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REINVESTIGATION OF ESSENTIAL OIL CONTENT OF *THAPSIA GARGANICA* GROWN IN THE EAST OF ALGERIA

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ABSTRACT

Thapsia garganica is a very famous medicinal plant known especially for its therapeutic effects such as diuretic, emetic and purgative. A resin is extracted with alcohol from the bark of the root. The plant has been considered specific in treating pain, though caution is advised since it is poisonous to some mammals. The plant is also strongly rubefacient, producing blisters and intense itching. In the present study, we have undertaken a Reinvestigation of essential oil content of this widely used plant because of its important bioactive effect to heal many ailments.

Key words: *Thapsia garganica*, medicinal plant, essential oil, GC-MS.

1. INTRODUCTION

Members of the Apiaceae family are widely distributed in the Mediterranean area, where they are generally used commercially as spices or drugs because of the presence of useful secondary metabolites. The most characteristic constituents are coumarins, essential oils and sesquiterpene lactones.

Among the genera belonging to the Apiaceae, *Thapsia* has, in recent years, been the subject of a great deal of interest. Intensive chemotaxonomic studies have been performed in order to investigate the distributionof specific bioactive polyoxygenated guaianolides, named thapsigargins.

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Previous studies on the secondary etabolites of the genus *Thapsia* have shown clear variationsbetween, and also within the species. Chemotaxonomicstudies have revealed that *T. garganica* and *T. transtagana are* separate species and that *T. maxima* includes two morphological types.

As an extension of the chemical investigation of the genus *Thapsia*, we report the composition of the essential oils from the visible parts of *T. garganica* grown in khenchela east of Algeria.

2. EQUIPMENTS AND METHODS

The three aerial parts of *Thapsia garganica* were collected in April in outskirts of khenchela about 500 km east of Algiers. A voucher specimen was deposited in the herbarium in the biology department, Oum Elbouaghi University. 100 g of each part was dried under shade and subjected to hydrodistillation procedure as described in many references, to give 0.32g, 0.29g and 0.22 g of essential oil from flowers, leaves and stems respectively.

3. ANALYTICAL CONDITIONS

Gas chromatography/mass spectrometry (GC/MS)

The oil was analyzed by GC/MS using a Agilent 5973EI mass selective detector coupled with a Agilent GC6890A gas chromatograph, equipped with a cross-linked 5% PH ME siloxane HP-5MS capillary column (30 m × 0.25 mm, film thickness 0.25 ìm). Operating conditions were as follows: carrier gas, helium with a flow rate of 1mL/min; column temperature 50 °C for 1 mn, 50°C to 150°C (3 °C /mn), 150°C to 250°C (5°C/mn) then isothermal for 5 mn.

Injector and detector temperatures, 280ºC; split ratio, 1:50.

The MS operating parameters were as follows: ionization potential, 70 ev; ionization current, 2 A; ion source temperature, 200ºC; resolution, 1000.

Identification of components

Identification of oil components was achieved based on their retention indices RI, determined with reference to a homologous series of normal alkanes, and by comparison of their mass spectral fragmentation patterns with those reported in the literature and stored on the MS library (NIST database). The concentration of the identified compounds was computed from the GC peak area without any correction factor [11].

4. RESULTS

The results of GC and GC-EI-mass spectral analysis of the essential oils obtained by hydrodistillation of three parts of the plant (stems, leaves and flowers) are shown in table1:

Table 1. Composition of the aerial parts essential oils

	Components	flowers	Leaves	stems	Type
1	α-Pinene	0.02	T	t	Hydrocarbon monoterpene
2	β-Pinene	0.12	0.06	0.05	Hydrocarbon monoterpene
3	Sabinene	0.12	0.05	0.13	Hydrocarbon monoterpene
4	Myrcene	0.11	0.10	0.13	Hydrocarbon monoterpene
5	Limonene	5.30	5.15	4.88	Hydrocarbon monoterpene
6	β-Phellandrene	0.10	0.09	t	Hydrocarbon monoterpene
7	γ-Terpinene	0.47	1.05	0.53	Hydrocarbon monoterpene
8	*p*-Cymene	1.70	1.09	0.36	Hydrocarbon monoterpene
9	1,4-dimethylazulene	06.57	06.31	06.18	Hydrocarbon Sesquiterpene
10	cis-Linalool oxide	0.20	0.03	0.03	Oxygenated monoterpene
11	trans-Linalool oxide	0.10	0.04	0.02	Oxygenated monoterpene
12	Benzaldehyde	0.06	-	-	-
13	Linalool	7.20	6.47	6.10	Oxygenated monoterpene
14	Terpinen-4-ol	0.03	0.02	0.03	Oxygenated monoterpene
15	Linalyl acetate	-	T	0.06	Oxygenated monoterpene
16	Geranial	t	-	-	Oxygenated monoterpene
17	Methylcarvacrol	-	T	0.10	Oxygenated monoterpene
18	Carvone	-	-	-	Oxygenated monoterpene
19	Neryl acetate	0.28	0.22	0.17	Oxygenated monoterpene
20	p-vinylguaiacol	62.31	61.61	59.03	Oxygenated monoterpene
21	Geraniol	1.08	1.17	1.54	Oxygenated monoterpene
22	cis-Carveol	-	-	-	Oxygenated monoterpene
23	Caryophyllene oxide	0.10	0.26	t	Oxygenated Sesquiterpene
24	Methyl eugenol	0.10	0.03	0.09	Oxygenated monoterpene
25	Methylionone	0.10	-	-	Oxygenated Sesquiterpene
26	Elemicin	-	0.23	0.06	Oxygenated monoterpene

5. DISCUSSION

The composition profiles showed notable quantitative and qualitative differences between the plant parts. The essential oil is composed mainly of monoterpenes. The dominant constituent in the plant parts is p-vinylguaiacol, which makes up 59-63% of the oil followed by Linalool and 1,4-dimethylazulene with 6-8% and 6-7% respectively.

Other compounds are present in different amounts ranging from traces to 6 %. Some components are absent in one part but appear in another part in little amounts. Moreover, it is noticed that the monoterpenes are strongly dominating the overall oil composition where the p-vinylguaiacol represents more than 60%.

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