



Essential Oil Analysis of the Leaves of Persian True Myrtle

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Abstract: Water-distilled volatile oil from dried leaves of true myrtle (*Myrtus communis* L.) from Myrtaceae family grown wild in Fars Province, Iran was analysed by GC-MS. Seventeen compounds, constituting 98.4% of the total components detected, were identified. Among them, α -pinene (37.8%), 1,8-cineole (23.1%) and limonene (17.1%) were the major components of the volatile oil, which was obtained in 1.2% yield.

Keywords: *Myrtus communis*, Myrtaceae, volatile oil, α -pinene, 1,8-cineole, limonene.

Introduction

Myrtaceae is a large and well defined family, with about 140 genera and 4000 species. *Myrtus* is one of the most important genera of Myrtaceae in the world and Iran which is used for medicinal, hygienic, edible and ornamental purposes (Azadbakht 1999; Azadbakht 2002; Mozaffarian 1996; Wilson et al. 2001).

Iran, the second largest country among the Middle East and Persian Gulf countries, has different climates and geographical conditions that result in the growth of numerous plant species. True myrtle or *Myrtus communis* L. is one of the famous and ancient medicinal herbs of Iran. It is the unique member of *Myrtus* genera in Iran. The popular Persian name of the plant is “Moord”. It is an evergreen shrub growing to five meters tall with white fragrant flowers (Azadbakht 2002; Mozaffarian 1996). The leaves of this holy medicinal plant have been used in Iranian Traditional Medicine as an antiseptic, anti-inflammatory, mucolytic, carminative and astringent remedy (Ebn-e Sina 2006; Azadbakht 2002).

M. communis possess several pharmacologic, biologic and medical activities e.g. antibacterial, antiviral, anti-candida, analgesic, anti-inflammatory, antioxidant, antimutagenic, antihemorrhagic, wound healing and anti-hyperglycemic (Azadbakht 2002; Koukos et al. 2001; Mahboubi and Ghazian Bidgoli

2010; Mimica-Dukic et al. 2010; Ozek et al. 2000; Savikin-Fodulovic et al. 2000).

There are several reports on the phytochemical analysis of *M. communis* found in the literature. Some scientific studies on this plant showed the presence of constituents belonging mainly to the groups of tannins, flavonoids, volatile oils, phenolic and fatty acids. The flavour composition in *M. communis* has been studied by various authors (Asslani 2000; Azadbakht 2002; Chalcat et al. 1998; Koukos et al. 2001; Mimica-Dukic et al. 2010; Nassar et al. 2010; Ozek et al. 2000; Savikin-Fodulovic et al. 2000).

The present paper deals with the detailed analysis of the volatile oil of dried aerial parts of *M. communis* from Mamasani, Iran by GC-MS. To the best of our knowledge, the oil composition of true myrtle leaves from Fars Province in Iran has not been investigated before.

Material and methods

Plant Material

Fresh leaves of *M. communis* L. were collected in September 2005 from Mamasani (Fars Province, Iran). The species was identified in herbarium department of Science and Research Branch, Tehran Islamic Azad University, Tehran, Iran by Dr. Iraj Mehregan. A voucher

specimen was deposited at the herbarium of our school.

Volatile Oil Extraction

The hydrodistillation of dried leaves (100 g) of *M. communis* L. for 3 h in a Clevenger-type apparatus was achieved (Ghannadi et al. 2002).

Gas Chromatography-Mass spectrometry

GC/MS analysis was performed on a Hewlett Packard 5972A mass selective detector coupled with a Hewlett Packard 6890 gas chromatograph, equipped with a cross-linked 5% PH ME siloxane HP-5MS capillary column (30m × 0.25 mm, film thickness 0.25 μm).

The GC operating conditions were as follows: carrier gas, helium with a flow rate of 2 mL/min; column temperature, 60°-275°C at 4°C/min; injector and detector temperatures, 280°C; volume injected, 0.1 μL of the oil; split ratio, 1:25.

The MS operating parameters were as follows: ionization potential, 70 eV; ion source temperature, 200°C; resolution, 1000.

Identification of components

Identification of components in the oil was based on GC retention indices relative to a homologous series of normal alkanes and computer matching with the Wiley 275.L library, as well as by comparison of the fragmentation patterns of the mass spectra with those reported in the literature (Adams 2007; Asadipour et al. 2003; Ghannadi et al. 2003).

Results and Discussion

Water distillation of the dried aerial parts of *M. communis* L. collected at Mamasani, South of Iran furnished 1.2% of a yellowish essential oil with a strong pleasant aroma. Seventeen compounds, representing 98.4% of the volatile oil were identified. The mass spectra of unidentified compounds (1.6%) did not find in the library. Table 1 shows the compounds and its percentage composition with retention indices. The main natural constituents in the Persian true myrtle oil were α-pinene (37.8%), 1,8-cineole

(23.1%), limonene (17.1%), linalool (10.1%). Other components were present in amounts less than 3.5%.

Table 1: Composition (%) and Retention Indices (RI) of the Essential Oil of *M. communis* L.

No.	RI ^a	Compound	% ^b
1.	929	tricyclene	0.8
2.	934	α-thujene	0.2
3.	942	α-pinene	37.8
4.	984	- pinene	0.3
5.	997	myrcene	0.3
6.	1018	-3-carene	0.2
7.	1036	limonene	17.1
8.	1040	1,8-cineole	23.1
9.	1061	trans- -ocimene	0.4
10.	1069	-terpinene	0.3
11.	1097	terpinolene	0.5
12.	1105	linalool	10.1
13.	1189	4-terpineol	0.2
14.	1200	α-terpineol	3.3
15.	1269	linalyl acetate	2.4
16.	1361	α-terpinyl acetate	0.6
17.	1394	geranyl acetate	0.8

^aRetention indices on HP-5MS capillary column
^b%: Calculated from TIC data

Published data about true myrtle leaf oil obviously differ from each other, probably due to geographical factors (Asslani 2000; Azadbakht 2002; Chalcat et al. 1998; Koukos et al. 2001; Mahboubi and Ghazian Bidgoli 2010; Mimica-Dukic et al. 2010; Nassar et al. 2010; Ozek et al. 2000; Savikin-Fodulovic et al. 2000). It is interesting to mention that the composition of the present volatile oil is similar to that of Egyptian myrtle oil with the main presence of α-pinene, 1,8-cineole and linalool but limonene (17.1%) seems to be exclusive to this Persian volatile oil as one of the main components. The lack of myrtenyl acetate in our oil is notable. This natural compound is one of the main components of Portuguese myrtle oil (Lawrence 1981).

Conclusion

The volatile oil of *M. communis* L., collected at Mamasani in Fars Province (South of Iran), is mainly characterized by the presence of α-pinene, 1,8-cineole, limonene and linalool. α-pinene, reported as a main component of our

studied myrtle oil, could be considered as a putative compound with several pharmacological and medicinal effects (Azadbakht 2002; Olle and Bender 2010).

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