REPORT OF THE UNIFORM METHODS COMMITTEE

PRESENTED AT FALL MEETING A. O. S. C., OCTOBER, 17-18, 1935

The Uniform Methods Committee had a meeting at Cincinnati at which three of the members were present. The reports were received from the Fat Analysis Committee, the Soap Committee, and the Sulphonated Oil Committee, all of which were considered and discussed by the members present.

FAT ANALYSIS COMMITTEE:

The Fat Analysis Committee make the following recommendations:

1. That the Wiley Melting Point method as modified be adopted as a tentative method of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.
2. That the Thiocyanogen Method, as described in their report, be adopted as a tentative method of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.
3. That the Twitchell Method as modified be adopted as a tentative method of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.
4. That the A. O. A. C. Method for the detection of foreign fats containing tri-stearin in unhydrogenated pork fats be adopted as a tentative method of the Society with the changes recommended. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.

SOAP COMMITTEE:

The Soap Committee recommends:

1. That the method as written for screen analysis of powdered soap be adopted as a tentative method of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.
2. That the present tentative method for the determination of Volatile Hydrocarbons be deleted and replaced with the method described in the Soap Committee report. The Uniform Methods Committee approves this change and moves its adoption. The motion was properly seconded and carried.
3. That the methods for Soap Analysis which have been tentative for a year or more be adopted for Official Methods of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.

SULPHONATED OIL COMMITTEE:

The Sulphonated Oil Committee recommends:

1. That the Titration Method and the Ash Gravimetric method for the determination of organically combined SO_3 be adopted as tentative methods of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.
2. That the Extraction-Titration method for sulphonated oils of the ester type containing sodium acetate or other interfering compounds be adopted as tentative methods of the Society. The Uniform Methods Committee approves this recommendation and moves its adoption. The motion was properly seconded and carried.

EGBERT FREYER,
R. C. HATTER
M. L. SHEELY
H. P. TREVITHICK
J. J. VOLLERTSEN,
Chairman.

ELM SEED OIL

By H. A. SCHUETTE and CARL M. LUNDE
(University of Wisconsin)

A SURVEY of the literature of elm seed oil having brought out the fact that all published data now extant pertain to the European product, repetition of these studies on a domestic oil for the purpose of comparison bid fair to be of interest.

The opportunity for carrying out such a study came in the spring of 1934, when the elm trees on the campus of the University of Wisconsin produced an unusually large crop of seeds. It was not a difficult matter to collect them nor to thresh them out of their winged envelopes when dry. The latter appear to have a waxy coating, for when the ether extract of wing and seed is examined it will be found, it has been reported (Anon. 1917), that the oil so obtained contains more unsaponifiable matter than that recovered from the seed alone. The seeds have a pleasant grainy flavor and a high nutritive value (Table 1). They apparently

TABLE I

Composition of Elm Seeds

Ash[1]	5.25%
Soluble	2.97
Insoluble	2.28
Alkalinity of soluble ash	13.06[2]
Alkalinity of insoluble ash	11.86[2]
Ether extract	25.55
Crude protein (Beythien 1916)	42.00
Crude fiber (Beythien 1916)	4.40
Nitrogen-free extract, etc.	22.80

[1]Analyses of the ash by D. S. Gaarder.
[2]cc N acid per 100 g. seed.

contain lypolytic enzymes for if the ground seed is left in contact with the oil, the acidity rises rapidly (Kreis 1918).

The oil is liquid at ordinary temperatures. It is green when recovered by petrolic ether extraction, when expressed it is yellowish green. The chemical and physical constants of the former were found to be:

TABLE II

Chemical and Physical Characteristics of Elm Seed Oil (*Ulmus americana*)

Specific gravity 20°/20°[3]	0.9288
Index of refraction 20°[3]	1.4554
Coefficient of viscosity 20° (centipoises)[3]	0.3381
Surface tension 20° (dynes/cm)[3]	30.72
Titer test °C.	14.0
Iodine number (Wijs)	24.10
Saponification number	273.0
Thiocyanogen number	16.18
Hydroxyl number	13.45
Reichert-Meissl number	2.1
Polenske number	33.9
Soluble acids (per cent as butyric)	0.8
Insoluble acids (Hehner number)	82.23
Iodine number of fatty acids	23.08
Thiocyanogen number of fatty acids	15.51
Saponification number of fatty acids	288.7
Unsaponifiable matter (per cent)	1.00

[3]Determined by F. S. Meade.

The presence, in large amount, of fatty acids of intermediate molecular weight as revealed by the high Polenske number, was later verified when, following methyl alcoholysis of the oil itself, approximately 50 per cent of capric acid was indicated. This value, however, must for the present be regarded as tentative for the separation will be repeated.

The calculated percentages of glycerol and the total fatty acids, assuming that this oil is composed of a mixture of triglycerides, are 14.9 and 92.8, respectively. The latter figure closely agrees with that found experimentally, or 92.7. Unsaturated acids are obviously present in small amount. Calculation by the Kaufmann procedure reveals that saturated acids comprise 82.82 per cent of the total acids. Similarly, oleic and linoleic acids comprise 8.83 and 8.36 per cent, respectively, of the whole.

TABLE III

Range of Constants of Elm Seed Oil

Iodine number	15.9 —37.9
Saponification number	26.4 —27.9
Reichert-Meissl number	3.0 — 5.7
Polenske number	33 —41
Hehner number	75.4
Unsaponifiable matter (per cent)	0.92—10.8 (1.35?)
Solidifying point °C	2.0 — 7.1

For purposes of comparison with such of the constants of this oil as have been already reported abroad, there is included here (Table III) a survey of such data. The species in question has not always been indicated by the investigator in question. Included among those reported on are *Ulmus campestris* L., *U. effusa, U. pedunculata,* and *U. scabra,* Mill. Except for the Hehner number, it appears tha the characteristics of the seed oil of *U. americana* fall within the range of those oils secreted by other species of this tree. Probable verification is also noted in the content of capric acid elsewhere reported (Pawlenko, 1912). In this connection it may be timely to recall that this oil is a richer source of this acid than either the milk fats of the cow or the goat, or of coconut and palm kernel oils (4.5 to 10.7 per cent).

In its major aspects, elm seed oil appears to be the counter part of coconut oil growing in the temperate zone. This investigation is being continued.

LITERATURE

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Discussion

Mr. Richardson—Are these the first references?

Prof. Schuette—There are about eight references and all of them are of foreign origin. I suspect that this will be the first report on the physical and chemical constants of American elm seed oil.

Dr. Bosart—How much capric acid?

Prof. Schuette—Approximately 50 per cent.

THE ANALYSIS OF SULFONATED (SULFATED) OILS COMMITTEE REPORT

By RALPH HART, Chairman

COMMITTEE REPORT NO. 2—DETERMINATION OF ORGANICALLY COMBINED SULPHURIC ANHYDRIDE

SULFONATED oils are structurally distinguished from soaps by their contents of organically combined sulfuric anhydride, which may be combined with the fatty matter either as a sulfuric acid ester (sulfated oil) or as a sulfonic acid (true sulfonated oil). The SO_3 in the true sulfonated oil is linked directly to a carbon atom, thus, R-C-SO_3Na, where R represents the fatty radical, whereas in the sulfated oil, it is connected to the fatty matter by an atom of oxygen, thus, R-O-SO_3Na. The sulfuric acid ester or sulfated oil is readily decomposed upon boiling with mineral acids, liberating free sulfuric acid, whereas the sulfonic compound remains stable under the same conditions.

In the Herbig method (10, 15), the splitting off of SO_3 upon heating the ester with mineral acids, is utilized for its estimation. The sample is hydrolyzed by boiling with hydrochloric acid and the total sulfur in the water layer determined as barium sulfate. Commercial sulfonated oils are contaminated more or less with inorganic sulfate—due to excess acid from the sulfonation process or to the Glauber's salt used in washing the crude sulfonated oil free from excess sulfuric acid. To determine the organically combined SO_3 by the Herbig method, it is therefore necessary to subtract from the total sulfur the SO_3 pres-

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