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COMPOSITION OF THE ESSENTIAL OILS OF *Prangos scabra* FRUITS AND INFLORESCENCE FROM IRAN

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The chemical composition of *Prangos scabra* and component activities have been investigated by several authors [1–6].

The air-dried fruits and inflorescence of *Prangos scabra* yielded 1.6% and 0.3% of a pale yellow oil, respectively. In the DPPH assay, the essential oils of the fruits (EOF) and inflorescence (EOI) exhibited weak free radical scavenging activities with RC_{50} values of 1.58 and 1.42 mg/mL, respectively.

The identified compounds from these essential oils [7, 8], their retention indices, amounts (%) are summarized in Table 1. In the present study, while 20 major components, 67.1% of which were sesquiterpenes and 23.3% oxygenated sesquiterpenes, were identified in the EOF, the EOI were found to contain 14 main components, among which 15% were sesquiterpenes and 45.3% were oxygenated sesquiterpenes.

The two most abundant components of the EOF were identified as β-elemene (19.9%) and β-farnesene (16.2%), whereas the EOI consists of *epi*-globulol (21.1%) and β-elemene (19.7%) as the two major components. Among the oxygenated sesquiterpenes, *epi*-globulol, spathulenol, caryophyllenoxide, and α-cadinol were the main components. The EOF contained only a small amount of monoterpenes, β-pinene (0.1%) and D-limonene (0.3%), while no monoterpenes in the EOI were present in detectable amounts. It is interesting to note that β-pinene, D-limonene, germacrene D, valencene, α-bisabolol, γ-cadinene, germacrene B, elemol, *p*-cresol, and α-bisabolol were present in the EOF but not in the EOI. Similarly, β-selinene, calarene, and *p*-methoxyacetophenone were found in the EOI but not in the EOF (Table 1).

A comparison of the essential oil composition of *Prangos scabra* with that of some other members of the genus *Prangos*, available in the literature [4, 6, 9–19], shows that considerable variations exist in the compositions of the essential oils of different species of the genus *Prangos*, especially in terms of the type of major components present. It has been found that the most abundant component in the essential oils of *P. uloptera* [6, 9, 10, 12], *P. asperula* subsp. haussknechth [11], *P. bornmuelleri* [15], *P. heyniae* [13], *P. ferulaveae* [18], and *P. uechtritzii* [13] were, respectively, α-pinene (15.0%), Δ^3-carene (16.1%), germacrene D (42%), β-bisabolene (53.3%), γ-terpinene (27.8%), and *p*-cymene (10.9%), whereas β-elemene was the main component of *P. scabra*. However, α- and β-pinene, germacrene D, and germacrene B are of common occurrence in the essential oils of fruits of nearly all investigated *Prangos* species.

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TABLE 1. Composition of the Essential Oils of *Prangos scabra* Nabelek.

Compound	KI	Amounts, %		Compound	KI	Amounts, %	
		Fruit	Inflores.			Fruit	Inflores.
α-Bisabolene	1507	0.3	-	β-Pinene	979	0.1	-
α-Bisabolol	1686	0.27	-	D-Limonene	1029	0.3	-
γ-Cadinene	1514	9.96	-	*tau*-Muurolol	1625	0.5	0.4
α-Cadinol	1654	2.75	6.2	*p*-Methoxyacetophenone	1350	-	0.4
Calarene	1482	-	1	β-Selinene	1490	-	0.4
β-Caryophyllene	1419	9.2	2.3	Spathulenol	1578	5.0	4.6
Caryophyllene oxide	1583	1.45	8.98	Valencene	1496	0.9	-
p-Cresol	1076	0.3	-	Valerenol	1711	0.9	2.4
β-Elemene	1391	23.3	19.7	Viridiflorol	1593	-	0.8
(*Z*)-β-Farnesene	1443	16.2	1.2	Monoterpenes		0.4	-
Elemol	1550	0.95	-	Sesquiterpenes		67.1	25.0
Germacrene B	1561	5.19	-	Oxygenated sesquiterpenes		23.3	45.3
Germacrene D	1485	0.41	-	Other		1.5	9.7
epi-Globulol	1629	11.5	21.91	Total identified		92.3	80.1
α-Humulene	1455	1.6	0.4				

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