Abstract

A simple procedure to make single and multiple vacuum bleaches is recommended for consideration as an official AOCS method.

The stirring of the oil or fat will be at 250 rpm and with an effective stirring area so as to follow implicitly the AOCS bleaching procedure in detail. The recommended time and temperature to use for open and vacuum bleaching of the various oils, fats, and waxes, obtained from literature, etc., are given.

Laboratory Vacuum Bleaching

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Introduction

AT THE PRESENT TIME, the AOCS has no official method for vacuum bleaching vegetable, animal, or fish oils. However, every new plant built in this country during the past decade has incorporated either continuous or batch vacuum bleaching.

With this for justification, the following method is proposed for consideration of the Bleaching Methods Subcommittee, the Uniform Methods Committee, Color Standards Subcommittee and other interested AOCS members. Comments of interested members may be directed to the author or to E. R. Hahn of the Bleaching Methods Subcommittee.

TABLE I

Laboratory Open and Vacuum Bleaching Temperatures for Animal Fats, Vegetable Oils, Fish Oils and Waxes

Product	Time and bleaching temperatures				Comment
	Open bleaching		Vacuum bleaching		
	Minutes	Temperature, F	Minutes	Temperature, F	
Castor oil	30	180	30	180	Carbon recommended to be used with clay.
Cedarwood oil	30	160–180	30	180 Filter at 140	This oil is generally decolorized without refining. Use activated clay.
Corn oil	20	230	20	180	
Coconut oil	30	210	30	180 Filter at 150	Use clay plus carbon. Cool filtered oil to prevent darkening.
Cocoa butter	30	230	30	180	
Cottonseed oil	10	248	10	248 Filter at 140	
Fatty acids:					
Stearic	30	160	30	160	
Oleic	30	180	30	160	
Fish oils except tuna			30	185 Filter at 140	When ready to filter pass in inert gas and also during filtration.
Grease inedible	30	230	30	180	
Hempseed oil	30	160–180			
Lanolin	30	230	30	180	
Lard	5	180			
Lard oil inedible	20	220	20	180	
Linseed oil	30	180	30	180 Filter at 140	
Olive oil	20	160	20	160	
Oticia oil	20	200	20	180	
Palm oil		380	15	275 Filter at 160	Open bleaching go to 380F allow to cool and filter at 220F.
Peanut oil	10	230	10	180	
Perrlla oil	10	220			Generally use carbon with the clay.
Rapeseed oil	20	190	20	180	
Rise bran oil		180			Very difficult oil to bleach. Determine length of time. Use carbon with clay.
Sesame oil	30	140–180	20	180	
Sunflower oil	10	220	10	180	
Safflower oil	10	230			
Tallow edible	15	220	15	180	
Tallow inedible	15	230	30	180	
Tallow oil	30	230	30	180	
Tung oil	30	180	30	180	
Waxes:					
Beeswax	10	230	20	180	
Candelilla	10	250	20	180	
Carnauba	10	250	30	180	

The bleaching temperatures recommended here for fatty products bleaching, etc, were obtained from published literature, sales pamphlets and from manufacturers.

The laboratory bleaching temperatures are generally higher than the refinery bleaching temperatures as the laboratory bleaches are generally from 5–30 min, while plant batch type bleaching consumes not less than 60 min.

Recommended Procedure for Single Vacuum Bleach

This is based on the experimental data for soybean and cotton oils described by King and Wharton (1) and recommendations by James (2).

Use a three-neck, one-liter Pyrex flask, Serial No. 4940. In the middle neck fit a No. 8 rubber stopper with a ball and socket joint (Pyrex Serial No. 6760). Ball 18 mm, tube diameter 7 mm; both cut from 6–3 in. in length. Lubricate with a drop of glycerin.

The stainless steel stirrer rod is ¼ in. diameter, 12 in. long, fitted on the end with a 1⁄16 in. thick cross stirrer, 1¼ in. long and ¾ in. high. Effective stirring area is 1.87 sq in., compared to 1.75 sq in. for AOCS open bleaching procedure. Fit the 7 mm tube of the socket joint to the stirrer with a piece of rubber tubing to make a vacuum seal.

The other two necks of the flask are fitted with a vacuum connection and a thermometer; both inserted in No. 3 rubber stoppers.

By securing the three-neck, one-liter flask always exactly at the same height on a ring stand and never touching the motor and stirrer after it has once been set up and tested, few difficulties will be experienced in making vacuum bleaches.

1) A clamp lined with asbestos padding is fastened around the middle neck of the flask and this is secured to a stand with a clamp. A ring with a 6 in. x 6 in. asbestos pad is now raised to the bottom of the flask and is secured to the stand with a clamp and should be set up about one inch above the top of the bunsen burner used for heating the flask. The motor and stirrer is now adjusted so the stirrer is ⅛ in. above the bottom of the flask, as described in the method for open bleach, and then well secured. The set up is now tried out for vacuum (29+ in. Hg) and stirring (250 ± 10 rpm) and if satisfactory will give trouble-free operation.

To fill the flask, the ring stand is dropped, clamp around the neck of the flask is loosened at the stand, but not at the neck, and flask and clamp placed in a one gallon container on a balance and weighed. The oil or fat, 300 g, is weighed in the flask, using a funnel in the middle neck, to make certain no oil or fat comes in contact with the neck of the flask so the rubber stopper will never become oil- or fat-soaked, as the rubber stopper will then turn as soon as the motor stirrer is switched on.

2) The required clay is added by means of a folded paper to make sure it is deposited on top of the oil.

3) The flask is secured on the stand by merely tightening the clamp at the stand. The stirrer is in proper place. The vacuum connection is now inserted in one neck and the thermometer in the front connection facing the operator.

4) Bleaching. After evacuating the oil-clay slurry for 5 min, raise the temperature following AOCS procedure for open bleaching, Method Cc 8a-52. For soybean and cottonseed oils, this is 248F (120C). The total time, from the time the heat is applied, should be 10 min with at least 5 min at the bleaching temperature. The the heat is removed, the ring with asbestos pad dropped, and a one gallon container fitted with ¼ in. overflow pipe, installed one inch below the top of the container, and containing one-half gallon of hot water, is raised on the ring to such a height that the water reaches the necks of the flask. Then cold water is added to the gallon container and allowed to overflow. The temperature of the oil is

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gram. President Harris asked the committee to work closely with the Executive Secretary in an effort to arrange for independent financial support from outside the Society.

The Board unanimously accepted the report of the Education Committee.

Since the Meetings Study Group was to meet later during the week in conjunction with the Exhibits Policy Committee, Dr. Cowan reported that the following agenda would be considered:

The matter of extending the length of our Spring and Fall Meetings; Shifting the meetings from Sunday through Wednesday to running from Wednesday through Saturday;

Elimination of conflict of committee meetings by having the Executive Secretary set up committee meeting schedules; and

Permitting exhibits at Spring Meetings as well as at Fall Meetings.

In presenting the report of the Journal Committee, A. R. Baldwin exhibited a series of charts (raw circulation, adjusted circulation, total pages published, technical pages published, news pages published, technical manuscripts received, production costs, advertising dollar volume, and pages of advertising published), each comparing current activity with that of past years, and depicting an element of growth that has brought the Journal into a state of financial imbalance.

In order to balance our publication budgets, Dr. Baldwin reported that both the Journal Committee and the Executive Committee had recommended that page charges be instituted to help compensate for rising costs of publication.

The Governing Board voted unanimously to institute a charge of $25 per published page for both *JAOCS* and *Lipids*, effective Jan. 1, 1966.

Dr. Baldwin also reported that the Journal Committee had decided to discontinue publication of the Annual Review of Literature for the year 1966 in order to appraise readership reaction and judge whether this project as a worthy investment of members' time and *JAOCS* money.

The Governing Board voted unanimously to accept the report of the Journal Committee with thanks and expressed appreciation to Dr. Baldwin for the educational manner in which the report was presented.

Dr. Baldwin was called upon for his progress report on the new publication *Lipids*. Samples of the new journal's cover and a brochure designed to announce the new publication were shown to the Board. Dr. Baldwin briefly reviewed plans for the first issue, indicating that production is on schedule for publication on Jan. 5, 1966, the date decided upon by the Executive Committee.

The review of manuscripts will be much like that used by *JAOCS*, with manuscript traffic being coordinated by the editorial office exactly as it is for *JAOCS*. The associate editors will be chosen by the end of October but a new editor will not be named immediately. (Dr. Baldwin will serve as the editor of *Lipids* with the approval of the Governing Board until a permanent editor has been chosen.)

Dr. Baldwin and the Journal Committee had devoted considerable time to seeking a workable set of standards for defining the specific scope of *Lipids*. It was decided that instead of separating papers on the basis of basic and applied research, papers of industrial or commercial orientation will be put in *JAOCS* and those of more academic or theoretical interest will be put in *Lipids*. During lengthy discussion the Governing Board tested these categories to their satisfaction.

The Board voted unanimously to accept Dr. Baldwin's report.

It was noted although the Executive Committee had recommended that meeting revenue should cover the cost of publication of Technical Program titles and abstracts and that such revenue was included in the budgets which the Board had approved, the Board had not actually voted that this be done.

The Board voted unanimously to accept the recommendation of the Executive Committee that these publication costs be charged against convention revenue.

The Executive Committee had recommended that the Society discontinue financial support of the MacGee Honored Student Program. It was felt that, in view of the difficulties in balancing our budgets in recent years, we could not justify continued use of Society funds for this purpose.

The Board voted unanimously that C. H. Hauber seek outside financial support of $2000 per year for this program. Regardless of the result of these efforts, financial support up to $1000 per year is committed from AOCS operating funds only through the year 1966.

A former member of the Society, Rodolfo J. Vergara, applied for reinstatement of his membership. The Board voted unanimously to reinstate Mr. Vergara.

The Board adjourned at 5:20 pm.

• *Vacuum Bleaching . . .*

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lowered to 140F (60C). The water bath is removed, the flask wiped dry, vacuum removed, motor stopped, and flask removed by loosening the clamp at the stand, making sure the rubber stopper with the ball joint is secured with a wire hoop against dropping on the agitator. The oil is then filtered, following standard AOCS procedure, pouring the oil from the flask by the neck that holds the thermometer.

Fish oils are so sensitive to oxygen that the recommended procedure calls for passing nitrogen in the flask after cooling the oil and over the Buchner funnel used for filtering. This can be accomplished by installing a T in the vacuum connection and connecting to an inert gas cylinder after the oil is cooled to the desired temperature.

Should the bleaching committee report favorably on the vacuum bleaching procedure as outlined, there is available recommendations for equipment, drawings and procedures for multiple vacuum bleaching to cover most oils, fats and waxes.

REFERENCES

1. King, R. R., and F. W. Wharton, JAOCS *26*, 201–207 (1949).
2. James, E. M., JAOCS *35*, 76–83 (1958).

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1966 SHORT COURSE ANNOUNCED

The Education Committee, under the chairmanship of N. H. Kuhrt, announces the 1966 Short Course Program will be held at Michigan State University, East Lansing, Michigan.

With the title "Processing Quality Control of Fats and Oils," this Short Course promises to offer to the fats and oils industry the most recent technological developments and future trends. Registration will be August 28th, with four days of lectures: Aug. 29–Sept. 1, 1966.

Chairman at the host University is LeRoy Dugan, Jr., Associate Professor of the Food Science Department. Acting with him on the Short Course Committee are Mrs. L. S. Crauer, De Laval Separator Co., as co-chairman; L. Going of Procter and Gamble, and W. Q. Braun, Wilson and Co.