JAP&T
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Journal of Agroalimentary Processes and Technologies 2019, *25* (4), 202-208

Journal of Agroalimentary Processes and Technologies

Fatty Acid Compositions of fruit and seed oils of some wild growing plant species

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Abstract

The fatty acid compositions of the 37 plant seed oils were determined by Gas Chromotography. Fatty acid compositions of oils were determined as follows: stearic (0.08 (*Allium sieheanum* Hausskn. ex Kollmann Endemic)-9.78% (Termopsis turcica Kit Tan, Vural & Küçüködük- Endemic)), behenic (0.09% (Robinra pseudoacacia L.)-34.38% (*Sisyrobrium altissimum* L.)), linolenic (6.55% (Suaeda carnossissima Post)-41.18% (Prangus hyniae H. Duman & M.F. Watson Endemic)), cis-11,14-eicosadienoic (0.15% (Prangus hyniae H. Duman & M.F. Watson Endemic)-69.55% (Asphadelina rigidifolia (Boiss.) Baker- Endemic)), heneicosanoic (7.00% (Isatis tinctoria L. subsp. tomentella (Boiss.) P.H. Davis and Hyacin Hella campanulata K.M. Perss. & Wendelbo- Endemic)-59.93% (*Allium cappadocicum* Boiss. Endemic) and caproic (0.43% (*Sisyrobrium altissimum* L.) - 43.44% (*Bupleunim rotundifolium* L.)) and some minor fatty acids. The highest heneicosanoic acid was found in termopsis (51.93%), Pyrus elaeagnifolia Pall. subsp. elaeagnifolia (31.61%), Hibiscus syriacus L. (33.22%), *Crateagus monogyna* Jacq subsp. monogyna (43.33%), *Camelina rumellca* Vel. (43.33%), *Colutea cilicita* Boiss. & Bal., *Cicer pinnatifidum*, *Cercus siliquastrum* L. subsp. siliquastrum plant seed oils.

Keywords: Wild plant, Seed, Fatty acid composition, Linolenic acid, Heneicosanoic acid

1.Introduction

Plant seeds are good sources for both common and uncommon fatty acids [1]. Uncommon fatty acids are usually produced by nonagronomic crops. There is a growing interest in finding new alternative crops for oil production [2-4]. The majority of world oil pruduction is based on a few annual and perennial plant species, such as soybean, oil palm, cotton, canola, and sunflower. Human consumption accounts, for 80% of oil consumption in the World [4,5]. The *Cercies siliquastrum* L. has a potential use for landscaping due to its ornamental features also use for borders, erosion control, wind breaks and wildlife plantings as a medicinal plant [6-8]. The chickpea is considered to be a healthy vegetarian food, and it is one of the most important human and domestic animal foods [9]. The finding of malvalic acid in the seed oil of Southeast-Asian Gnetum scandens by Berry [10]. came as a surprise to most researchers familiar with the fatty acid composition of seed oils of Gymnospermae. The genus *Hibiscus* exhibits great diverstiy in the production of natural materials with both edible and industrial applications [11]. The Leguminosae is a family of flowering plants comprising about 269 genera and 5100 species [12] and is one of the largest plant families in the world and also in Turkey. Roses have been also used in the food, perfumery, and cosmetics industries for many years [13-15]. The fruits of the rose species are considerably beneficial for human health since they contain organic and inorganic matters that are outstanding in quality and amounts [16-20]. The Fabaceae is a more important family of food plants, especially pulses (Geans, grow, peas) and oil, but also tanbarks, timber, copal, gums, insecticides and cultivated ornamentals, as well as medicinal plants [21-22]. Apiaceae represent one of the best-known plant families, widely distributed in temperate climate regions where they are often used as spices

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vegetables, or drugs owing to the presence of useful secondary metabolites [23-24]. Legume seeds contain low levels of total oil and saturated fatty acids, as well as has high content of unsaturated fatty acid therefore, increase intake of legumes can be beneficial to human health [25-26]. *Camelina sativa* is an ancient cultivated crop of the Brassicaceae family and an alternative oil seed crop for using marginal areas Turkey [27]. Many Bugleurum species have been examined to evaluate their flavonoid content essential oil composition, antioxidant properties, and fatty acid composition [28-30]. The aim of current study was to determine to the fatty acid compositions of seed oil from 37 different domesticated wild plants.

2.Materials and methods

2.1.Material

Plants used in this study were collected from different locations of Turkey (Table 1). Plants were identified by Dr Bağcı.

2.2. Oil content

The oil contents of plant seeds were determined according to the method ISO 659:1998 (ISO,1998). About 2 g of the kernels were ground in a ball mill and extracted with petroleum ether in a Twisselmann apparatus for 6 h. The solvent was removed by a rotary evaporator at 40 °C and 25 Torr. The oil was dried by a stream of nitrogen and stored at -18 °C until used.

2.3. Determination of Fatty acids

Fatty acid compositions for plant seed oil were determined using a modified fatty acid methyl ester method as described by Hışıl [31]. The oil was extracted three times for 2 g air-dried seed sample by homogenization with petroleum ether. The oil samples (50-100 mg) was converted to its fatty acid methyl esters (FAME). The methyl esters of the fatty acids (1 µl) were analysed in a gas chromotography (HP 6890) equipped with a flame ionising detector (FID), a fused silica capillary column (60 m x 0.25 mm i.d.; film thickness 0.20 micrometer). It was operated under the following conditions: oven temperature program. 175 ^{o}C for 7 min. Raised to 250 ^{o}C at a rate 5 ^{o}C/min and than kept at 250 ^{o}C for 15 min); injector and detector temperatures, 250 and 250 ^{o}C; respectively, carrier gas. nitrogen at flow rate of 1.51 ml/min; split ratio. 1/50 µl/min.

3. Results and Discussion

The fatty acid compositions of the seed oils are shown in Table 2. The fatty acid compositions of the 37 plant seed oils belong to different family were determined. The major fatty acids of oil samples changed depending on plant species. Generally, the major fatty acids in seed oils were stearic, behenic, caproic, linolenic, cis-11,14-eicosadienoic, cis-11-eicosenoic and heneicosanoic adis. Fatty acid compositions of oil samples were determined as follows: stearic (0.08% (*Allium sieheanum* Hausskn. ex Kollmann Endemic) - 9.78% (*Termopsis turc*ica Kit Tan, Vural & Küçüködük- Endemic)), behenic (0.09% (*Robinra pseudoacacia* L.)-34.38% (*Sisyrobrium altissimum* L.)), linolenic (6.55% (*Suaeda carnossissima* Post)-41.18% (*Prangus hyniae* H. Duman & M.F. Watson Endemic)), cis-11,14-eicosadienoic (0.15% (*Prangus hyniae* H. Duman & M.F. Watson Endemic) - 69.55% (*Asphadelina rigidifolia* (Boiss.) Baker- Endemic)), heneicosanoic (7.00% (*lsatis tinctoria* L. subsp. *tomentella* (Boiss.) P.H. Davis and Hyacin *Hella campanulata* K.M. Perss. & Wendelbo- Endemic) - 59.93% (*Allium cappadocicum* Boiss. - Endemic) and caproic (0.43% (*Sisyrobrium altissmum* L.) - 43.44% (*Bupleunim rotundifolium* L.)) and some minor fatty acids. These major acids comprise about 90% of total fatty acids in all determined seed oils. The highest heneicosanoic acid was found in termopsis (51.93%), *Pyrus elaeagnifolia* Pall. Subsp. *elaeagnifolia* (31.61%), *Hibiscus syriacus* L. (33.22%), *Crateagus monogyna* Jacg. subsp. monogyna (43.33%), *Camelina rumelica* Vel. (43.33%), *Colutea cilicita* 43 Boiss. & Bal., *Cicer pinnatifidum* Jaub. & Spach, *Cercus siliquastrum* L. subsp. *siliquastrum* plant seed oils. In addition, the highest caproic acid was determined in *Bupleunim rotundifolium* L. (43.44%) *Marrabium parviflorum* Fisch. & Mey. subsp. parviflorum (41.83%) oils. The highest cis-11, 14-eicosadienoic acid contents of oils ranged from 17.93% (*Marrabium parviflorum* Fisch. & Mey. subsp. *parviflorum*) to 69.55% (*Asphadelina rigidifolia* (Boiss.) Baker- Endemic).

In several Rose seed oil, the identified fatty acids were linoleic (45.38 to 54.58%), linolenic (13.67 to 24.75%), oleic (11.97 to 21.08%), palmitic (6.54 to 12.97%), stearic (3.37 to 8.54%) and arachidic acids (0.85 to 1.99%) (Sharma et al. 2012) [20] .

In the present study, the percentage of linoleic acid was recorded higher among all the fatty acids. In all the accessions content of oleic acid (11.97 to 21.08%) was higher than that of stearic acid (3.37 to 8.54%). The variations in composition of fatty acids in seed oils of different rose accessions were also reconded. In previous study, fatty acid compositions of wild rose species were determined as follows: linoleic (44.4-55.7%), α-linolenic (18.6-31.4%), oleic (13.5-20.3%), palmitic (2.3-3.3%), stearic (1-2.5%), octadecenoic (0.38-0.72%), eicosenoic (0.3-0.7%), eicosadienoic (0.0-0.16%), erucic (0.03-0.17%) and minor fatty acids [32].

Dietary unsaturated fatty acids are essential for correct functioning of human organism [33-35]. The main saturated fatty acids of Bupleurum seed oils were palmitic, stearic and myristic [36]. Palmitic, stearic, oleic, linoleic, linolenic, eicosenoic and erucic acids were detected in the seed samples of current plants. Fattty acid compositions of the species differed among the plant families. Large ranges for these fatty acids reported that variation was found to be greater for palmitic (0.65%-24.43%) and linoleic (7.04%-66.22%) acids than for stearic(2.07%-9.24%) and oleic (9.02%-51.05%) acids (linolenic, eicosenoic, and erucic acids were found only in members of the family Brassicaceae [4]. Our results of linolenic, α-linolenic,stearic and olic acids determination are in agreement with the results obtained by several researchers.[32-37] The seed oils of *Astragalus* sp. contained linolenic (20-41%), linoleic (23-37%), and oleic acids (8-19%) as the major fatty acids (Bagci, 2006).[38] Zia_UL_Hag [39] reported that chickpea seed oils contained 18.9-20.4% palmitic, 0.3-0.05% palmitoleic, 1.3-1.7% stearic, 21.6-22.2% oleic, 54.7-56.2 % linoleic, 0.5-0.9% linolenic and 1.0-1.4% arachidic acids.

(Cis-vaccenic acid), (18:2n-6 and 13-phenyl tridecanoic acids were found to be the main fatty acids in the seed oil. [40] The major fatty acids were palmitic (15.33%), oleic (18.06%), cis-vaccenic (11.02%) and linoleic acids (23.21%), followed by palmitoleic (4.87%), stearic (3.27%) and 13-phenyltridecanoic acids (9.47%).[40] Vaccenic acid was determined in some Umbelliferae seed oils (Reiter et al. 1998). These seed oils are rich source of polyunsaturated fatty acids, especially linolenic, cis-11,14-eicosadienoic and cis-11-eicosenoic acids. It is favorable for medicinal and nutritional application of these natural products.

Table 1. Used plants in experiment

No	Toplayıcı No	Familya	Bitki Adı	Lokalite
1.	EY-Y Bağcı-2860	Cruciferae	**Camelina rumelica** Vel.	Konya; Beyşehir-Başarakavak yol ayrımı, yol kenarı, 1300 m, 05.07.2010
2.	EY-Y BAGCI-2861	Caryophyllaceae	**Silene dichotoma** Ehrh. subsp. **dichotoma**	Konya-Beyşehir yolu, Değirmenköy yol ayrımı, step, 1265 m, 05.07.2010
3.	EY-Y BAGCI-2862	Leguminosae	**Sphaerophysa kotschyana** Boiss.- **ENDEMIK**	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 08.07.2010
4.	EY-Y BAGCI-2863	Liliaceae	**Allium sieheanum** Hausskn. ex Kollmann **ENDEMIK**	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 08.08.2010
5.	EY-Y BAGCI-2864	Leguminosae	**Gleditsia triacanthos** L.	Konya-Beyşehir yolu, Başarakavak, yol kenarı, 1265 m, 05.07.2010
6.	EY-Y BAGCI-2865	Labiatae	**Salvia cryptantha** Montbret & Aucher ex Benth. - **ENDEMIK**	Konya; Beyşehir-Başarakavak yol ayrımı, DSİ Ormanlığı, taşlık yerler, 1340 m, 05.08.2010
7.	EY-Y BAGCI-2866	Leguminosae	**Cercis siliquastrum** L. subsp. **siliquastrum**	Konya-Beyşehir yolu, Başarakavak, yol kenarı, 1265 m, 05.08.2010
8.	EY-Y BAGCI-2867	Cruciferae	**Diplotaxis viminea** (L.) DC.	Konya-Beyşehir yolu, Başarakavak, yol kenarı, 1265 m, 05.07.2010
9.	EY-Y BAGCI-2868	Zygophyllaceae	**Peganum harmala** L.	Konya; Beyşehir-Başarakavak yol ayrımı, yol kenarı, 1300 m, 11.09.2010
10.	EY-Y BAGCI-2869	Labiatae	**Salvia halophila** Hedge - **ENDEMIK**	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 12.09.2010
11.	EY-Y BAGCI-2870	Liliaceae	**Hyacinthella campanulata** K.M.Perss. & Wendelbo- **ENDEMIK**	Konya; Altınapa Barajı, Suderesi mevkii, taşlık yerler, 1280 m, 15.07.2010
12.	EY-Y BAGCI-2871	Liliaceae	**Allium karacae** Koyuncu **ENDEMIK**	Konya; Hadim-Taşkent arası 5. km, serpantin yamaç, 1570 m, 19.09.2010
13.	EY-Y BAGCI-2872	Zygophyllaceae	**Zygophyllum fabago** L.	Konya-Beyşehir yolu 10. km, step, 1280 m, 11.08.2010
14.	EY-Y BAGCI-2873	Malvaceae	**Alcea pallida** Waldst. & Kit.	Konya; Altınapa Barajı-Başarakavak arası, Han mevkii, yol kenarı, 1280 m, 03.09.2010
15.	EY-Y BAGCI-2874	Liliaceae	**Allium cappadocicum** Boiss. - **ENDEMIK**	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 18.09.2010
16.	EY-Y BAGCI-2875	Chenopodiaceae	**Suaeda carnossissima** Post	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 18.09.2010
17.	EY-Y BAGCI-2876	Leguminosae	**Cicer pinnatifidum** Jaub. & Spach	Mersin (Anamur); Pullu Piknik Alanı, kızıl çam altı, 20-50 m, 08.07.2010
18.	EY-Y BAGCI-2877	Chenopodiaceae	**Chenopodium album** L. subsp. **album** var. **album**	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 18.09.2010
19.	EY-Y BAGCI-2878	Umbelliferae	**Bupleurum rotundifolium** L.	Konya -Altınapa Barajı, Suderesi mevkii, yol kenarı, 1245 m, 11.08.2010
20.	EY-Y BAGCI-2879	Primulaceae	**Androsace maxima** L.	Konya; Tatköy, Bayrakkayası Tepesi, taşlık yerler, 1500 m, 24.07.2010
21.	EY-Y BAGCI-2880	Cruciferae	**Sisymbrium altissimum** L.	Konya; Altınapa Barajı-Başarakavak arası, Örenarası mevkii, tarla kenarı, 1280 m, 08.08.2010
22.	EY-Y BAGCI-2881	Leguminosae	**Melilotus alba** Desr.	Konya; Altınapa Barajı-Başarakavak arası, Kayacık mevkii, yol kenarı, 1290 m, 11.08.2010
23.	EY-Y BAGCI-2882	Liliaceae	**Asphodeline rigidifolia** (Boiss.) Baker- **ENDEMIK**	Konya; Altınapa Barajı-Başarakavak arası, Kayacık mevkii, step, 1290 m, 03.08.2010
24.	EY-Y BAGCI-2883	Caryophyllaceae	**Gypsophila pilosa** Hudson	Konya; Küçük Muhsine Köyü yol ayrımı, yol kenarı, 1290 m, 11.08.2010
25.	EY-Y BAGCI-2884	Leguminosae	**Thermopsis turcica** Kit Tan, Vural & Küçüködük- **ENDEMIK**	Konya Çamözü Beldesinin doğusu, tarla kenarı, 25.09.2010
26.	EY-Y BAGCI-2885	Caryophyllaceae	**Saponaria officinalis** L.	Konya, Selçuk Universitesi, Bahçe içi, 1130 m, 11.09.2010
27.	EY-Y BAGCI-2886	Umbelliferae	**Prangos heyniae** H.Duman & M.F.Watson **ENDEMIK**	Konya, Hadim-Bozkır arası, Yalnızkaya T., nemli yerler, 1700 m, 30.08.2010
28.	EY-Y BAGCI-2887	Leguminosae	**Trigonella spruneriana** Boiss. var. **spruneriana**	Konya; Altınapa Barajı, Suderesi mevkii, taşlık yerler, 1245 m, 11.08.2010
29.	EY-Y BAGCI-2888	Cruciferae	**Isatis tinctoria** L. subsp. **tomentella** (Boiss.) P.H.Davis	Konya; Beyşehir-Başarakavak yol ayrımı, yol kenarı, 1300 m, 11.08.2010
30.	EY-Y BAGCI-2889	Malvaceae	**Hibiscus syriacus** L.	Konya, Selçuk Universitesi, Bahçe içi, 1130 m, 11.09.2010
31.	EY-Y BAGCI-2890	Umbelliferae	**Ferula halophila** Pesmen **ENDEMIK**	Konya-Cihanbeyli, Yavşan Tuzlası, tuzlu topraklar, 920 m, 18.09.2010
32.	EY-Y BAGCI-2891	Rosaceae	**Pyrus elaeagnifolia** Pall. subsp. **elaeagnifolia**	Konya; Başarakavak, Küngönü mevkii, yol kenarı, 1350 m, 30.08.2010
33.	EY-Y BAGCI-2892	Leguminosae	**Sophora japonica** L.	Konya, Selçuk Universitesi, Bahçe içi, 1130 m, 11.09.2010
34.	EY-Y BAGCI-2893	Leguminosae	**Astragalus yilmazii** Aytaç & M.Ekici - **ENDEMIK**	Konya; Bozkır, Kayacık Köyü, Sugla Gölü, tarla kenarı, 1100 m,30.09.2010
35.	EY-Y BAGCI-2894	Leguminosae	**Robinia pseudoacacia** L.	Konya; Beyşehir-Başarakavak yol ayrımı, yol kenarı, 1300 m, 19.07.2010
36.	EY-Y BAGCI-2895	Rosaceae	**Mespilus germanica** L.	Konya; Başarakavak, Küngönü mevkii, yol kenarı, 1350 m, 30.10.2010
37.	EY-Y BAGCI-2896	Rosaceae	**Crataegus monogyna** Jacq. subsp. **monogyna**	Konya; Altınapa Barajı, Suderesi mevkii, taşlık yerler, 1245 m, 21.09.2010
38.	EY-Y BAGCI-2897	Rosaceae	**Rosa canina** L.	Konya; Altınapa Barajı-Başarakavak arası, Hayrat mevkii, step, 1280 m, 15.10.2010
39.	EY-Y BAGCI-2898	Labiatae	**Marrubium parviflorum** Fisch. & Mey. subsp. **parviflorum**	Konya; Altınapa Barajı-Başarakavak arası, Karataş T., kayalık yerler, 1350 m, 08.10.2010
40.	EY-Y BAGCI-2899	Umbelliferae	**Falcaria vulgaris** Bernh.	Konya; Başarakavak, Küngönü mevkii, tarla kenarı, 1350 m, 24.09.2010
41.	EY-Y BAGCI-2900	Umbelliferae	**Hippomarathrum scabrum** (Fenzl) Boiss.	Konya; Altınapa Barajı, Suderesi mevkii, eğimli ve taşlık yerler, 1270 m, 24.10.2010
42.	EY-Y BAGCI-2901	Leguminosae	**Colutea cilicica** Boiss. & Bal.	Konya; Altınapa Barajı-Başarakavak arası, Han mevkii, yol kenarı, 1280 m, 21.10.2010

Table 2. Fatty acid composition of several plant oils (%)

Fatty Acids	**Thermopsis turcica** Kit Tan, Vural & Küçüködük- Endemic	**Suaeda carnossissima** Post	**Sisymbrium altissimum** L.	**Saponaria officinalis** L.	**Sphaerophysa kotschyana** Boiss.- Endemic	**Sophora japonica** L.
Heptadecanoic acid	0.28	0.04	-	-	-	-
Stearic acid	9.78	4.94	5.11	6.29	5.56	5.56
Cis-11-eicosenoic acid	26.80	-	10.94	27.52	14.16	14.16
Heneicosanoic acid	51.93	13.26	12.91	45.39	46.32	46.32
Behenic acid	6.09	-	34.38	0.96	7.73	7.73
Erucic acid	0.40	0.62	-	-	0.20	0.20
Cis-11,14,17-eicosatrienoic acid	0.86	0.67	10.12	1.38	0.35	0.35
Nervonic acid	0.83	0.48	20.26	0.82	0.67	0.67
Caproic Acid	-	4.24	0.43	11.39	14.65	14.65
Linolenic acid	-	6.55	-	-	-	-
Cis-11, 14-eicosadienoic acid	-	64.57	0.24	2.00	-	-
Cis-8,11,14-eicosatrienoic acid	-	3.67	-	-	-	-
Tricosanoic acid	-	0.13	1.04	0.19	-	-
Cis-13,16-docosadienoic acid	-	0.03	-	-	-	-
Linolenic acid	-	6.55	-	-	-	-
Cis-11, 14-eicosadienoic acid	-	64.57	0.24	2.00	-	-
Lignoceric acid	-	-	1.12	-	-	-

Fatty Acids	**Salvia cryptantha** Montbret & Aucher ex Benth. - Endemic	**Salvia halophila** Hedge - Endemic	**Rosa canina** L.	**Robinia pseudoacacia** L.	**Pyrus elaeagnifolia** Pall. subsp. **elaeagnifolia**	**Prangos heyniae** H.Duman & M.F.Watson Endemic
Caproic Acid	1.09	12.97	1.25	13.59	6.80	7.12
Cis-10-pentadecenoic acid	0.02	-	-	-	-	0.47
Stearic acid	4.50	4.12	4.12	2.06	6.39	0.11
Elaidic acid	0.02	-	0.13	0.86	-	0.43
Oleic acid	0.16	0.05	-	-	-	0.07
Linolelaidic acid	0.03	-	-	-	0.06	0.46
Linoleic acid	0.03	22.10	0.06	-	0.06	0.12
x-linolenic acid	0.08	0.09	-	-	-	0.08
Linolenic acid	7.05		19.56			41.18
Heneicosanoic acid	16.22	28.68	-	26.56	31.61	-
Cis-11,14-eicosadienoic acid	67.95	-	44.98	9.96	44.34	0.15
Cis-8,11,14-eicosatrienoic acid	0.57	-	-	3.79	-	-
Cis-11,14,17-eicosatrienoic acid	0.65	0.56	0.90	0.21	0.85	0.63
Tricosanoic acid	0.10		0.10	0.35	0.04	-
Nervonic acid	0.18	0.23	0.25	0.22	0.38	0.10
Behenic acid	-	0.16	21.29	0.09	0.64	0.49
Cis-11-eicosenoic acid	-	-	5.95	4.64	7.11	1.72
Erucic acid	-	-	1.08	-	0.60	-
Behenic acid	-	0.16	21.29	0.09	0.64	0.49
Arachidonic acid	-	-	-	0.18	-	0.10

Fatty Acids	**Peganum harmala** L.	**Mespilus germanica** L.	**Marrubium parviflorum** Fisch. & Mey. subsp. **parviflorum**	**Isatis tinctoria** L. subsp. **tomentella** (Boiss.) P.H.Davis	**Hyacinthella campanulata** K.M.Perss. & Wendelbo- Endemic	**Hippomarathrum scabrum** (Fenzl) Boiss.
Caproic Acid	13.31	13.31	41.83	9.81	9.81	3.37
Cis-10-pentadecenoic acid	0.12	0.12	-	0.04	0.04	0.39
Heptadecanoic acid	0.04	0.04	-	-	-	0.51
Stearic acid	5.26	5.26	2.68	2.86	2.86	4.86
Elaidic acid	0.15	0.15	-	0.14	0.14	0.21
Oleic acid	0.17	0.17	-	-	-	-
Linoleic acid	0.09	0.09	-	0.05	0.05	-
Cis-11-eicosenoic acid	3.89	3.89	-	1.52	1.51	11.01
Linolenic acid	15.48	15.48	13.94	18.58	18.58	-
Cis-11,14-eicosadienoic acid	56.53	56.53	17.93	-	-	-
Behenic acid	0.85	0.85	0.67	22.47	22.47	2.05
Cis-11,14,17-eicosatrienoic acid	0.22	0.22	0.78	8.84	8.84	0.33
Arachidonic acid	0.15	0.15	-	-	-	-
Tricosanoic acid	0.07	0.07	0.19	0.34	0.34	
Cis-4,7,10,13,16,19-docosahexaenoic acid	0.04	0.04		0.27	0.27	0.17
Heneicosanoic acid	-	-	21.68	7.00	7.00	13.90
Cis-5,8,11,14,17-eicosapentaenoic acid	-	-	0.04	0.48	0.48	
Nervonic acid	-	-	0.27	-	-	1.25
Pentadecanoic acid	-	-	-	-	-	1.46
Palmitic acid	-	-	-	-	-	0.54
Palmitoleic acid	-	-	-	-	-	0.70
Erucic acid	-	-	-	-	-	0.49

Fatty Acids	Hibiscus syriacus L.	Melilotus alba Desr.	Gypsophila pilosa Hudson	Gleditsia triacanthos L.	Ferula halophila Pesmen Endemic	Falcaria vulgaris Bernh.
Caproic Acid	2.24	-	-	-	-	-
Cis-10-pentadecenoic acid	0.20	0.08	0.08	0.08	0.08	0.08
Stearic acid	0.18	8.53	8.53	8.53	8.53	8.53
Elaidic acid	0.76	0.06	0.06	0.06	0.06	0.06
Oleic acid	0.11					-
Linoleic acid	0.12	0.08	0.08	0.08	0.08	0.08
Arachidic acid	0.90	-	-	-	-	-
Cis-11-eicosenoic acid	2.56	2.26	2.26	2.26	2.26	2.26
Linolenic acid	15.27	8.86	8.86	8.86	8.86	8.86
Heneicosanoic acid	33.22	-	-	-	-	-
Behenic acid	3.03	0.12	0.12	0.12	0.12	0.12
Cis-11,14,17-eicosatrienoic acid	1.77	0.23	0.23	0.23	0.23	0.23
Arachidonic acid	0.26	-	-	-	-	-
Tricosanoic acid	0.39	0.08	0.08	0.08	0.08	0.08
Nervonic acid	0.31	0.66	0.66	0.66	0.66	0.66
Cis-4,7,10,13,16,19-docosahexaenoic acid	2.09	0.11	0.11	0.11	0.11	0.11
Heptadecanoic acid	-	0.21	0.21	0.21	0.21	0.21
Cis-11,14-eicosadienoic acid	-	49.36	49.36	49.36	49.36	49.36

Fatty Acids	Diplotaxis viminea (L.) DC.	Crataegus monogyna Jacq. subsp. monogyna	Colutea cilicica Boiss. & Bal.	Cicer pinnatifidum Jaub. & Spach	Cercis siliquastrum L. subsp. siliquastrum	Camelina rumelica Vel.
Cis-10-pentadecenoic acid	0.08	-	-	-	-	-
Heptadecanoic acid	0.21	-	-	-	-	-
Stearic acid	8.53	5.74	5.74	5.74	5.74	5.74
Elaidic acid	0.06	0.17	0.17	0.17	0.17	0.17
Linoleic acid	0.08	-	-	-	-	-
Cis-11-eicosenoic acid	2.26	27.66	27.66	27.66	27.66	27.66
Linolenic acid	8.86	-	-	-	-	-
Cis-11,14-eicosadienoic acid	49.36	-	-	-	-	-
Behenic acid	0.12	1.06	1.06	1.06	1.06	1.06
Cis-11,14,17-eicosatrienoic acid	0.23	1.04	1.04	1.04	1.04	1.04
Tricosanoic acid	0.08	-	-	-	-	-
Nervonic acid	0.66	0.38	0.38	0.38	0.38	0.38
Caproic Acid	-	10.89	10.89	10.89	10.89	10.89
Heneicosanoic acid	-	43.33	43.33	43.33	43.33	43.33
Erucic acid	-	0.67	0.67	0.67	0.67	0.67
Arachidonic acid	-	0.27	0.27	0.27	0.27	0.27

Fatty Acids	Bupleurum rotundifolium L.	Asphodeline rigidifolia (Boiss.) Baker-Endemic	Androsace maxima L.	Allium sieheanum Hausskn. ex Kollmann Endemic	Allium cappadocicum Boiss. - Endemic	Alcea pallida Waldst. & Kit.
Caproic Acid	43.44	6.48	21.06	21.06	10.10	0.50
Stearic acid	2.54	4.16	0.08	0.08	3.36	0.14
¥-linolenic acid	0.77	-	-	-	-	2.66
Cis-11-eicosenoic acid	17.96	2.68	1.60	1.60	0.71	3.56
Heneicosanoic acid	13.61		13.09	13.09	59.93	
Behenic acid	0.42	0.43	15.75	15.75	0.45	0.75
Cis-10-pentadecenoic acid	-	0.06	0.13	0.13	-	0.25
Heptadecanoic acid	-	0.04	0.36	0.36	-	0.09
Oleic acid	-	0.05	-	-	-	0.10
Linolelaidic acid	-	0.08	-	-	-	0.15
Linolenic acid	-	14.92	22.42	22.42	19.83	16.55
Cis-11,14-eicosadienoic acid	-	69.55	-	-	-	50.71
Erucic acid	-	0.08	-	-	-	0.33
Cis-11,14,17-eicosatrienoic acid	-	0.60	2.64	2.64	0.60	0.26
Arachidonic acid	-	0.09	0.13	0.13	0.07	0.13
Tricosanoic acid	-	0.10	-	-	0.07	0.14
Cis-13,16-docosadienoic acid	-	0.06	-	-	-	
Nervonic acid	-	0.16	5.33	5.33	0.32	0.22
Elaidic acid	-	-	0.48	0.48	-	0.16
Linoleic acid	-	-	0.28	0.28	-	0.91
Cis-13,16-docosadienoic acid	-	-	0.11	0.11	-	-
Lignoceric acid	-	-	0.07	0.07	-	-
Arachidic acid	-	-	-	-	-	0.49
Cis-8,11,14-eicosatrienoic acid	-	-	-	-	-	0.14

This study about fatty acid composition of some plant seed oils have demonstrated differences among the species samples. Previous reports have also underlined differences among various species. The variations in composition of fatty acids in seed oils of different plant accessions were also recorded. High content of seed oils present in domescicated wild plants and the presence of different polyunsaturated fatty acids. Fatty acid compositions quantitatively inherited characters and they are influenced greatly by environmental and genetic factors. All these studies showed that the saturated and particularly unsaturated fatty acid contents of several seed oils are partly related to each other and that the amount of umsaturated fatty acids is higher than those of saturated fatty acids.

Compliance with Ethics Requirements. Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human / or animal subjects (if exist) respect the specific regulation and standards.

Acknowledgement: This work was supported by Selçuk University Scientific Research Project (S.U.-BA.-Project, Konya, Turkey).

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