COMPOSITION OF THE ESSENTIAL OIL OF *Salvia longipedicellata* FROM TURKEY

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Salvia longipedicellata, which is among the endemic species, is a perennial plant. In Turkey, this endemic species usually grows on disturbed steppe, meadows, and fallow fields [1]. Very little is known about *Salvia longipedicellata*. To date, there is only one published literature regarding the essential oil composition of the species. In this study, it was reported that caryophyllene oxide (23.3%) and β-caryophyllene (16.1 %) were major constituents of *Salvia longipedicellata* plants collected from Sivas province [2].

Salvia longipedicellata plants collected from Askale in August 2004 were dried in shadow and ground in a grinder with a 2 mm in diameter mesh. The voucher specimen has been deposited at the Herbarium of the Department of Biology, Ataturk University, Erzurum–Turkey (ATA HERB No 9779).

Air-dried plant material was subjected to hydrodistillation using a Clevenger-type apparatus for 3 hours (0.22 % yield). The obtained essential oil was dried over anhydrous sodium sulfate and, after filtration, stored at +4°C until tested and analyzed. The analysis of the essential oil was performed using a Thermofinnigan Trace GC/Trace DSQ /A1300, (E.I Quadrapole) equipped with a SGE-BPX5 MS capillary column (30 m $\times$ 0.25 mm i.d., 0.25 μm). For GC-MS detection an electron ionization system with ionization energy of 70 eV was used. Helium was the carrier gas, at a flow rate of 1 mL/min. Injector and MS transfer line temperatures were set at 220°C and 290°C, respectively. The program used was 50–150°C at a rate of 3°C/min, held isothermal for 10 minutes and finally raised to 250°C at 10°C/min. Diluted samples (1/100, v/v, in methylene chloride) of 1.0 mL were injected manually and in the splitless mode. The components were identified based on the comparison of their relative retention time and mass spectra with those of standards, Wiley7N, TRLIB library data of the GC-MS system and literature data [3]. The quantitative data were expressed as area %.

The results of the chemical composition of the essential oil of *Salvia longipedicellata* are presented in Table 1. A total of 16 compounds was identified, which constitute 95.8 % of the volatile oil. As can be seen from this table, the major constituents in the essential oil of *Salvia longipedicellata* collected from Askale were β-caryophyllene (37.0%), germacrene-D (13.4%), α-humulene (9.7%), cembrene (9.2%), and α-copaene (8.1%).

Compared to the previous study [2], the caryophyllene oxide percentage of our oil was relatively low (1.2%) compared with 23.3% for the percentage reported for this component in the oil analyzed by Demirci et al. [2]. It is noteworthy that β-caryophyllene (37 vs. 16.1%), germacrene-D (13.4 vs. 2.5%), α-copaene (8.1 vs. 0.9 %), β-elemene (4.4 vs. 0.4%), α-humulene (9.7 vs. 5.0%), and bicyclogermacrene (3.4 vs. 0.7%) were higher in our oil than in the oil of previous sample. It is clear from this and earlier studies that there are important differences qualitatively and quantitatively. Our results confirm the evidence in the literature indicating that the chemical composition of essential oils within a species are greatly affected by climatic and geographical conditions, and developmental stages [4–10].

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TABLE 1. Chemical Composition of the Essential Oil of *Salvia longipedicellata* collected from Askale, Erzurum, Turkey

Components	RI	Composition, %
Nonanal	1114	0.3
Bornyl acetate	1234	0.6
α-Copaene	1277	8.1
β-Elemene	1283	4.4
β-Caryophyllene	1297	37.0
Aristolene	1306	0.8
α-Humulene	1312	9.7
Germacrene-D	1322	13.4
Bicyclogermacrene	1327	3.4
γ-Cadiene	1335	3.2
endo-1-Bourbonanol	1361	2.2
Caryophyllene oxide	1364	1.2
α-Cadinol	1401	0.3
Hexahydrofarnesyl acetone	1445	0.6
Sclareoloxide	1451	2.5
Cembrene	1456	9.2
Total		95.8

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RI, retention index; compound listed in order of elution from a BPX5 MS column; identification: GC-MS, RI.

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