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GC-MS of the essential oils extracted from leaves *Juniperus phoenicea* Linn.

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Abstract

Juniper (*Juniperus phoenicea*) (Rank: Pinales, family: Cupressaceae, genus: *Juniperus*) , includes six juniper (Juniperus) 60 species. A total of thirty four volatile compounds, representing 88.29% of the total oil composition in sample 1, were identified in the leaves oils. Monoterpene hydrocarbons were found to be the major group of compounds. The present investigation was made to evaluate the essentioal oil from J. phoenicea Linn. leaves by GC-MS.

Key words: GC-MS, Essential oil, *Juniperus phoenicea* L.

Introduction

Essential oil of Tunisian *juniper* is characterized by a high percentage of ô-3-carene and limonene with respectively 11.69 % and 10.29 % in comparison to 7.6 % and 1.1 % for the Moroccan juniper. The sesquiterpenes fraction is more abundant in Tunisian juniper with a significant percent of ß-selinene (7.32 %), followed by ß-caryophyllene (4.76 %) and Ot-cubebene (4.15 %) [1].

Juniper (*Juniperus phoenicea*) (Rank: Pinales, family: Cupressaceae, genus: *Juniperus*) [2], includes six juniper (Juniperus) 60 species.

Essential oils extracted from the plants are used medicinally and posses s good antioxidant activity as reported and reveled by several scholars, keeping the in view the present investigation was undertaken to evaluate constituents present in *Juniperus phoenicea* using GCMS.

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Material and Methods

Plant material

The samples of *Juniperus phoenicea* collected from the EL-Gabal EL-Akhdar area (Asulntah area) and then choose three random plants were next to some includes ((Sample1= plant intact naturally grow, sample2= plant grow almost normal and sample 3= No plant grows naturally)). All samples were collected from the same location

Methods

Extraction of essential oil from leaves of *Juniperus phoenicea* (sample 1, sample 2 and sample 3):

The dry powdered leaves of *Juniperus phoenicea* (500g) were subjected to hydro distillation using Clevenger apparatus. The isolation of volatile oils was completed within 6 hours [3].

Store essential oils

The oil samples were stored at 7°C in dark air-tight containers after drying over anhydrous sodium sulfate and filtered before injecting to GC-MS analysis.

Gas chromatography/ Mass spectra

Thermo Scientific, Trace GC Ultra & ISQ Single Quadruple MS, DB-5 bonded-phase fused-silica capillary column was used in for GC/MS analysis of essential oils. This experiment has been conducted in the central laboratory at Cairo University-Egypt

Results and Discussion

The retention time of the different compounds in the essential oils of *J. phoenicea* are presented in Table 1. A total of thirty four volatile compounds, representing 88.29% of the total oil composition in sample 1, were identified in the leaves oils (Table 1). Monoterpene hydrocarbons were found to be the major group of compounds. The most abundant component found in the leaf oil was α pinene (20.85%) followed by Germacrene D (16.49%), while α pinene and Germacrene D in sample 2 and sample 3were (12.45%,3.09%) and (9.19% ,1.054%) respectively. Surprisingly, there were decrease of these compounds in the sample diseased (table 1).

Table 1: The main components of essential oils of *Juniperus phoenicea* L. leaves collected from Al-Jabal Al Akhdar area (A sulnta)
***Rt: Retention time obtained by chromatogram.**
Sample1= plant intact naturally grow, sample2= plant growth almost normal and sample 3= No plant grows naturally.

Constituents	Area %			*Rt (min)
	sample 1	Sample 2	Sample 3	
α –pinene	20.85	12.45	3.09	4.16
β –myrcene	1.36	0.23	-	5.06
Terpinolene	0.07	-	-	5.26
β –phellandrene	3.84	1.79	0.02	5.91
Trans-Caryophyllene	5.44	5.00	2.087	14.66
4,7,10-Cycloundecatriene,1,1,4,8 tetramethyl-,cis,cis,cis	5.31	4.13	0.12	15.37
Germacrene D	16.49	9.19	1.054	16.05
Germacrene B	2.73	1.72	-	17.46
α – cedrol	0.36	-	-	18.27
+. alpha.-longipinene	2.98	2.082	0.471	18.08
Naphthalene,1,2,3,4,4a,5,6,8a,- octahydro-7-methl-4-methylene-1- (1-methylethyl)-(1.alpha,4a.alpha.,8a.alpha)	5.22	2.011	0.57	16.23
Camphene	0.29	-	-	4.32
β-pinene	0.49	-	-	4.81
1-phellandrene	0.39	-	-	5.33
delta.3-carene	0.40	-	-	5.46
α – terpinolene	0.23	-	-	7.10
Terpinolene	5.13	5.13	2.093	13.11
Linalool	0.47	-	-	7.37
Citronellol	0.63	-	-	10.30

α-cubebene	0.39	-	-	13.60
β-bourbonene	0.22	-	-	13.80
β-elemene	0.93	-	-	13.94
Widdrene	1.24	0.53	-	14.83
α-gurjunene	0.35	-	-	16.40
Zingiberene	0.43	-	-	16.92
delta.-cadinene	5.63	5.00	3.73	16.81
α-muurolene	0.43	-	-	17.01
α-calacorene	0.24	-	-	17.10
Elemol	0.61	-	-	17.28
Caryophyllene oxide	2.06	1.890	0.281	17.95
Fonenol	0.36	-	-	18.58
α-ylangene	1.33	0.072	-	19.03
β- selinene	0.30	0.30	0.30	19.54
vulgarol B	1.09	0.873	-	19.88

Conclusion

The retention time of the different compounds in the essential oils of *J. phoenicea* are presented in Table 1. A total of thirty four volatile compounds, representing 88.29% of the total oil composition in sample 1, were identified in the leaves oils (Table 1). Monoterpene hydrocarbons were found to be the major group of compounds. The most abundant component found in the leaf oil was α pinene (20.85%) followed by Germacrene D (16.49%), while α pinene and Germacrene D in sample 2 and sample 3were (12.45%,3.09%) and (9.19% ,1.054%) respectively**.** Surprisingly, there were decrease of these compounds in the sample diseased (table 1). The main chemical components of juniper oil are a-pinene, camphene, b-pinene, sabinene, myrcene, a-phellandrene, a-terpinene, y-terpinene, 1,4-cineole, b-phellandrene, p-cymene, terpinen-4-ol, bornyl acetate, cayophyllene and trace amounts of limonene, camphor, linalool, linalyl acetate, borneol and nerol.

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