CHEMICAL CONSTITUENTS OF THE ESSENTIAL OIL OF *THYMUS KOTSCHYANUS BOISS. & HOHEN.* FROM IRAN

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ABSTRACT

Water-distilled essential oil of *Thymus kotschyanus Boiss.& Hohen.* was examined by GC and GC/MS. Fifteen constituents representing 80.7% of the oil were characterized of which thymol (38.0%), carvacrol (14.2%) and 1,8- cineole (13.2%) were the main compounds which were identified.

Key words: *Thymus kotschyanus, Lamiaceae*, Essential oil composition, Thymol, Carvacrol, 1,8- Cineole.

INTRODUCTION

The genus *Thymus* include 300-400 species (1) and some species are used in folk medicine. The main medicinal *Thymus* are *T. vulgaris* (common thyme) and *T. serpyllum* (wild thyme) that are used internally for dry coughs, bronchitis, laryngitis, indigestion and gastritis and externally for rheumatism, arthritis, sciatica and mastitis. Commercial thyme oil is largly derived from *T. zygis* (Spanish sauce thyme), a white flowered species found in Spain and Portugal (2).

The result published on the chemical composition of *Thymus* oils reveal that thymol and carvacrol represent the most important compounds in the genus, followed by linalool, p- cymene, γ-terpinene, borneol, terpinen-4-ol and 1,8-cineole (3). The volatile oil of *Thymus kotschyanus* in Turkey (4) and Armenia (5) has been examined proviously. This paper reports on the results of GC/MS analysis of the water-distilled essential oil of the aerial parts of *T. kotschyanus* growing in Iran.

MATERIALS AND METHODS

Plant Materials: The leaves and flowers of *Thymus kotschyanus* were collected from Dizin, 30 km North of Tehran, Iran, at an altitude of 3200m, in May 1997. A voucher specimen has been deposited in the Herbarium of the Department of Botany, Shaheed Beheshti University, Tehran, Iran.

Isolation of the Essential Oil: The leaves and flowers of the plant were dried at room temperature and hydrodistilled for 3 h using a Clevenger-type apparatus. The oil was dried over anhydrous sodium sulfate and stored at 2°C in the dark. The yield based on dry weight was 0.39% (W/W)

GC Analysis: GC analysis was performed using a Packard 439 chromatograph was equipted with a CP Sil 5 CB column (25m - 0.25mm i. d.; film thickness 0.39 μm). Carrier gas was nitrogen with a flow rate of 0.8 ml/min. The oven temperature was programmed from 60°-220°C at 5°C/min. Injector and detector temperatures were 270°C.

Table 1. The Components identified in the essential oil of *Thymus kotschyanus Boiss. & Hohen.*

Compound	*RRI*	*%*
α-Thujene	926	2.2
α-Pinene	936	1.3
Camphene	950	0.3
β-Pinene	975	1.5
p-Cymene	1016	2.2
1,8 Cineole	1025	13.2
γ-Terpinene	1056	0.9
Linalool	1087	4.4
Borneol	1155	0.7
Terpinen-4–ol	1168	0.4
Thymol	1273	38.0
Carvacrol	1282	14.2
β-Caryophyllene	1420	0.9
Germacrene–D	1480	0.3
δ-Cadinene	1516	0.2

GC/MS Analysis: GC/MS analysis was performed using Varian 3700 with a CP Sil 5 CB column (25m-0.25mm i.d.), film thickness 0.39μm) combined with Varian MAT 44S, ionization energy 70 eV, helium as carrier gas and injector temperature of 270°C. Approximately 0.1 ml of the neat oil was injected under split conditions (100:1) and the oven temperature was held at 60°C for 5 min, programmed at 5°C/min to 220°C and then held at this temperature for 20 min. Constituents were identified by

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comparison of their mass spectra and relative retention indices (RRI) data with those of authentic compounds in the literature (6-8).

RESULTS AND DISCUSSION

The chemical composition of the oil of *T. kotschyanus* are listed in Table I. Constituents are in order of their elution on the CP Sil 5CB column. The oil was characterized by large amount of oxygenated monoterpenes (70.9%), thymol (38.0%), carvacrol (14.2%) and 1,8- cineole (13.2%) which were the major constituents. The sesquiterpene fraction of the oil was relatively low, representing (1.4%) of the total oil. The major components of the oil of *T. kotschyanus* growing in Turkey (4) is carvacrol (44.2%) and of Armenia (5) are thymol (35.5%), p-cymene (17.8%) and carvacrol (11.6%). Thymol and carvacrol, two major components of the oil, were also found to be the major components of some other Thymus species such as, *T. fedtschenkoy* (5), *T. transcaucasicus* (9), *T. serpyllum* (10) , *T. leucostomus* (11), T. *praecox* (12) and *T. serpylloides* (13)

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