age conditions and the oxidation of fats. Present-day knowledge of the oxidation of fats leaves much to be desired in such a study. This lack of fundamental knowledge is responsible for the lack of better methods of study. It is hoped that this paper will stimulate a study of the fundamental basis of the oxidation of fats.

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Report Of The Seed Analysis Committee*

THE activities of the Seed Analysis Committee this season have developed very few positive results on which recommendations may be made. However, certain lines of investigation were followed and will be briefly reported on.

The efforts of the committee to find or develop a mill more suitable for grinding seed samples were continued without success. Manufacturers in all parts of the country were contacted without finding a satisfactory unit or interesting anyone in developing one. E. H. Sargent & Company also unsuccessfully tried to get some manufacturer to cooperate with them in this work. The explanation seems to be that the market would be so limited that development of a grinder would not be profitable to the manufacturer. The committee still feels, however, that the present grinding operation is weak and presents a large opportunity for the introduction of variables and error, even with the most careful attention.

A method for the determination of lint on cotton seed, developed by Mr. R. S. McKinney of the Oil, Fat and Wax Laboratory at Washington and submitted to the committee at their request, was also studied. Without question, more and more frequently the chemist (and especially the plant chemist) is asked to determine the percentage of lint on seed, both before and after mechanical delinting, usually as a function of plant control. For this type of work the method is entirely adequate. However, the practical difficulties in obtaining a sample, small enough for use representative of the whole, are such that the committee feels a great deal of confusion might develop if any such test later became accepted as a settlement test. It therefore confines its recommendation to the statement that the method is simple and gives results that may be closely duplicated using any given sample. The question of the desirability of including it among our Official Methods we feel should be decided by the membership.

The third phase of the committee's work centered about the questionnaire which was sent to the check seed collaborators. Before discussing this phase the committee and its chairman would like to thank the membership for their cooperation and interest as shown by the completeness of the replies and suggestions on the questionnaire. In spite of this, the committee's study of these replies in conjunction with the check seed series results, did not equal our hopes. No absolutely undebatable trends or facts were brought out; it was hoped that common differences in procedure might be found in similar groups, thus showing definite effects produced from specific causes. This did not prove entirely true. Laboratories whose questionnaires showed almost identical procedures were found at opposite extremes in efficiency, while no single variation in temperatures or procedure could be found solely in one group. Certain tendencies, often somewhat obscured by other factors and of a negative rather than a positive nature, did seem visible; whether or not these tendencies are the primary causes of error might be debatable. However, it is significant that no laboratory incorporating any one of the following points in its procedure rated high in accuracy:

No laboratory using a maximum fuming temperature as high as 135° C. missed less than eight tests.

Laboratories using unmeasured or greater amounts than 1.5 cc. of acid tended definitely to fall in lower efficiency groups, with the exception of instances where extremely low fuming temperatures were used.

Laboratories designating their ground samples as brownish or dark (with one exception) missed nine or more tests.

Ground samples designated as gray or yellowish are, from the report, equally satisfactory.

From the above it is obvious that carelessness or a deliberate disregard of the rules is one of the major causes of error. Too high fuming temperatures and varying amounts of acid have no other explanation. Darkened samples, while more difficult, can in all cases be eliminated by careful experimentation, except where the seed itself is so badly off as to have a naturally brownish color.

One other point seems worthy of mention: Laboratories using lower than required temperatures for fuming did so with no apparent damage to their efficiency. One laboratory using an extreme fuming temperature of from 60° to 80° C. had only five tests outside of tolerance. The width, thus shown, of the effective fuming range below that now stipulated and the narrowness of the range from it to temperatures high enough to be harmful (135° C.) logically raise a question regarding the present rule. It would seem possible that, instead of being the optimum, the present designated fuming temperature may lie too near the maximum limit, thus requiring very close control and offering the possibility of overheat-

*As presented at the Spring Meeting at New Orleans, May 28-29, 1935.

ing in unventilated ovens or when small loads are fumed. This question, often discussed, is shown to be a definite possibility by our study of the questionnaire. Such a condition, if proved true and corrected, should largely eliminate sample darkening and many otherwise unexplainable cases of "off" results in oil determinations.

The committee regrets that after receiving the questionnaire answers, time was not available to go into this problem, but recommends it to our successor as the only question brought out by our work where further careful study might definitely improve our methods.

Respectfully submitted,
J. L. MAYFIELD, Chairman,
Seed Analysis Committee.

Method of Lint Determination: Weigh out 50 grams of the original sample of cotton seed in duplicate, and place in porous pots in the walls of which 3 cc. of concentrated hydrochloric acid has been absorbed. Cover the pot with a watch glass or other suitable cover and place in an oven at 130° C. for 1 hour. Remove and allow to cool to room temperature and reweigh on a balance sensitive to 0.05 grams. Place the fumed sample on a 10-mesh sieve and rub off the lint with a No. 11 solid rubber stopper and/or a towel. Reweigh the sample. Consider the weight of the dried lint as equal to the difference between the weight of the dried and fumed seed before and after removal of the lint.

Moisture determination of dried and fumed lint: At the beginning of each season collect the dried fumed lint from several samples and weigh 5 grams into a moisture dish and dry at 101° C. for 2 hours in the oven specified in Section 2 (a) of Rule 270. Place cover on dish, cool is dessicator, and reweigh. Calculate loss of weight as per cent of moisture in dried fumed lint. Check this determination from time during the season as conditions may indicate.

Example of calculation:

Weight of original sample	50.00	50.00
Weight after fuming	47.40	47.50
Weight after removal of lint	41.15	41.25
Loss due to removal of lint	6.25	6.25
Per cent of loss (weight × 2)	12.50	15.50
Moisture content original lint	7.00	7.00*
Moisture content fumed lint	2.00	2.00

Calculation:

$$\frac{12.50 \times 98}{93} = 13.2 \text{ per cent lint content of seed.}$$

*All lint calculated to 7 per cent moisture basis.

REPORT OF THE REFINING COMMITTEE FOR 1935-1936*

TWO matters were referred by last year's committee to this year's committee for further consideration as follows:

Specifications for Filter Paper

No work has been done on this problem because none of our members has been able to suggest a suitable procedure other than the present method of approving certain definite brands.

Soya Bean Oil

The refining procedure for this oil needs further study because of the various varieties of soya bean oil to be handled. This matter was taken up with the Soya Bean Manufacturers' Association in the attempt to have them cooperate with our committee in further study of refining procedure. Mr. Glenn H. Pickard, chairman of the Finished Materials Standards Committee of that association, indicated his desire to cooperate in this matter, but Mr. Pickard subsequently resigned as chairman and was replaced by Mr. M. M. Durkee of this society. We understand that Mr. Durkee is organizing his committee and we may expect cooperation later on, but nothing has been accomplished this year.

Coconut Oil

An omission occurs in our Refining Methods as published which should be corrected by inserting in the Lefax Methods, page 16c, paragraph 7, line 3, after "75 + 2° C.," the following parenthesis—(50±2° C. for coconut oil). The same change should be made in the Methods as published in the Rules of the National Cottonseed Products Association, Rule 273, Section 5 (c), in the last line of page 141.

This insertion makes this portion of the rule agree with the tabulation of methods which is correct.

Refining Paddles

The use of copper refining cups and paddles was brought to the attention of the committee because of the effect of copper on the green color in certain fats and oils, as published in OIL & SOAP for January, 1935. It was there shown that when tallow has a greenish cast due to the presence of chlorophyll, the green color becomes greatly intensified if the tallow is treated with copper. The increased green color then masks to some extent the red color in the Lovibond reading and gives an apparent color of lower red. The same was found to be the case with certain cottonseed oils having a green color, but not in any considerable number of cottonseed oils. Inasmuch as some laboratories are at the present time using copper or brass paddles, and others are using steel paddles, this difference may cause slightly different color readings on certain oils and is a point which should probably be standardized. The committee has accordingly voted four to one, with four other members not voting, to approve the following amendment to our Refining Methods:

In the Lefax Methods for refining loss on page 12 at the end of paragraph (a), Refining Apparatus, insert the following:

Note: Refining cups and paddles must be made of steel or some alloy not containing noticeable amounts of copper. The oil should not be allowed to come in contact with copper.

Recommendations

a. Further work by next year's committee on the refining of soya bean oil in cooperation with the Soya Bean Manufacturers' Association.

b. Correct the present method for coconut oil as indicated above.

c. Amend the refining method to eliminate the use of copper in refining cups or paddles.

Respectfully submitted,
C. B. CLUFF, Chairman.

*As Presented at the Spring Meeting at New Orleans, May 28-29, 1935