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## Extraction and comparison of chemical constituents of the essential oils isolated from leave and stem of *Thymus pubescens* Boiss. & Kotschy ex Celak

Farshid Salimi\*, Ali Shafaghat, Fatemeh Ebrahimzadeh, Jafar Abbasi  
Department of Chemistry, Islamic Azad University, Ardabil Branch, Ardabil, (IRAN)

E-mail : salami\_far1388@yahoo.com; sibsalmi@yahoo.com

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### ABSTRACT

A comparison of the chemical composition of the essential oils obtained from the leave and stems of *Thymus pubescens* Boiss. & Kotschy ex Celak. were carried out. The oils were obtained by Hydrodistillation and were analyzed by GC and GC/MS. Seventeen constituents representing 93.1% of the essential oil of leaves and two components of the stems oil have been identified. The oil from leave was characterized by higher amount of thymol (35.5%), linalool (21.7%), geraniol (9.0%) and  $\gamma$ -terpinene (3.5%). In the oil of *T. pubescens* stems, thymol (84.6%) and linalool (10.1%) were only detected as the predominant compounds. In the both sample oils, the oxygenated monoterpenes compounds predominated over sesquiterpenes. © 2010 Trade Science Inc. - INDIA

### KEYWORDS

*Thymus pubescens*;  
Labiatae;  
Essential oil composition;  
Thymol;  
Linalool.

### INTRODUCTION

*Thymus* is one of the genres in Labiatae (Syn: Lamiaceae) family. It is represented in Iran by fourteen species including 4 endemics<sup>[1]</sup>. Some species of *Thymus* are used since ancient times in folk medicine for their antiseptic, antibacterial, energetic, antitension, antidistension, anticough, sedative, antirheumatic, antiparasite and fungicidal properties. The essence of those plants have used in the food, medicinal, cosmetic and trade industries<sup>[2]</sup>.

The extract of the leaves of lemon thyme, especially the oil, are strongly antiseptic, deodorant and disinfectant<sup>[3]</sup>. And it is used in aromatherapy to treat asthma and other respiratory complaints, especially in children. The leaves are dried and used in potpourri and herbal

pillows<sup>[4]</sup>. Lemon thyme is also recommended for use in teas and salad dressings<sup>[5]</sup>. Thyme oil has a disinfecting effect, is good for controlling infections of the oral and pharyngeal cavity and has found use as an expectorant<sup>[6]</sup>. Genus *Thymus* is a taxonomically complex group of plants.

### RESULTS AND DISCUSSION

The chemical compositions and those percentages of the oils of *Thymus pubescens* leave and stems are listed in TABLE 1. As it shown, the volatile oil of leave (17 compounds, 93.1%) contained five monoterpene hydrocarbons (9.6%), eleven oxygenated monoterpenes (81.0%) and one sesquiterpene hydrocarbons (2.5%).

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**TABLE 1 : Chemical composition (%) of the essential oils of *Thymus pubescens* leave and stems**

No.	Compound	KI	% Leave oil	% Stems oil
1	$\alpha$ -Pinene	938	2.5	--
2	Myrcene	991	0.7	--
3	$\alpha$ -Terpinene	1017	0.7	--
4	P-Cymene	1025	2.2	--
5	1.8-Cineole	1031	0.8	--
6	$\gamma$ -Terpinene	1060	3.5	--
7	Linalool	1096	23.7	10.1
8	4-Terpineol	1177	0.9	--
9	$\beta$ -Fenehyl alcohol	1123	2.5	--
10	Thymol methyl ether	1236	1.1	--
11	Linalyl acetate	1256	1.5	--
12	Geraniol	1254	9.0	--
13	Thymol	1290	35.5	84.6
14	Carvacrol	1299	2.9	--
15	$\alpha$ -Terpinyl acetate	1349	1.3	--
16	Geranyl acetate	1381	1.8	--
17	$\beta$ -Bisabolene	1505	2.5	--
--	Total	--	93.1%	94.7

The major components were thymol (35.5%), linalool (23.7%), geraniol (9.0%) and  $\gamma$ -terpinene (3.5%). 2 components only in the oil of stems which represented about 94.7% of the total oil, were identified. The constituents of this oil consisted of thymol (84.6%) and linalool (10.1%). Results showed that oxygenated monoterpenes are the major portion of two samples (TABLE 1).

Essential oils rich in phenolic compounds, such as thymol, are widely reported to possess high levels of antimicrobial activity<sup>[7]</sup>. Several studies have focused

on the antimicrobial activity of the essential oils of thyme in order to identify the responsible compounds<sup>[8]</sup>.

Thymol and carvacrol, which is the main component of *Thymus* genus essential oils, have been considered as a biocidal, resulting in bacterial membrane perturbations that lead to leakage of intracellular ATP and potassium ions and ultimately cell death<sup>[9]</sup>. The highest content of thymol as major component was observed in both samples.

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