Report of Soap Analysis Committee 1938-9

THIS report covers the activities of the Committee for the years 1938-39. No official recommendations were made in 1938 and the report was postponed until the cooperative studies that had been undertaken were completed.

The following subjects have been studied by the Committee:

1. McNicoll method for rosin determination.
2. Hitchcock-Divine method for determination of combined CO_2 in soap.

Under subject No. 1 above, the tabulated results have been distributed to the Committee and are published as a part of this report. The vote of the Committee was unanimously in favor of adopting the McNicoll method as a tentative procedure. It was decided to retain the present official Wolff method as an alternate procedure until such time as the members have accumulated further experience with both methods.

Referring specifically to the details of the McNicoll method as distributed to the Committee members (November 21, 1938), a few minor changes were approved, as follows:

a. Drying time and temperature in preparation of fatty acids changed to "45 to 60 min. at 105° C."
b. Rosin soda soap factor to be included, namely, 1ccN NaOH = 0.368 g. rosin.
c. Change "free" fatty acid soap to "true" fatty acid soap.
d. Use 25 ml. pipette instead of 20 ml. pipette.
e. Method for preparation of fatty acids to be the same as for titer, acid and iodine number (see detail method published with this report).
f. McNicoll method gives results approximately 1% high, consequently it was approved to deduct 1% from final result. Qualitative test for rosin to be retained in this method as in the Wolff procedure.

CO_2 DETERMINATION Results of the cooperative work on the proposed Hitchcock-Divine method are published with this report. Considerable difficulties were reported by several members of the Committee and the results were, in general, not in good agreement. However, it was felt that the method holds possibilities and it was agreed to appoint a subcommittee to work out and recommend further modification.

IODINE NUMBER In addition to the above, the Committee voted to include a method for the determination of iodine number of fatty acids, the procedure following essentially that of the A.O.C.S.-A.C.S. Fat Analysis Committee on fats and oils. Preparation of fatty acids for the determination will be revised to make the procedure conform with that of preparation of fatty acids for titer and acid number. The detailed methods for all three determinations are published as a part of this report.

MATTER VOLATILE AT 105° C. (Oven Method) specifies drying to "constant weight." It was agreed to define this as follows: "Constant weight is attained when successive heating for one hour periods shows a loss (or gain) of not more than 0.1%."

MATTER INSOLUBLE IN WATER Some confusion has existed in the interpretation of this method, some laboratories have been proceeding with this determination on the same sample used under matter insoluble in alcohol, that is, after drying and weighing the latter. The Committee agreed to revise the method to emphasize the fact that a new sample should be taken for the water insoluble determination. The method will read as follows: "Proceed as in the determination of matter insoluble in alcohol, using a separate sample for this determination, and omitting the drying and weighing of the matter insoluble in alcohol."

SCREEN TEST The Committee has approved the deletion of the reference to the Ro Tap machine and the method will refer to the use of any suitable type screen test machine.

Also, since specifications may call for use of sieves other than those now specified in the method, it was agreed to add a note that when called for other sieves may be used in the determination as now written.

A meeting of the Committee was held on October 3, 1939, in the Stevens Hotel, Chicago, Illinois. The recommendations noted above were again reviewed and the detailed changes will be made in the official methods as per vote of the Committee.

The following new subjects were brought up for discussion:

FREE ALKALI A communication from a laboratory which conducts many analyses of soaps called attention to this determination and stated that errors are introduced when analyzing soaps which contain little or no alkaline builders, if the procedure of filtering the alcoholic soap solution is followed. The communicant recommended omitting filtration and titrating the hot alcoholic soap solution direct.

The Committee felt that such procedure was permissible provided no builders such as phosphates, silicates, borates, etc. were present. However, since all commercially neutral soaps contain some carbonates, it was decided that filtration could be omitted if the carbonates (as Na_2CO_3) do not exceed 0.5%. The method will be amended as follows: "Note:— In testing soaps known to contain little or no alkaline salts, it is unnecessary to filter the hot alcoholic soap solution as described above. However, the filtration should be carried out in all cases where alkaline salts such as silicates, phosphates, borates, etc. are present, since these are known to affect the free alkali determination. The presence of carbonates up to 0.5% as Na_2CO_3 does not appreciably affect this determination and filtration may be omitted if the carbonate determination on a separate sample is not in excess of this figure."

SODIUM PYROPHOSPHATE In view of the extensive use of this material in certain types of soap, the Committee agreed to take up the study of methods of analysis. Samples of soap containing known amounts of this material will be made up and distributed to the Committee for cooperative studies. The following procedures were tentatively agreed upon:

1. Gravimetric determination as zinc pyrophosphate.
2. Convert all pyrophosphate to ortho-phosphate by acid treatment and determine total P_2O_5 by the

[1] "Report of British Standards Committee," by Cox and Evers. Analyst, Vol. 62, No. 741, pp. 865 to 870 (1937); also "The Estimation of Rosin Acids in Fatty Mixtures," by D. McNicoll, Journal, Soc. Chemical Industry, Vol. 40, p. 124 T (1921).

official A.O.C.S. method. (Since this method will not differentiate between pyro- and ortho-phosphate, it is included only as a check on the method No. 1 above).

3. Moisture content will also be determined so that all results reported may be calculated to a comparable basis.

CARBONATES AS CO_2 The Committee agreed that further work was necessary on the method proposed by Messrs. Hitchcock and Divine. The chairman appointed a sub-committee to study the proposed method further. The modified procedure will be submitted to this group for cooperative tests.

Method B. Rosin, (McNicoll Method)[1]*

Apparatus

The apparatus required consists of a glass flask connected, preferably by a ground-glass joint, to a reflux condenser.

(a) *Esterification Flask.*—A 150-ml. flask of either the round-bottom or Erlenmeyer type shall be used.

(b) *Reflux Condenser.*—Any suitable water-cooled, glass reflux condenser may be used.

Special Solutions Required

(a) *Potassium Hydroxide (0.2 N).*—Accurately standardize a 0.2 N solution of KOH in neutral redistilled 95% ethyl alcohol (due to volatility of alcohol, this solution should be restandardized frequently).

(b) *Naphthalene-β-Sulfonic Acid Solution.*—Dissolve 40 g. of Eastman grade or equivalent reagent in 1 liter of c.p. absolute methyl alcohol.

(c) *Phenolphthalein Indicator.*—Prepare a 0.5 per cent solution in neutral redistilled alcohol.

Procedure

(a) *Preparation of Fatty and Rosin Acids.*—For the preparation of the sample for this determination, follow the procedure described in C-VII under "Preparation of Total Fatty Matter."

(b) *Esterification and Titration.*—Weigh about 2 ± 0.001 g. of the fatty acids into the esterification flask. Add 25 ml. of naphthalene-β-sulfonic acid solution. Add a few glass beads to ensure smooth boiling, attach the reflux condenser, and boil for 30 min.; also, run a blank test using 25 ml. of the reagent. At the end of the boiling period cool the contents of the flask, add 0.5 ml. of phenolphthalein indicator, and titrate immediately with 0.2 N alcoholic potassium hydroxide.

(c) *Calculations.*—Calculate the results as follows (Note 1):

$$R = \frac{(S - B) \times N \times 0.346 \times 100}{W}$$

$$R_1 = R - 1.0$$

$$R_2 = \frac{R_1 \times F}{100}$$

$$Rs = \frac{R_1 \times 1.064 \times A}{100}$$

where:

R = percentage of rosin in fatty acids,
R_1 = corrected percentage of rosin in fatty acids (Note 2),
R_2 = percentage of rosin on basis of original sample,
Rs = percentage of rosin soda soap on basis of original sample,
S = milliliters of KOH required to titrate sample,
B = milliliters of KOH required to titrate blank,
N = normality of KOH,
W = weight of sample,
F = percentage of total fatty acids in soap, and
A = percentage of total anhydrous soap.

If true fatty acid soap is desired, subtract the rosin soap from the total anhydrous soap.

NOTE 1.—In all cases where the rosin content is found to be less than 5 per cent, the actual presence or absence of rosin should be checked qualitatively by the Liebermann-Storch test, which may be found described in detail in the note under Wolff's Method, Modified.

NOTE 2.—Cooperative studies have shown that the McNicoll method gives results approximately 1 per cent higher than the amount of rosin present. Consequently, the committee recommends deducting 1 per cent from the percentage of rosin found in the fatty acids.

PREPARATION OF TOTAL FATTY MATTER
(Fatty and Rosin Acids, and Unsaponified Matter)

Special Solutions Required

Sulfuric Acid (30 per cent).—Slowly add 650 g. of H_2SO_4 (sp. gr. 1.84) to 1400 ml. of water.

Preparation for Rosin and Titer Tests, Iodine and Acid Numbers

Dissolve about 50 g. of the sample in 500 ml. of hot water. (If soaps to be tested contain alcohol, the alcohol should be completely removed by evaporation from the soap solution). Add 100 ml. of H_2SO_4 (30 per cent), heat gently until the fatty matter collects in a clear layer. Siphon off the aqueous acid layer, add 300 ml. of hot water, boil gently for a few minutes, and siphon off the aqueous acid layer. Wash the acids in this manner three times. Complete this acidification and washing in a very short period of time, and keep the beaker covered to prevent oxidation of the acids. After the last washing, remove the last traces of water from the beaker with a pipette, filter the fatty acids through one or two thicknesses of filter paper, and dry at a temperature of 105 C. for 45 to 60 min. These acids may then be used for the titer and rosin determinations.

In preparing the acids for the iodine and acid number determinations, the washed acids should be filtered through one or two thicknesses of filter paper at a temperature not exceeding 15C. above the titer point of the fatty acids. If the acids are not perfectly clear and dry, refilter.

IODINE NUMBER (WIJS METHOD)

Special Solutions Required

(a) *Wijs Iodine Solution.*—Dissolve 13.0 g. of resublimed iodine in 1 liter of c.p. glacial acetic acid and pass in washed and dried chlorine gas until the original thiosulfate titration of the solution is not quite doubled. There should be no more than a slight excess of iodine, and no excess of chlorine. When the solution is made from iodine and chlorine, this point can be ascertained by not quite doubling the titration (Note). For preparation of the Wijs solution use glacial acetic acid of 99.0 to 99.5 per cent strength. For glacial acids of somewhat lower strength, freezing and centrifuging or draining, as a means of purification is recommended. Preserve the solution in amber, glass-stoppered bottles, sealed with paraffin until ready for use. Mark on the bottles the date on which the solution is prepared; do not use Wijs solution that is more than 30 days old.

NOTE.—For preparation of the solution, McIlhiney[3] gives the following details:

*Wolff's Method, Modified, to be designated Method A.

The preparation of the iodine monochloride solution presents no great difficulty, but it must be done with care and accuracy in order to obtain satisfactory results. There must be in the solution no appreciable excess either of iodine or more particularly of chlorine, over that required to form the monochloride. This condition is most satisfactorily attained by dissolving in the whole of the acetic acid to be used the requisite quantity of iodine, using a gentle heat to assist the solution, if it is found necessary; then setting aside a small portion of this solution, while pure and dry chlorine is passed into the remainder until the halogen content of the whole solution is doubled. Ordinarily, it will be found that by passing the chlorine into the main part of the solution until the characteristic color of free iodine has just been discharged there will be a slight excess of chlorine which is corrected by the addition of the requisite amount of the unchlorinated portion until all free chlorine has been destroyed. A slight excess of iodine does little or no harm, but excess of chlorine must be avoided.

(b) *Sodium Thiosulfate Solution (0.1 N).*—Dissolve 24.8 g. of c.p. $Na_2S_2O_3.5H_2O$ in freshly boiled distilled water and dilute to 1 liter at the temperature at which the titrations are to be made. To standardize, place 40 ml. of $K_2Cr_2O_7$ (0.1 *N*) to which has been added 10 ml. of the solution of KI in a glass-stoppered flask, add 5 ml. of HCl (sp. gr. 1.19), dilute with 100 ml. of water, and allow the 0.1 *N* sodium thiosulfate to flow slowly into the flask until the yellow color of the liquid has almost disappeared. Add a few drops of the starch paste, and while shaking constantly, continue to add the 0.1 *N* sodium thiosulfate solution until the blue color just disappears.

(c) *Potassium Dichromate Solution (0.1 N).*—Dissolve 4.903 g. of c.p. $K_2Cr_2O_7$ in water and dilute to 1 liter at the temperature at which titrations are to be made.

NOTE.—Occasionally $K_2Cr_2O_7$ is found containing $Na_2Cr_2O_7$, although this is rare. If the character of the $K_2Cr_2O_7$ is not certain, the purity can be ascertained by titration against freshly resublimed iodine. However, this is usually unnecessary.

(d) *Potassium Iodide Solution (15 per cent).*—Dissolve 150 g. of KI in water and dilute to 1 liter.

(e) *Starch Paste.*—Boil 1 g. of starch in 200 ml. of distilled water for 10 min., and cool to room temperature.

NOTE.—An improved starch solution may be prepared by autoclaving 2 g. of starch and 6 g. of boric acid dissolved in 200 ml. of water at 15 lb. pressure for 15 min. This solution has good keeping qualities.

Procedure

Weigh accurately from 0.10 to 0.50 g. (depending on the iodine number) of the melted and filtered sample into a clean, dry, 450-ml. (16-oz.) glass-stoppered bottle containing 15 to 20 ml. of carbon tetrachloride or chloroform. Add 25 ml. of the iodine solution from a pipette, allowing it to drain for a definite time. The excess of iodine should be from 50 to 60 per cent of the amount added, that is, from 100 to 150 per cent of the amount absorbed. Moisten the stopper with KI solution (15 per cent) to prevent loss of iodine or chlorine, but guard against an amount sufficient to run down inside the bottle. Let the bottle stand in a dark place for 30 min. at a uniform temperature; then add 20 ml. of KI solution (15 per cent) and 100 ml. of distilled water. Titrate the iodine with 0.1 *N* sodium thiosulfate, added gradually while shaking constantly, until the yellow color of the solution has almost disappeared. Add a few drops of starch paste and continue titration until the blue color has entirely disappeared. Toward the end of the reaction, stopper the bottle and shake vigorously, so that any iodine remaining in solution in the tetrachloride or chloroform may be taken up by the KI solution. Make two determinations on blanks employing the same procedure as used for the sample except that no fat is used in the blanks. Slight variations in temperature quite appreciably affect the titer of the iodine solution, since acetic acid has a high coefficient of expansion. It is therefore essential that the blanks and determinations on the sample be made at the same time. The number of milliliters of standard thiosulfate solution required by the blank, minus the amount used in the determination, gives the thiosulfate equivalent of the iodine absorbed by the amount of sample used in the determination. Calculate the iodine number of the sample tested (centigrams of iodine absorbed by 1 g. of sample) (percentage iodine absorbed).

[3] **Journal**, Am. Chemical Soc., Vol. 29, p 1222 (1907).

1938-39 A.O.C.S. Soap Committee Cooperative Results
Carbon Dioxide Determination

	Titration Method (Na_2CO_3)	A.O.C.S. Absorption Method (Na_2CO_3)	Hitchcock Divine Method (Na_2CO_3)	
Armour & Co.	43.38%	44.83%	46.53%	46.47%
	43.09	44.93	47.11	47.23
	43.21	44.93	47.11	47.15
			47.41	
Average	43.21%	44.90%	47.00%	
Davies Young Soap Co.	43.47%		47.41%	
	43.47		47.11	
Average	43.47%		47.26%	
Lever Bros.	42.42%	45.14%	45.09%	
	42.49	45.31	44.78	
	42.58	45.23	44.90	
Average	42.50%	45.23%	44.92%	
Procter & Gamble	42.15%	46.03%	47.74%	
	42.30	46.20	47.48	
			46.95	
Average	42.23%	46.12%	47.39%	
Hooker-Electrochemical Co.			47.00%	47.15
			47.00	47.15
			47.05	
Average			47.06%	
New York Produce Exchange	42.99%	45.24%	44.00%	
			43.93	
Average			43.97%	
Swift & Co.	47.44%		46.00%	46.40%
	47.17		46.60	46.93
Average	47.31%*		46.60	46.90
			46.30	47.12
			46.37%	46.84%**

* A volumetric method in which the CO_2 is absorbed in $Ba(OH)_2$ solution, a blank being run on the $Ba(OH)_2$ solution, and the spent absorbents titrated with 0.5 Normal HCl.

** Spent absorbent from the run was titrated with 0.253 Normal HCl and Phenolphthalein Indicator, instead of the Bicarbonate solution specified by Hitchcock and Divine.

Comments of Collaborators on 1938 A.O.C.S. Cooperative Samples for CO_2 Determination

Armour & Co.: "We are of the opinion that the Hitchcock-Divine Method has possibilities as an improved CO_2 Metnod and we believe that with certain modifications it may be developed into a satisfactory procedure."

Lever Bros.: "In our opinion, the method requires considerably more technique and manipulation than is claimed. . However, after improving our technique, results can be obtained by our official Carbon Dioxide Absorption Method. We do not believe that the Hitchcock-Divine Method is an improvement over our present official absorption method."

Procter & Gamble: "For accurate analysis of soaps of unknown composition, the gravimetric method for sodium carbonate is to be preferred. Little difficulty was experienced with the Hitchcock-Divine Method unless trichlorbenzol is omitted. In this case, the end point is poor. If the Hitchcock-Method is considered as an alternative method, the use of the trichlorbenzol should be mandatory."

Swift & Co.: Swift and Company comment in detail on the manipulations of the Hitchcock-Divine Method, offer for consideration by the committee a similar method which they have used in their laboratory for a number of years.

1938-39 A.O.C.S. Soap Committee Cooperative Results

ROSIN

Sample No.	1		2		3		4	
	McNicoll Method	Wolff Method	McNicoll Method	Wolff Method	McNicoll Method	Wolff Method	McNicoll Method	Wolff Method
% Rosin Present	0%		5%		20%		35%	
Armour & Co.	2.05% 1.68	2.72% 2.74	6.60% 6.68	7.59% 7.68	21.98% 21.04	20.94% 21.08	36.39% 36.37	35.31% 35.27
	1.86%	2.73%	6.64%	7.64%	21.51%	21.01%	36.38%	35.29%
Davies Young Soap Co.	1.92% 1.70	2.90% 2.62	6.22% 6.57	7.12% 7.12	22.14% 21.80	19.65% 20.13	37.36% 37.71	31.83% 33.70
	1.81%	2.76%	6.40%	7.12%	21.97%	19.89%	37.54%	32.77%
Hooker Electro-chemical Co.	2.09% 2.09	2.99% 2.62	6.93% 7.05	5.85% 5.58	21.10% 21.24	21.94% 21.54	36.49% 36.87	36.15% 36.34
	2.09%	2.81%	6.99%	5.72%	21.17%	21.74%	36.68%	36.25%
James Lees & Sons	1.06% 1.25	2.90% —	6.50% 6.35	7.30% —	22.2 % 23.3	20.10% —	36.80% 36.40	34.43% —
	1.16%	2.90%	6.43%	7.30%	22.3 %	20.10%	36.60%	34.43%
Lever Bros.	0.96% 1.20	Nil	5.84% 5.86	5.18% 5.19	20.37% 20.27	19.69% 19.75	35.43% 34.93	33.95% 34.02
	1.08%		5.85%	5.19%	20.32%	19.72%	35.18%	33.99%
Los Angeles Soap Co.	1.00%	—	5.58%	—	20.71%	—	35.10%	—
New York Produce Exchange	1.40% 1.61		6.58% 6.31		21.13% 21.04		35.70% 35.67	
	1.51%	4.60%*	6.45%	8.89%*	21.09%	22.59%*	35.69%	36.15%*
Procter & Gamble	1.32% 1.43	2.65% 2.71	6.28% 5.95 6.13	7.16% 7.18	20.92% 21.68 21.30	20.67% 20.86	35.88% 35.64 35.56	34.52% 35.08
	1.38%	2.68%	6.12%	7.17%	21.30%	20.77%	35.69%	34.80%
Stillwell & Gladding	1.49% 1.57	— —	6.44% 6.75	— —	21.23% 21.45 21.23	20.70% — —	35.51% 35.41 35.60	34.18% — —
	1.53%	—	6.60%	—	21.30%	20.70%	35.51%	34.18%
Swift & Co.	1.48% 1.39	2.74% 2.65	6.11% 5.96	7.30% 7.35	21.93% 21.64	20.98% 21.33	36.32% 36.54	34.87% 35.22
	1.44%	2.70%	6.04%	7.33%	21.79%	21.16%	36.43%	35.05%
U. S. Dept. of Commerce, National Bureau of Standards	0.8 % 0.9 1.6 1.5 1.1	3.1 % 3.4 3.0 3.5	6.4 % 6.1 5.6 5.2 5.9	7.3 % 7.5 7.7 7.1	19.8 % 20.2 20.5 20.7	22.0 % 22.5 21.7 21.7	36.2 % 35.6 35.9 35.8 36.1	37.0 % 35.9 36.5 35.9 36.0
	1.18%	3.25%	5.84%	7.4 %	20.3 %	21.98%	35.92%	36.06%
Average	1.46%	2.83%	6.27%	6.86%	21.25%	20.79	36.07%	34.76%

All results are calculated on a mean molecular weight of 346.

*Not considered in close enough agreement and therefore not included in average.

The 1938-39 Personnel of the Soap Committee is as follows:

M. L. Sheely, Chairman
H. C. Bennett
H. E. Cutts
J. E. Doherty
L. B. Hitchcock
C. P. Long
E. R. Luckow
R. C. Newton
B. S. Van Zile
F. W. Smither
H. P. Trevithick
R. B. Trusler
Foster D. Snell

Abstracts

Oils and Fats

Edited by
M. M. PISKUR

FATS FROM WASTE. H. K. Dean. *Soap, Perfumery, & Cosmetics. 13,* 99 (1940). Extraction and use of garbage and sewage fats are discussed.

THE DEVELOPMENT OF THE TECHNICAL APPLICATIONS OF HYDROGENATION. E. F. Armstrong and K. A. Williams. *Chem. & Ind. 59,* 5-9 (1940).

PREPARATION, PROPERTIES, AND THIOCYANOGEN ABSORPTION OF TRIOLEIN AND TRILINOLEIN. D. H. Wheeler, R. W. Riemenschneider, and C. E. Sande. *J. Biol. Chem. 132,* 687-699 (1940).

INTRA MOLECULAR OXIDATION OF LINOLEIC ACID. M. Brambilla. *Ann. chim. applicata 29,* 303-14 (1939). When linoleic acid is heated 3 hrs. at 320-5° in an inert atm. (N), intramol. oxidation takes place with formation of propionic, butyric, caproic and glutaric acids, water, CO_2, certain acids recognized as sebacic acids, an unsaponifiable portion contg. ethylenic hydrocarbons and a tarry residue. This behavior is similar to that found when oleic acid is heated (*Chem. Abs.*).

INFORMATION ON AND DETERMINING THE ANTIOXIDANT OF OAT FLOUR. W. Diemair, R. Strohecker and K. Reoland. *Z. Untersuch Lebensm. 79,* 23-42 (1940). Reactions of Strohecker *et al* von Fellenberg, Kreis and the peroxide value were used as criteria for progress of oxidation. Addn. of 10 g. of oat flour yielded some protection to olive oil. Distinct protection to peanut, corn, olive, sesame, almond, poppy seed, soy bean and hardened train oils was obtained on addn. of 1-2.25% solvent extd. oat oil; no retarding of rancidity was obtained on linseed, train liver and certain soy bean oil samples. Partly rancid oils were not precipitibly influenced. In chromatographic adsorption investigations, using animal charcoal, spanish earth, and clarit as absorbents and petrol. ether and C_6H_6 as solvents, no characteristic zone formation was observed. The active constituent was not absorbed from the oil. A high P content of the petrol. ether extd. oat oil at first suggested that the antioxidant may be a phosphatide-like material, but, tests did not bear this out. Boiling the oil with acid yielded a ppt. and destroyed the antioxidant. Treatment of the petrol. ether or the alc.-C_6H_6 ext. of oat flour with Et or Me alc. or ice cooled acetone yielded a ppt. contg. an antioxidant substance. The ppt. from this petrol. ether ext. gave a much greater antioxidant effect than that from the alc.-C_6H_6 ext. The former contd. a 1:17.5 and the latter 1:1.5 P:N ratio. Such a high N content in the most active ppt. suggested the presence of a protein. It gave positive protein reactions and reduced Fehlings soln. The vacuum dried ppt. was insol. in C_6H_6, ether, $CHCl_3$, MeOH, EtOH, BuOH, Am. OH, PrOH, $C_6H_5CH_3$, pentane, H_2O and dil. acids. It was sol. in pyridine and alk. water of pH 12.2. Pepsin digestion destroyed the antioxidant capacity and split off a fatty material.

DETERMINING OF VITAMIN E. (THE TOCOPHEROLS). Felix Grandel and Hans Newmann. *Z. Untersuch. Lebensm. 79,* 57-65 (1940). Two biol. and 3 phys.-chem. methods for qual. and quant. detg. vitamin E. were described and discussed. Investigations on 7 wheat germ oils gave the following results:

Wheat germ sample	*Acid No.*	*Peroxide No.*	*Fellenberg reaction*	*Vitamin E content in % tocopherol.*
A	6.4	3.9	—	0.60
B	7.0	5.1	+	0.51
C	5.3	9.0	+	0.37
D	13.2	6.0	+	0.29
E	3.9	20.2	++++	0.7
F	16.6	30.9	++++	0.01
G	60.3	48.1	++++	0.005

The authors conclude that the results show enough correlation for recommending detn. of acid no., peroxide no. and Fellenberg reaction for proximately estg. the vitamin E content of wheat germ oils. There are 14 references.

HYDROGENATION OF WHEAT LECITHIN. A. Schloemer and W. Diemair. *Z. Untersuch. Lebensm. 79,* 43-6 (1940). The alc.- C_6H_6 (4:1) ext. of wheat germ was dissolved in ether, the lecithin therein pptd. 9 times with ice-cooled acetone and dried over P_2O_5. Abs. alc. dissolved only 65% of the dried product. Alc. solns. of the product were hydrogenation using Pt and Pd catalysts. There was an original rapid H_2 uptake followed by a much slower uptake. The tests were stopped at 7 days even though the endpoint of H_2 uptake had not been reached. Pt was the more active catalyst. The authors suggested that the break in the curves plotting H_2 uptake with time was due to depolymerization or to a variation in the type of double bonds in lecithin.

GROWTH OF RATS ON HIGH FAT AND LOW FAT DIETS, DEFICIENT IN THE ESSENTIAL UNSATURATED FATTY ACIDS. R. G. Sinclair. *J. Nutri., 19,* 131-40 (1940). On a diet of cassein, salt mixture, dried yeast and the fat, elaidin, supplemented with vitamins A and D, rats cease growing when only about 100 gm. in weight. After several weeks at constant weight they go into a decline and die. Since growth and health are readily restored by feeding a little corn oil, the impairment in growth is attributed to a severe deficiency of the essential unsaturated fatty acids. It is concluded that the better growth of rats on a high carbohydrate than on a high fat diet, both equally poor in essential fatty acids, is due, in part at least, to the synthesis of the fatty acids necessary for growth An increase in the requirement of essential fatty acids by rats on a high