

Basic Research Committee—Report of Chairman to the National Cottonseed Products Association Convention of 1934, June 4th and 5th

E. R. Barrow, Chairman

During the past year the experimental work conducted under the direction of the Basic Research Committee has been diverted from studies on cottonseed meal to the investigation of some fundamental problems dealing with refined cottonseed oil and its products. Although further investigations on the utilization of cottonseed meal were planned we have considered that the situation of the refined oil warranted our immediate cooperation in contributing information which we believe is of basic importance to the industry as a whole.

New criteria are arising for the evaluation of edible oils and fats in relation to the growing practice of vitaminizing of both natural and manufactured food products. In maintaining and broadening the markets for cottonseed oil, the Basic Research Committee has acceded to demands for information on this subject which could be provided through our Research Fellowship.

All edible vegetable and animal oils are to be regarded as potential carriers of two essential vitamins, designated as A and D, but the oils and fats from different sources differ in the important quality of tending to preserve or destroy the potency, particularly, of vitamin A.

The investigations reported to the Basic Research Committee by our Research Fellow, Dr. Stevens, concerns the use of the plant pigment, carotene, as a source of vitamin A for cottonseed oil or for products made from or with cottonseed oil. The many ramifications of this problem have been discussed in detail in the conferences of the Basic Research Committee, but in the time allotted to this report I am able to present but a review of the work and the committee's evaluation of it.

Carotene, a pigment of intense yellow color, is soluble in cottonseed oil or hydrogenated cottonseed oil. The color value of carotene contributes to the usefulness of this product as a source of vitamin A in some types of food, but from a practical standpoint the intensity of the color limits the quantity that may be incorporated to enhance the nutritive value of the food. In refined cottonseed oil, cottonseed oil shortening and in cottonseed oil margarine, a concentration of 10 parts per million by weight of carotene contributed to these products, which are usually devoid of vitamin A, a value equivalent to approximately 13 International Units of this vitamin per gram, or 370 Units per ounce. In cold storage this value did not change, over a period of three months, in any of the products tested. Other trials are in progress to determine whether the vitamin A potency is altered to a significant degree under conditions less favorable to the preservation of the oil or fats.

Among several edible vegetable and animal oils which have been tested in other laboratories as vehicles for carotene, cottonseed oil occupies the most favorable position in preserving the biological value of this pigment. Our data extends this information to include commercially important products in which cottonseed oil is the sole or major constituent. The collection of experimental evidence of this character through our

Fellowship in the Bureau of Chemistry and Soils is valued for its technological as well as scientific interest and will find application in the food industries where oils and fats from different sources are in competition.

Within the past month vitamin concentrates carrying no significant color value, and which are acceptable for delicately flavored foods, have been obtained from commercial sources. These concentrates, derived from codliver oils, have been successfully used therapeutically but have been considered too high in flavor to be acceptable in foods. Because of their high vitamin value in relatively minute quantities, these concentrates are now being successfully used in both fresh and evaporated milks and are said to be acceptable for oils and fats. Their stability in cottonseed oil products remains to be demonstrated.

The results of our experimental nutrition studies executed through cooperation and direction of the scientific workers of the Bureau of Chemistry and Soils are presented to you in a much condensed form.

To the Basic Research Committee falls the responsibility of planning and evaluating for the Association the results of this cooperative program. We cannot, by the nature of the work, present the full details of the experiments as they are submitted to us, nor can we at once foretell their full significance. Therefore, I wish to make record of this opinion, that by no other means can our industry be as well prepared to deal promptly and effectively with problems of major significance to our markets, as through continuously promoting unbiased scientific investigation of our products. Past experiences of this committee fully attest the soundness of this opinion.

We are pleased to acknowledge our appreciation for the facilities and counsel provided through our relations with the Bureau of Chemistry and Soils in the conduct of the Research Fellowship. In this connection I wish to give notice to the signal honor accorded to Dr. E. M. Nelson who directs the Fellowship activities in Washington and who usually meets with our committee as a representative of the Bureau. Dr. Nelson has accepted the invitation from the League of Nations to represent the United States and the Department of Agriculture as delegate to the International Vitamin Conference and is now on his way to the Conference in London.

Report of the Uniform Methods and Planning Committee of 1933-1934

J. J. Vollertsen, Chairman

During the past year more members of the Society took part in the Committee work than at any previous time. This was due to the fact that President Harris requested all of the members to signify the names of the committees in which they were interested and in whose work they would be willing to participate. The response to this inquiry was very gratifying. We also feel that the chairmen of the various committees should be commended for their diligence and for the fact that in many cases their reports were in the hands of the Uniform Methods Committee several weeks prior to the annual convention.

The Committee on Determining Stability of Fats and Oils considered the various methods for determining the resistance to oxidation of oils and concentrated on a study of the peroxide value as applied to an accelerated test for stability. Its work is not completed and we recommend that it continue its investigation for another year.

The Smalley Foundation work went along as usual and the high standards set heretofore have been upheld. Dr. W. F. Hand won the cup for the third time and it now becomes the property of his laboratory. We are pleased to report that he has offered a new cup to replace the old one.

The Olive Oil Committee suggested that it determine the chemical constants for pure olive oil, so that these may be published for use in the industry.

The Color Committee in its report presented detailed specifications for the instrument which is to be used for reading colors. The Uniform Methods

Committee suggests one change in the specifications as follows:

Paragraph 4 shall read as follows: "The bottom of the tube shall be approximately 2½ inches above the reflecting surface."

We have deleted the measurements in the tube inasmuch as this is covered in another part of our methods.

The Color Glass Development Committee did a very interesting and valuable piece of work and it is the recommendation of the Uniform Methods and Planning Committee that this committee be continued for another year.

The Sampling Committee in its report suggested that the weight of the official sampler be reduced by using lighter metal. It is recommended by the Uniform Methods and Planning Committee that this change be made.

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It also proposes a tentative method for the sampling of ships' tanks and shore tanks, which can be found in its report. This also has the approval of the Uniform Methods and Planning Committee.

The Selenium Committee did a very good piece of work investigating quite thoroughly the use of a selenium catalyst in the determination of nitrogen. It found that it was not as satisfactory as the mercury catalyst now being employed and this was likewise confirmed by a committee of the Association of Official Agricultural Chemists. We recommend the discharge of this committee as the work has been brought to a definite conclusion.

The Seed Committee has been very active and has presented a very com-

prehensive report dealing mainly with the method of free fatty acids in seeds. Its recommendation on the determination of free fatty acids was as follows:

"Heat 200 g. of the original clean sample of seed for 30-40 minutes at a temperature of 100°-105° C., and cool. Pass the cooled seed through a laboratory huller approved by the Chemists' Committee. Separate the meats from the hulls by the use of a 4-6 mesh screen. Grind the meats in a Ruswine No. 1 food chopper equipped with 16-tooth blade. Thoroughly mix sample and pass through a 15-mesh screen so as to remove any remaining lint or hulls. Proper grinding and complete separation of meats from hulls are essential points in obtaining concordant results. Without undue loss of time quarter the thoroughly mixed ground meats so as to obtain at least a 40-gram sample. Extract this sample by cold percolation in the following manner: Place the lower disc from a Knorr Extraction Apparatus in a Butt tube and place on it a layer of asbestos fibre suspended in petrolic ether. A satisfactory mat should allow none of the meats to pass through but should allow the extracting solvent to flow through at about 150 drops per minute. Place the sample in the prepared tube, and add 50 cc. of petrolic ether followed by two portions of 25 cc. each of petrolic ether, each portion being allowed to flow through before the following portion is added. Allow the extracted oil to remain on the steam bath for 1½ hours to completely remove all trace of the solvent. Weigh 7.05 g. of the oil into

a titrating flask, add 30 cc. of neutralized alcohol, 10 cc. petrolic ether, 1 cc. of 1 per cent phenolphthalein and titrate the free fatty acid of the oil with standard 0.25 N alkali. The flask is shaken vigorously during the titration, the end point being taken when a permanent pink is obtained which persists for at least one minute.

Per cent F.F.A. =

$$28.2 \times \text{normality of alkali} \times \text{cc. used}$$

weight of oil

If results indicate a free fatty acid content of 4 per cent or higher the complete test should be duplicated."

The Uniform Methods and Planning Committee approved this recommendation and it was adopted by the Society.

The Committee on Crude Mill Operations had a change of chairman in the very end of the year and for this reason very little work was accomplished. However, we are indebted to it for several papers on the program and recommend that the committee be continued during the coming year.

The Committee on Sulphonated Oils was started during the last year and we feel sure that it will be productive in some very interesting methods in the near future.

The Fat Analysis Committee has had several meetings and is actively at work. It has a very interesting program outlined and we feel that its work shall result in clearing up some methods which are not just what they should be at the present time.

The Refining Committee has recom-

mended only one change in procedure, which is as follows:

"That in the methods for refining procedure on cottonseed oils the remelting of the foots be continued until the recovered oil from the last remelting amounts to not over 1.5 grams."

The Uniform Methods and Planning Committee concur in this recommendation.

We feel that the committees have had a very good start towards some interesting developments and we are sure that the coming year should result in information on methods which will be of value to the Society and the fat and oil industry in general.

ARCHIBALD CAMPBELL,

C. B. CLUFF,

EGBERT FREYER,

H. P. TREVITHIC,

J. J. VOLLERTSEN, Chairman.

A. O. C. S. and I. A. M. P.

Meetings Coincide

Members of the A. O. C. S. who also belong to member companies of the I. A. M. P. will find that this year's program will give them an opportunity to not only attend the A. O. C. S. meetings on October 11th and 12th, but also the meeting of the Scientific Research Division of the I. A. M. P., under the direction of Dr. W. Lee Lewis, director of scientific research for the I. A. M. P. A program of unusual interest to all packing house chemists will be presented Saturday, October 13th, so that every packing house chemist or technician is urged to attend the meetings of both of these Societies.