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Essential oil of *Cytisus triflorus* L' Her

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ABSTRACT

The essential oil of Cytisus triflorus L'Her., a Mediterranean species was obtained by steam distillation and identified by GC and GC-MS. 61 compounds were determined. The oxygenated terpenoidic components constituted the most important fraction (64%) followed by the fatty acids (8.2%) and the hydrocarbonated fractions (10.7%).
Keywords : Cytisus triflorus L'Her., Fabaceae, Genisteae, essential oil, linalool, α-terpineol , geraniol, fatty acids, hexadecanoic acid, hydrocarbons.

INTRODUCTION

The genus *Cytisus* belonging to the tribe Genisteae of the Fabaceae family comprises about 60 species. It is widespread in the Mediterranean region among which 8 species are growing in the north of Algeria [1]. Several species of the genus are used in folk medicine for their diuretic, anti inflammatory, anti hypertensor and anti diabetic properties [2-5]. Phenolics, flavonoids and quinolizidine alkaloids were also described for this genus [6-8]. Previous studies on two species of the genus (*C. sessilifolius* and *C. scoparius*) showed that the essential oil contains almost Fatty acids, Fatty acid methyl esters and hydrocarbons (9-11]. In this paper as a continuation of our research on Algerian medicinal plants [12-22], we report the essential oil of the aerial parts of *Cytisus triflorus* L'Her. To the best of our knowledge this is the first report on the essential oil of this species.

MATERIALS AND METHODS

Plant material

The aerial parts of *Cytisus triflorus* L'Her. [1] were Collected in March 2011 in the region of Azazga (North of Algeria). Voucher specimen was deposited at the herbarium of the reseach unity VARENBIOMOL of the university of Constantine 1 (CTA 125/03/11) .

Essential Oil extraction

The aerial parts of *C.triflorus* were steam distilled in a Kaiser-Lang apparatus (2 hours).

GC-FID Analysis: The essential oils were analyzed on an Agilent gas chromatograph (GC-FID) Model 6890, equipped with a HP-5 ms fused silica capillary column (5%-diphenyl-95%-dimethylpolysiloxane (25 m x 0.25 mm, film thickness 0.25 µm), programmed from 50°C (5 min) to 250 °C at 3°/min and held for 10 min. Injector and flame ionization detector temperatures were 280 and 300 °C, respectively. The essential oils were diluted in acetone in 3.5% (v/v) and 1 µl was injected in split mode (1/60), helium was used as a carrier gas (1.0 mL/min). The proportions of the identified compounds were calculated by internal normalization.

Table 1: Chemical composition of the essential oil of Cytisus triflorus L'Her.

Pics	Compounds	RI	%
1	1-Octen-3-ol (CAS)	979	0.2
2	3-Methoxypyridine	995	1.9
3	Limonene	1028	0.5
4	*(Z)-β*-Ocimene	1035	0.2
5	Phenyl acetaldehyde	1043	0.8
6	Δ^3-carene	1046	0.1
7	cis-Linalool oxide	1070	1.3
8	Δ^2-carene	1084	0.2
9	trans -Linalol oxide	1085	0.3
10	Linalol	1096	20.9
11	Nonanal	1103	0.1
12	Terpinen-4-ol	1183	0.1
13	Methyl-salicylate	1189	0.2
14	α-Terpineol	1198	6.4
15	Safranal	1201	0.3
16	para-Menthen-9-al	1222	0.2
17	Nerol	1226	1.2
18	Geraniol	1252	6.5
19	trimethyl-tetrahydronaphthalene	1257	0.3
20	4-vinyl-2-methoxy-phenol	1311	3.5
21	Eugenol	1353	1.7
22	3,4-dimethoxy-styrene	1366	4.3
23	(E)- Isoeugenol	1369	0.1
24	1,4,6-Trimethyl-1,2-dihydronaphtalene	1393	0.2
25	1-Mesityl-buta-1,3-diene	1397	0.1
26	Methyleugenol	1400	0.1
27	2-(4-Methoxyphenyl)thiophene	1408	1.6
28	2-Ethyl-1,4-dimethylbenzene	1411	1.5
29	(E)-α-ionone	1424	0.3
30	Geranyl acetone	1448	1.6
31	2,6,10-Trimethyl-dodecane	1461	0.2
32	1-Ethyl-3,5-diisopropylbenzene	1478	0.6
33	(E)-β-Ionone	1480	1.6
34	4,5-Dimethoxy-2-(2-propenyl)phenol	1509	0.7
35	4,5,7,7a-Tetrahydro-4,4,7a-trimethyl-2(6H)benzofuranone	1532	0.3
36	2-methyl-3-(3,4,5-trimethylphenyl)-2-butene	1548	1.2
37	Megastigmatrienone	1579	0.3
38	3-Phenyl-5-t-butylpyridazine	1669	0.5
39	Heptadecane	1700	0.2
40	1-Ethyldibenzothiophene	1716	1.1
41	3-Phenyl-5-t-butylpyridazine	1722	0.7
42	N-Methylsaccharin	1727	0.3
43	Tetradecanoic acid	1758	2.5
44	Hexacosane	1799	0.3
45	2-Ethylhexyl -salicylate	1806	0.2
46	6,10,14-trimethyl-2-pentadecanone	1841	7.6
47	Diisobutyl phthalate	1858	2.8
48	Triacontane	1899	0.2
49	E,Z -Farnesyl acetone	1909	1.1
50	Hexadecanoic acid, methyl ester	1923	0.1
51	Cyclohexadecanolide	1932	0.2
53	Acide hexadécanoique	1958	5.6
54	Eicosane	1999	0.3
55	Manoyl oxide	2021	0.3
56	Heneicosane	2097	1.9
57	1,5-Dimethyl 7-oxabicyclo[4.1.0] heptane	2106	1.4
58	(Z,Z)-6,9-cis-3,4-epoxy-nonadecadiene	2135	0.2
59	Musk ambrette	2145	2.3
60	Tricosane	2295	2.1
61	n C25H52	2395	0.2
		Total	92.7

GC-MS Analysis: Mass spectrometry was performed on an Agilent gas chromatograph-mass spectrometer (GC-MS) Model 7890/5975, equipped with HP-5 capillary column (25 m x 0.25 mm, film thickness 0.25 µm) programmed with the same conditions as for GC-FID. The mass spectrometer (MS) ionization was set in positive electron impact mode at 70 eV and electron multiplier was set at 2200 V. Ion source and MS quadrupole

temperatures were 230°C and 180°C, respectively. Mass spectral data were acquired in the scan mode in the *m/z* range 33-450. The essential oils constituents were identified by matching their mass spectra and retention indices (RI) with those of reference compounds from libraries [23-24].

RESULTS AND DISCUSSION

Chemical composition of the essential Oil

Sixty one compounds were determined in the essential oil of *Cytisus triflorus* representing 92.7 % of the total oil content. The main constituents of the oil were found to be : linalool (20.9%), α-terpineol (6.4%) , nerol (1.2%), geraniol (6.5%) , 4-vinyl-2-ethoxy-phenol (3.5%), eugenol (1.7%), 3,4-dimethoxy-styrene (4.3%), 6,10,14-trimethyl-2-pentadecanone (7.6%), tetradecanoic acid (2.5%), geranyl acetone (1.6%), heneicosane (1.9%), tricosane, (2.1%), hexadecanoic acid (5.6%) and musk ambrette (2.3%).

The essential oil of *Cytisus triflorus* seems to be more rich in oxygenated terpenoidic compounds than those of other previously described *Cytisus* species (*C. sessilifolius* and *C. scoparius*) [11-13], since it constituted the most important fraction (64%). The hydrocarbon fraction from which heneicosane (1.9%) and tricosane (2.1%) were the most abundant components, was not so important (10.7%). Fatty acid and fatty acid methyl esters fraction (8.2%) from which hexadecanoic acid (5.6%) was the major constituent, was also less important than in the other oils. To the best of our knowledge this is the first report on the chemical composition of the essential oil of *Cytisus triflorus*.

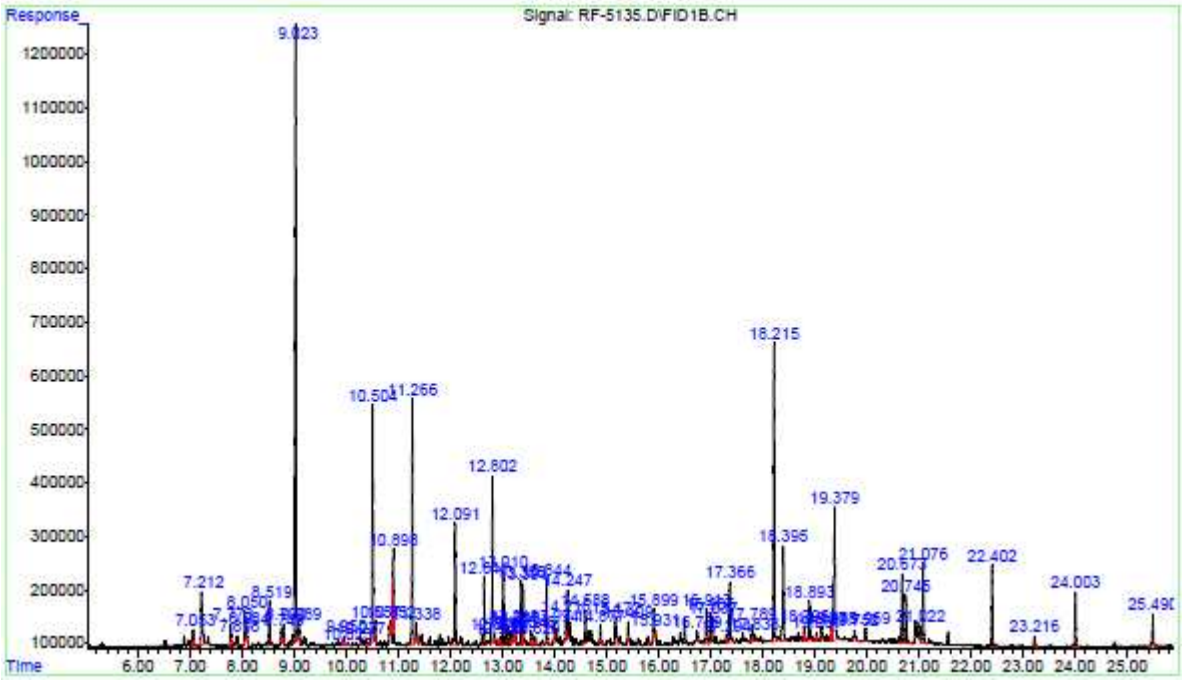

Figure 1 : GC- Chromatogram of the essential oil of *C. triflorus*.

CONCLUSION

The chemical composition of the essential oil of *Cytisus triflorus* was described for the first time. Sixty one components were determined. The oxygenated terpenoidic compounds constituted the most abundant fraction. The major constituents were linalool (20.9%), α-terpineol (6.4%), geraniol (6.5%), 4-vinyl-2-methoxy-phenol (3.5%), 3,4-dimethoxy-styrene , 4.3%), 6,10,14-trimethyl-2-pentadecanone (7.6%) and hexadecanoic acid (5.6%).

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REFERENCES

[1] P Quezel, S. Santa, Nouvelle flore de l'Algérie et des Régions Désertiques et Méridionales, Tome I, Editions CNRS, Paris, **1963**. p484.

[2] MS Giao, ML González-Sanjosé, MD Rivero-Pérez , CI Pereira, ME Pintado, FX Malcata, *J. Sci. Food. Agric.* **2007**, 87, 2638–2647.
[3] S Raja, K.F.H.N. Ahamed, V Kumar, K Mukherjee, A. Bandyopadhyay, PK Mukherjee, , J. Ethnopharmacol. **2007**, 109 ,41–47.
[4] M. Rigat, MA Bonet, S Garcia, T Garnatje, J Vallès, J. Ethnopharmacol. **2007**, 113, 267-277.
[5] AP Rauter, A Martins, R Lopes, J Ferreira, LM Serralheiro, ME Araujo, C Borges, J Justino, FV Silva, M Goulart, JT Ouates, JA Rodrigues, E Edwards, JP Noronha, R Pinto, H Mota-Filipe, J. Ethnopharmacol., **2009**, 122, 384–393.
[6] A Luis, F Domingues, C Gil, AP Duarte, *J. Med. Plants Res.*, **2009**, 3, 886–893.
[7] CAM Pereira, JH Yariwake, M McCullagh, *Phytochem. Anal.*, **2005**,16, 295–301.
[8] KI Nihei, K Shibata, I Kubo, *Phytochemistry*, **2002**, 61,8, 987-990.
[9]F.Senator, D.Di. Novella, A. Grassia, A. Liguori, and Lariccia, J. Essent.Oil. Bear. Pl., **2004**, 7 (3), 195-200.
[10]T Mitsuhashi, M Arita, M Fukukawa and S Endo, Shizen Kagaku, **1973**, 4(25): 72-5; via C.A. 79: 129063.
[11]T Kurihara and M Kikuchi, Yakugaku Zasshi, **1980**, 100(10): 1054-7; via C.A. 93: 2351183.
[12]MN Algabr, S Amedah, A. Menad, R Mekkiou, JC Chalchat, S Benayache, F Benayache., *Int. J. Med. Arom. Plants*, **2012**, 2 (4), 688-690.
[13]A Amel, D Zama, N Boubekri, O Benaissa, Z Meraihi, F Benayache, S Benayache and S Bettuzzi. *J. Med. Plants. Res*. **2012**, 6 (19), 3535-3544.
[14]EH Kolli, FLeón, F Benayache, S Estévez, J Quintana, F Estévez, I Brouard, J Bermejo and S Benayache., *J.Braz.Chem.Soc*., **2012,** 23 (5), 977-983.
[15]L Hammoud, R Seghiri, S Benayache, P Mosset, A Lobstein, M Chaabi, F León, I Brouard, J Bermejo, F Benayache. (2012), *Nat. Prod. Res*., **2012**, 26 (3), 203-208.
[16]H Dendougui, S Seghir,M Jay, F Benayache and S Benayache., *Int. J. Med. Arom. Plants*., **2012**, 2 (4), 589-595.
[17]S Bicha, P Chalard, L Hammoud, F León, I Brouard, VP. Garcia, A Lobstein, A Bentamene, S Benayache, J Bermejo and F Benayache., *Rec. Nat. Prod*. **2013**, 7 (2), 114-118.
[18]A Mezrag, M Bouheroum, N Beghidja, Y Khalfaoui, L Zaiter, S Benayache and F Benayache., ***C**hem. Nat. Comp.*, **2013**, 49 (4), 749-750.
[19]H Dendougui, F Benayache , S Seghir, Z Belloum, F León, I Brouard, J Bermejo and S Benayache, Rec. Nat. Prod., **2011**, 5 (4), 300-304.
[20]R Seghiri, R Mekkiou, O Boumaza , S Benayache, P Mosset, J Quintana, F Estévez, F León, J Bermejo and F Benayache., *Phytochem. Lett*., **2009**, **2,** 114-118.
[21]A Boudjerda, H Zater, S Benayache, JC Chalchat, J González-Platas, F León, I Brouard, J Bermejo and F Benayache., *Biochem. Sys. Ecol.*, **2008**, 461- 466.
[22]M Chaabi, N Begidja, S Benayache and A lobstein., *Z. Naturforsch*., **2008**, 63c, 801-807
[23] Adams, R.P. Identification of essential oil components by gas chromatography/mass spectroscopy. Allured Publishing Co.Carol Stream, Illinois., **2007**, 4 th Ed.
[24]Mc Lafferty, F.W. and Stauffer D.B. The Wiley/NBS registry of mass spectral data. 5th Edition, J.Wiley and Son, New York., **1991**.