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• *Letter to the Editor*

A Simple Graph for Rapid Calculation of Refining Settlement Cup

A SIMPLE, quick way to determine which of two or three refining-cup results is the settlement cup as outlined in the National Cottonseed Products Association Rule No. 201 is described in Figures 1 and 2. These charts may be of help to persons who refine cottonseed oils in laboratories throughout the country and are often faced with the annoying problem of actually having to stop and calculate every refining analysis in order to be certain they choose the correct settlement cup.

The charts are good only for cottonseed oil, using a 9.0% loss and 7.6% Lovibond Red color as the bases. They cover a wide-enough range to take care of most situations for, facetiously speaking, if your problems are losses in excess of 15% and colors that are in excess of 20% Lovibond Red, then you have problems of such a nature that charts will not help you to solve.

The charts are designed so that the color lines are approximately 10 small lines apart horizontally. This makes for easy estimation of the Lovibond Red color to the nearest 0.1 unit. If this were not true, the chart would be of little value as anything other than unity would be confusing.

In so doing, the point system at the bottom of the charts is on a rather unconventional scale, but workable, if actual premium or discount points are desired. Each small division is equivalent to 4.5 points. The actual value of these points is 4.3 points per line if perfect unity is to exist between color lines, providing the refining loss figures on the ordinate are not changed. But, as can easily be seen, if the exact point value were used, it would be very difficult to determine actual points of premium or discount by using a scale of 4.3 points per chart unit. Only once in every 10 lines would you arrive at an integer.

Therefore the system presented is the one for which it is believed that the best compromise exists or one in which unity is shown for both the refining loss and the color, and a fairly readable scale for actual premium or discount points. The color lines on the chart are exact. The 0.1 unit of color may be estimated very closely, using the "one small line equals 0.1 unit color" rule. It is really so close as to offer no serious objection because only the nearest 4.5 points can be ascertained with complete accuracy anyway.

Two charts are necessary if the wide range of losses and colors is to be covered. One chart will serve for any loss from 1 to 8% and any color from 7.6 to 20.0 Lovibond Red (Figure 1). The other chart will serve for losses from 8 to 15% and colors from 7.6 to 20.0 Lovibond Red (Figure 2).

To use the charts, enter from the left along the ordinate with the refining loss figure (one tenth % loss = 2 small lines) and proceed horizontally until the Lovibond Red color of that refining cup is reached. Drop down vertically, and read the premium or discount points on the abscissa. For convenience, the charts are designed for reading at the top and right side as well as at the bottom and left side. This reduces errors made in following horizontal lines over long distances. If the charts are entered from the left, the refining loss-color combination travelling the

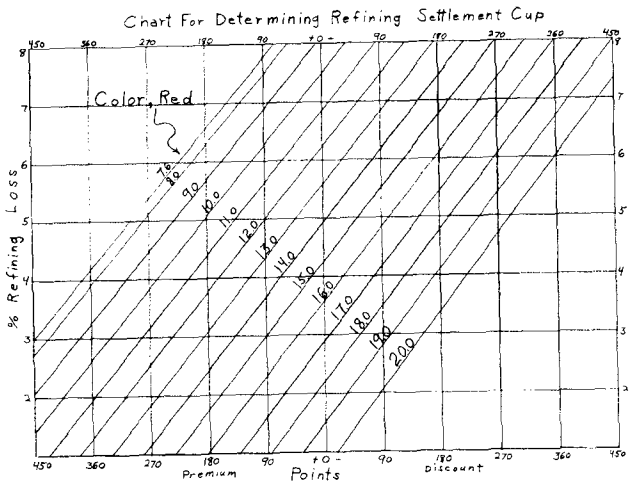

FIG. 1.

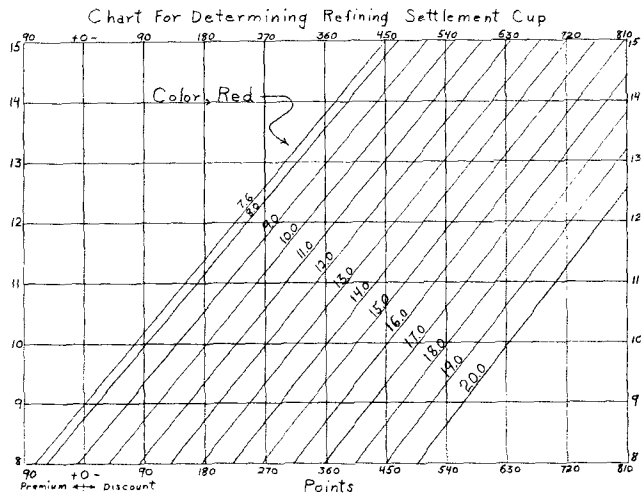

FIG. 2.

shortest distance horizontally is the settlement cup because, as can be seen, it represents either the most premium points or the fewest discount points. Conversely, if the charts are entered from the right, the combination of loss and color travelling the greatest distance horizontally is the settlement cup.

A limited number of larger-size charts is available from the author upon request.

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ABSTRACTS . . . .

R. A. REINERS, Editor

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• Fats and Oils

FREEZING POINT DATA FOR A PORTION OF THE TERNARY SYSTEM: ACETAMIDE-PALMITIC ACID-STEARIC ACID. R.R. Mod, F.C. Magne, and E.L. Skau (Southern Reg. Res. Lab., New Orleans, La.). *J. Phys. Chem.* 11, 1613–1616 (1960). Freezing point data were obtained for stable, metastable, and unstable crystalline phases in binary mixtures of the 1:1 molecular compounds acetamide-palmitic acid (AP) and acetamide-stearic acid (AS), and for a portion of the ternary system acetamide-palmitic acid-stearic acid. The equimolar mixture of AP and AS exhibited three freezing points, representing stable equilibrium with the high-melting modification of acetamide, metastable equilibrium with crystals of AS, and unstable equilibrium with a crystalline phase of unknown composition, respectively. X-ray and infrared data are also shown.

FATTY ACIDS ANALYSIS, QUANTITATIVE DETERMINATION OF STEAM-VOLATILE FATTY ACIDS BY GAS-LIQUID CHROMATOGRAPHY. C.W. Gehrke and W.M. Lamkin (Dept. of Agricultural Chem., Univ. of Missouri, Columbia, Mo.). *J. Agr. Food Chem.* 9, 85–8 (1961). A quantitative gas chromatographic procedure has been developed for the determination of steam-volatile fatty acids in biological materials. It is a modification of the original procedure of James and Martin and uses commercially available gas chromatographic apparatus. Techniques for low temperature vacuum concentration of samples and for the column removal of water are included. The removal of water is so complete that problems due to its presence are eliminated. Recovery in each step approaches 100%. Thermal conductivity detection is used, and an independent detector temperature control system is not required.

DETERMINATION OF BUTYLATED HYDROXYANISOL AND BUTYLATED HYDROXYTOLUENE IN POTATO FLAKES. V.J. Filipic and C.L. Ogg (Eastern Regional Research Lab., Philadelphia 18, Pa.). *J. Assoc. Off. Agr. Chem.* 43(4), 795–9 (1960). A simple method for the determination of BHA and BHT in potato flakes was developed by modification of a method applied to edible fats.

A COLORIMETRIC METHOD FOR DETERMINING FAT ACIDITY IN GRAIN. Doris Baker (Agr. Marketing Service, U.S.D.A., Beltsville, Md.). *Cereal Chem.*, 38, 7–50 (1961). A rapid colorimetric method for determining fat acidity in grain has been developed. The method is based upon the reaction of the fatty acids in benzene solution with aqueous cupric acetate to form soaps. The copper soaps are soluble in the benzene solution and the intensity of the resulting blue color of the solution is measured by a colorimeter.

BUTTER ADULTERATION, DETECTION OF HYDROGENATED FATS IN BUTTER FAT BY MEASUREMENT OF CIS-TRANS CONJUGATED UNSATURATION. J.C. Bartlet and D.G. Chapman (Food and Drug Directorate, Ottawa, Canada). *J. Agr. Food Chem.* 9, 50–3 (1961). Butter contains *cis-trans* conjugated unsaturation as well as isolated *trans* unsaturation, while hydrogenated fats contain only the latter. Both systems are detectable in the 940 to 990 $cm.^{-1}$ region of the spectrum. By using differential infrared spectroscopy, it was found that conjugated and isolated unsaturation are present in a constant ratio in pure butter. The addition of hydrogenated fats greatly increases the isolated *trans* double bonds (967 $cm.^{-1}$) but leaves the conjugated diene essentially unchanged (948 and 980 $cm.^{-1}$), thus changing the ratio. By using this technique it is possible to detect as little as 7% of a hydrogenated adulterant fat.

STUDIES IN PACKAGING, TRANSPORTATION, AND STORAGE OF SOME EDIBLE VEGETABLE OILS. M. Prasas and P.B. Mathur (Central Food Technological Res. Inst., Mysore, India). *Oil & Oilseeds J.* 13, 11–16 (1960). Castor, coconut, mustard, olive, and peanut oils were stored at 71–93°F. and 138–142°F. in colorless and green glass. A direct correlation was found between red/yellow pigment ratios and stability in both containers, and at both temperatures.

MASS SPECTROMETRY IN LIPID RESEARCH. R. Ryhage and E. Stenhagen (Laboratory for Mass Spectroscopy, Karolinska, Inst., Stockholm, Sweden). *J. Lipid Research* 1, 361–390 (1960). The authors have presented a complete review of the literature concerning the application of mass spectrometric techniques to the study of lipids. The principles, design, and construction of the instrument, reproducibility of the methods employed, and the application of the technique to structure determination of lipid materials is discussed.

SOME NEW METHODS FOR SEPARATION AND ANALYSIS OF FATTY ACIDS AND OTHER LIPIDS. K. Fontell, R.T. Holman and G. Lambertsen (Hormel Inst. and Dept. of Physiol. Chem., Univ. of Minn., Austin, Minn.). *J. Lipid Research* 1, 391–404 (1960). The authors review most of the methods of analysis for lipids now in use and discuss their relative merits. Methods for the analysis of fatty acids are emphasized. The methods discussed are: crystallization, zone melting, urea complexing, mercury-addition compounds, and distillation; adsorption methods—column, paper, thin film, and glass paper chromatography are presented. Displacement chromatography and its variations are treated. Various partition methods such as countercurrent distribution, partition separations on columns and paper are discussed. Finally gas liquid chromatography is given a detailed treatment and the existing methods compared to each other.

COMPOSITION OF CABBAGE LEAF PHOSPHOLIPIDS. L.W. Wheeldon (Lister Inst. of Preventive Medicine, London S.W. 1, England). *J. Lipid Research* 1, 439–445 (1960). The author has attempted to separate the phospholipids of the cabbage leaf by silicic acid chromatography. The compounds separated consisted of phosphatidyl glycerol and an unknown glycerophospholipid. The phospholipids were of fairly uniform fatty acid composition and contained predominantly palmitic, linoleic, and linolenic acids.

NONPHOSPHATIDE ALDEHYDROGENIC LIPIDS IN MILK FAT, BEEF TALLOW, AND OX HEART. J.C.M. Schogt, P.H. Begemann, and J. Koster (Unilever Res. Lab., Vlaardingen, The Netherlands). *J. Lipid Research* 1, 446–449 (1960). Phospholipid-free milk fat, beef tallow, and ox heart fat contain approximately 50 (calculated as tetradecanal), 65, and 1,000 mg. per kg. (calculated as hexadecanal), respectively, of aldehydes. The aldehydes are bound as enol ethers, and are located mostly in the *alpha* position of the glycerol molecule. A sample of milk fat was found to contain 45 mg. per kg. glycerol ether (calculated as chimyl alcohol).

SEPARATION OF TISSUE CHOLESTEROL ESTERS AND TRIGLYCERIDES BY SILICIC ACID CHROMATOGRAPHY. M.G. Horning, E.A. Williams, and E.C. Horning (Nat. Heart Inst., Nat. Inst. of Health, Bethesda, Md.). *J. Lipid Research* 1, 482–485 (1960). The authors have determined and presented conditions for the separation of cholesterol esters and triglycerides from other lipid components without the use of low boiling solvents, and which result in an easier separation of neutral lipids. The chromatographic columns consisted of silicic acid and the eluting solvent of mixtures of benzene in hexane, which separated the major classes of lipids.