

• Fats and Oils

THE STRUCTURE OF AN ORNITHINE-CONTAINING LIPID FROM *THIOBACILLUS THIOOXIDANS*. H.W. Knoche and J.M. Shively (Dept. of Biochem. and Nutr., Univ. of Nebraska, Lincoln, Neb. 68503). *J. Biol. Chem.* 247, 170-8 (1972). The structure of an ornithine-containing lipid from *Thiobacillus thiooxidans* has been elucidated. Methanolysis of the lipid released methyl cis-11,12-methylene-2-hydroxyoctadecanoate. Acid hydrolysis of the residue yielded ornithine and a mixture of fatty acids, the major components of which were 3-hydroxyhexadecanoic and 2-hexadecenoic acids. Identification of the 3-hydroxy fatty acid was based on the thin-layer chromatographic mobilities of the acid, its methyl ester, the methyl ether and acetate derivatives of its methyl ester, the equivalent chain lengths of the derivatives of the acid and the acid obtained by oxidation of the natural acid with permanganate and mass spectral studies. Similar techniques were used for the identification of 2-hexadecenoic acid. The minor fatty acids and the 2-hexadecenoic acid were found to be degradation products of the 3-hydroxy acid. Data obtained in this investigation indicated that the δ -amino group and the carboxyl group of ornithine were free and that the extracted lipid existed as a zwitterion. Elemental analysis and unit weight determinations were consistent with the proposed structure.

PHYSICO-CHEMICAL ANALYSES OF BOVINE MILK FAT GLOBULE MEMBRANE. I. DIFFERENTIAL THERMAL ANALYSIS. R.C. Chandan, J. Cullen, B.D. Ladbroke and D. Chapman (Unilever Res. Lab., Colworth-Welwyn, The Frythe, Welwyn, Herts, G.B.). *J. Dairy Sci.* 54, 1744-51 (1971). Freeze-dried milk fat globule membrane contained 63% by weight lipids of which 68% were triglycerides and 14% phospholipids. Diglycerides, monoglycerides, cholesterol, cholesteryl esters, free fatty acids and pigments were also present. Differential thermal analysis of the membrane preparation and of various fractions isolated therefrom, revealed pronounced thermal transitions from melting of the triglyceride components. Thermal characteristics of the isolated phospholipids were also examined, but transitions from these components could not be detected in the intact membrane because of the dominant thermal effects from triglycerides. Fat globule membrane underwent an irreversible endothermic transition near 80C which is of interest in relation to the pasteurization of cream.

II. ELECTRON MICROSCOPY. A.F. Henson, G. Holdsworth, and R.C. Chandan. *Ibid.*, 1752-63. Samples of cream and milk fat globule membrane fractions from bovine milk were examined by electron microscopy with thin sectioning and freeze-etching. Certain components of the fat globule membrane aggregated inside the continuous envelope surrounding the globule. At the site of aggregates the trilaminar electron microscopic image is similar to that of a normal cytoplasmic membrane. However, most of the membrane, contiguous with fat of the globule, exhibited no trilaminar structure. This difference in the structure of the membrane at various points is probably due to a re-arrangement of its components. Freeze-etching provided further evidence of the orientation of a layer of triglyceride crystals adjacent and parallel to the membrane in fat globules.

NUCLEAR MAGNETIC RESONANCE STUDIES OF PHOSPHOLIPID MICELLES. R. Haque, L.J. Tinsley and D. Schmedding (Dept. of Agr. Chem. and Envir. Health Sciences Center, Oregon St. Univ., Corvallis, Ore. 97331). *J. Biol. Chem.* 247, 157-61 (1972). The proton magnetic resonance spectrum of DL- α -lecithin at 100 MHz in CHCl_3 solvent is reported. An analysis of the spectrum is made. The chemical shifts of the $\text{N}-(\text{CH}_2)_3$ protons and the resonance peak associated with the condensed water molecule showed concentration dependence with the latter showing the more pronounced response. These chemical shift changes are interpreted in terms of micelle formation through intermolecular hydrogen bond formation between lecithin monomers. The chemical shift data are used to calculate the critical micelle concentration of lecithin as well as the number of monomer lecithin units required to form a micelle. The temperature-dependent studies showed a small negative enthalpy change associated with the micelle. The micellar behavior in CHCl_3 is compared with those in benzene and carbon tetrachloride.

CONTINUOUS MANUFACTURE OF A LOW-FAT DAIRY SPREAD HAVING A WATER-IN-FAT EMULSION. D.H. Bullock, K.C. Thomas and L.M. McKnight (Dept. of Food Sci., Univ. of Guelph, Guelph, Ontario, Canada). *J. Dairy Sci.* 54, 1801-06 (1971). A 40% fat dairy spread of a water-in-fat emulsion has been made successfully with a continuous laboratory-scale unit. The method included swept-surface chilling and controlled crystallization of butteroil to achieve a consistency similar to butter tempered at 21C. Reconstituted calcium-reduced skimmilk was introduced stepwise into the flow of plasticized fat. This, with recirculation of 44% of the product through the working and emulsifying chambers, resulted in a small amount of serum being introduced into a much larger volume of product at each point of addition. In this way the serum was dispersed in droplets 20 μ or less in diameter.

ANALYSIS OF STEROIDS BY OFF-LINE COMPUTERIZED GAS CHROMATOGRAPHY-MASS SPECTROMETRY. R. Reimendal and J. Sjövall (Dept. of Chem., Karolinska Inst., Stockholm, Sweden). *Anal. Chem.* 44, 21-29 (1972). Procedures are described for handling of data recorded on magnetic tape in gas chromatographic-mass spectrometric analyses of steroids from biological materials. The methods are intended for use in biochemical and clinical studies where large numbers of samples consisting of complex mixtures are analyzed. The aim has been to achieve high capacity and speed in the processing of data. In isothermal analyses, spectra are taken automatically with a continuously increasing interval between scans. Thus, the number of spectra is reduced markedly compared to that obtained by repetitive scanning with constant intervals. Short processing times are achieved by limiting the preliminary evaluation of spectra to 100-120 selected ions, the intensities of which are listed in retention time sequence. Plots of fragment ion current chromatograms, and computer search for appearance of gas chromatographic peaks may also be used in the evaluation. Sensitivity limits in applications of fragment ion current plots to quantitative work are discussed. A computer search for possible molecular ions has been used as an aid in the interpretation of the normalized spectra which are often due to mixtures of compounds.

NEW METHOD FOR PREDICTION OF PARTITION COEFFICIENTS IN

(Continued on page 156A)

CALL FOR PAPERS

AOCS 46TH ANNUAL FALL MEETING

The Technical Program Committee has issued a call for papers to be presented at the AOCS Fall Meeting, September 24-28, 1972, in the Chateau Laurier Hotel, Ottawa, Canada. Papers on lipids, fats and oils, and all related areas are welcome.

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