a dark brown, semi-liquid oil containing 20.5% phosphatide. The total amount of phosphatides in the fresh, wet, raw material was 0.31%.

Conclusion

It has been proved that all the tree seeds investigated contain a certain amount of phosphatides. The quantities are as follows:

Red currant seeds	0.76%
Raspberry seeds	0.55%
Plum seeds	0.31%

REFERENCES
1. Krzizan: Chemische Revue/Harze. H. Fett, *16*, 1 (1909).
2. Rothea: Bulletin Science Pharmacologie, *26*, 105 (1919).
3. Krzizan: Zeitsch Oeffentliche Chemie, *13*, 263 (1907).
4. Klemont: Pharmazeut Post, *51*, 561 (1909).
5. Delvaux: Fette & Seifen, *43*, 183 (1936).
See also: Hilditch: Industrial Fats and Waxes, page 118 (1941).

Preparation and Analysis of Peanuts

CHARLES H. COX
Barrow-Agee Laboratories, Inc., Memphis, Tennessee

Peanuts are analyzed either to find their comparative values for grading purposes or for their actual value in terms of oil and cake to a mill crushing the nuts.

In either case the analysis must show the quantity of moisture, oil, and nitrogen present, together with the free fatty acid content of the oil. Since all of the valuable constituents are found in the kernels, the first and most obvious method of preparation for analysis was to separate the shells and kernels and determine the percentage of each. The oil and nitrogen were then determined on the kernels and calculated from those figures back to the whole nuts. Moisture was determined either on whole nuts or on the two portions.

The two main difficulties in this method were, first, that a large quantity of nuts had to be shelled before the analyst could be sure the percentages of meats and hulls were correct and, second, that proper grinding and mixing of the kernels was very difficult, if not impossible. The grinding was usually done in a mortar by hand. Despite these drawbacks, the method was in use for some time.

The next step forward was the present official method in which the whole nuts are first roughly ground in a food chopper, dried, and then ground again in a food chopper, using the peanut butter blade. This procedure was much better as it eliminated all errors arising from incorrect kernel percentage and the presence of the shell made grinding much more satisfactory by absorbing part of the oil. The resultant ground material, however, is oily and does not mix well. The method I am suggesting seems to me to eliminate all of these objections.

Since by the inclusion of the shells some of the oil was absorbed, making the mixture much more readily ground than the kernels alone, it seemed possible that the addition of a quantity of a still more absorptive material might make the mixture even more easily ground and the finished product finer and in better mechanical condition.

With this in view I thoroughly mixed with the dried, coarsely ground nuts a weighed proportion of diatomaceous earth, allowed the mixture to stand for a short time, and then ground it through the Bauer Brothers mill specified for cottonseed. The result was extremely satisfactory. The ground product was almost as fine as wheat flour and could be mixed and handled without any danger of loss of oil.

Only one precaution was found necessary. The sample must be so handled that no loss occurs. That can be accomplished by having a tight box for recovering the ground material and feeding the mill through a rather small opening in the removable cover. This method of preparation can also be applied to the analysis of the shelled nuts. In this case the diatomaceous earth is added in slightly larger proportions and a material is obtained which grinds perfectly.

The very satisfactory results obtained by this method, particularly with the shelled nuts, led to the conclusion that it would probably be a great help in the preparation for analysis of tung nuts and possibly for copra or palm kernels. We have, however, made no experiments along that line.

One of the greatest advantages of the proposed method for peanuts is that the regrinding during the extraction period is unnecessary. The present method requires that the extraction be taken down after two hours, reground, and re-extracted for three additional hours. The mechanical condition of the samples ground with the diatomaceous earth is such that a complete removal of the oil takes place in a straight four-hour extraction. This amounts to a saving of time and labor that considerably outweighs the slight extra trouble in preparation. Our experience also shows that duplicate portions of nuts prepared in this manner agree more closely for both oil and ammonia. This necessitates fewer rechecks.

In order to simplify the calculation, a quantity of the mixture is weighed that will give exactly 2.0 grams of the nuts for oil and 1.401 grams for nitrogen. A second moisture is run on the ground material as a basis for recalculation to the original basis.

We have analyzed a series of peanut samples by both the present official method and the proposed method, in each sample a single portion of the roughly ground nuts having been divided and used as the material for both methods of analysis. The results by the two methods are in very close agreement—in fact, much better agreement than seems possible to obtain from duplicate portions of the whole nuts analyzed by either method.

One reason for the latter variation, we believe, is the fact that some shelled nuts are almost always

present and the inclusion of a few extra kernels materially increases the percentage of both oil and nitrogen. The use of a mechanical sample splitter may largely eliminate this source of error, and I think work of this kind should be included in the program of any committee on peanut analysis.

The detailed procedure for the proposed method is as follows:

Weigh, thoroughly clean, and mix the entire sample of nuts. Weigh the foreign matter and calculate the percentage. Mix and divide the sample, taking every precaution to include in the portion taken for analysis the correct proportion of the shelled nuts, if any are present.

Grind at least 100 grams of the nuts through a Russwin or Universal food chopper, using the 12 or 16 tooth blade. Thoroughly mix this sample in a two-quart Mason jar by shaking. Weigh duplicate portions of 5-10 grams and dry for 5 hours at 101°C. in the official forced draft oven for moisture.

Dry about 55 grams of the ground nuts for one hour at 130°C., and when cool, weigh 45.0 grams ± 0.1 gram. Add to this, 15.0 grams, ± 0.1 gram, of diatomaceous earth and mix well in a one-quart Mason jar by shaking. Let stand for one hour to allow the diatomaceous earth to absorb the excess oil. Then grind in the Bauer Brothers No. 148 mill used for cottonseed. Special precaution must be taken to insure that no loss of material takes place during grinding. Mix the ground material in a two-quart Mason jar.

Oil: Weigh 2.666 grams, wrap in 2 filter papers and extract 4 hours with petroleum ether exactly as specified for cottonseed. Divide the weight of oil extracted by 2 and multiply by 100 for percentage of oil.

Nitrogen: Weigh 1.87 grams (corresponding to 1.401, the nitrogen factor) and proceed exactly as for nitrogen in cottonseed.

Second Moisture: Weigh 2.666 grams and dry for 2 hours in a forced draft oven at 101°C. The loss in weight divided by 2 and multiplied by 100 gives the per cent moisture in the ground material. The calculation to the original basis is the same as for cottonseed.

Official Method			Proposed Method	
Moisture	Oil	Ammonia	Oil	Ammonia
8.0	36.0	4.80	35.7	4.84
6.4	35.9	4.45	36.0	4.50
7.4	34.8	4.41	35.2	4.55
7.0	37.2	4.41	37.1	4.50
7.0	37.9	4.24	38.0	4.35
	(37.8	(4.46	(37.6	(4.49
5.2	(37.9	(4.42	(37.8	(4.39
	(37.9	(4.43	(37.6	(4.42

SHELLED PEANUTS
(Ground With 50 Grams Nuts and 25 Grams Diatomaceous Earth)

Official Method			Proposed Method	
Moisture	Oil	Ammonia	Oil	Ammonia
4.7	49.0	5.76	48.8	5.86
	49.2	5.73	48.4	5.75

ANALYTICAL DATA
By E. C. Ainslie, Buckeye Cotton Oil Company, Atlanta, Georgia

Cox Proposal			Rules		
Unground % Oil	Ground % Oil	Moist.	Unground % Oil	Ground % Oil	Moist.
41.40	41.50	0.65	40.55	40.90	0.7
41.40	41.50	0.50	40.55	40.90	0.7
40.80	40.95	0.35	40.70	40.85	0.78
40.80	40.95	0.45	40.80	40.90	0.80
40.00	40.00	0.4	40.00	40.00	0.80
40.00	40.00	0.4	40.00	40.00	0.76
40.90	40.95	0.55	41.05	41.30	0.62
41.00	40.95	0.8	41.05	41.40	0.76
41.35	41.30	0.8	41.10	41.35	0.68
41.30	41.35	0.95	41.10	41.35	0.72
41.00	41.00	0.2	41.20	41.20	0.62
40.85	41.00	0.12	41.20	41.20	0.58
Ave. 41.10*	41.14*	0.49	41.06*	41.24*	0.71

* Oil averages reported here have been calculated to a dry basis.

Should the diatomaceous earth show a loss on heating at 101°C. for 2 hours, this moisture must be determined and the weight of moisture in the 0.66 grams of earth used for the second moisture determination subtracted from the total loss of weight before calculating to percentage.

I wish to acknowledge the help of Mr. E. C. Ainslie in verifying the agreement between the present method and the one I am proposing.

Report of the Uniform Methods and Planning Committee—Spring Convention 1942-1943

As you know, the past year has been an exceedingly difficult one for all of our laboratories and as a result very little work has been reported by the committees that requires changes in our methods. Most of the reports received were progress reports. We are hoping that during the coming year the committees will get under way earlier and in this way be able to complete some work in time for our next annual convention.

Before taking up the individual committee reports we would like to commend the Journal Committee on the fine work that they have done during the past year. This is the first year that the journal has been published entirely by our Society and we think the results have been most excellent. This is due both to the untiring efforts of the Editor and his assistant and to the Advertising Committee who were quite successful in obtaining additional advertising for the journal.

One of the difficulties which we have faced through the past year was to revise our methods. It was decided a couple of years ago that the methods should be entirely revised and all arranged uniformly so as to make a better appearance and enable the chemist to save time in using them. Mr. J. T. R. Andrews thought that he would be able to undertake this work