45th Annual Report of the Smalley Committee 1962-1963

THE SMALLEY COMMITTEE, through six subcommittees, distributed over 4,000 samples and tabulated and graded about 16,000 results during the past season. Each subcommittee has furnished its collaborators with a final report summarizing the work and showing the final relative standings. The following table lists the types of samples and the extent of participation by 479 subscribers. Overall participation showed a decrease of about 3% from last year, generally in the oil seeds and meal series.

TABLE I

Series	Number of Collaborators	Number of Samples	Graded Tests per Sample
Cottonseed	38	10	5
Soybean	31	10	2
Peanut	13	7	4
Meal	134	15	3–4
Vegetable Oil	86	6	3
Tallow and Grease	78	5	6
Glycerine	24	5	4
Drying Oil	20	6	4
Edible Fat	56	5	7–10

As of March 31, 1963, the AOCS Smalley account showed the following:

Balance from 1961–1962 season	$ 717.26
Receipts from 1962–63 season	6983.34
Expenses for 1962–63 season	6427.82
BALANCE	$1272.78

The current balance will be decreased somewhat by a few charges not yet paid. A detailed accounting has been given to the Governing Board.

Two years ago, L. A. Baumann, of the U.S.D.A., proposed a new method for grading Smalley results, based on a sound statistical examination of test data. Last year, the glycerine series was graded by the proposed procedure and certificates were awarded on that basis. This year, the Baumann grading method was extended to all other series except Tallow and Grease, Vegetable Oil, and Drying Oil. A brief explanation is in order to permit those not familiar with the arithmetic involved to appreciate the final ratings.

Rather than being assigned penalty points based on pre-determined tolerances for the various analyses, collaborators are rated according to how far they deviate from the mean test result on each sample, taking into consideration the average deviation for all collaborators for the particular sample. The collaborator's final rating reflects his average deviation from the mean for all tests on all samples. A final score of +100 would be obtained if each of his results were exactly the same as the mean for all collaborators. A final score of zero would mean that on the average, his deviations were equal to one average deviation from the mean. A final score of −100 would mean that on the average, his deviations were equal to two average deviations from the mean. The first place winners this year, whose final grades were based on the Baumann method, average about +50. This means that on the average, their test results were equal to about one half of one standard deviation from the means.

As predicted, this grading method eliminated tie scores. Certificates are awarded this year to 28 collaborators.

Glycerine. With 24 chemists participating, first place was won by: F. A. Adams, The Procter & Gamble Mfg. Co., Long Beach, Calif., with a rating of 51.87; J. H. Dietz, The Harshaw Chemical Co., Gloucester City, N. J., was second with a rating of 39.78.

Vegetable Oil. With 86 chemists participating, first place was won by: J. R. Mays, Jr., Barrow-Agee Laboratories, Memphis, Tenn., with a grade of 100%; F. M. Tindall, HumKo Products, Memphis, Tenn., was second with a grade of 99.5%.

Drying Oil. With 20 chemists participating, first place was won by: Warren Chapin, The Sherwin-Williams Co., Cleveland, Ohio, with a grade of 95.50%; R. E. Anderson, Archer-Daniels-Midland Co., Minneapolis, Minn., was second with a grade of 95.25%.

Edible Fat. Two first place and two second place awards are made in this series this year. About 75% of the chemists participating had the necessary equipment to run the AOM Stability test and were graded on this as well as the customarily rated tests. Based on 41 test results, including AOM, first place was won by: R. A. Marmor, The Pillsbury Co., Minneapolis, Minn., with a rating of 32.26; E. Nesom, Swift and Co., Chicago, Ill., was second with a rating of 26.29.

Based on 36 test results, as in past years, first place was won by: F. A. Adams, The Procter & Gamble Mfg. Co., Long Beach, Calif., with a rating of 33.48; E. A. Nielson, Swift and Co., Omaha, Neb., was second with a rating of 31.38.

Tallow and Grease. With 78 chemists participating, first place was won by: L. J. Brown, Canada Packers, Ltd., Edmonton, Alberta, Can., with a grade of 100%; W. B. Sizer, General Testing Laboratories, Vancouver, B. C., Can., was second with a grade of 99.9%.

Peanut. With 12 chemists participating, first place was won by: G. C. Henry, Law and Co., Atlanta, Ga., with a rating of 41.38; W. C. Dean, Dothan Oil Mill, Dothan, Ala., was second with a rating of 36.78.

Soybean. With 31 chemists participating, first place was won by: W. N. Kesler, Woodson-Tenent Laboratories, Little Rock, Ark., with a rating of 62.98; J. G. Bowling, Woodson-Tenent Laboratories, Des Moines, Iowa, was second with a rating of 41.47.

Cottonseed. With 38 chemists participating, first place and the Barrow-Agee Cup was won by: A. H. Grimes, Barrow-Agee Laboratories, Decatur, Ala., with a rating of 33.95; B. C. White, Barrow-Agee Laboratories, Dallas, Tex., was second with a rating of 31.87.

Meal. With 134 chemists participating, first place for the determination of moisture was won by: J. M. Ridlehuber, Plains Cooperative Oil Mill, Lubbock, Tex., with a rating of 59.73; W. N. Kesler, Woodson-Tenent Laboratories, Little Rock, Ark., was second with a rating of 56.54.

For the determination of oil, first place was won by: Biffle Owen, Planters Mfg. Co., Clarksdale, Miss., with a rating of 84.00; H. L. Hutton, Woodson-Tenent Laboratories, Clarksdale, Miss., was second with a rating of 73.28.

For the determination of nitrogen, first place was won by: D. A. Bradham, Jr., Barrow-Agee Laboratories, Greenville, Miss., with a rating of 70.14; R. C. Pope, Pope Testing Laboratories, Dallas, Tex., was second with a rating of 61.93.

For the determination of crude fiber, first place

was won by: W. N. Kesler, Woodson-Tenent Laboratories, Little Rock, Ark., with a rating of 48.06; T. J. Potts, Ralston Purina Co., St. Louis, Mo., was second with a rating of 39.73.

Last year, the Smalley Cup, awarded annually for combined proficiency in the determination of moisture, oil and nitrogen in meal, was retired by H. L. Hutton of the Woodson-Tenent Laboratory in Clarksdale, Miss. A new cup was graciously donated by Mr. Tenent to be awarded this year and was won by Biffle Owen, Planters Mfg. Co., Clarksdale, Miss., with a rating of 66.89. This gives Mr. Owen permanent possession of the new cup, having won two legs in 1956–57 and 1961–62. H. L. Hutton was second with a rating of 57.75.

The following chemists, while not winning certificates, did outstanding work in the past season's program.

Meal

W. D. Simpson, Woodson-Tenent Laboratories, Wilson, Ark.

Cottonseed

R. C. Pope, Pope Testing Laboratories, Dallas, Tex.

Soybean

W. D. Simpson, Woodson-Tenent Laboratories, Wilson, Ark.

Peanut

Stephen Prevost, Law and Co., Wilmington, N. C.

Vegetable Oil

R. C. Pope, Pope Testing Laboratories, Dallas, Tex. and O. S. Simpson, The Procter & Gamble Co., Dallas, Tex.

Tallow and Grease

J. W. Thomas, Southern Testing Labs., Westwego, La., and E. Nesom, Swift and Co., Chicago, Ill.

Glycerine

S. B. Stearn, The Procter & Gamble Co., Port Ivory, N. Y.

Drying Oil

W. A. Moe, Spencer Kellogg Co., Minneapolis, Minn., and V. Bloomquist, Minnesota Linseed Oil Co., Minneapolis, Minn.

Edible Fat

S. D. Jones, Hunt Foods, Gretna, La., and L. J. Brown, Canada Packers, Ltd., Edmonton, Alberta, Can.

M. J. ANDERA
L. V. ANDERSON
T. J. BALDWIN
R. T. DOUGHTIE, JR.
K. H. FINK
W. H. KOESTER
W. J. MILLER, Chairman

• *Letters to the Editor*

A Simple Method of Calibrating a GLC Column for Quantitative Fatty Acid Analysis

RELATIVE chromatogram peak area is a function of molecular weight and molecular structure. Relative molar response values have been calculated for application to methyl esters of even carbon number fatty acids from C_2 through C_{22}, and for methyl esters of the cis unsaturated series of C_{18} fatty acids (1,2,3).

Many workers are interested in obtaining quantitative analyses of mixtures of methyl esters of fatty acids in animal tissues that range from dodecanoic acid to docosahexaenoic acid as common and experimentally induced constituents. It has been observed in our laboratory that the correction factors required in such analyses are very large and are probably caused by detector response to differences in molecular weight and structure as well as reaction of the sample with the liquid phase of some columns. To meet the needs of routine quantitative analyses of samples containing large numbers of long chain polyunsaturated fatty acids the following technique was developed for routine laboratory usage.

A mixture of known composition containing methyl octadecanate, methyl eicosenoate, methyl docosanoate, methyl eicosatetraenoate, methyl eicosapentaenoate, and methyl docosahexaenoate is analyzed 5 times and the correction factors calculated by using methylstearate as a base of one. It is apparent that there is almost a curvilinear relationship between retention time and correction factor. Assuming the relationship is logarithmic, regression analysis is used to obtain the equation for the line of best fit for the points obtained (Fig. 1). This equation can then be used for calculating correction factors to be used with all other chromatograms obtained with this column under the same experimental conditions. Under our experi-

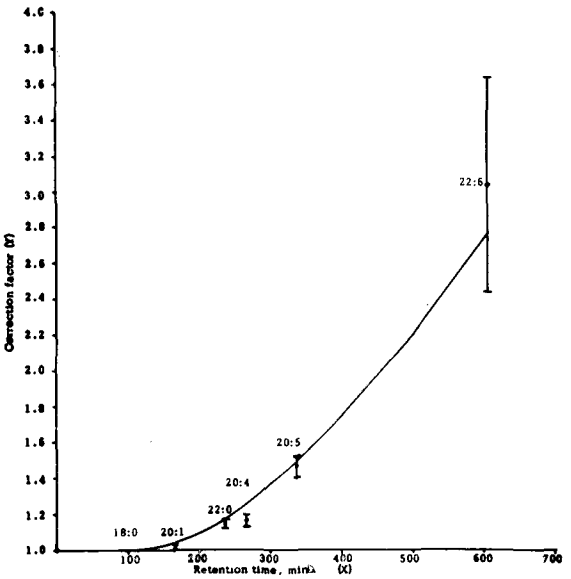

FIG. 1. Correction factor as a function of retention time. Mean correction factors and standard errors of mean. Numbers by means identify fatty acids—first number indicates length of carbon chain, second denotes number of double bonds. Equation from regression analysis: Log $Y = 0.001007X - 0.161$. Instrument: Perkin Elmer 154C, ¼" × 84" Cu tubing with 30% degs on acid washed chromosorb W, He at 55 psi and 50 ml/min flow rate, isothermal at 220C.