Report Of The Fat Analysis Committee 1938-39

THE Committee for Analysis of Commercial Fats and Oils submits herewith a report of its activities for the past year.

Cooperative work is in progress in a study of the following methods:

1. The detection of beef fat in lard.
2. Several qualitative tests for the detection of specific oils.

An extensive study has been made of the titer method, and the revised method is attached, which has been submitted to the Uniform Methods & Planning Committee for approval.

The committee has made a general survey of all the accepted methods for fat and oil analyses. Our work for the ensuing year will include a completion of cooperative work now in progress as well as any items which may be developed out of the survey.

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TITER
(Solidification point of the Fatty Acids)

Reagents:

1. Glycerol caustic — Dissolve with the aid of heat, 250 gms. of potassium hydroxide in 1250 gms. of glycerine (dynamite or C. P. grade). To avoid foaming, do not heat over 135 — 145° C.
2. Sulphuric acid — 30% by weight of H_2SO_4.

Apparatus:

1. Two liter Griffin low form beaker.
2. Wide mouth bottle 450 mls. about 19.0 cms. high, inside diameter of neck about 3.8 cms.
3. Test tubes 10.0 cm. long 2.5 diameter, with or without rim.
4. Evaporating dish, beaker or casserole, capacity about 1 to 1½ liters or of convenient size.
5. Laboratory thermometer 0-150° C.
6. Glass stirrer 2-3 mm. o.d., one end bent in form of loop of 1.9 cms. diameter. Nichrome, stainless steel or monel wire may be used instead of glass. The upper end can be formed to accommodate hand stiring, or attached to a mechanical stirrer.
7. Titer Thermometer: Specifications
   TYPE: Etched stem glass.
   LIQUID: Mercury
   RANGE AND SUBDIVISION. Minus 2 to plus 70 degrees centigrade in 0.2 degree graduations.
   TOTAL LENGTH: 370 to 380 mm.

STEM: Plain front, red reading mercury, suitable thermometer tubing with diameter 6 to 7 mm.

BULB: Corning normal or equally suitable thermometric glass. diameter not less than 5.5 mm. but not greater than that of the stem. Length 15 to 30 mm.

DISTANCE TO MINUS 2 DEGREE MARK FROM BOTTOM OF BULB: 50 to 60 mm.

EXPANSION BULB: To premit heating the thermometer to at least 85° C.

TOP FINISH: Glass ring.

FILLING ABOVE MERCURY: Nitrogen or other suitable gas or vacuum.

GRADUATION: All lines, figures, and letters to be clear cut and distinct. Each degree mark to be longer than the remaining line. Graduation to be numbered at each multiple of 2 degrees.

IMMERSION: 45 mm.

MARKING: "F.A.C. Titer Test," serial number, and the manufacturer's name or trade mark shall be etched upon the stem. The words 45 mm. immersion shall also be etched upon the stem, and a line shall be etched around the stem 45 mm. above the bottom of the bulb.

SCALE ERROR: The error at any point on the scale, when the thermometer is standardized at 45 mm. immersion shall not exceed 0.2 degrees C.

STANDARDIZATION: The thermometer shall be standardized at intervals of approximately 10 degrees C and for an average temperature of the emergent mercury column of 25 degrees C.

CASE: The thermometer shall be supplied in a suitable case on which shall appear the marking: "F.A.C. Titer Test," minus 2 degrees to plus 70 degrees in 0.2 degree graduations.

NOTE: For the purpose of interpreting these specifications the following definitions apply:

The total length is the over-all length of the finished instrument.

The diameter is that measured with a ring gauge.

The length of the bulb is the distance from the bottom of the bulb to the beginning of the enamel backing.

The top of the thermometer is the top of the finished instrument.

PREPARATION OF FATTY ACIDS:

1. Weigh 110 gms. of glycerol caustic into evaporating dish, heat while stirring to 150° C., add 50 mls. of melted fat and reheat. In some cases some additional caustic may be found necessary to insure complete saponification.
2. Continue stirring being careful not to heat over 150° C., until completely saponified. Saponification is usually indicated by the homogenity of the mass, as well as by the tendency of soap bubbles to form and rise from the mass, especially if the latter is stirred rapidly. Complete saponification is absolutely necessary to insure correct results.
3. Cool slightly, add 200-300 mls. of water and after solution of the soap add 50 mls. of the sulphuric acid, stirring during the addition. After

separation of the fatty acids, add 500 to 600 mls. of water and boil until the fatty acids are completely melted and clear.

4. The aqueous layer containing the sulphuric acid may be removed from under the fatty acid layer by an appropriate syphon. Again add 500 to 600 mls. of water and boil two or three minutes, making sure that all of the fatty acids are melted and clear.

CAUTION: Hard fats and other high melting point fats are sometimes slow to melt and clear. Fatty acid layer should be carefully inspected while it is quiet, to be sure all has melted.

5. Syphon off water again and repeat, if necessary, with water as under *4* until wash water is neutral to litmus paper.
6. Carefully remove fatty acids so as not to include any water. Filter these while entirely melted through a rapid filtering paper. Heat the filtered acids on a hot plate to 130° C. to remove traces of moisture and pour into the test tube. Fill the latter to a height of 57 mms. from the bottom.

NOTE: If excessive moisture is present, the acids should be decanted, after having stood for a few minutes, refiltered and reheated. Acids must be thoroughly dry.

CAUTION: Fatty acid should never by overheated or held at a high temperature for more than a few minutes. Unless samples can be stirred out shortly after separation, it is best to hold them at cool temperature and heat them to 130°C. just prior to stirring.

SOLIDIFICATION OF FATTY ACIDS:

1. Fill and adjust the temperature of the water bath. The temperature of the water should be 20° C. for all samples having titers of 30° C. or higher, and approximately 10° C. below the titer point for all samples with titers under 30° C.
2. Place the test tube with the separated fatty acids in the assembly as shown in the drawing. Insert titer thermometer and place in position so that the immersion mark on the thermometer coincides with the upper level of the sample.
3. Stir with the glass stirring rod in a vertical manner at the rate of 50 complete up and down motions per minute. The stirrer should travel through a vertical distance of about 1.5 inches or 3.8 cms.

NOTE: The stirring may be performed by mechanical means by attaching a small motor with suitable reducing gears to and above the stirring rod.

4. Stir at the directed rate until the temperature remains constant for 30 seconds. Discontinue stirring immediately and observe the increase in temperature. Report as the titer the highest point reached by the thermometer. Duplicate determinations are normally expected to agree within 0.2° C.

Report of the Journal Committee

THE official journal of the Society, OIL AND SOAP, has again been published at regular monthly intervals during the past year. There have been no changes in the mechanical form of the Journal, no significant changes in the volume of its editorial content or in the volume of its advertising accounts.

The Journal Committee and the Editorial Advisory Board have again, during this year, critically examined each manuscript prior to publication. In this connection it has frequently been necessary to ask individuals other than members of the Editorial Advisory Board to review and criticize papers. Since the Board was set up for this purpose it was felt that it might be advisable to expand the membership of the Board to include some individuals who have been assisting us in this work. The Journal Committee has approved a suggestion to expand the Board to fifteen members. This suggestion has been transmitted to Mr. Cox for consideration of the Governing Board and since it entails a change in the By-Laws will probably be acted upon at the Spring Convention of the Society.

It will be recalled that in November of 1937 our publishing contract with the Gillette Publishing Company was modified. The modified contract gave the Society a share in the gross revenue of the Journal. At the present time figures are available for the first fifteen months of operation under this contract. The Society received as its portion of the returns $962.67 during these fifteen months. Under the contract under which we operated prior to November 1937, there would have been no return to the Society.

This increase of return to the Society has been made possible largely through a moderate increase in the volume of advertising carried in the publication. This advertising has been secured largely through efforts of the Advertising Committee under Victor Conquest. Much work remains to be done in this connection to convince the industry to advertise in OIL AND SOAP before the volume of advertising is brought up to a point which the publication should rightfully enjoy. All members should take advantage of every opportunity presented them to bring before prospective advertisers the advantages of advertising in our publication.

There is still much room for improvement in the number and quality of papers published in the Journal. The Journal Committee urges all members to cooperate by writing up and sending in their papers or by giving suggestions regarding the improvement of the Journal.

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