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Short Communication

Volatile Constituents of *Salvia compressa and Logochilus macranthus*, two Labiatae Herbs Growing wild in Iran

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Abstract

The hydrodistilled volatile oil from aerial parts of Salvia compressa and Logochilus macranthus were analyzed by gas chromatography and mass spectrometry (GC-MS) technique. Eight components of the oil of S.compressa were characterized , representing 97.46% of the total components detected. The major constituent were identified as α-Pinen (70.93%), Borneol (7.1%), and Camphen(5.92%). The oil of L.macranthus was characterized by higher amount of caryophyllene oxide (17.52%), Humulene epoxide II (11.02%) and Viridiflorol (9.32%) among the fifteen components comprising 97.46% of the total oil detected.

Keywords: Salvia compressa, logochilus macranthus, hydrodistilled volatile.

Introduction

The family umbelliferae is rich in secondary metabolites and embodies numerous genera of high economic and medicinal value, yielding flavonoids, coumarins, acetylenes, terpenes and essential oils [1,2]. Genus salvia is one of the largest member of the family lamiaceae, comprising more than 700 species, many of them collected from the wild and a few of them cultivated[3,4]. Fifty – eight species of the genus Salvia are found in Iran, seventeen of which are endemic[5]. Due to the use of this genus or its essential oils in the food, drug and perfumery industries[6]. Previous chemical investigations on different species of salvia have shown the presences of flavonoids, diterpenoids and even the rare sesterterpenes[3-13]. The genus lagochilus from lamiacea family consists of forty four species, thirty three of which grow in central Asia. The flora of Iran comprises five species, including four endemics: *L. alutaceus* Bunge., *L.aucheri* Boiss., *L. kotschyanus* Boiss and *L. macranthus* Fisch . Fc.A.Mey.[14,15]. In 2009, it was reported that the water distilled oils from the aerial parts of *salvia compressa* vent. collected from two different localities, were analyzed by Gc and Gc/Ms. The main components found in the oil of *S. compressa* collected at Tang-e-malavi, was α-pinene (18.4%), while in the oil of the plant collected at Mamolan to Pol-e-dokhtar, was, α-pinene (4.8%)[16].

This present study deals with the analysis of the oils isolated from aerial parts of *S.compressa* collected in province of Bandar Abbas, south of Iran.

Material and Methods

Plant Material: The aerial parts of *S.compressa* and *L. macranthus* were collected during the flowering stage at the following places. *S.compressa* was collected from Bandar Abbas, Province of Hormozgan (Iran), In june 2010 and *L. macranthus* was collected from Nudushan, Province of Yazd (Iran) In April 2011. Voucher specimens have been deposited at the Herbarium of The Research Institute of Forests and Rangelands (TARI), Tehran, Iran. Collection and identification of plant material were greatly supported by Dr.V. Mozafarian (TARI).

Extraction of the oils: The oils of the aerial parts of *S.compressa* and *L.macranthus* (l00 gr and 80gr, respectively) were obtained by hydro distillation using a Clevenger-type apparatus for 4'h. After decanting, the oils were dried over anhydrous sodium sulfate. They were isolated in Yields of 0.67 % and 0.5% (w/w), respectively.

Analysis: GC analysis of the oil from the aerial parts *S.compressa* and *L.macranthus* were performed using a Shimadzu 15A gas chromatograph equipped with flame ionization detector (FID) and a DB-5 fused silica column (30 m × 0.25 mm i.d., film thickness 0.25 µm). The oven temperature was programmed, 60 ºC (3 min) – 220ºC (5 min) at a rate of 5 °C/min; the injector and detector temperatures were 260°C; the carrier gas was N_2 with a flow rate of 1 ml/min. The sample was injected using the split sampling technique, 1:50. The percentage composition of the oil was calculated automatically from peak areas without any correction. GC-MS analysis was carried out on a Hewlett-Packard 6890/5973 using an HP-5MS column (30 m × 0.25 mm i.d., film thickness 0.25 µm). The oven temperature was as above, the transfer line temperature was 260 °C; ionization energy in mass was 70eV; mass range was 40–300 amu; and scan time was 1 s. Retention indices (RI) of compounds were determined relative to the retention times of

a series of n-alkanes with linear interpolation. Identification of the oil components was done by comparison of their mass spectra with Chem-station software and Wiley 275 GC-MS library as well as by comparing them with those reported in the literature. The identification of each component was confirmed by comparison of its retention index either with those of authentic compounds or with data in the literature[17,18].

Results and Discussion

The composition of the essential oils obtained from the aerial parts of *S.compressa* , *L.macranthus* are listed in table 1 and 2.

Table-1
Chemical Composition of aerial parts Oils of *S.compressa*

Compound	RI[a]	Aerial parts
α- Pinene	939	70.93
Camphene	953	5.92
β- Pinene	975	2.59
ρ- Cymene	1026	2.92
Limonene	1029	3.92
Borneol	1169	7.10
Terpinen-4-ol	1177	2.43
β- Eudesmol	1651	4.19
Total %		100
Yield,w/w %		0.67

[a] kovat's retention index, Tr.: trace (<0.05%).

Table-2
Chemical Composition of aerial parts Oils of *L. macranthus*

Compound	RI[a]	Aerial parts
Tricyclene	926	4.31
α- Terpinene	1017	2.16
β- Caryophyllene	1418	8.71
δ Elemene	1437	2.43
(E) Ionone	1485	5.88
Caryophyllene oxide	1583	17.52
Viridiforol	1590	9.32
Humullene epoxide II	1610	11.02
Davanole D1	1616	8.00
α-Cadinol	1653	0.2
Khosinol	1680	9.30
1,2-Benzendicarboxylic acid buthyl cyclohexyl ester	1700	6.12
Xanthorrhizol	1753	6.33
2,4,6-Trimethyl benzoic acid	1790	6.12
Total		97.50
Yield,w/w %		0.5

[a] kovat's retention index, Tr.: trace (<0.05%).

As it is shown, in the oil of *S.compressa,* 8 compounds representing 97.46% of total were identified. The oil was rich in monoterpenes (86.28%), including 5 monoterpene hydrocarbons. α-Pinen (70.93%), Borneol (7.10%) and Camphene (5.92%) were the major components, in this oil, while β-caryophyllene, the major component of the two samples of *S.compressa* from two different locations, was also found to be the major componenets. As can be seen from the above information, the total amounts of monoterpenes fractions in the oils of *S.compressa* (86.28%) in work presents,werehigher than the monoterpenes fractions of the oils of *S.compressa* from two different locations,(23.5%) and 15.5%), respectively.

The oil of *L.macranthus* was characterized by large amounts of oxygenated sesquieterpenes with Caryophyllene oxide (17.52%), Humulene epoxide II (11.02) and Viridilorol(9.32%) being the major constituents found.

Conclusion

Detailed analysis on chemical composition of essential oil from the *S.compressa*, showed that this endemic *S. compressa* species can be exploited as a source of biologically active constituent α-Pinene. On the other hand, GC-Mass data of *L. macranthus* oil's showed that this plant can be used as a good source for Caryophyllene oxide, one of the powerful natural antioxidant agents.

Acknowledgments

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References

1. Gijbels M.J.M., Scheffer J.J.C. and Baerheim Svendsen A., *Phthalides in umbelliferae, Rivista Ital.Eppos.,* **61**, 335-341 **(1979)**

2. Kubeczka K.H., In: Aromatic Plants, Basic and applied aspects. Edits Margaris N., Koedam A. and Vokov D. 165, Martinus Nijhoff Publishers, the Hagus **(1982)**

3. Chalchat J.C., Michet A. and Pasquier B., Study of Salvia officinalis L.yields and chemical composition of essential oil, *Flav.fragr. J,* **13**, 68-70 **(1998)**

4. Tucker A.O., Macairollo M. and Clebesch B.B., Volatile leaf oils ofcultivars of *Salvia clevelandii* (Gray) Green X S. leucophylla Greene, *J.Essent.Oil Res*., **7**, 101-104 **(1995)**

5. Mozaffarian V., A Dictionary of Iranian Names. P. 477, Farhang Moasser ,Tehran **(1996)**

6. Heath H.B., Source Book of Flavors. P.890, Avi,Westport **(1981)**

7. Veitch N.C., Grayer J.L., Taked Irwin and K., Flavonoid Cellobiosides from *Salvia uliginosa*, *Phytochemistry*, **48**, 389-393 **(1998)**

8. Ulubelen A., Topcu G., Triterpenoides from Salvia Pinnata, *Phytochemistry*, **23**, 133-134 **(1984)**

9. Habibi Z., Eftekhar F., Samiee K., Rustaiyan A., Structure and Antibacterial Activity of a New Labdane Diterpenoide from *Salvia leriaefolia, J.Nat.Prod.,* **63**, 270-271 **(2000)**

10. Rustaiyan A., Niknejade A., Nazarians L., Jakupovic J., Bohlmann F., Sesterterpenes from *Salvia hypoleuca, Phytochemistry*, **21,** 1812-1813 **(1982)**

11. Rustaiyan A., Koussari S., Further sesterterpenes from *Salvia hypoleuca, Phytochemistry*, **27**, 1767-1769 **(1988)**

12. Rustaiyan A., Sadjadi A., Salvisyriacolide a Sesterterpene from *Salvia syriaca*, *Phytochemistry*, **26**, 3078-3079 **(1987)**

13. Gonzalez M.S., San Segundo J.M., Grande M.C., Medarde M. and Bellido I.S., Sesterterpene lactones from *Salvia aethiopis,* Salviaethiopisolide and 13-epi-salviaethiopisolide lactones, *Tetrahedron*, **45**, 3575-3582 **(1989)**

14. Rechinger K.H., Lagochilus, In: Flora. Iranica, Labiatae, No. 150, Edits K.H.. Rechinger and I.C. Hedge, Akademische, Druck and Verlagsanatalt, Graz, Austria, 340-341 **(1982)**

15. Mozaffarian V., A Dictionary of Iranian Plant Names. Farhang Moasser, Tehran, Iran **(1996)**

16. Rustaiyan A., Jamzad M., Larijani K., Masoudi S. and Jamzad Z., Composition of the essential oil of *Salvia compressa* Vent. and *Cyclotrichium leucotrichum* (Stapf. ex Rech.f.) Leblebici from Iran, *J.Essent.Oil Res*., **21,** 222-224 **(2009)**

17. Jenning W.J. and Shibamoto M., Qualitative Analysis of Flavor and Fragrance Volatile by Capillary Gas Chromatography. New York: Academic Press **(1980)**

18. Adams R.P., Identification of Essential Oil Components by Gas Chromatography /Mass Spectrometry, Carol Stream, IL: Allured Publishing **(1995)**