

The essential oil composition of *Teucrium apollinis* (Lamiaceae) from Libya

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ABSTRACT

The essential oil from fresh aerial parts of *Teucrium apollinis* (Lamiaceae), endemic in Libya, was isolated by hydro distillation and analyzed using GC and GC-MS. Twenty five component were identified. The major constituents of the essential oil were β -caryophyllene (22.4%), limonene (11.79%), germacrene-D (11.77%), α -humulene (7.81%), α -pinene (5.38%).

Key words: *Teucrium apollinis*, Lamiaceae, Libya, β -caryophyllene

INTRODUCTION

The genus *Teucrium* (Germander) belongs to the family Lamiaceae, within the subfamily Ajugoideae. The species of this genus are widespread on all continents of the world, and a very large number of species are present in the Mediterranean. A large number of known medicinal species belonging to the genus *Teucrium* are used in folk medicine and pharmacy. The species of the genus *Teucrium* are very rich in phenolic compounds with very strong biological activity [1,3]. The most popular species of this genus are *T. chamaedrys*, *T. montanum* and *T. polium*, used in treatment of digestive and respiratory disorders, abscesses, gout and conjunctivitis, in the stimulation of fat and cellulite decomposition, and possess antiinflammatory, antioxidative, antimicrobial, antidiabetic and antihelminthic effects. However, their most significant therapeutic effect was the elimination of some problems in the digestive tract [4]. Essential oils have been used for therapeutic purposes since ancient times. The genus *Teucrium* belongs to the family Lamiaceae and contains 340 species. Lamiaceae family is rich in essential oils. The main components of the essential oil reported from the genus *Teucrium* are alpha pinene, linalool, carophyllene oxide, Germacrene D, beta carophyllene and delta cadinene. These phytochemicals possess antimicrobial, cytotoxic, phospholipase, esterase inhibitory properties [5] and can prove very useful leads for novel drug development. In Libya represented by only 13 species from *Teucrium* four of them are endemic, *T. apollinis* one of the endemic plants it had never been chemically studied. In this paper we report on the composition of the essential oil of this *Teucrium* species isolated from the aerial part.[6].

MATERIALS AND METHODS

Plant Material : An aerial part of *Teucrium appollinis* was collected from Ras Alhelal in March 2006 during the flowering season, the plant was identified by Dr .Mohammed ElSherif, department, faculty of science, Benghazi University.

Isolation of the Essential oils: The aerial part of *T. apollinis* (300 gr) were subjected to hydro distillation using Clevenger- type apparatus for 5 h. The oil was dried over anhydrous sodium sulphate and stored in dark container at a low temperature before analysis. The oil was analyzed by GC and GC-MS.

GC/MS analysis of the volatile oils

The GC/MS analyses Finnigan mat SSQ 700. Work station, Igital DEC 3000. Ionization mode FI 70 ev. Column Fused Silica Capillary Column. DB-5 (5 % Phenyl) Methylsiloxane (0.25 mm in Dim) Column length 30 m. Carrier gas Helium gas. Flow rate Column head pressure 13 ps. Detector MS.

Table 1. The chemical constituents of the essential oil of *T. apollinis*

	Components	RT	RI	A %
1	α -pinene	4.51	939	5.83
2	β -Citronellene	5.33	947	3.81
3	β -pinene	5.46	980	2.72
4	Limonene	6.34	1031	11.79
5	Benzene acetaldehyde	7.88	1043	2.62
6	β -Ocimene	8.52	1050	0.98
7	4-Terpineol	9.68	1177	1.90
8	α - Terpineol	9.97	1189	0.83
9	Piperonal	13.22	1329	0.75
10	α -Copean	14.08	1376	0.52
11	β -Bourbonene	14.30	1384	0.94
12	β -Caryophyllene	15.02	1418	22.44
13	α -E-Ionone	15.22	1426	0.88
14	α -Humulene	15.75	1454	7.81
15	Aromaderadrene	15.91	1461	0.74
16	Unknown	16.19	1474	0.96
17	Germacrene-D	16.32	1480	11.77
18	Unknown	16.63	1496	2.22
19	Unknown	16.96	1514	1.31
20	Φ -Cadinene	17.14	1524	3.70
21	Spathulenol	18.26	1576	1.10
22	Caryophlene oxide	18.37	1581	1.94
23	Sesquilandulol	19.42	1632	3.98
24	α -Muurolol	19.69	1645	1.82
25	Unknown	20.46	1682	0.38

RESULTS AND DISCUSSION

The essential oil from fresh aerial parts of *Teucrium apollinis* (*Lamiaceae*), endemic in Libya, was isolated by hydro distillation and analyzed by GC and GC-MS. The essential oil obtained was yellow in color and with a characteristic odor, the identified volatile component are listed according to their retention indices in table (1), including their retention indices and their percentage contributions. In total twenty five compounds were identified, the major constituents of the essential oil β -caryophyllene (22.4%), limonene (11.79%), germacrene-D (11.77%), α -humulene (7.81%), α -pinene (5.38%), β - pinene (2.72 %), β -citronellene (3.81%) and Φ -cadinene (3.70%).

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