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traction over different time intervals was repeated with the results recorded below:

Time. Hours.	Ether.	Oil obtained. Per cent.
16	U. S. P.	5.96
5	Washed and dried.	5.34
16	Washed and dried.	5.68
42	Washed and dried.	5.39

These discordant results are presented simply because they represent facts experimentally ascertained, and indicate the possibility of considerable error being introduced by too short a period of extraction.

Some run-of-the-mill palm kernels were ground, extracted with ether and titrated with alcoholic alkali in the ethereal solution; the acidity was 10.0 per cent. Expeller oil contained about 10.8 per cent. F. F. A.; hydraulic oil contained about 8.8 per cent. The two oils are industrially produced in the ratio of about 3:1.

Palm-kernel oil refines very similarly to coconut oil. As with the latter, the soapstock is liquid at ordinary temperatures and solid at 50 degrees Centigrade. The "break" in the two oils develops similarly and the soapstock settles rapidly. Likewise, the oil should be washed to remove the unsettled soap.

The meal was brighter than copra meal, but had a dryer feel. Its analysis was as follows:

	Per cent.
Moisture.	9.6
Ash.	3.5
Protein.	16.1
Nitrogen free extract.	49.8
Fiber.	13.4
Ether extract.	7.6

Thus, palm kernels can be readily expressed by the expeller-hydraulic press process, yielding a residue containing in good factory practice around 7 per cent. oil. The oil obtained is very similar to coconut oil, and readily responds to similar refining procedure. The cake formed is not compact and cannot be trimmed by machinery. The difficulty of producing a low oil content meal requires a longer cooking and pressing period operating to reduce the capacity of standard machinery. The amount of hand-trimmed edges constitutes about 30 per cent. of the cake as it is withdrawn from the hydraulics. If a given oil mill, especially copra or cotton, is equipped with disc grinders and is favorably situated for cheap labor, there is no reason why it cannot crush palm kernels and produce a low oil meal when the market conditions are right, but in such an event due allowance should be made for the fact that the oil obtained may be as high as 10 per cent. acid. Such excessive acidity is no reflection, apparently, on the method of manufacture, but rather on the character of the raw material.

THE STANDARDIZATION OF ALKALIMETRIC SOLUTIONS.

By Frank L. La Motte of the La Motte Chemical Products Co.

Generally speaking, any substance of pronounced acid character which can be obtained in pure condition and which is stable in the air may be used to standardize alkalimetric solutions. Of the vast number of such compounds existing, innumerable ones have been prepared, tested and apparently proven satisfactory for the purposes in view. Each, in turn, possessed its discrepancy or discrepancies and slowly passed into disuse as more efficient salts were devel-

oped. The greatest difficulty encountered in the older standards was the lengthy and tedious procedure necessary to obtain them in an absolutely pure condition and at the same time secure stable solutions. Through the ordinary processes, unless the most skilled technique was employed, compounds were obtained whose resulting composition differed from their theoretical composition. This has been demonstrated in a number of instances following the most bitter discussions, and in keeping with the progress of chemistry in recent years, in both its scientific and industrial application, the older standards have been largely superseded by newer ones which conform strictly to the efficiency, rapidity and accuracy of modern operations.

Of the older substances used in this connection, oxalic acid ($C_2H_2O_4 \cdot 2H_2O$) and its salts have been most widely used. It could be more conveniently obtained in a purer state than most of the other standards in use at the time of its introduction, and was capable of very practical usage. Commercial oxalic acid, however, contains acid oxalates from which it cannot be readily freed by the ordinary processes of recrystallization from water. This difficulty is due to the fact that the acid oxalates, although readily soluble in hot water, are only very moderately soluble in cold water, and hence are reprecipitated from cooling saturated solutions of the acid. Only a partial removal of these salts are effected by saturating cold water with the acid and then evaporating to the crystallization point. Aside from this, oxalic acid cannot be dried in a dessicator, since it loses its water of crystallization in an atmosphere free from moisture, and also its solutions are not altogether stable. Potassium tetroxalate ($KHC_2O_4 \cdot H_2C_2O_4 \cdot 2H_2O$) may be used with advantage instead of oxalic acid. The salt is stable in the air at ordinary temperature, and is easily obtained in a relatively pure state by neutralizing oxalic acid with potassium carbonate. Like the free acid, however, potassium tetroxalate cannot be dried in a hot-air bath or in a dessicator.

Hydrochloric and sulphuric acids have been used by a large number of laboratories, and it is safe to believe that their application would be universally adopted were it not for the extreme difficulties encountered in the preparation of samples of sufficient purity. Hydrochloric may be redistilled a number of times from concentrated solutions, collecting the gas in cold distilled water. By this method it is obtained comparatively pure. Another method consists of evaporating a strong solution to a consistently stable concentration and using this as the stock solution. Great care must be exercised in weighing the acid for the preparation of a standard solution, and it is only through unlimited patience that one of a given definite strength is obtained. Sulphuric acid is less used generally, owing to the difficulty in removing impurities. The acid derived from the electrolysis of pure copper sulphate checks well with the results obtained with other standards, but the necessity of employing platinum electrodes and the special preparation of the copper salt have been serious drawbacks in its general usage.

Among other compounds of lesser importance are potassium acid tartrate and organic acids, such as benzoic, malonic and succinic, but, as Van Valkenburgh has already pointed out, their slight solubility is a great objection, since it requires the use of somewhat bulky solutions. Benzoic acid may be prepared in an extremely pure state, dissolved in alcohol, and under the proper experimental conditions serves as an excellent standard. The great change which alcohol and the other common organic solvents suffer with increased temperature constitutes a serious objection

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in this respect, since corrections will have to be added to all calculations unless great care is exercised in both the preparation and use of such solutions at standard temperature.

Potassium-acid iodate and potassium chlorate have been suggested by some authors, but at the present time they are not generally used. Glaser mentions the former standard in "Indicatoren der Acidimetrie und Alkalimetrie," 1909, as being particularly adaptable to certain reactions, while the fact that this salt is so uncommon in most laboratories has caused it to receive very little consideration. Van Valkenburgh (*Journal American Chemical Society*, Vol. 42, No. 4, pp. 757) has found potassium chlorate to give concordant results in the standardization of sodium hydroxide, as compared to those obtained by the use of standard acid. Careful drying of the salt at temperatures above 225 degrees Centigrade are necessary, and the likelihood of formation of chlorides, resulting in subsequent high normality factors, are serious handicaps.

The latest standard and, indeed, one of the most efficient for both technical and industrial application is potassium-acid-phthalate, described by F. D. Dodge. This salt was introduced as early as 1904, but owing to the accustomed usage of some of the older standards it received very little attention until 1914-15, when its merits were fully realized. Unlike potassium tetroxalate, potassium-acid phthalate crystallizes from its aqueous solution without water of crystallization, and hence can be dried rapidly to constant weight in an air bath at 100 to 110 degrees Centigrade. The salt is stable, anhydrous, and is not hygroscopic. Samples which have been left standing at room temperature in contact with the air over a period of 92 days have given results concordant with those obtained through the use of freshly-prepared anhydrous, oxalic acid, standard hydrochloric acid and standard sulphuric acid. The salt is soluble in 10 to 11 parts of water at ordinary temperature, and hence overcomes the discrepancy which is so common to the salts of other organic acids. Behaving like a monobasic acid, it can be titrated with extreme sharpness, and its high molecular weight eliminates a common source of error in weighing. Potassium-acid phthalate crystallizes in colorless, hexagonal plates with the composition $\text{KHC}_8\text{H}_4\text{O}_4$ (molecular weight 204.14). In a number of researches by Dodge, and later by Hendrixson and others, the properties of this standard have been vigorously studied, and as a result of their investigations its use in the standardization of alkalimetric solutions has been heartily recommended. W. M. Clark and H. A. Lubs adopted it as their standard in work along this line in connection with their researches in the colorimetric determination of H-ion concentration, and through its use they found it possible, without the use of potentiometer, to prepare reasonably accurate Buffer solutions of known H-ion concentration. It may be interesting to note that the author, in conducting further work along these lines, was able to check the results obtained by the previously-mentioned investigators, and also maintained a nearly constant factor with the same solutions which had been tested electrometrically. (The detailed procedure and tabulated results will be published at a later date.)

From out of a dirty laboratory cometh inaccurate results.

"A hair in your head is worth two in the brush," but a tube through a cork is better than a piece in your hand.

MESSAGE FROM OUR PRESIDENT TO COMMITTEE CHAIRMEN.

On November 11 six months will have passed since the close of our last annual meeting. In the September number of the COTTON OIL PRESS we tried to indicate some of the work as it was getting under way at that time.

Another summary of the work to date in the December COTTON OIL PRESS will be an inspiration to all of us.

Please write me what you have done so far, letting this letter reach me by November 11, so that I may summarize these letters and get a summary to our editor by the 20th of November, in time for the December issue of the COTTON OIL PRESS.

Have you made a special effort to get every man on your committee to work?

Be sure to write me about November 8.

Yours for efficient committee work,

F. B. PORTER, President.

SEPTEMBER OLEO OUTPUT AT CHICAGO.

Total oleomargarine output for the month of September, 1920, in Chicago was 14,716,785 pounds, 14,353,833 pounds being uncolored and 362,952 colored. September production was more than 2,000,000 pounds greater than August and nearly a million and a half greater than for the same month the previous year. Margarine production in the Chicago district by months for the past year is as follows:

September, 1919.....	13,223,982
October.....	17,821,072
November.....	18,436,966
December.....	18,673,955
January, 1920.....	16,805,820
February.....	15,365,178
March.....	17,189,145
April.....	14,078,498
May.....	16,805,055
June.....	10,966,000
July.....	11,964,237
August.....	12,685,269
September.....	14,716,785

HISTORY OF VEGETABLE OILS.

Address Before the Institute of Independent Margarine Manufacturers' Convention, August 6.

By DR. DAVID WESSON.

Vegetable oils were used in some form or other in the earliest times. They were used chiefly for food and filling lamps, candles being unknown. The oil mentioned in the Bible was almost invariably olive oil. The Greeks were the first Europeans to use oil, and they learned how from the Egyptians. In the first century of the Christian era, from the writings of Dioscorides and Pliny the Elder, we learn that the Greeks and Romans were familiar with castor oil, almond oil and walnut oil. In the main, however, until the middle of the last century olive oil was the chief vegetable oil in use for edible and other purposes, and it has been only during the very recent past that it has had to take its proper place with the very many other vegetable oils with which it has to contest its supremacy.

There are several causes, of course. The principal ones are: First, the constantly increasing demands for edible oils, which could not be met by the fruit of the olive trees and, second, the work of the chemist and chemical engineer, who have opened up new sources of edible oils by making almost all vegetable