

Research Article

**The main composition detected in essential oil of *Satureja rechingeri*
Jamzad in Khorramabad, Iran**

**Pouya Parsaei¹, Zohreh Eftekhari², Behrouz davari^{3,4}
and Mahmoud Rafieian-Kopaei^{5*}**

¹Young Researchers and Elite Club, Islamic Azad University, Shahrekord, Iran

²Research & Development Department, Research & Production Complex,
Pasteur Institute of Iran, Tehran, Iran

³Environmental Health Research Center,

Kurdistan University of Medical Sciences, Sanandaj, Iran

⁴Department of Medical Entomology, School of medicine,

Hamadan University of Medical Sciences, Hamadan, Iran

⁵Medical Plants Research Center, Basic Health Sciences Institute,

Shahrekord University of Medical Sciences, Shahrekord, Iran

Corresponding author. rafieian@yahoo.com

ABSTRACT

Satureja is a genus of aromatic plants of the family Lamiaceae, related to rosemary and thyme. These genres include 15 species, which 9 species of them are endemic to Iran. *Satureja* species may be annual or perennial. They are low-growing herbs and subshrubs, reaching heights of 15–50 cm. The habitat of *S. rechingeri* native to Iran is Khorramabad near the Lorestan province and local name is Jatareh. *S. rechingeri* Jamzad is a perennial plant with a woody base and all parts of that contain aromatic essential oils, however, its aerial parts are usually used for medicinal purposes. For the phytochemical study, during 2014-2015, aerial parts of savory were collected from the city of Khorramabad. The essential oil was extracted by distillation with water and chemically analyzed using GC/Mass apparatus. The results revealed that essential oil of *S. rechingeri* Jamzad native to Lorestan contained 46 components and 83.84% of isolation of the compound was Carvacrol which has various medicinal uses.

Keywords: Savory, Essential oil, GC/Mass, Carvacrol

INTRODUCTION

Satureja is a genus of aromatic plants of the family Lamiaceae, related to rosemary and thyme. These genres include 15 species, which 9 species of them are endemic to Iran. *Satureja* species may be annual or perennial. They are low-growing herbs and subshrubs, reaching heights of 15–50 cm. *Satureja rechingeri* that is native to Iran is a perennial plant that its aerial parts are used for medicinal purposes. Its habitat is Majin near the

Lorestan Province and is known by the local people as Jatareh (1,2). *Satureja* species is used in traditional medicine for treatment of urinary tract stones, burning and burial of animal parasites (1). *Satureja rechingeri* Jamzad is a perennial plant with a woody base and all parts of that contain aromatic essential oil (2). The main components of essential oil in *Satureja rechingeri* are Carvacrol, α -Thujene and Parasmin (3). In a lot of

researches, Carvacrol ([2-methyl-5-(1-methylethyl)-phenol]) has been identified as a major component of essential oil of *Satureja* species (3, 4). The phenolic compounds of savory are considered as healthy additives for food and flavoring in sweets and soft drinks (3). Carvacrol as a savory ingredient has been approved by the FDA. Carvacrol has important biological activities including antibacterial, antifungal, anti-spasmodic, acetylcholinesterase inhibitor, antioxidant and WBC macrophage stimulant (5). Additionally, Carvacrol is able to inhibit prostaglandin synthesis (6). Carvacrol is a phenolic mono-terpen which in addition to savory presents in countless aromatic plants. The purpose of this review is to identify the chemical composition of the Savory plant in the Lorestan Province, located in the South West of Iran.

The practical part

Collection of plant

Phytochemical study was carried out during 2014-2015 in which aerial parts of the savory were collected from the city of Khorramabad, Lorestan province, Iran.

Phytochemicals analysis

The essential oil was prepared by distillation with water, and chemically was analyzed by using GC/Mass. First aerial parts of the plant were collected and were dried at room temperature in the shade and then ground. Distillation was carried out for 4 hours. Dehydrated was carried out by using sodium sulphate, and stored at 4 ° C in dark glasses.

RESULTS

Phytochemical analysis of *Satureja rechingeri* is presented in Table 1. Based on the results of our study, 46 compounds were detected in *Satureja rechingeri* native to Lorestan Province.

As seen in Table 1, the most important compound of *Satureja rechingeri* is Carvacrol with 83.84 percent. Other substances and details are mentioned in table (1). The chromatogram obtained from the analysis of essential oil compounds of Savory GC-MS method are shown in Figure 1.

Table 1: Compounds found in the essential oil of aerial parts of *Satureja rechingeri*

No	Cn	Cn+1	Tn	Sn	Sn+1	RI	Area%	SREO
1	8	9	7.34	6.51	8.48	842.132	0.02	Ethyl-2-methylbutyrate
2	8	9	7.39	6.51	8.48	844.67	0.02	ethyl isovalerate
3	9	10	9.22	8.48	10.99	929.482	0.18	α -thujene
4	9	10	9.46	8.48	10.99	939.044	0.17	α -pinene
5	9	10	9.86	8.48	10.99	954.98	0.04	Camphene
6	9	10	10.58	8.48	10.99	983.665	0.05	β -pinene
7	9	10	10.72	8.48	10.99	989.243	0.17	β -Myrcene
8	10	11	10.84	10.99	13.76	994.585	0.07	dehydro-1,8-cineole
9	10	11	11.22	10.99	13.76	1008.3	0.35	α -phellandrene
10	10	11	11.4	10.99	13.76	1014.8	0.05	(MS)
11	10	11	11.54	10.99	13.76	1019.86	0.32	α -Terpinene
12	10	11	11.74	10.99	13.76	1027.08	1.79	P-cymene
13	10	11	11.88	10.99	13.76	1032.13	0.07	limonene
14	10	11	11.93	10.99	13.76	1033.94	0.1	β -phellandrene
15	10	11	11.98	10.99	13.76	1035.74	0.02	1,8-cineole
16	10	11	12.69	10.99	13.76	1061.37	0.71	γ -Terpinene
17	10	11	13.04	10.99	13.76	1074.01	0.7	cis-sabinen hydrate
18	10	11	13.55	10.99	13.76	1092.42	0.07	α -Terpinolene
19	11	12	13.73	13.76	16.6	1098.94	1.01	linalool
20	11	12	14.06	13.76	16.6	1110.56	0.3	trans-sabinen hydrate
21	11	12	14.6	13.76	16.6	1129.58	0.15	1-terpineol

22	11	12	16.16	13.76	16.6	1184.51	1.6	4-terpineol
23	12	13	16.68	16.6	19.38	1202.88	0.47	α -terpineol
24	12	13	16.81	16.6	19.38	1207.55	0.1	cis dihydro carvone
25	12	13	17.55	16.6	19.38	1234.17	0.3	(MS)
26	12	13	17.84	16.6	19.38	1244.6	0.12	Carvacrol methyl ether
27	12	13	18.03	16.6	19.38	1251.44	0.03	Z-Citral
28	12	13	18.28	16.6	19.38	1260.43	0.19	D-carvone
29	12	13	18.91	16.6	19.38	1283.09	0.05	E-Citral
30	13	14	19.14	19.38	22.05	1291.01	0.84	Thymol
31	13	14	19.69	19.38	22.05	1311.61	83.84	carvacrol
32	13	14	20.25	19.38	22.05	1332.58	0.2	(MS)
33	13	14	21.06	19.38	22.05	1362.92	0.11	Eugenol
34	14	15	21.34	22.05	24.58	1371.94	0.09	Carvacrol acetate
35	14	15	23	22.05	24.58	1437.55	0.14	trans caryophyllene
36	15	16	23.37	24.6	27	1450	0.06	geranyl acetone
37	15	16	24.96	24.6	27	1515.7	1.51	β -bisabolene
38	16	17	25.75	27	29.27	1544.93	0.24	trans- α -bisabolene
39	16	17	27.08	27	29.27	1603.52	0.52	caryophyllene oxide
40	16	17	27.42	27	29.27	1618.5	0.21	β -Eudesmol
41	18	19	29.23	31.5	33.58	1690.87	0.06	α -bisabolol
42	19	20	33.93	33.58	35.61	1917.24	0.11	(MS)
43	19	20	34.48	33.58	35.61	1944.33	0.17	(MS)
44	19	20	34.81	33.58	35.61	1960.59	0.17	palmtic acid
45	22	23	39.95	39.6	41.93	2215.02	2.26	(MS)
46	22	23	41.9	39.6	41.93	2298.71	0.21	(MS)

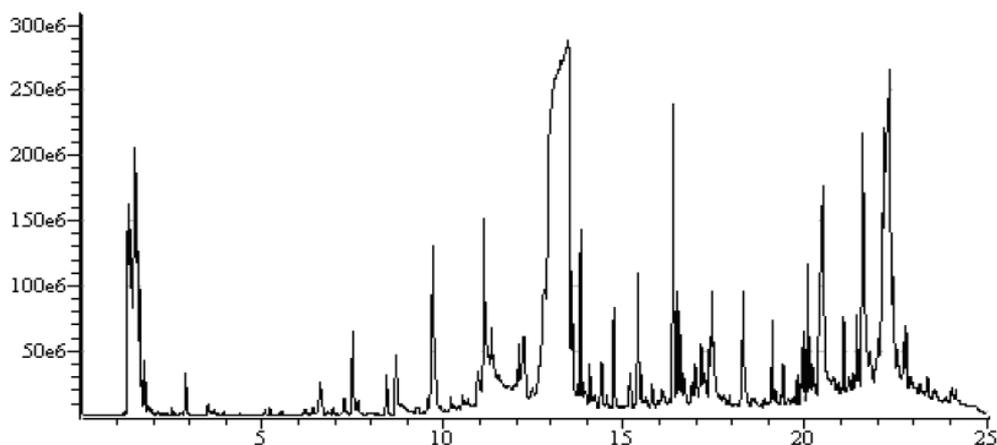


Figure 1: Ion chromatography analysis of the extract of *Satureja rechingeri* by GC-MS method.

DISCUSSION

As seen in Table 1, the most important compound of *Satureja rechingeri* is Carvacrol. In another study on other species such as *S. mutica* and *S. bactarica*, the highest combination of plant extracts analysis has been reported Carvacrol in agreement with the results of the present study.

spicigera, *S. sahendica* and *S. intermedicus*, the highest combination obtained from the analysis of these plants has been reported Thymol (5,8,9,10). Due to high levels of Carvacrol and other terpenoids in the plant it can be suggested that this plant is used as a spice in food or in medicine and perfumery industries and because of the presence of phenolic compounds (linalool and p-cymene) in the plant it can be used in medicine.

But in other studies done on other species of the plant, such as *S.*

Carvacrol has been reported in essential oils of other plants including *Origanum majorana*, *O. vulgare*, thyme, pepperwort, and wild bergamot. *Origanum majorana* and Dittany of Crete are the plants rich in carvacrol, having respectively 50% and 60-80% carvacrol. Thyme subspecies essential oils contain 5% to 75% carvacrol, and *Satureja* subspecies have been reported to contain 1% to 45% carvacrol (11). This variation in the amount of phytochemicals depends not only to the different subspecies, but to the environmental variations. Other reports also confirm the presence of various compounds as well as variations in a specific compound in the plants (12-20). This variation is also due to variations in preparation methods (21-29).

The various effects of medicinal plants are mostly due to the variations in compounds (30-33). Carvacrol has been shown to inhibit the growth of several strains of bacteria, including *Escherichia coli* (30). It possesses pleasant smell and taste as well as very low toxicity. Hence, it is used as a food additive for prevention of bacterial contaminations (34).

Carvacrol is an activator of the ion channels of TRPV3 (transient receptor potential V3). Its application on the tongue causes the activation of TRPV3, inducing a sensation of warmth on the tongue. It also suppresses COX-2 inducing anti-inflammatory activities (35-37).

Carvacrol is a potent antioxidant. This makes the plants which have this component very effective in various diseases. Antioxidants are able to counteract free radicals and combat free radicals and combat the oxidative stress induced complications (38).

Medicinal herbs have effective ingredients which have various therapeutic effects (39-42).

Hence, this plant should be effective in some other diseases.

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