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B R I E F C O M M U N I C A T I O N S

FATTY ACID COMPOSITION OF *Zygophyllum fabago* SEEDS

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Zygophyllum fabago L. a member of the Zygophyllaceae family, is a herbaceous plant found widely in the Mediterranean area. Genus *Zygophyllum* is represented by only two species, *Z. album* and *Z. fabago*, and *Z. fabago* is widely distributed in Turkey [1]. The plant is reported to be used as antihelmentic, antirheumatic, and antiasthmatic [2]. To date, little phytochemical study has been performed on *Z. fabago*. From the aerial part of the plant triterpenoid saponins have been isolated [3]. There is no investigation on the seed oil of *Z. fabago*.

Fatty acids, especially essential fatty acids (EFAs), are of vital significance for human beings. The role of EFAs such as linoleic (18:2ω6) and γ-linolenic (18:3ω6) acids obtained from various oils (mainly evening primrose, borage, and black currant oils) in the diet is crucial. It has also been suggested that consumption of a diet enriched in EFAs confers beneficial health effects such as a protective effect on the development of cardiovascular diseases, inflammatory symptoms (rheumatoid arthritis and ulcerative colitis), atopic dermatitis, psoriasis and malignant diseases [4, 5]. In our search to find new sources of EFAs, we have investigated about one hundred oils from plant seeds in previous studies [6–9]. Therefore, we aimed to determine the fatty acid composition of the seed oil of *Z. fabago* in this study.

Mature plant seeds were collected from the vicinity of Ankara, Turkey in the natural habitats of the plants in September 2002. The plants were identified by M. Vural, Ph.D. A voucher specimen (GUE 2312) was kept in the Herbarium of the Faculty of Pharmacy, Gazi University (GUE), Ankara, Turkey.

Seeds were weighed accurately and powdered with anhydrous Na_2SO_4. They were extracted with petroleum ether (bp 40–60°C) in a Soxhlet apparatus, and the fatty acids were later converted to methyl esters with a Boron trifluoride-methanol complex (20%) reagent [10]. The methyl esters of fatty acids were dissolved in CH_2Cl_2 and applied into a GC-MS apparatus (Hewlett Packard Model 6890 series) equipped with a mass selective detector. Experimental conditions for capillary GC-MS analysis were developed under the following conditions. Capillary column HP-5MS (5% phenylmethylsiloxane, 30 m × 250 μm, i.d., with 0.25 μm film thickness, model No. HP 190915-433), detector temperature 280°C, injector temperature 250°C, carrier gas helium (1 mL/min), split ratio 1/20, injection volume 0.2 mL, and mass range *m/z* 20–440. GC oven temperature was kept at 180°C for 5 min and programmed to 280°C at a rate of 2°C/min and kept constant at 280°C for 10 min.

Identification of the peaks was carried out through a Wiley library databank search as well as comparison with the standards. The relative percentage amounts of the separated fatty acids were calculated from total ion chromatography by a computerized integrator. Data obtained from three analyses of the seed oil were expressed as means (±SD).

In this study, seed oil was obtained at an average yield of 3.7%. The composition of the fatty acids of the seed oil and their relative percentages are given in Table 1. The major constituents of the oil were unsaturated fatty acids. The total unsaturated acid content was 72.58%. The main component was linoleic acid (51.02%), followed by oleic acid (21.56%). When we compared the saturated fatty acids, the amount of palmitic acid (8.34%) was higher than the others such as stearic (4.88%), arachidic (1.41%), and behenic acid (1.05%).

In conclusion, according to the results obtained by capillary GC-MS analysis, *Z. fabago* seed oil could be considered new alternative sources of linoleic acid, a precursor of arachidonic acid, which plays a crucial role in many normal metabolic process [4, 5]. To the best of our knowledge, this is the first report of the seed oil content of *Z. fabago*.

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TABLE 1. Fatty Acid Composition of Zygophyllum Fabago Seeds

Fatty acids	Retention times, min	Relative percentage of fatty acids*
Palmitic acid, 16:0	8.58	8.34±1.32
Linoleic acid (18:2ω6)	13.22	51.02±0.47
Oleic acid (18:1ω9)	13.35	21.56±0.87
Stearic acid, 18:0	14.02	4.88±0.34
Arachidic acid, 20:0	20.60	1.41±1.08
Behenic acid, 22:0	27.53	1.05±0.56

*Data are expressed as mean ± SD.

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