

CHEMICAL AND FATTY ACID COMPOSITION OF *Cyperus esculentus*

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Chufa (*Cyperus esculentus* L. Tuber), a member of the Cyperaceae family, is one of the finest nuts from the tropics to the temperate regions [1–3]. It is also known by various other names such as chufa “flatsedge,” “Nut-grass,” “Teki,” “Tiger Nut,” “Earth Nut,” “rush nut,” and “edible galingale” [4, 5]. It is considered to be a superior oil that compares favorably with olive oil. The tubers contain up to 30% of a nondrying oil and are used in cooking and in making soap. It does not solidify at 0°C [6, 7]. The tubers are said to be aphrodisiac, carminative, diuretic, emmenagogue, stimulant, and tonic [8, 9]. The aim of this study is to establish the physical properties, fatty acid composition, and mineral contents of chufa tuber harvested from the east mediterranean region in November 2005.

The physical and chemical properties of chufa tubers are given in Table 1. The nuts were found to be rich in oil (21.57%), fiber (22.13%), and protein (8.11%). Previous studies reported 932.8 g/kg dry matter, 245 g/kg crude lipid, 256.8 g/kg starch, 14.3 g/kg ash, 50.5 g/kg protein, 89.1 g/kg crude fibre, and 154.3 g/kg total sugar [3]. The fatty acid composition of chufa tuber was determined by gas chromatography (Table 2). Oleic acid (72.7%) was present in the highest concentration, followed by palmitic (14.8%), linoleic (11.4%), arachidic (0.6%), and linolenic (0.5%) acids. The fatty acid composition of chufa oil comprised 689.2–732.9 g/kg oleic acid, 125.5–141.2 g/kg palmitic acid, and 99.6–154.6 g/kg linoleic acids [3]. The mineral contents of chufa tuber were determined by ICP-AES (Table 3). Chufa tubers were found to be rich in some minerals such as Al (709.1 mg/kg), Ca (739.1 mg/kg), Fe (412.5 mg/kg), K (9821.7 mg/kg), Mg (1190.5 mg/kg), Na (2407.4 mg/kg), and P (3012.6 mg/kg). Caglarirmak reported 280–380 mg/100 g P, 230–340 mg/100 g K, 81–99 mg/100 g Mg, and 67–105.5 mg/100 g Ca in fresh walnut kernels [10]. This work attempts to contribute to knowledge of the nutritional properties of these tubers.

The physical-chemical properties and fatty acid composition were analyzed according to AOAC [11]. The methyl esters of the fatty acids (1 µL) were analyzed in a gas chromatograph (Shimadzu GC-2010) equipped with a flame ionization detector (FID) and a fused silica capillary column (60 m × 0.25 mm i.d.; film thickness 0.20 µm).

TABLE 1. Physical and Chemical Properties of Chufa Tubers

Properties, %	Values	Properties, %	Values
Moisture	35.0±0.62	Total sugar	10.0±1.13
Weight	0.32±0.04	Starch	18.6±2.1
Crude oil	21.6±0.42	Ascorbic acid, mg/kg	78.0±3.4
Crude protein*	8.11±0.63	Alcohol-soluble extract	9.81±1.42
Crude fibre	22.13±1.14	Water-soluble extract	18.98±1.24
Ash	2.34±0.03		

*Nx6.25.

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TABLE 2. Fatty Acid Composition of Chufa Tuber Oil

Properties	Values, %	Properties	Values, %
Palmitic	14.8±1.1	Linolenic	0.5±0.01
Oleic	72.7±2.3	Arachidic	0.6±0.01
Linoleic	11.4±0.17		

TABLE 3. Mineral Contents of Chufa Tubers*

Minerals, mg/kg	Values	Minerals, mg/kg	Values
Ag	0.487±0.144	K	9821.7±4218.012
Al	709.15±61.904	Li	0.75±0.047
B	28.21±48.598	Mg	1190.50±58.238
Ba	3.67±0.486	Mn	2.36±1.829
Ca	739.09±173.371	Na	2407.38±228.446
Cd	0.14±0.108	Ni	10.52±0.596
Co	0.19±0.261	P	3012.56±360.008
Cr	23.13±33.223	Sr	5.90±0.292
Cu	5.77±0.727	V	0.64±0.067
Fe	412.54±13.586	Zn	11.67±0.291
Ga	0.59±1.051		

*Dry matter.

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