SEED FATTY ACIDS COMPOSITION OF *Ballota cristata*

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The genus Ballota (*Lamiaceae)* is represented by 35 species in the world and in Turkey it is represented by 17 taxa, 9 of which are endemic to Turkey. *B. cristata* is one of the endemic species of Turkey [1, 2].

Ballota species are well known in folk medicine plants for their fresh leaves, fruits, and seeds, since they possess calmative and antispasmodic properties and are externally used for colic, asthma, influenza, insomnia and haemorroids. The also possess antipruritic and analgesic effects on local pain [3]. *Ballota* species are widely used in medicine because of their spasmolitic and sedative effect in Europe and in Turkey [4–7].

Some species of the genus have been studied for their leaf components such as flavonoid aglycones [8] terpenoid, and phenylproponoids [3, 4, 8, 9]. The biological activities of these compounds isolated from leaves of several *Ballota* species have been investigated [10]. However, the seed oils of *Ballota have never been analyzed*. Here, we report on the seed oil composition of *Ballota cristata*.

B. cristata seeds were collected from Antalya (Turkey), Serik, Bozburun Mountains, Bogaz-Tuzlucukur yayla, and calcareous rocks, 1450–1500 m.

GC/MS analysis was carried out with a Shimadzu GC/MS QP5000. Carrier gas was helium. GL Science TC-5 column (30 m × 0.32 mm) was used. The temperature of the GC oven was held at 35°C (3 min) and programmed to 125°C with 3°C/min (3 min), and to 185°C with 4°C/min (3 min), and finally to 250°C and detector temparature 300°C. Split ratio was 24. Oven flow was 77 ml/min. Mass range was 40–600 *m/z* and detector volts (kV) was held at 1.45. Identification of individual components was achieved using the Wiley 139 Library. Analyses were carried out at BITAUM (Ankara University Research Center).

The seed fatty acid composition of *B. cristata* is summarized in Table 1. *B. cristata* seeds contain 20% total fatty acid. Among of them 14.24% are saturated and 85.87% are unsaturated. Six fatty acids were totaly identified and quantitated. The dominant fatty acids were linoleic acid, oleic acid, and tarriric acid.

Tarriric acid has not been reported to date for *Ballota*. Tarriric acid was found mainly in the species of *Picramnia* (*Simarubaceae*) [12].

The value of fatty acid patterns in deducing systematic relationship among plants is becoming increasingly apparent. Many recent studies in which phylogenetic and taxonomic aspects are considered in relation to fatty acid composition suggest that fatty acids have evolutionary implication and taxonomic significance in higher plant systematics [13, 14]. Thus, our investigation results on seed fatty acid composition of *Ballota cristata* will be useful in the taxonomy of this genus.

Seeds were extracted with *n*-hexane for 8 hours in a Soxhlet apparatus for the extraction of oil. Methyl esters from the extracted oil was prepared according to the method of Metcalfe et al. [11] and were examined by GC-MS under specified conditions.

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TABLE 1. Seed Fatty Acids Composition of *Ballota cristata*

Peak No.	Compounds	RI	Rt min	% amount
1	Methyl palmitate	1907.82	49.742	7.975
2	Methyl stearate	1981.17	50.983	6.262
3	Methyl oleate	2310.57	55.200	24.177
4	Methyl tarirate*	2337.51	56.058	15.421
5	Methyl linoleate	2358.41	56.733	43.559
6	Methyl linolenate	2385.42	57.617	2.716

*Tentative identification by GC/MS.

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