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Original artical

COMPOSITION OF THE ESSENTIAL OIL OF *SESELI CAMPESTRE* Besser. GROWING IN THE NORTHWEST ANATOLIA

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Abstract

Seseli campestre Besser. (Apiaceae) is a perennial herb, white or purplish flowers. Water distilled essential oil from aerial parts of S. campestre was analysed by GC and GC/MS systems, simultanously. Thirty compounds were identified representing 97.1±0.3 % of the oil. The main essential oil components were found as α-pinene (38.6±0.5%), β-pinene (17.5±0.1%) and (E)-sesquilavandulol (10.3±0.8%).

Key words: *Essential oil, GC, GC-MS, Seseli campestre*

Kuzey Batı Anadolu'da Yetişen *Seseli campestre* Besser. Uçucu Yağının Kompozisyonu

Seseli campestre Besser. (Apiaceae) beyaz ve mor çiçekli çok yıllık bir bitkidir. Seseli campestre'nin toprak üstü kısımlarından su distilasyonu ile elde edilen uçucu yağları GC ve GC/MS sistemleri ile analiz edildi. Yağların % 97.1±0.3 kadarını temsil eden 30 bileşik tanımlandı. Uçucu yağ ana bileşenleri α-pinen (38.6±0.5%), β-pinen (17.5±0.1%) ve (E)-sesquilavandulol (10.3±0.8%) olarak bulundu.

Anahtar kelimeler: *Uçucu yağ, GC, GC-MS, Seseli campestre*

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INTRODUCTION

The Apiaceae is a best known family of flowering plants because of its characteristic inflorescences and fruits, and the diverse chemistry reflected odour, flavour and even toxicity of many of its members. It contains about 300 genera and 2500-3000 species throughout the world (1) The genus *Seseli* L., belongs to the Apiaceae family which comprises 55 species distributed mainly in Europe (2). Twelve of them could be found in Turkey (3–6). *Seseli* is composed of aromatic herbs and economically important species that have been used in folk medicine since ancient times (7).

The roots of *Seseli mairei* Wolff., a plant growing in China, is used as a herbal remedy for human inflammation, swelling, rheumatism, pain and common cold (8). The seeds of *Seseli indicum*, growing in India, have been reported to possess anthelmintic, carminative, stomachic and stimulant properties (9). In Turkish folk medicine, the fruit of *Seseli tortuosum* is used as emmenagogue and anti-flatulence (10) while the leaves of *Seseli libanotis* are consumed as a vegetable in the eastern Turkey (11).

S. campestre Besser is a perennial, glabrous, purplish-coloured or green, terete with fine ridges, solid and up to 1 m. Inflorescences composed of many lateral branched. Rays 7-10, unequal, 5-20 mm. Umbellules 10-14-flowered and petals white or purplish. It grows on dry hillsides and at sea level-500 m altitudes in Northwest and South Anatolia (3).

There is one previous paper on the chemical composition of the fruit and herb oils of *Seseli campestre* from the south Anatolia (12). A detailed chemical composition of essential oil of the aerial parts of *Seseli campestre* growing in the Northwest Anatolia is presented here.

EXPERIMENTAL

Plant material

S. campestre was collected during the flowering period from Istanbul province of Northwest Anatolia in November 2008. Voucher specimens were deposited in the Herbarium of the Faculty of Pharmacy of Anadolu University, in Eskişehir, Turkey (ESSE 14457).

Isolation of essential oil

The essential oil from aierial part of the plant material was isolated by hydrodistillation for 3 h, using a Clevenger-type apparatus. The oil was dried over anhydrous sodium sulphate and stored at +4°C in the dark until analysed.

GC–MS analysis

The GC-MS analysis was carried out with an Agilent 5975 GC-MSD system. Innowax FSC column (60 m x 0.25 mm, 0.25 μm film thickness) was used with helium as carrier gas (0.8 ml/min). GC oven temperature was kept at 60°C for 10 min and programmed to 220°C at a rate of 4°C/min, and kept constant at 220°C for 10 min and then programmed to 240°C at a rate of 1°C/min. Split ratio was adjusted at 40:1. The injector temperature was set at 250°C. Mass spectra were recorded at 70 eV. Mass range was from *m/z* 35 to 450.

GC analysis

The GC analysis was carried out using an Agilent 6890N GC system. FID detector temperature was 300°C. To obtain the same elution order with GC-MS, simultaneous auto-injection was done on a duplicate of the same column applying the same operational conditions. Relative percentage amounts of the separated compounds were calculated from FID

chromatograms. The analysis results are expressed as mean percentage ± standard deviation (SD) (n= 3) as listed in Table.

Identification of components

Essential oil from aerial parts of *S. campestre* was analysed by GC and GC/MS. Identification of the essential oil components were carried out by comparison of their relative retention times with those of authentic samples or by comparison of their relative retention index (RRI) to series of *n*-alkanes. Computer matching against commercial Adams Library, Wiley GC/MS Library (13), MassFinder 3 Library (14) and in-house "Baser Library of Essential Oil Constituents" built up by genuine compounds and components of known oils, as well as MS literature data (15–17) was used for the identification.

RESULTS AND DISCUSSON

Thirty compounds were characterised in the oil of *S. campestre* representing 97.1±0.3 % of the oil with α-pinene (38.63±0.5%), β-pinene (17.5±0.1%) and (E)-sesquilavandulol (10.3±0.8%) as the main constituents. The compounds identified are given in Table 1 with their percentages.

Some essential oil analyses (12, 18–26) as well as phytochemical and biological activity studies have been done on the *Seseli* species. Comparison of the main compounds with the other *Seseli* species show many similarities regarding the main constituents of the oils. For example, α-pinene was identified in the oil of *S. tortuosum* L. 18.6% in Italy (18), 21.2% in Iran (19), 35.9% and 13.5% in Turkey (20, 23), for *S. peucedanoides* (MB) Kos.-Pol. 69.4% (22), for fruit of *S. resinosum* Freyn et. Sint. 13.7% (23), for *S. rigidum* Waldst. et. Kit var. *rigidum* 53.31% (24), for different altitudes of *S. buchtormense* (Fisch ex Sprengel) W. Koch 5.3-14.6% (25) and for unripe and ripe fruits of *S. globiferum* Vis. 7.2 % and 4.4% (26). β-pinene was reported for *S. tortuosum* 13.2% in Italy (18), 14.2% in Iran (19), 7% in Turkey (20), for *S. peucedanoides* 4.9% (22) and for fruit of *S. resinosum* 37.5% (23). (E)-sesquilavandulol was identified only in *S. tortuosum* 8.4% and 37.0% (20, 23).

There is one previous paper on the chemical composition of the fruit and herb oils of *Seseli campestre* from the south Anatolia (12). Ninety seven compounds representing 95% of the oil were identified in the fruit and one hundred and two compounds making up of 96% of the oil were characterized in the oil obtained from aerial parts. The oil of *S. campestre* had contained α-pinene (26.2% and 35.8%) and (E)-sesquilavandulol (11.8% and 3.2%). Our results generally agree with the present study. In this study, the percentage amount of (E)-sesquilavandulol (10.3%) in aerial parts of *S. campestre* in the Northwest Anatolia was found more than that of the oil in the material from south Anatolia (3.2%).

Table 1. Composition of the Essential Oil of *Seseli campestre*

RRI*	Compound	%*
1032	**α-Pinene**	**38.63±0.5**
1076	Camphene	1.63±0.1
1118	**β-Pinene**	**17.50±0.1**
1132	Sabinene	4.37±0.1
1174	Myrcene	1.80±0
1176	α-Phellandrene	tr*
1203	Limonene	5.80±0
1218	β-Phellandrene	0.87±0.2
1255	γ-Terpinene	1.0±0.1
1280	*p*-Cymene	1.0±0.1
1499	α-Campholene aldehyde	0.60±0
1586	Pinocarvone	1.33±0.1
1572	Cascarilladiene	1.07±0.1
1600	β-Elemene	0.10±0
1611	Terpinen-4-ol	0.43±0.1
1612	β-Caryophyllene	0.50±0
1648	Myrtenal	1.30±0
1670	*trans*-Pinocarveol	1.10±0
1683	***trans*-Verbenol**	1.0±0
1707	δ-Selinene	0.57±0.1
1726	Germacrene D	1.0±0.1
1742	β-Selinene	0.43±0.1
1804	Myrtenol	0.73±0.1
1854	Germacrene-B	0.60±0
1902	Benzyl isovalerate	0.20±0
2008	Caryophyllene oxide	0.97±0.1
2100	(*E*)-Sesquilavandulyl acetate	0.63±0.1
2183	**(*E*)-Sesquilavandulol**	**10.33±0.8**
2232	α-Bisabolol	0.57±0.1
2264	Alismol	1.07±0.1
	Total	**97.1±0.3**

*RRI Relative retention indices calculated against n-alkanes
*% calculated from FID data
*tr Trace (< 0.1 %)

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