emergency medical technicians; communications hardware; and educating citizens in the use of the system.

The grant applications sent to NAS must demonstrate the ability to provide for the following elements of emergency medical care: (1) immediate citizen access to the emergency medical system through a centralized communication unit open round-the-clock, with reserved channels and easy-to-remember, well publicized call numbers, such as "911"; (2) prompt and appropriate emergency medical response systems, through well planned, coordinated services kept ready on a standby basis; (3) medically controlled dispatching of appropriate emergency care to the scene of an emergency, and of patients to appropriate medical facilities; (4) area-wide communications links among hospital emergency rooms, ambulance services, emergency cardiac care units, and such other special facilities as burn and poison centers; and (5) central control of communications, with a single regional institution assigned responsibility for the coordination of emergency vehicles and services.

Priority will be given those proposals which encompass the largest geographic or population areas and provide for strong linkages between the medical care system and other sources of emergency medical services and planning, such as local civil defense agencies, rescue squads, police and fire departments.

The programs are required to become self-sufficient after 2 years, with operational expenditures provided by local institutions.

Areas with significant programs of this kind already in operation include the State of Illinois, Miami, Jacksonville, Baltimore, Los Angeles and parts of New York City, among others.

The National Academy of Sciences has published three studies in this field, including a recent report recommending that public and private groups undertake a national program to establish regional emergency communications systems of the type with which the present program is concerned.

The NAS will receive $300,000 from the Foundation to support an advisory committee that will screen applicants, make site visits, and evaluate the program's effectiveness.

Prospective applicants must notify the National Academy of Sciences in writing by June 1 of their intention to submit a proposal and must file their completed application by August 1. Following site visits and selection of recipients, the 2 year funding period will start in January 1974.

Questions concerning applications should be directed to David McConnaughey at the National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

Jungermann speaks to SCC

AOCS member Eric Jungermann, vice-president and director of research and development for Armour-Dial, Inc., Phoenix, addressed the California chapter of the Society of Cosmetic Chemists, March 26, in Los Angeles. The subject of Jungermann's address was "Antiperspirants and Deodorants."

Armour-Dial, Inc., a subsidiary of The Greyhound Corp., markets a wide variety of personal care products, including Dial antiperspirant and deodorant. ■

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