Solvent Extraction One of the Research Problems Discussed In New Orleans Spring Meeting

A TOTAL of 25 technical papers was presented at the 39th annual meeting of the American Oil Chemists' Society in New Orleans on May 4-6, 1948, and a summary of the points brought out is presented in this issue of the Journal. Future issues will carry most of the papers in full.

The present high price of oil has accentuated the interest in solvent extraction. MacGee and Weber humorously pointed out suggestions for safe handling of solvents, particularly from standpoint of fire, explosion and toxicity. A comprehensive accumulation of data relating to factors affecting safety with solvents normally encountered was included in the paper, which will be published in an early issue of the Journal. Ayers and Dooley reported yield and quality of oil obtained from cottonseed when extracted in laboratory using various pure petroleum hydrocarbons. In general, paraffins and isoparaffins had advantages over cyclic hydrocarbons. Duncan reported that continuous trichlorethylene extraction (there are four plants in operation in U. S.) gave oil equal or lower in refining loss and color to that obtained by expellers for similar beans. Trichlorethylene extraction of cottonseed gives dark oil, but it readily refines to prime oil which varies from 3.5 to 8.5 red and after an official bleach to 1.0 to 2.5 red. A centrifugal method was recommended for cottonseed oil. The alkali is added after oil reaches 65°C. while stirring rapidly. The oil in about 1 to 2 minutes breaks and after 12 minutes it is centrifuged. A loss about 2.0% lower and a color about 0.5 lower was secured by this method than when using the official expeller method. Pilot plant work shows that trichlorethylene extraction of flaxseed and copra gives prime oil. Coats in a review of recent advances in soybean technology points out that it is entering a state of maturity where further improvement is resulting from a systematic application of method of chemical and engineering science. Flaking, desolventizing of oil and of meal, and pressure toasting are operations which have been so studied and improved.

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David B. McIsaac (left) of the Kershaw (S. C.) Oil Mill wins permanent possession of the Smalley cup after having been winner in 1932-3, 1943-4, and 1947-8. The other cup was awarded by R. W. Bates, chairman, to M. A. Clark, Hartsville (S. C.) Oil Mill, at the annual dinner of the American Oil Chemists' Society in New Orleans on May 5, 1948.

Several other papers were related to soybeans, which is now the number one vegetable oil crop in U. S. from standpoint of quantity, but not quality. As part of the improvement program for this oil, the Northern Regional Laboratory group of Dutton, Schwab, Moser and Cowan reported data showing correlation between flavor stability and oxidative stability. Data were presented as evidence that citric acid and related polycarboxylic acids and also polyhydric alcohols improve the stability of soybean oil and that they do so as metal scavengers, i.e., by inhibiting the prooxidant effect of the metals. In connection with trace metal it should be pointed out that a Southern Regional Laboratory group of O'Connor, Heinzelman, and Jefferson presented a spectrochemical procedure for determination of copper, iron, manganese, and nickel in quantities as low as 1 to 10 parts per million in oil. The method is applicable to other organic materials low in ash content. Scholfield, Dutton, Tanner, and Cowan reveal the nature of the components of the phosphatide material which is usually erroneously but conveniently referred to as "soybean lecithin." It confirms the commonly accepted figure of 30-35% lecithin but showed that the value of 65% for cephalin needed revision. The approximate analysis of one sample of soybean phosphatides is: 30% lecithin, 32% cephalin, and 38% inositol—phosphatides. This good work will be of interest to many due to the increased recovery of soybean phosphatides, which has been stimulated by extension of solvent extraction and by the adoption this year by the National Soybean Products Association trading rules on basis of refining loss and bleach color.

The first meeting of the new subcommittee on analysis of tung fruit and meal (Seed and Meal Analysis Committee) was held on May 5 at the Roosevelt hotel in New Orleans. Left to right those present are C. R. Campbell, G. F. Potter, F. C. Pack, G. W. Agee, (standing) W. M. McGuire, R. T. Doughtie, Jr., R. S. McKinney, chairman, T. H. Hopper, R. S. Andrews, Dan Lee Henry, R. L. Holmes, and J. R. Mays, Jr.

Holman reported changes during germination of soybeans in content of oil and its iodine number, linoleic and linolenic acid, chlorophyll, carotenoids, catalase and lipoxidase. He speculated from the data that the function of lipoxidase is to initiate the oxidation of linoleic and linolenic acids, which then can proceed autocatalytically. Riser presented data as evidence that swine adipose tissue contains a lipoxidase active substance or substances other than hemoglobin. Stevens and Thompson of Food and Container Institute reported results of a study of stability of shortening as related to keeping quality of army biscuits. Under the conditions of the test hydrogenated vegetable oils, cottonseed and peanut or soybean, with an iodine number of 65-70 had storage life in excess of two years at 100°F. It was pointed out: 1. that NDGA failed to carry through its antioxidant effect on fat alone to the biscuit, 2. that the instability of the biscuits was correlated with unsaturation of the shortening and 3. that oxidative rancidity of fats absorbed on chipboard cartons was a major factor as to shelf life of biscuits in army ration. The latter was attributed as due to greater exposed surface of fat and to the presence of copper and iron.

The other papers related to U. S. number two vegetable oil seed were primarily related to gossypol. The Southern Regional Laboratory squad of Spadoro, Persell, Murphey, Vix, McCourtney, Hecker, Pollard, and Gastrock presented engineering data secured on disintegration of cottonseed meats for fractionation of cottonseed into oil, meal, and pigment glands on a pilot plant scale. The process has been studied in connection with the obtaining of material for further research on the gland pigments, on the meal, and on the oil. One has speculated that research may develop important uses of meal and particularly of gossypol based on its physiological action. At present the economics have not been shown to justify its commercial application. Hall, Castillon, Guice, and Boatner described a new antimony tri-chloride spectrophotometric method for the determination of gossypol. Its application and limitations to various cottonseed products, including oils, were described. Boatner, Castillon, Hall, and Neely describe changes in seed on storage of two varieties, G. Barbadense and G. Hirstutum, with emphasis on content of gossypol, which fails to follow a common pattern, and gossypurpurin, which in all cases increased.

In the field of peanut research Arthur, Crovetto, Molaison, Guilbeau, and Altschul described effect of temperature of extract liquor and of rate of addition of sulfur dioxide during prescription on the settling rate of the precipitated protein, which was suitable for adhesives and synthetic fibers. Peanut oil was used by Feuge and Gros in a study of alkali catalyzed interesterification-reactions. Wolff and Hill told of investigating the alcoholysis reaction between fatty acid esters with alpha methyl glucoside.

Deorschuk and Daubert concluded from composition of the 19 fractions into which two kilograms were quantitatively separated by acetone crystallization technique that there was an even rather than a random distribution of fatty acids in the glyceride molecules. In another paper from the University of Pittsburgh Daubert and Kapur describe the composition of samples of rapeseed oil (B. Compestria) of various degrees of hydrogenation. Oil from mustard seed (B. Juncea) secured from the Punjab, India, area was analyzed for component acids.

Clopton, Roberts, and Jeskey reported analyses of principal constituents of okraseed. The composition of the oil differed from published figures. About 4% myristic acid was recovered although this acid had been reported before. About 8% of C_{20} acid was found as compared to about 1% as given in the literature. It was pointed out that if the spectrophotometric method was assumed to give absolute values, then iodine is not absorbed in theoretical quantities by one of the isomers of linoleic acid which must be present. From the University of Wisconsin another oil, the kernel oil of oats, has been characterized and the composition given by Schuette, Tweet, Milunaitis, and Kuceski.

The fat and oil shortage has fostered the development of synthetic surface active agents from petroleum products. Vaughn and Smith presented data showing temperature-detergency and concentration-detergency for a number of the component mixtures of varying composition of sodium carboxymethyl cellulose, a sodium alkylaryl sulfonate, and selections from alkali detergent builders. From the Eastern Regional Laboratory Stirton, Schaeffer, Stawitzke and Ault described yields and some properties of aryl stearic acids produced from oleic acid and different aromatic compounds using Friedel Craft's type catalyst under various conditions.

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NEW ORLEANS

Members of the New Orleans convention committee are shown, l. to r.: (seated) T. H. Hopper, general chairman, Mrs. H. P. Newton, ladies' chairman, and K. S. Markley, program chairman; (standing) J. A. Kime, publicity, Esler L. D'Aquin, registration, E. A. Gastrock, finances, C. L. Hoffpauir, printing, F. C. Magne, golf, and H. P. Newton, hotel. Absent is J. J. Ganucheau, banquet.

Legal representatives of the American Oil Chemists' Society in New Orleans are conferring above: J. J. Ganucheau (left) and J. C. P. Helm. They call themselves the gentlemen who can be sued.

Esler L. D'Aquin (left foreground) is supervising his staff at the registration desk in the Roosevelt hotel, where the 39th annual meeting of the Society was held on May 4-6, 1948.

GENERAL MILLS' PROMOTIONS

Walter E. Flumerfelt, who has served as manager of Belmond Operations for several years for the Chemical Division of General Mills inc., has been transferred to Minneapolis. In his new assignment Mr. Flumerfelt, who is a division vice president, will handle the purchase of soybeans and the purchase and sale of soybean oil. Mr. Flumerfelt is well known in the soybean trade, having been one of the industry's early pioneers.

Charles Greve will be in charge of sales of fatty acids and chemical derivatives at the company's new Chemoil Plant at Kankakee, Ill., and Fred Hafner will be in charge of sales of soybean oil meal and industrial protein.