Fatty Acids of Brazilian Cashew Kernels[1]

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Abstract. **Kernel oil of Brazilian cashew (*Anacardium occidentale* L.) contained measurable amounts of 4 fatty acids, palmitic (7.5%), stearic (4.5%), oleic (73.7%), and linoleic (14.3%) and trace amounts of arachidic and linolenic. The cashew kernels had an average oil content of 45.6%.**

The cashew is grown for commercial production in relatively few areas of the world. These are mainly in India, Africa, and a few other tropical areas. The production of cashews in northeastern Brazil is being developed aggressively seeking export capability. It is estimated that total cashew production in Brazil was 16,000 tons in 1970 (1).

The literature on the fatty acid content of cashew kernel oil often depends on analyses antedating gas-liquid chromatography (GLC). Furthermore, there is a lack of published information concerning the fatty acid composition of cashew kernels produced in northeastern Brazil. In this study, non-roasted cashew kernels produced in northeastern Brazil were analyzed for fatty acid composition by GLC (4, 6) and for quantity of oil extracted.

Samples of nonroasted cashews were obtained from a processor in Fortaleza, Ceara, Brazil. They were arbitrarily classified into 3 sizes: large (3.5 to 4.0 cm), medium (2.6 to 3.4 cm), small (2.0 to 2.5 cm). Upon receipt, the samples were stored at -10°C until analysis.

In preparation for oil extraction, the nuts were allowed to reach room temp. Approx 5.0 g of nuts were selected at random from each sample and washed with small volumes of distilled water, sprayed with acetone to remove adhering water, dried under vacuum at 50 to 60°C for 30 min, and cut into ca 0.5 cm particles.

Kernel oil was extracted by shaking (2 cm distance) on a water bath with 70 ml chloroform:methanol, 1:1 solvent mixture, at 85 cycles per min, for 8 hr at 35°C and dried under vacuum at 50° for 2-½ hr. A 0.2 ml aliquot of oil was further dried under vacuum at 100° for 10 min. Fatty acid methyl esters of the triglycerides were prepared by transesterification (5). The methyl esters were extracted in hexane, and stored under refrigeration until analyzed by GLC (3) on a Perkin-Elmer Model 800 gas chromatograph (Perkin-Elmer Corp., Norwalk, Conn.), equipped with dual flame ionization detector, 2 stainless steel columns, 1.83 m x 0.63 cm, packed with 15% diethyl glycol succinate (DEGS) on a 60/80 mesh Chromosorb W. The carrier gas used was argon at 40 psi of pressure. The column temp was 200°. Sample size was about 0.5 μl. Identification of the esters was made by comparison with standard compounds and chromatograms (3). Relative amounts were determined by comparison of the areas under the peaks as calculated by an Infotronics Model CRS-108 integrator (Infotronic Corp., Houston, Texas).

Oil from these Brazilian cashew kernels contained measurable amounts of 4 fatty acids (palmitic, stearic, oleic, and linoleic) and trace amounts of 2 others (arachidic and linolenic). Patel et al., as cited by Jacqmain (4), found no linolenic or arachidic but lignoceric acid (0.5%), and the other 4 which were detected in this analysis. Pereira and Pereira (6) reported 6 fatty acids: palmitic, stearic, arachidic, pamitoleic, oleic, and linoleic (Table 1).

Myristic acid was not detected in this work but was included in Jacqmain's (4) analysis (0.2%). No other author has referred to this fatty acid.

While there were some differences in the fatty acid values of the 3 kernel sizes, the trends were not uniform.

Oil content averaged 45.6% for the 3 sizes. This is slightly lower than 47.15 - 47.93% reported by Wehmer, and 47.93% by Gobert, both as cited by Tkatchenko (8) but more than the 42.2% reported by Patel et al., as cited by Barve and Kane (2). It is almost exactly the same as recorded in a 1963 compilation of food composition by the U. S. Department of Agriculture (9). Smaller kernels tended to have slightly higher oil content than that in the large size; (46.8% vs. 43.3%).

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Table 1. Fatty acid content and total kernel oil of Brazilian cashew kernels compared with other reported analyses.

	Brazilian cashews				Other reported analyses				
	Size				*Reference*				
Substance	Large	Medium	Small	Mean	(2)	(4)	(6)	(8)	(9)
Fatty acid (%)									
Myristic	–	–	–	–	–	0.2	–	–	–
Palmitic	7.4	6.6	8.4	7.5	–	6.4	14.0	–	–
Stearic	4.1	2.1	7.4	4.5	–	4.7	9.0	–	–
Archidic	Trace	–	–	–	–	4.6	1.0	–	–
Lignoceric	–	–	–	–	–	0.5	–	–	–
Oleic	74.3	79.5	67.2	73.7	–	73.8	59.0	–	–
Linoleic	14.2	11.8	17.0	14.3	–	18.1	15.0	–	–
Linolenic	–	Trace	Trace	–	–	–	1.2	–	–
Total kernel oil (%)	43.4	46.8	46.8	45.6	42.2	–	–	47.2 47.9	45.7

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