Report of the Color Committee of 1939-40

THE 1939 Color Committee included four recommendations in its report for the 1940 Committee to consider for its program of work.

These were:

(1) Adopting one and only one instrument as a standard for all color reading.
(2) Having the color reading tubes checked as to the presence of coloring in the glass and for adherence to the specifications.
(3) Painting the interior of the tintometer white, instead of the present dull black.
(4) Specifying standard of illumination on the magnesia block. This has been studied by one member of the committee, and it is his opinion that the illumination on the magnesia block should be between 15 and 22 ft. candles. This member of the committee suggests that other work be done on this question in order that his work might be checked, and supported by the results obtained by the other members of the committee.

The 1940 Committee first received these and, using them as a basis along with several other matters that were presented to the group for consideration, a program of work was set up. Four items were to be covered, namely:

(1) Improvement of the tintometer, including standardization of illumination.
(2) The color reading of crude coconut oil.
(3) Standardization of the yellow-red ratio.
(4) Use of a one-inch column for dark oils.

Of these four, the committee is ready to make a final recommendation on the last one only. Work on the others is still in progress and so will extend into the next year. However, each will be covered in order as to aims and status following which the committee's recommendations for the incoming committee will be presented.

(1) Improvement of the Tintometer, Including Standardization of Illumination

It has been pointed out that the 1939 recommendations included "adopting one and only one instrument as a standard for all color reading" and "painting the interior of the tintometer white, instead of the present dull black." The committee as a whole agreed that the degree of illumination should be standardized. Without it, accurate and consistent color readings are extremely doubtful. Painting the interior white was intended to minimize the effect of too much light absorption by the black interior.

To this end, Dr. Estey, one of the members of the committee, agreed to submit for study a tintometer which embodies a number of new features. Included among these are a device for changing the intensity of light and a white interior. A regular schedule for the examination of this instrument has been arranged but it has not been sent out yet.

The committee will also study the data on standardization of illumination, which another member of the committee, Mr. Stevenson, will send out.

(2) The Color Reading of Crude Coconut Oil

It was brought to the attention of the committee that the method for color on crude coconut oil needed some study. The present procedure calls for filtering the oil through one thickness of approved filter paper until completely free from turbidity. It was pointed out that different observers might easily interpret the "end point" *differently*. The apparent color is lowered each time by repeated filtration so that variations would occur in the results. Furthermore, the turbidity is difficult to remove from some oils.

A sub-committee has been appointed to study this problem and is working on it now.

(3) Standardization of the Yellow-Red Ratio

The committee has undertaken the study of this rather involved subject. There exists at present a number of inconsistencies and irregularities in the setting of yellow which it is hoped will be eventually straightened out. Each member is recording the official and actual ratios on various samples he is running in the regular course of operation. From time to time these will be studied and an attempt made to set up a general system of ratios.

One of the members, Mr. Gill, already has some data which he will compile for study by the committee.

(4) Use of a One-Inch Column for Dark Oils

The Fat Analysis Committee asked this committee to consider the adoption of a one inch column where it was found impractical to use a five and one-quarter inch column. They further proposed mentioning the Lovibond Color Reading Method in the F. A. C. section, as well as in the Refined Oil Section where it now appears.

Recommendations

The committee makes the following recommendations for the incoming committee to consider:

(1) Carry on the work regarding the improvement of the tintometer, including standardization of illumination.
(2) Carry on the work regarding the color reading of crude cocoanut oil now being handled by the Sub-Committee.
(3) Carry on the work regarding standardization of the yellow-red ratio.
(4) Make the following changes in the methods:
   (a) on page 16 f—change the specifications for color tubes to read as follows: "Length, 154 mm. over all, inside diameter 19 mm., outside diameter 22 mm. They shall be provided with two marks, one to indicate an oil column of 133 mm. and one to indicate an oil column of 25 mm. Tubes separately marked to indicate columns of 133 mm. and 25 mm. may be used."
   (b) on page 17 at end of present method add the following paragraph: "Dark oils are to be read on a 25 mm. column, the limit for 'light oils' being 40.0 red on a 133 mm. column. If an oil or fat is found to have a color exceeding 40.0 red when using the regular 133 mm. column, fill another tube to the 25 mm. mark and read the color under the same conditions outlined above for the 133 mm. column. Report the color as being read on a 25 mm. column. (It will be assumed that any color result in which the column height is not designated has been read on a 133 mm. column. Only when the color has been read on a 25 mm. column will it be necessary to specify the length of column.*)"

(c) at bottom of page 17 add *"It must be borne in mind that the analyst must use only the 133 mm. column in reading colors of oils traded under the NC.P.A. rules."

(d) Include the following in the Section on "Standard Methods for the Sampling and Analysis of Commercial Fats and Oils":

"LOVIBOND COLOR

(Follow the method for color as outlined in the section on Refined Oils)"

The Committee recognizes that the methods are to be revised shortly so no effort was made to revamp the color method completely and incorporate the recommended ideas of (4). If the latter are accepted, it is assumed they will be included in the revised methods.

H. P. Trevithick
H. B. Stevenson
J. J. Lappen
N. T. Joyner
L. M. Gill
R. S. Estey
G. Worthen Agee
A. D. Rich, Chairman

Report of the Soybean Analysis Committee - 1939 - 40

A PROGRESS report describing several studies on oil determination made during the year covers the subjects listed below:

1. *Effect of grinding on the determination of oil in soybeans.*

One sample of whole soybeans was analyzed for oil (lipids) by five laboratories. Each laboratory returned a sample of the beans ground on their mill, and the oil in each sample was determined and a sieve analysis made on the ground meal. To eliminate grinding after partial extraction, it is necessary to grind the beans to pass the following specifications:

Over 60 per cent through 100 mesh.
Over 70 per cent through 80 mesh.
Over 80 per cent through 60 mesh.
Less than 8 per cent on 35 mesh.
Less than 2 per cent on 20 mesh.

Attempts to find a small inexpensive mill that would accomplish this result were unsuccessful. If beans are ground to this degree of fineness, extraction for from 16 to 20 hours will remove within a few tenths of a per cent of the lipids removed by the four-hour extraction with regrind.

2. *Oil in solvent-extracted soybean meal.*

Collaborative studies made by three laboratories on eight samples of extracted meal have shown excellent agreement. On the last three samples, the average deviation in oil content from the average ranged from 0.02 to 0.05 per cent in absolute amount. These samples contained from 0.17 to 0.93 per cent oil. It was found that Skellysolve B extracted slightly more than anhydrous ethyl ether and that Skellysolve F extracted about 0.2 per cent less material in absolute amount than did ethyl ether. The effects of both the type of solvent and predrying upon the amount of extract were found greatest for a sample of toasted meal. The maximum variations between determinations on dried and undried samples were found for Skellysolve B.

3. *Oil in soybean meal from continuous presses.*

Collaborative results obtained by three laboratories on six samples showed agreement within about 0.2 per cent in absolute amount. Skellysolve F did not remove as much of the crude lipids as did Skellysolve B and anhydrous ethyl ether. These samples represented dry material fresh from the press and the same material after being brought to about 10 per cent moisture content. For some of the samples more extract could be obtained from the meal which had been moistened than from the meal which had never been hydrated. This was true even though the moist meal was dried before extraction. In other words, some meals produced by a continuous press operation possessed apparent oil contents calculated on a moisture-free basis which were dependent on previous treatment. For these samples, the meal taken directly from the continuous press shows an apparent oil content lower by as much as 1 per cent than this same meal when hydrated and then dried and extracted. This indicates the need for caution in determining the oil content of such meal and may explain some of the difficulties in obtaining oil balances in commercial operation.

4. *Nature of the extract called "oil."*

A large (50 lb.) sample of soybean flakes was fractionally extracted in a Soxhlet type apparatus. The first and major fraction was very low in phosphorus whereas the last fraction, comprising less than 1 per cent of the total extract, contained almost 1 per cent of phosphorus and about 30 per cent of material insoluble in acetone. This indicates that, in an attempt to obtain the maximum amount of extract, substances which are not triglycerides may be removed. Soybeans are known to contain relatively large amounts of phosphatides, and it is probable that these substances and material associated with them are extracted to a greater or lesser extent depending on the solvent, method, time, and similar factors. For analytical and control purposes the determination of total crude lipids is apparently of most value. The requirements of a method for determining the total lipid extract from soybeans may differ markedly from those used for other oil-seeds where the triglycerides are not associated with large amounts of similar compounds.

M. M. Durkee
N. F. Kruse
T. L. Rettger
S. O. Sorensen
Lawrence Zeleny
R. T. Milner, Chairman.