reconcile theory with practice in the bleaching of a fatty oil.

THE AMOUNT OF ADSORBENT TO USE

Colloidal impurities and soluble coloring matter are removed by treatment with caustic soda and adsorptive agents and each treatment should contribute a certain relative share, more or less, of the work to be done in order to effect an economically balanced refining treatment. While reduction in color and colloidal impurities is also effected, very markedly, by efficient hydrogenation and deodorization, it may not be economy in the final analysis to depend upon these operations for decolorization beyond certain limits.

If an oil is to be hydrogenated, the optimum dosage of adsorbent in the previous bleaching operation will be such that all traces of soap and catalyzer poisons are removed in order to economize on hydrogen gas, catalyzer and conversion time.

Deodorization under high heat and vacuum causes precipitation of mucilaginous and coloring matter and within certain limits the action is progressive. Undoubtedly there is danger of causing incipient or complete decomposition of delicate fat molecules with a resultant premature rancidity in the finished fat if heat treatment is depended upon for removal of undue amounts of color. Moreover, the accumulation of this precipitated matter necessitates frequent shut-down and caustic cleaning of the plant, which, in turn, requires a subsequent prewash of the system with refined oil before proceeding with operations in order to absorb caustic residue and oxygen unavoidably left in the system. The precipitated matter will be a continual source of contamination to the deodorized oil. In many plants the oil is clarified and brightened by filtering through paper lined presses which, by the way, is an excellent precaution under the usual circumstances. However, the presence of undue amount of precipitated matter causes rapid blinding of the finished oil press with consequent extra labor for redressing and the possibility of autocontamination of the oil itself.

Because of these considerations, it will be obvious that below certain minima of adsorbent dosage, economy is defeated and finished oil quality is likely to be impaired.

The destearinization or winterizing of animal and vegetable oils and fats is materially accelerated when inhibiting impurities are first removed with adequate adsorbent treatment. In addition the stearine precipitates in much better crystalline form, thus making its separation from the liquid oil with greater speed and completeness.

REFERENCES

[1]Gurwitsch, L., and Moore, H., "The Scientific Principles of Petroleum Technology," p. 485, New York, D. Van Nostrand Co., 1932.

[2]Haseman, J. D., "The Alleged Catalytic Action of Fuller's Earth on Coloring Matter in Oils," paper presented before Amer. Oil. Chem. Soc., New Orleans, May 5–6, 1924.

[3]Nutting, P. G., "The Bleaching Clays," U. S. Geol. Survey Circular 3, pp. 11, 17, 20 (1933).

[4]Kerr, P. F., "Montmorillonite or Smectite as Constituents of Fuller's Earth and Bentonite," Jour. Miner. Soc. of Amer., 17, No. 5, 192 (1932).

DISCUSSION

Pres. Hutchins: Thank you, Mr. Odeen. Are there any questions that any of you would like to ask Mr. Odeen? I feel sure he would be glad to answer them.

Mr. Kilgore: I was very much interested in this theoretical discussion on adsorption, but some of the actual results it seemed, disagreed with his very complete discussion of adsorption. I would like to point out that a common fallacy is made by writers on adsorption in trying to apply a formula worked out by the famous Willard Gibbs, as referred to in this paper, to the interface instead of the surface. If you will examine Gibbs' original papers carefully, you will find that the adsorption isotherms are applicable only to surfaces, not to interfaces. That fallacy has persisted down through the literature, until recent work has shown on a very good mathematical basis that the isotherm does not even approximately hold in the case of interface adsorption. This was particularly interesting to me, because the results seem to actually verify the recent work on that. I would suggest that in going over this theoretical work, as has been done so thoroughly, this recent work be taken into account, because it certainly has a heavy bearing on the problem which has just been discussed.

President Hutchins: We appreciate the paper very much, and it will be published along with all the others, so that you can dwell on it and think over the many points more than you can this morning.

REPORT OF THE REFEREE BOARD

For the Annual Meeting, May 1935

AT A JOINT meeting of the Governing Committee and the Referee Board in Chicago on October 10, 1934, the consensus of opinion regarding the future policy of our Society on cooperative samples was as follows:

1. The A.O.C.S. should regularly sponsor a set of cooperative samples of broader scope than the check meal samples of the Smalley Foundation Committee. Cottonseed samples and crude oil samples are believed to be appropriate additions to the cooperative samples regularly sponsored by the Society.

2. Participation in this work should be required of referee chemists and made available optionally to others.

3. In the tabulation of the results, there should be a grading system and a standard set for what is considered satisfactory work.

4. It should not be the policy of the Society to issue certificates generally to those performing the work and meeting the standard prescribed.

5. Referee certificates should still be issued, substantially as in the past, and the results of the cooperative work should be taken into account as determining in part the qualifications of referee chemists. However, all present at the meeting agreed that the results of cooperative work should not be emphasized to the point of detracting from

the importance of considering the character and professional qualifications of referee chemists.

6. Although in the main the results are confidential and are to be made available to the individual participants primarily for their own guidance, the results should be made available with the consent of the participant to any trade organization desiring our cooperation. Particularly it is hoped that the N. C. P. A. will desire to cooperate with us, and it is considered almost essential for the success of the general plan to avoid duplication in the distribution of cooperative samples which our referee chemists are required to examine.

7. The charges for this service should be fixed with view to making the work self-sustaining without substantial profit.

It is the opinion of the retiring Referee Board that most of the detailed adjustment required for carrying out the above policy can best be left to the future Referee Boards, but that the Society as represented at the general meeting should vote on the question of approving the general policy as defined, and that at least item 1 should be discussed in considerable detail. There will invariably be a wide divergence of opinion on the proper handling of collaborative samples. Particularly in regard to the number of check meal samples, widely divergent positive opinions are held. Apparently some collaborators are satisfied with the present number of samples (30), while some believe that the number should be decreased and others would be glad to have the number increased.

Responsibility for handling of the samples is another matter on which opinions differ. Perhaps the wisest policy will be to avoid changes in organization responsibility for at least the next year or so.

The following is offered as a specific program, but is intended chiefly to serve as a basis for discussion at the general meeting:

Twenty check meal samples to be distributed each year by the Smalley Foundation Committee, with results available for use of the Referee Board.

Fifteen check seed samples to be distributed by the Referee Board.

Five crude oil samples for refining and bleach tests to be distributed by the Referee Board.

With regard to item 3, the present Referee Board is not prepared to recommend any specific grading system in preference to the grading system in recent use by the Chemists' Committee of the N. C. P. A. Without representing this system to be ideal in all respects, we believe that in the main it is a fair one to the various participants in the collaborative work. We think that the system may be open to objection in that it sets no limit on the penalty which may attach to a single error. In the hypothetical case of a mistake of 1 per cent in free fatty acid of a typical crude oil, the deduction from the participant's grade would be more than double the deduction from the grade of a participant showing a deviation of .5 per cent from the accepted mean, whereas the primary significance of each error would be that something was radically wrong with the analysis. There may be a slight presumption that the collaborator making the larger of these two large mistakes deserved somewhat more blame than the one making the smaller mistake, but it is questionable if the penalty should increase in proportion to the deviation from the limits of tolerance. With this reservation, the retiring Referee Board recommends to the Society and to the incoming Referee Board the N. C. P. A. grading system as a good starting point.

In subscribing to item 4 of the above program, we do not mean to question the practice of the Smalley Foundation Committee in giving special awards and prize certificates for outstanding work. Also such endorsement as we have given to the N. C. P. A. grading system should not be construed as an attempt to pass judgment on the relative merits of that system and the grading system used by the Smalley Foundation Committee for the purpose of selecting the highest ranking participants.

The matter of fixing the charges for the collaborative work is one for which we do not think the Referee Board should take full responsibility. The referee chemists themselves are entitled to be consulted, and either the Society as a whole or the Governing Committee should take appropriate action. We are of the opinion that the charge for each set of samples should not be in excess of $10.00, or the total charge in excess of $30.00, unless it is desired to continue the full number (30) of check meal samples, in which case it may be necessary to retain the $15.00 charge for these samples and increase the limit on the total to $35.00. This program will not be put into effect unless the N. C. P. A. Official Chemists are relieved from further charges for collaborative samples sponsored by that organization.

For the clear understanding of all concerned, it is proposed that an approval of this report at the general meeting will imply an approval of the general program expressed in items 1 to 7 at the beginning of this report, and that the more specific suggestions and recommendations of the retiring Referee Board will be referred to, but not necessarily binding on the incoming Referee Board.

N. C. Hamner,
J. P. Harris,
W. D. Hutchins,
J. J. Vollertsen,
A. S. Richardson,
Chairman.

Applications

Application for Referee Certificate. First notice. Mr. J. C. Burt, Director of the Barrow-Agee Laboratory of Leland, Mississippi, has applied for an A. O. C. S. Referee Certificate reading on cottonseed, cake and meal.

Corrections

Correction on Color Committee Report, July Issue OIL & SOAP, Page 155

Correction on Uniform Methods Committee Report, August Issue OIL & SOAP, Page 180

In the table showing the amount of yellow color to be used with various amounts of red, the Committee reports should read:

Up to 3.9	red	use 6	yellow to 1 red
4.0 to 4.9	red	25	yellow
5.0 to 5.9	red	30	yellow
6.0 to 6.9	red	35	yellow
7.0 to 7.9	red	40	yellow
8.0 to 10.9	red	50	yellow
11.0 to 14.9	red	70	yellow
15.0 to 19.9	red	100	yellow
20.0 and above		150	yellow

Errata

Article on "Review of Literature on Fats and Oils for 1934," Oil and Soap, 12, 106-121 (1935.)

Page 107, column 1, line 6, for 28 read 18.

Page 115, column 1, line 7, for 83.97 read 38.97

Page 115, column 1, line 24, for hirsulum read hirsutum.

Page 119, column 2, line 34, for 107 read 106.