

COMPOSITION OF THE ESSENTIAL OIL OF *Genista tricuspidata*

T. Lograda,^{1*} A. N. Chaker,¹ J. C. Chalchat,²
M. Ramdani,¹ and G. Figueredo²

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Genisteae (Adans.) Benth. is a tribe of Fabaceae, basically circum-Mediterranean. The tribe also extends to the Canary Islands, Northern Europe, and America [1]. Different palaeoclimatic and geological processes have been involved in the evolution of Mediterranean plant communities, including those characterized by *Genisteae* [2]. The *Genisteae* have a great ecological importance in the western Mediterranean countries not only because of the high species diversity but also for the colonization of degraded forests and deforested areas that characterize the landscape [3].

The genus *Genista*, consisting of 87 species [4], is predominantly distributed in the Mediterranean area; among these species, 23 grow in Algeria, including 11 endemics, distributed particularly in the northern parts of the country [5, 6]. The ratio of endemism is quite high (47.8%). Taxonomic criteria were based on leaves, branching pattern, size and shape of petals, and legume characteristic [7].

Genista tricuspidata is a perennial endemic shrub in North Algeria. It is commonly known as “Gandoule”, is very thorny, and grows in forests and rocky hills on dry land. Flowering occurs from May to June. Phytochemical analysis of *Genista* has revealed the presence of flavonoids, isoflavones, and alkaloids [4, 8–12]. Little information on the essential oil of *Genista* is available.

The present study aims to determine the composition of the essential oil of the endemic species *Genista tricuspidata*. The average oil yield of this species is found to be 0.32% based on fresh weight. The compounds identified in this oil and their relative proportions are listed upon their elution and are given in Table 1. Seventy-seven compounds were characterized, representing 87.2% of the total oil of *G. tricuspidata*. This oil is very rich in the fatty acids, palmitic acid (22.6%), lauric acid (14.6%), myristic acid (3.7%), and linoleic acid (1.9%), with one diterpene *trans*-phytol (10.1%).

The aerial parts of *G. tricuspidata* during the flowering stage were collected at Djemila (Algeria) in May 2007. A voucher specimen is stored in the herbarium of the Department of Biology, Ferhat Abbas University, Algeria. The air-dried materials were subjected to hydrodistillation for 3 h using a Clevenger-type apparatus.

The oils were analyzed by GC on a Hewlett-Packard 5890 GC series II equipped with FID and fitted with an SE-54 capillary column (25 m × 0.25 mm; 0.25 μm film thickness). The column temperature was programmed from 55°C (5 min) to 210°C (4 min) at a rate of 6°C/min. The injector and detector temperatures were programmed at 220°C. Helium was used as carrier gas at a flow rate of 0.6 mL/min⁻¹, with split ratio 1:50. GC-MS analysis was performed on a Hewlett-Packard GC-MS system (5890, series II; MSD 5971A) equipped with an SE-54 column, under conditions of GC analysis using splitless injection of the essential oil sample.

1) Laboratory of Natural Resource Valorization, Faculty of Sciences, Ferhat Abbas University, 19000 Setif, Algeria, e-mail: tlograda63@yahoo.fr; 2) Laboratoire de Chimie des Heterocycles et des Glucides, Chimie des Huiles essentielles, Universite Blaise Pascal de Clermont Ferrand, 63177 Aubiere Cedex France. Published in *Khimiya Prirodnykh Soedinenii*, No. 6, pp. 842–843, November–December, 2010. Original article submitted July 16, 2009.

TABLE 1. The Composition of the Essential Oil of *Genista tricuspidata*

Compound	RI	%	Compound	RI	%
Oct-1-en-3-ol	981	0.3	<i>epi</i> -Cedrol	1616	0.5
2-Pentylfuran	990	0.1	Megastigmatrienone-2	1625	0.3
<i>trans</i> -2-(1-Pentenyl)furan	998	0.1	1- <i>epi</i> -Cubenol	1631	0.3
(<i>E</i>)-Oct-2-en-1-ol	1067	0.2	γ -Eudesmol	1636	0.2
Linalol	1099	2.0	α -Epimurolool	1648	0.4
Nonanal	1104	0.1	Dodecanoic acid trimethylsilyl ester	1652	0.1
Nonadienal (2 <i>E</i> ,6 <i>Z</i>)-thymohydroquinone	1153	0.1	α -Cadinol	1660	1.4
(2 <i>E</i>)-Nonen-1-al	1160	0.1	Heptadecane	1697	0.3
Octanoic acid	1175	0.2	12-Methytridecanal	1714	0.4
Naphthalene	1186	0.1	2,6-Diisopropyl-naphthalene	1721	0.1
α -Terpineol	1197	0.4	Diisopropyl-naphthalene	1726	0.2
Safranal	1200	0.1	Myristic acid	1772	3.7
Decanal	1206	0.1	Benzyl benzoate	1775	Tr.
β -Cyclocitral	1221	0.1	Octadecane	1798	0.2
Nerol	1225	0.2	6,10,14-Trimethyl-pentadecan-2-one	1841	8.4
Geraniol	1250	0.6	Phthalate	1858	1.0
5-Pentyl-2(3 <i>H</i>)-furanone	1263	0.1	Nonadecane	1899	0.8
Nonanoic acid	1274	0.5	Fanesyl acetone	1908	0.9
2,4-Dimethyl-3(2 <i>H</i>)-benzofuran	1307	0.1	Methyl hexadecanoate	1923	0.2
(2 <i>E</i> ,4 <i>E</i>)-Decadienal	1320	0.1	Cyclohexadecanolide	1931	0.1
Eugenol	1353	0.2	Phytol	1944	0.4
Caprylic acid	1370	0.6	Phthalate	1953	0.7
(<i>E</i>)- β -Damascenone	1380	0.6	Palmitic acid	1989	22.6
(<i>Z</i>)-Jasmone	1393	0.2	Cosane	1999	0.1
1,3,5-Trimethyl-2-(1,3-butadienyl)-benzene	1396	0.1	Heptadecanoic acid	2061	0.2
4-(2,6,6-Trimethylcyclohexa-1,3-dienyl)butan-2-one	1411	0.9	Diethyl linoleate	2096	0.1
β -Caryophyllene	1423	0.1	Heneicosane	2099	0.2
1-(6,6-Dimethyl-2-methylene-3-cyclohexenyl)-buten-3-one	1428	0.1	<i>trans</i> -Phytol	2110	10.1
Geranyl acetone	1447	0.7	Linoleic acid	2138	1.9
2,6,10-Trimethyldodecane	1462	0.2	9,12,15-Methyloctadecatrienoate	2146	2.4
4-(2,6,6-Trimethylcyclohexa-1,3-dienyl)but-3-en-2-one	1477	0.2	Stearic acid	2171	0.3
(<i>E</i>)- β -Ionone	1480	0.4	Docosane	2198	0.2
5,6-Epoxy-5,6-dihydro- β -ionone	1483	0.2	11-Tricosene	2286	0.2
<i>epi</i> -Cubenol	1499	0.2	Tricosane	2299	0.6
δ -Cadinene	1520	0.3	Tetracosane	2398	0.3
Elemol	1551	0.8	Pentacosane	2501	2.4
Lauric acid	1579	14.6	Hexacosane	2598	0.3
(<i>E,E</i>)-Pseudoionone	1596	0.1	Heptacosane	2700	0.1
Caryophyllene oxide	1599	0.1	Total		87.2

RI: retention indices on HP-5 capillary column. %: calculated from FID data. Tr.: trace.

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