Report of Peanut Committee-1939-40

DURING each of the last several years, some cottonseed crushing units have supplemented their usual raw material with varying quantities of peanuts. The amounts of nuts so handled varying with the size of the crop.

In the main, peanuts move through shelling plants in the producing area, to confectioners and packers throughout the country. The discards or "pickouts" from these plants, together with any surplus of farmers' stock move to the crushers.

During several years large crops have created a shellers' surplus which has been diverted to the crushers under a plan of government subsidy, allowing the grower to receive approximately the same amount of money from the crusher as would have been paid by the sheller under conditions of a normal crop.

As grades of peanuts have been established in use for several years and are entirely acceptable to the shellers, these grades have been the basis of the sales to both the sheller and the crusher.

Unfortunately, this system does not, except in a vague way, indicate the serious differences in yields encountered by the crusher when processing different lots of nuts.

Accordingly your committee has endeavored to devise methods for the analysis of whole nuts, shelled stock and pickouts, so that there may be some uniform method of evaluation of these raw materials in terms of prospective yields of oil and meal.

The work of the committee has followed an orderly program of proposing a method, testing the proposal through trial on split samples, revising and correcting to meet sound objections and criticisms and the final adoption by the committee of the method attached herewith.

We make no claim that this procedure is a finished product. It is offered as a workable method, not difficult in performance and well adapted to the equipment and habits of the laboratories in the area of peanut production.

T. C. Law
W. T. Maxwell
E. C. Ainslie, Chairman.

METHODS FOR ANALYSIS OF WHOLE PEANUTS AND SHELLED STOCK

Apparatus

Balance	Accurate to 0.02 grams
Balance	Analytical
Ovens (Approved Type)	Circulatory — for original moisture
Ovens (Approved Type)	Convection — optional for 2nd moisture
Extraction Equipment	As specified for analysis of cottonseed
Ammonia	As specified for analysis of cottonseed
Food grinder	Universal, equipped with 12 tooth and peanut butter blades.
Moisture dishes	Flat dishes of sufficient size to hold 50 grams of material.

Reagents

Petroleum Ether	A. O. C. S. specification
N/4 Caustic Soda	As specified for analysis of cottonseed
Phenolphthalein (Ind.).	As specified for analysis of cottonseed.

Operation

Foriegn Matter

Weigh the entire sample to the nearest gram. Pour onto a clean surface and remove all foreign matter by hand picking. Weigh this to the nearest 0.1 gram.

$$\frac{\text{Weight of Foreign Matter} \times 100}{\text{Weight of Sample}} = \%\ \text{Foreign matter}$$

The % Foreign Matter is required on all samples of shelled stock. It is optional for samples of whole nuts. When not needed the weighings may be omitted. All samples, either whole nuts or shelled stock, must be entirely clean before proceeding with the preparation of the sample for analysis.

Preparation of Sample

Accumulate approximately 55 grams of material by grabbing small portions from the cleaned, thinly spread sample. Grind the entire taken lot through the food grinder, using the 12 tooth blade.

Original Moisture

Weigh 50 $\pm$ 0.1 grams of the ground material into a suitable dish. Dry for one hour in a circulatory oven at 130°C.

Remove from oven and weigh pan and contents as soon as handling can be done comfortably with the bare hands.

Loss in Weight $\times$ 2 = % Original Moisture.

Oil (Whole Nuts)*

When the dried sample, used for the moisture test has become entirely cool, grind all of it through the food grinder using the peanut butter blade.

Mix this ground sample thoroughly and completely with the fingers. This prepared sample is to be used for the oil, 2nd moisture and ammonia tests.

Weigh 2 $\pm$ .001 grams of the ground and mixed material into an extraction cartridge or paper and make a regular soxhlet extraction, using Petroleum Ether of A. O. C. S. specification. The extraction time is to be four hours with the partially extracted material ground thoroughly at the end of the second hour.

Upon completion of the four hours of extraction, remove from condenser, free from solvent, cool to room tempertaure, and weigh.

$$\frac{\text{Weight of Extract} \times 100}{2} = \%\ \text{Oil in Whole Nuts (partially dry basis)}$$

Ammonia*

Determine Ammonia on the partially dried, ground and mixed samples, as directed in the Official Method for Cottonseed.

2nd Moisture*

Determine moisture on the partially dried, ground and mixed samples as directed for 2nd moisture in the Official Method for the Analysis of Cottonseed.

Oil (Shelled Stock—Pickouts)*

A second sample of 50-100 grams, grabbed in the same way that the portion for original moisture has been taken, is accumulated, placed in a drying dish and dried for not more than 20 minutes at 130°C.

After the sample is completely cool, grind through the food grinder using the peanut butter blade. Utmost care is required in this grinding so that no oil is expressed in the operation.

Completely mix the ground sample with the fingers.

Proceed with the extraction exactly as directed under Whole Nuts except that 1-2 grams of sand is added to the partially extracted material before regrinding.

Ammonia*

As directed above under whole nuts.

2nd Moisture*

As directed above under whole nuts.

* The weighings of prepared samples for moisture, oil and ammonia should take place at as nearly the same time as possible. This partially dry material may change rapidly under some conditions.

Calculation—Partially Dry to Original Moisture Basis

$$\frac{\%\ \text{Oil or}\ \%\ \text{Ammonia} \times (100 - \%\ \text{Original Moisture})}{100 - \%\ \text{2nd Moisture}} = \%\ \text{Oil or}\ \%\ \text{Ammonia (Original Basis).}$$

Notes % Foreign Matter may be added to the % Original Moisture in the above calculation if it is desired to report on an As Received Basis.

FFA in Oil in Peanuts

Preparation of Sample Whole Nuts

Accumulate, as directed under Preparation of Sample, approximately 200 grams of nuts.

Separate the kernels and hulls by hand.

Grind these kernels through the food grinder, using the peanut butter blade. This grinding, need not be as thorough as is required for the oil determination.

Shelled Stock

Accumulate, as directed under preparation of Sample, 150 grams of kernels.

Grind these kernels as directed above under whole nuts.

Extraction and Determination

After thoroughly mixing the ground samples extract sufficient oil for a titration, by percolation, as directed in the official Method for Cottonseed. Weigh, titrate and calculate the % FFA in oil as directed in the Cottonseed Method.

Calculation of Crushing Yields from Analytical Data on Whole Peanuts

In the calculations given below the following assumptions are used:

1. Working Loss—Material	5%—100 lbs. per ton
2. Oil lost in hulls	6 lbs. per ton
3. Factor—Available ammonia	92%
4. Cake ammonia	8.76%—45% Protein
5. Oil—Ammonia ratio	.80 (Standard)
6. Factor (Invisible Loss)	97%

% Oil (Original Moisture Basis) × 1900 = Lbs. total oil per ton — 5% loss basis

% Ammonia (Original Moisture Basis) × .92)1900 = Lbs. available ammonia per ton — 5% loss basis

$$\frac{\text{Lbs. Available Ammonia per ton}}{.0876} = \text{Lbs. 45\% protein cake per ton}$$

Lbs. 45% Protein Cake × .0701 = Lbs. Oil lost in pressing per ton

Lbs. Oil lost in pressing — 6 = Total oil lost — visible

(Lbs. Total Oil — Lbs. Total lost) .97 = Lbs. available oil per ton — 5% loss basis.

Abstracts

Oils and Fats

Edited by
M. M. PISKUR

SOYBEAN FLOUR AS AN EMULSIFYING AGENT IN PREPARATION OF SALAD DRESSINGS. B. M. Watts and L. Morse. *Food Res. 5*, 197-203 (1940). Benzine extracted, undenatured, soybean flour, heated with water, was successfully used as an emulsifying agent in the preparation of salad dressings. The emulsions obtained were less finely dispersed than those prepared from an equal proportion of yolk solids, but were practically identical in droplet size to egg-white emulsions made over the same formula. The relative viscosity of the soybean dressings was much greater than those from either yolk or white, making possible the preparation of inexpensive salad dressings, containing a low amount of oil with the soybean flour as the sole emulsifying and thickening agent. The fat-free soybean flour was also used to replace egg white in combination with egg yolk as an emulsifying agent but the characteristic high viscosity of the cooked soybean flour was lost on addition of yolk.

STORAGE OF MARGARINE IN THE ATMOSPHERE OF COMBUSTION GASES. M. Ravich and E. Schmidt. *Masloboine Zhirovoe Delo 15*, No. 4, 20-3 (1939). Comparative tests on the effect of storage of margarine in air and in a current of combustion gases (CO_2 85.8, N 14.1 and O 0.1+) at room temperature are described. After storage for 100 days in the atmosphere of combustion gases, the margarine samples showed no changes in their physical appearance. The samples held in the air atmosphere became moldy after 13 days of storage and were thoroughly infected with green and brown molds, after 2 days (*Chem. Abs.*)

THE COMPOSITION OF COMMERCIAL PALM OILS. V. PARTIAL SEPARATION OF PALM OILS BY CRYSTALLIZATION AS AN AID TO THE DETERMINATION OF THE COMPONENT GLYCERIDES. T. P. Hilditch and L. Maddison. *J. Soc. Chem. Ind. 59*, 67-71 (1940). The chief components are "oleo"-dipalmitin and palmitodi-"olein," in amts. which vary according to the proportions of palmitic, oleic, and linoleic acids in the whole fats; together, these glycerides amt. to 70-75% of the palm oil, "oleo"-dipalmitin preponderating in oils with high palmitic acid content, and conversely. The other (minor) components are, in addn. to "oleo"-palmitostearin (10-15%), tri-unsaturated glycerides (linoleodiolein and/or triolein, 6-15%, according to the united oleic and linoleic acid content of the palm oil) and fully-saturated glycerides (tripalmitin and dipalmitostearin) 3-9%, according to the palmitic acid content of the palm oil. The linoleic acid of palm oils probably occurs mainly in the form of linoleo-oleopalmitins, with minor amts. of linoleodipalmitin and linoleodiolein.

OBSERVATIONS ON FAT SYNTHESIS AND METABOLISM. E. W. McHenry and G. Gavin. *J. Biol. Chem. 133*, lxvi (1940). In rats given an alcohol-soluble fraction of beef liver, fat synthesis is greatly augmented and fatty livers, different from those caused by thiamine, are produced. These fatty livers are highly resistant to the lipotropic action of choline but readily respond to lipocaic. A procedure for the rapid assay of lipocaic is thus available. The administration of the liver fraction causes a marked increase in liver cholesterol, although no cholesterol is furnished by the basal diet or supplements. Lipocaic diminishes the amt. of liver chol-