

EVALUATING THE FATTY ACID COMPOSITION OF THE OIL FROM FRUIT HULLS OF TWO *Pistacia* SPECIES GROWING WILD IN IRAN

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UDC 547.915

The *Pistacia* genus includes the Anacardiaceae family and consists of 11 species. Three *Pistacia* species occur naturally in Iran, including *Pistacia vera*, *Pistacia atlantica*, and *Pistacia khinjuk* [1]. *P. atlantica* and *P. khinjuk* grow wildly and largely in the southwest and west of Iran. *P. atlantica* and *P. khinjuk* grow 600 to 3000 m and 700 to 1900 m above sea level, respectively [2]. The fruits of *P. atlantica* and *P. khinjuk* are used by natives as food after grinding and mixing with other ingredients. They are round to oval, somewhat flat, and 0.5–0.7 cm and 0.3–0.5 cm in diameter in *P. atlantica* and *P. khinjuk*, respectively. Their wooden hard shells are covered with a rather dry hull, which could be easily removed by pressing between fingers. The color of these soft hulls is dark green [3] and their oil contents are 30% (*P. atlantica*) and 40% (*P. khinjuk*).

The fatty acid compositions of the oils from the fruits of *P. atlantica* and *P. khinjuk* indicate that the nutritional value of *P. atlantica* fruit oil is better than that of *P. khinjuk* [4]. The amount of linoleic acid, which is essential in human diet, in *P. atlantica* fruit oil is greater than that in *P. khinjuk*. Moreover, essential fatty acids have been shown to reduce the level of cholesterol in the blood. They prevent cardiovascular diseases better than any other oil [5, 6].

In this investigation, the fatty acid composition of *P. atlantica* hull (PAH) and *P. khinjuk* hull (PKH) oils was studied. The fatty acid compositions of these oils were analyzed by GC, and the results are given in Table 1.

The major fatty acid components characterized in the oil were as follow: oleic acid (52.03–52.12%), palmitic acid (22.55–23.4%), palmitoleic acid (7.74–14.05 %), linoleic acid (5.35–12.02%), stearic acid (2.39–3%), and linolenic acid (1.16–1.5%), but negligible amounts of margaric acid (0.05–0.4%), margaroleic acid (0.2–0.24%), and gadoleic acid (0.25–0.76%) were identified in the fatty acid composition of these oils. Fatty acid (FA) components representing about 99.58–99.63% of total oil were characterized. The amounts of saturated (SFA), monounsaturated (MUFA), and polyunsaturated fatty acids (PUFA) in the studied oils were found to be 25.84–25.95, 60.22–67.17, and 6.51–13.52%, respectively.

The main fatty acid found in PAH and PKH oils was oleic acid, and there was no significant difference in amounts of it between the two studied oils. The amounts of palmitic acid and linolenic acid in PAH and PKH oils were statistically the same, too. The percentage of linoleic acid in PKH oil was more than that in PAH oil, but the palmitoleic acid and stearic acid contents in PKH oil were lower than those in PAH oil.

TABLE 1. Fatty Acid Composition of *P. atlantica* (PAH) and *P. khinjuk* (PKH) Oils, %

Fatty acid	PAH	PKH	Fatty acid	PAH	PKH
16:0	22.55 ± 0.07 a	23.4 ± 0.24 a	18:3	1.16 ± 0.12 a	1.5 ± 0.19 a
16:1	14.05 ± 0.22 a	7.74 ± 0.07 b	20:1	0.76 ± 0.06 a	0.25 ± 0.05 b
17:0	0.4 ± 0.03 a	0.05 ± 0.08 b	ΣSFA	25.95 ± 0.9 a	25.84 ± 0.21 a
17:1	0.24 ± 0.13 a	0.2 ± 0.16 a	ΣMuFA	67.17 ± 0.7 a	60.22 ± 0.3 b
18:0	3 ± 0.14 a	2.39 ± 0.05 b	ΣPuFA	6.51 ± 0.11 b	13.52 ± 0.19 a
18:1	52.12 ± 0.17 a	52.03 ± 0.16 a	ΣFA	99.63 ± 0.21 a	99.58 ± 0.17 a
18:2	5.35 ± 1.02 b	12.02 ± 0.2 a			

The data are expressed as percentages of total fatty acids. Each value represents the mean of three experiments. The means with the same letter in each row do not differ significantly at the 0.05 level.

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The fatty acid composition of PAH and PKH oils indicates that the main fatty acids in these oils are statistically the same but the percentage of linoleic acid and palmitoleic acid is different. Therefore, from the viewpoint of nutritional value, PKH oil is better than PAH oil (having higher polyunsaturated fatty acid contents, especially linoleic acid, as essential fatty acids). Our results indicate that the fatty acid compositions of the oils from fruit hulls of *Pistacia atlantica* and *Pistacia khinjuk* in comparison with those of the oils from fruits of these pistacia species [4] are different.

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