

- (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 N.C.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.

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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.

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