COMPOSITION AND CHARACTERISTICS OF CUBAN PALMICHE NUT OIL

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No data appear to be available in the literature concerning the composition or characteristics of Cuban palmiche nut oil. Junelle[1] states that the fruit of the royal palm, Roystonea regia or Oreodoxa regia, which is very common in Cuba, is known as palmiche, and yields about 25 per cent of oil. Jamieson[2] examined the ripe fruit of the Cuban royal palm, Roystonea regia, and found about 3 per cent of oil in the fleshy pulp, and about 18 per cent of oil in the kernel. He stated that, because of their low oil content, neither the pulp nor the kernel oils had been examined.

A quantity of palmiche nuts, obtained from Cuba, was processed at Ivorydale.

The crude oil, obtained by pressing, gave the following analysis:

Titer	20.5° C.
Acid value	28.2
Saponification value	226.5
Iodine value	39.8
Color, raw	150Y—16 R
Color, bleached	30Y— 2.5R

A quantity of this oil was saponified, and the fatty acids were liberated from the soap with hydrochloric acid. These fatty acids were then dried and fractionally distilled at reduced pressure. About 375 grams of fatty acids were distilled in a one-liter distilling flask equipped with a 36-inch Vigreux fractionating column, ten fractions being obtained. The pressure was kept at from 0.2 to 0.6 mm. during the distillation. Heating bath temperatures, boiling points and distillation pressures were recorded for each fraction. The distillation data are given in Table No. 1.

The analysis of the distillate fractions included saponification, iodine, and thiocyanogen values, together with the percentage of unsaponifiable matter. The linoleic, oleic, and saturated fatty acid contents of the original fatty acids and the distillate fractions were calculated from these data. These results are included in Table No. 1.

Using the corrected saponification values, the percentages of linoleic, oleic, and saturated acids in each fraction, and the percentage of the total that each particular fraction represents, the composition of each fraction (based on the total sample) has been calculated in terms of four constituents, namely, linoleic, oleic, and the two saturated acids whose saponification values are respectively higher and lower than that of the fraction after it has been corrected from its linoleic and oleic acid content. Table No. 2 shows the composition of the fractions expressed on this basis.

Although fair agreement exists between the composition of the fatty acids, as calculated from iodine and thiocyanogen values of the original sample, and that calculated from the analysis of the fractions, it should be borne in mind that the calculation of the composition gives only approximate results, which, however, present a general picture of the true composition of the fatty acids. The linoleic acid content as calculated from the analyses of the fractions (8.07%) was not as high as that obtained from the analysis of the original fatty acids (9.5%). The latter figure is considered to be more accurate, as some of the linoleic acid may have been lost during the distillation due to oxidation.

Accordingly, the composition of palmiche nut fatty acids is considered to be approximately as follows:

	Percentage Present
Unsaturated acids (38.0%):	
Linoleic acid	9.5
Oleic acid	28.5
Saturated acids (61.5%):	
Capric acid	5.0
Lauric acid	32.0
Myristic acid	16.0
Palmitic acid	7.5
Stearic acid	1.0
Unsaponifiable matter	0.5

The characteristics of fatty acids of the above composition agree very closely with those actually found, as is shown below:

	Calculated Value	Value Found
Iodine value	42.8	42.5
Thiocyanogen value	34.2	33.9
Saponification value	239.4	239.3

REFERENCES
[1]Henri Junelle, "Les Huiles Vegetales," Paris, (1921), page 157.
[2]George S. Jamieson, "Vegetable Fats and Oils," A. C. S. Monograph No. 58, (1932), page 123.
[3]W. S. Martin and R. C. Stillman, Oil and Fat Analysis by the Thiocyanogen Method, Oil and Soap, February, 1933, Volume X, Number 2, pages 29-31.

TABLE NO. 1—DISTILLATION DATA AND FRACTION ANALYSES

Fraction Original Fatty Acids	Weight of Fraction	Heating Bath Temp. ° C.	Distillate Temp. ° C.	Pressure mm.Hg	Fraction Pct.	Pct. Distilled	Sap. Value of Distillate	Pct. Unsap. of Fraction	Cor. Sap. Value	Mean M.W.	Fraction I.V.	Fraction T.V.**	Pct. Linoleic Acid	Pct. Oleic Acid	Pct. Sat'd Acids
	373.2	200	105*	0.5	....	....	239.3	0.36	240.2	233.6	42.5	33.9	9.5	28.1	62.4
1st	35.8	222	160	0.6	9.6	9.6	300.1	0.04	300.2	186.9	0.9	0.7	0.2	0.6	99.2
2nd	45.3	218	159	0.5	12.1	21.7	282.0	0.06	282.2	198.8	1.1	0.6	0.6	0.1	99.3
3rd	36.8	226	163	0.2	9.8	31.5	275.7	0.06	275.9	203.3	1.2	0.7	0.6	0.2	99.2
4th	37.9	232	178	0.3	10.2	41.7	263.7	0.06	263.9	212.6	3.5	2.6	1.0	1.9	97.1
5th	35.0	228	183	0.2	9.4	51.1	242.8	0.08	243.0	230.9	16.4	13.1	3.6	10.9	85.5
6th	34.9	244	186	0.3	9.4	60.5	217.6	0.10	217.8	257.6	50.2	40.8	10.4	34.9	54.7
7th	30.9	252	190	0.4	8.3	68.8	207.2	0.10	207.4	270.5	72.6	59.5	14.5	51.6	33.9
8th	33.8	256	197	0.3	9.1	77.9	202.4	0.10	202.6	276.9	90.2	74.4	17.4	65.2	17.4
9th	31.8	262	205	0.3	8.5	86.4	200.8	0.12	201.0	279.1	96.4	79.8	18.3	70.3	11.4
10th	41.2	290	205	0.4	11.0	97.4	198.7	0.50	199.7	280.9	97.8	80.0	19.7	69.2	11.1
Res.	9.8	...	...	..	2.6	....	140.3	21.5	178.7	313.9	49.6	...	...	...	...

*First drop.
**Modified Kaufmann thiocyanogen value.[3]

TABLE NO. 2—COMPOSITION OF PALMICHE FRACTIONS

Fraction	Per Cent Linoleic	Per Cent Oleic	Per Cent C_{10} Acid	Per Cent C_{12} Acid	Per Cent C_{14} Acid	Per Cent C_{16} Acid	Per Cent C_{18} Acid	Unsaponifiable + Unknown
1st	0.02	0.06	4.34	5.18	...	...	...	...
2nd	0.07	0.01	0.68	11.34	...	...	...	...
3rd	0.06	0.02	...	8.68	1.04	...	...	...
4th	0.10	0.19	...	5.76	4.14	...	...	...
5th	0.34	1.03	...	1.07	6.97	...	...	...
6th	0.98	3.28	...	...	3.02	2.12	...	...
7th	1.20	4.28	...	...	0.52	2.29	...	...
8th	1.58	5.93	...	...	0.04	1.54	...	...
9th	1.55	5.96	...	...	...	0.87	0.11	...
10th	2.17	7.61	...	...	...	0.46	0.76	...
Res.	...	...	...	...	...	...	...	2.6
Total	8.07	28.37	5.02	32.03	15.73	7.28	0.87	2.6