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*J. Nat. Prod. Plant Resour.*, 2014, 4 (1):1-3  
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ISSN : 2231 – 3184  
CODEN (USA): JNPPB7

### Composition of the essential oil of *Inula graveolens* Algerian origin species

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#### ABSTRACT

CPG and GC/SM Analysis of the obtained oil fraction from the aerial parts of *Inula graveolens* Algerian origin showed the presence of 47 constituents. The main constituents were: bornyl acetate (69.78%), borneol (4.25%), Caryophyllene oxide (5.7%). Preponderancy of the Bornyl acetate on the Borneol in the case of the Algerian oil as a particularity compared with the Greece Libanese, Corce and Tunisian oil. and its richness with oxygenated compounds.

**Keywords:** *Inula graveolens* L., Inulae; Asteraceae; essential oil, Steam distillation; Chemotype.

#### INTRODUCTION

The genus *Inula graveolens* L. Desf. [Syn. *Ditrichia graveolens* Desf Greuter] (Asteraceae) is a section of *Inulae* tribe. *Inula graveolens* is well known and wide spread in the Mediterranean area, with pleasant odour. The literature survey indicated that chemical and biological investigation of the essential oil of *Inula graveolens* has been a subject of several studies.[1]. Biologically active compounds were also isolated from this species[2]: aromatics[3], flavonoids[4], sesquiterpene lactones as well as sesquiterpene acids compounds[5]. More than forty (50) terpenic compounds were identified in its essential oil fraction[6,7,8]. The Chemotype of borneol bornyl acetate caryophyllene oxide and 1(7) 5 Menthadien-2-ol **9,10** as major components are reported mainly in all the previous studies with some slight differences.

#### MATERIALS AND METHODS

##### Plant material :

Aerial parts (stems, flowers and leaves) of *Inula graveolens* were collected at the flowering stage in October 2008 from Ain el-bey (Constantine).

##### Extraction and isolation :

The essential oil fraction from fresh aerial parts of *Inula graveolens* L. Was obtained by a steam distillation in a Clevenger apparatus type Kaiser Lang modified in yield of 0.89%. The obtained thick and yellowish oil fraction was rescued with petroleum ether (3 ml), dried over magnesium sulphate, filtered, evaporated to dryness and then analyzed by CPG and GC/MS using a capillary column of methylsilicium WCOT (50m x 0.3 mm; df: 0.25 mm) CPWAX 51. The injector temperature was fixed at 280°C. The experimental temperature was programmed between 50°C-230°C (3°C/min). The used gas vector was Helium in a flow of 3 ml/min. More than 47

compounds were observed and obtained results are summarized in table:( Retention time; percentage of the components and Kovach's indices are reported) .

Table 1

N°	Compounds	Tr	KI	%	Identification
1	Camphre	17,47	1180	0,25	KI, MS
2	1[7]5 -Mentha -diene-2-ol	17,73	1189	0,09	K I, MS
3	bornyle acetate	17,96	1200	6 9,78	K I, MS
4	P Cymene -8- ol	18,41	1218	0,98	KI, MS
5	1 [7] 2 mentha diene 8 ol	18,64	1230	2,10	KI, MS
6	Isoborneol	19,58	1261	0,10	KI, MS
7	Borneol	21,14	1276	4,25	KI, MS
8	Menth-1-ene-9-ol acetate	21,32	1319	0,28	KI, MS
9	4 -Terpineol	23,19	1388	0,30	KI, MS
10	$\beta$ -Caryophyllene	24,69	1447	0,50	KI, MS
11	Benzoate de geranyle	25,33	1472	0,18	KI, MS
12	Allo-4-aromadendrene	26,37	1515	0,20	KI, MS
13	Isogermacrène D	27,01	1543	0,15	KI, MS
14	Isobornyl-2-methylbutyrate	27,16	1552	0,15	KI, MS
15	Neryl acetate	28,28	1593	0,34	KI, MS
16	Ocimenone	28,47	1600	1,00	KI, MS
17	Caryphyllene oxide	28,67	1616	5,7	KI, MS
18	Occidentallo acetate	29,4	1638	0,78	KI, MS
19	Nerolidol acetate	29,86	1660	0,38	KI, MS
20	$\alpha$ -Chamigrene	29,93	1663	2,90	KI, MS
21	Epicadinol	30,03	1681	1,68	KI, MS
22	$\alpha$ -Eudesmol	30,30	1689	1,17	KI, MS
23	4-Methyl valerate de neryl	30,42	1693	0,39	KI, MS
24	Nerolidol (99)	30,62	1700	0,63	KI, MS
25	<i>trans</i> Verbenol	31,42	1715	0,18	KI, MS
26	<i>Cis</i> Eudesm-6-ene- 12 al	32,65	1760	0,10	KI, MS
27	Farnesyl acetate	32,77	1775	0,24	KI, MS
28	Isobornyl isobutyrate	32,90	1783	0,33	KI, MS
29	$\beta$ -Selinene	34,60	1873	0,95	KI, MS
30	Germacrene B	34,83	1894	0,67	KI, MS

The main constituents were : bornyl acetate (69. 78%) , borneol (4. 25%), Caryphyllene oxide (5.7 %), 1[7]5 Menthadien-8-ol (2.10 %), chamigrene (2.9 %) and the  $\beta$  selinene 0. 95%.

In order to study our oil a comparison with previous work reveals that the two major components are bornyl acetate and borenol as it has been reported previously with a preponderance of the first component on the second.

In the Greece Chemotype the epi- $\alpha$ -cadinol and the bornyl acetate are reported as major components 30.2 % and 25.4% respectively. Whereas the Lebanese oil is constitute mainly of oxygenated compounds . Major compounds are Borneol acetate , Bornyl and T- cardinal.

In the case of the Algerian chemotype both of p-mentha 1(7), 2–diene-8-ol and  $\beta$ -selinene are present in a yield of 2.1% and 0.95% respectively. Also both of caryophyllene oxide and  $\alpha$ -chamigrene are present in yield of 5.7% and the other 2.90% as minor's component. However in the case of Tunisian , Corse and Greece they were present in notable quantities.

Hence it is noticeable from this comparison that the Algerian oil has its particularity which consists in the preponderance of the Bornyl acetate on the Borneol in its chemotype and its richness with oxygenated compounds.

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