Excellence Marks Technical Program

THE 41st Annual Meeting of the American Oil Chemists' Society was characterized by an excellent technical program. Fifteen of the 30 papers were from the U.S.D.A. Regional Laboratories. Most of these papers and the 16 committee reports will be published in this Journal. Many will be vitally interested in the fact that the method developed by the subcommittee of the Color Committee after intensive work on 120 samples was accepted by the Society as tentative. The equation is: the photometric color

$$= 1.29 \times D_{460} + 69.70 \times D_{550} + 41.2 \times D_{620} - 56.4 \times D_{670}$$

The full significance for the coming year will await the action to be taken by the National Cottonseed Products Association and the National Soybean Processors Association on their respective trading rules for the following year. The committee has attempted to improve upon the Lovibond system yet at the same time obtain a figure which could be correlated. A correlation of .993 with Lovibond Red was secured on these samples.

Another point of interest to many, particularly those in the margarine industry, was the final report of the Vitamin A Committee, which worked jointly with the Official Agricultural Chemists Association and the United States Pharmacopeia Committees. The new U.S.P. XIV official methods, which will be published in the very near future, will become obligatory as regards U.S.P. Standards within six months of publication. This replaces the biological procedure as the official assay method and in essence is an ultra-violet spectrophotometric method with corrections for extraneous absorption as developed by Martin and Stubbs. The biological assay method is a confirmatory method, and the Carr-Price (blue color method) is also included as an identity test.

The papers will be grouped for discussion under the following headings: a) foods, b) processes and basic data, c) drying oils, and d) miscellaneous.

Foods

Morgareidge and Gilmore gave data showing the effect of input assay method on the recovery of vitamin A added to margarine. Two points are of timely interest. With a synthetic vitamin A palmitate and the use of U.S.P. XIV procedure with the Martin-Stubbs corrections, complete recovery was shown. For six commercial concentrates of both ester and alcohol forms, all samples showed Carr-Price "values" approximately 25% above those for the U.S.P. XIV procedure.

Dutton, Lancaster, Evans, and Moser submitted direct evidence that linolenic acid was the unstable precursor of "reversion" flavors in soybean oil. This was done by studying the effect of substantially reducing the linolenic acid in soybean oil by furfural extraction and of incorporating linolenic acid into cottonseed oil, using an interesterification technique. Using data secured in this work, Evans et al. showed the method of statistical evaluation which was used. A probability table of organoleptic identification for use by taste panels of 20 members or less was presented. Recognizing the role of metallic impurities in soybean reversion, Beal and Lancaster reported the effect of various protective films on different type metals in the deodorizer upon flavor stability of the oil. Melvin and Hawley described a chemical-spectrophotographic method for estimation of copper in amounts as low as .01 ppm of iron and .001 of copper and presented data secured on commercial salad oils.

Processes and Basic Data

Three valuable contributions to our hydrogenation knowledge were made. Thompson of Lever Brothers Company reported fatty acid composition at 10 iodine value intervals on hydrogenation of a mixture of 50% tung oils and 50% linseed oil. Relative rates for the various acids were calculated. During initial stages eleostearin was 20 times more reactive than normal linolenic, but as the eleostearin was reduced to 1 to 2% concentration, it was only 1.5 times as reactive as normal linolenic. Jackson and Callen of Procter and Gamble evaluated several hydrogenated oils by the new infra-red spectrophotometric as compared with the old Twitchell lead salt method for determination of trans-isooleic acids. The accuracy of the new method was established on known samples, and its validity was supported by the Twitchell values which showed that 30-45% of the total trans-isooleic acids of hydrogenated stocks pass into the liquid fatty acid fraction. The lead isooleate solubility increases as the complexity of the isooleic acid mixtures increases during hydrogenation.

Ward and Singleton of the Southern Regional Laboratory reported the percentage of solid over the entire range of melt-

ing of hydrogenated and unhydrogenated peanut oil in study VII of the thermal properties of fats.

In furthering knowledge of the use of solvents in fat technology, Skau, Dopp, Burleigh, and Banowetz made a systematic physical chemical study of cottonseed oil and of peanut oil in acetone. Cottonseed and peanut oils are only partially miscible with acetone at lower temperatures. This should not interfere with winterization of cottonseed oil but may within certain range of concentration for peanut oil.

In another paper from the Southern Regional Laboratory, Magne, Hughes, and Skau presented complete density composition temperature data on binary systems of refined cottonseed oil with methyl pentane, diethyl ether, trichloroethylene, and tetrachloroethylene from the point of incipient phase separation to within 10-15°C of the boiling point of the solvent. An equation has been derived which makes it possible to adjust these data to apply with reasonable accuracy to other refined cottonseed oils and even to soybean and peanut. Wingard and Phillips of Blaw-Knox Company gave quantitative data on effect of temperature of extraction, using soybeans, cottonseed, and flaxseed with several ways of preparation and with several solvents in their paper No. IV of this series.

The reduction of the gossypol content of cottonseed by pressure cooking was reported by Gribbins of Blaw-Knox Company. Although unstable, the gossypol is well protected by the gland wall; thus high temperature and high pressure are required to free the gossypol by rupture of the pigment glands. This paper reported data which indicated that flaking the meats prior to pressure cooking was 55% more effective in reducing gossypol content than cooking whole meats. Data were also presented supporting mathematical equations developed to calculate time required for attaining a predetermined reduction in gossypol content under various operating conditions.

Persell, Vix, Reuther, and Pollard reported that the economic advantage of the combination screw-press extraction-fractionation plant, as shown over the screw-press operation, is small in comparison with the large additional investment required for the combination plant. The present value of the combination process lies in the production of two new products: a purified high-protein meal and a concentrated pigment gland fraction, and in the possibility of an improved oil. Jensen, Lambou, Andrews, Magne, Karon, Wilcox, Altschul, Newby, and Bollens reported logs of commercial storage tests of cottonseed of various moisture contents, particularly as to aeration, temperature, and seed quality. During storage generally the moisture content is reduced below 14% by the time the seed is taken out of storage. The investigations covered a period of six years. Aeration, although useful, may not be adequate to prevent substantial increase in free fatty acid in all cases of high moisture.

Drying Oils

Two papers were related to species of the perennial gourds, Cucurbita, which potentially in times of increased demand for a drying oil may become of some economic importance in the future as an arid or semi-arid crop. Bolley, McCormack, and Curtis of the National Lead Company reported investigation of C.fetidissima, C.palmata, and C.digitata. It was shown that the protein was technically suitable for industrial use and that the oil had good drying properties. The fact that the species showed distinct differences and that the plant can be produced vegetatively suggest favorable opportunity for further improvement by plant breeding. Shahani, Dollear, and Quimby characterized chemically the oil secured from C.foectidissima, which is known as the Buffalo gourd. The yields of non-fat fractions were reported. The carbohydrate fraction was very low. Bleaching difficulty would handicap the oil for edible uses.

Batterson, Hanks, and Potts reported the fatty acid composition of the oils from Stillingia sylvatica and Bebastiana lingustriana. Shelburne and Freyer reported results showing shortcomings of the official acetone foots test for raw linseed oil and the advantages of centrifuging as a way of improving the accuracy. Hunt, Neustadt, Shurkus, and Zeleny described a hand refractometer calibrated in an iodine equivalent scale for linseed and flaxseed and proposed its use for grading of seed.

Grummitt, Arters, and Stearns gave acetone solubility data secured in a program for developing methods to characterize and analyze thermally polymerized (bodied) oils in order to predict their behavior in coating compositions. Acetone num-

bers vary from a very high value to approximately 80 for a highly polymerized oil.

Miscellaneous

The evaluation of derivatives 9, 10-dihydroxy stearic acid as plasticizers for polymers was described by Swern, Knight, Koos, and Jordan of the Eastern Regional Laboratory. The report includes an interesting discussion of the requirements and properties of a good plasticizer. Several derivatives of dihydroxystearic acid which show promise as plasticizers were discussed.

A contribution of the West Virginia Pulp and Paper Company by Ball and Vardell presented spectrophotometric data on the composition of the rosin acid fraction of tall oil. Comparative results on the analysis of gum and wood rosin revealed similar compositions to the tall oil rosin acids.

Harris and Brown discussed wash test methods as the first paper of a series on detergency evaluation. Several different wash test methods were evaluated, using four selected detergents and a single standardized soiled test fabric. Correlation between procedures was relatively good, but the authors indicated that consistency of results was a matter of extended experience.

The isolation of arachidonic acid from beef suprarenal glands was related by Herb, Riemenschneider, and Donaldson of the Eastern Regional Laboratory. By a series of extractions and crystallizations followed by removal of the unsaponifiable material, conversion of the acids to their methyl esters and chromatographic technique, the authors obtained a solution weighing 104 grams and containing 25% methyl arachidonate from 30 pounds of beef suprarenal glands.

Gros and Feuge gave considerable interfacial data for various monoglycerides and cottonseed oil, mineral oil, and amyl acetate at various temperatures. Schuette gave a paper on the hydroxyl number. Rose's paper revealed how a castor bean lipase cream could be prepared and used in assaying its lipase activity.

The chromatographic separation and identification of the minor constituents of crude cottonseed oils was the subject of a paper by J. W. Hayward and C. B. Hayward of Texas A & M. A number of the separated constituents have been identified, some of which are hitherto unreported.

Hogan and Arthur described the preparation of plywood glue, using hydraulic-pressed, screw-pressed, and solvent-extracted cottonseed meal. The glue, consisting of 40-45% solids, may be utilized for the manufacture of plywood using standard hot pressing procedure.

Scanlan, Luddy, and Ault of the Eastern Regional Laboratory, presented very interesting and potentially valuable data characterizing constituents of wool wax. Only a relatively small portion of the 150 million pounds of wool wax obtained from grease wool each year in the United States is recovered. The work shows promise of further converting a product, which now is a stream pollution problem, into valuable products.

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ARTHUR S. LAPINE COMPANY announces the manufacture of a stainless steel beaker with a pouring lip. Fabricated from 18-8 stainless steel in gauge proportioned to capacity, they are available in sizes from 50 ml. to 4000 ml.

A convenient graphic method developed by H. L. Curtis of the National Bureau of Standards makes possible the quick and accurate determination of the curvature and second derivative at any point on a plotted curve. The method utilizes an easily constructed device known as an "Osculometer," a piece of transparent material containing a series of arcs of known curvature. Curvature is read by direct comparison of the experimental curve with the osculometer, and the corresponding second derivative is then obtained by a simple calculation.