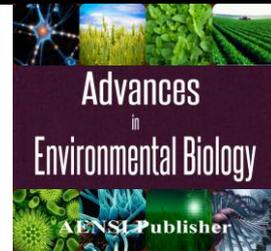




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# Studying and Comparing Amount, Essence and Thymol Extent in Essence 12 Thyme Ecotypes in Qom Climate

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### ABSTRACT

Thyme or *Thymus kotschyanus* belongs to Labiate family as valuable herbal specie grown mostly in mountains. Its dark species are distributed worldwide especially in Mediterranean areas. Its botanical properties include a short woody plant, colonized or grassy which improves the performance of stomach and it is energizer, anti-convulsion, anti-flatulence, anti-cough, relaxing, anti-arthritis, anti-bacterial, anti-parasite, anti HIV virus and anti-cancer. Its essence is mainly used in food, medicine, health, cosmetic and beekeeping. In Qom climate, thyme especially *kotschyanus* is seen in such regions as Gazaran, Salafchgan, Kahak, Ghahan, Ghanavat and Nayzar. Present research aims at investigating three characteristics including amount and percentage of essence and thymus extent in 12 *Thymus kotschyanus* ecotypes of in Qom climate. The experimental group consists of 12 thyme ecotypes in fully random blocks with three times of repetition in Qom Badiel Research and Engineering Station. The extent and percentage of essence and thymol amount in essence were noted in the stage of 50% of flowering. In each experimental unit, five bushes were samples in all of which, experimental group differed significantly. Concerning the amount and percentage of essence, ecotypes of Semnan (Shahmirzad) and Western Azerbaijan (Urumyeh) had the highest and lowest rates while concerning thymol, ecotypes of Markazi (Arak) and Kurdistan (Divandareh) has the highest and lowest rates.

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## INTRODUCTION

The history of consuming herbs for treatment is as old as human age. In recent years, using medical herbs is increased because of their lower side effects and costs and more adaptability of patients with such medicines and the known side effects of synthetic medicines [10]. Today, over 80% and 20% of prescribed medicines in developing countries and developed industrial countries are herbal medicines and their derivatives respectively [5]. USA is the greatest global market of herbal medicines while Japan is the biggest importer of such medicines in Asia [4].

There are near to 8000 species of herbs in Iran most of which can have medical impacts. Labiate family is among the first group of species identified by botanists due to its food and medical properties [6]. Its species are dispersed throughout the world while colonized in some Mediterranean regions [7].

Globally, thyme has over 250 species of which 14 species are going in Iran and 4 species are exclusive to Iran [11,12]. Most thyme species are broadly consumed worldwide as drink (tea), food tasters (spice and relish) and medicine [12]. Thyme is an important medical herb widely used since the past. However, various species are called thyme while the used specie in present research with broad dispersion in Iran is mountain thyme or *Thymus kotschyanus* as one of the most well-known specie and the most important type in terms of essence quantity and quality [8]. The existence of such specie in heights indicates that it can resist against coldness and hard conditions. It has a broad dispersion in other areas of the country so that it is reported and harvested in Qazvin Province (1500 meters over sea) and Mazandaran (1500 – 2000 meters over sea) [3]. In most well-known medical encyclopedia, thyme is introduced as a medical herb. Traditionally, it is used as an anti-convulsion, food digestion, anti-spasm, anti-cough and anti-cold medicine. Its therapeutic parts include its flowers [1]. Thyme medical ingredients are used to prepare syrups and tablets while its liquid essence; liquid – alcoholic essence and thyme glycol propylene are all used in making shampoos, creams and ointments. Its anti-fungus, anti-parasite and anti-bacterial effects are approved [2,9]. In Qom climate, thyme especially *kotschyanus*

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is seen in such regions as Gazaran, Salafchgan, Kahak, Ghahan, Ghanavat and Nayzar. Present research aims at investigating three characteristics including amount and percentage of essence and thymus extent in 12 *Thymus kotschyianusecotypes* of in Qom climate.

#### Methodology:

The experimental group consists of 12 thyme ecotypes in fully random blocks with three times of repetition in Qom Badii Research and Engineering Station. Experimental group of 12 mountain thyme ecotypes include Lorestan (Aligudarz), Lorestan (Khranabad), Isfahan (Faridan), Markazi (Shazand), Markazi (Arak), Markazi (Tafresh), Seman (Shahmirzad), Isfahan (Ferydun Shahr), Western Azerbaijan (Urumiye), Lorestan (Al-Ashtar), Kurdistan (Sanandaj) and Kurdistan (Divandareh).

Ecotypes were cultivated in lab in February 2010 and transferred to the main farm in April of the same year.

Studies properties include the extent and percentage of essence and thymol amount in essence for which five bushes were sampled and the heads of branches in the stage of 50% of flowering were cut in spring from 10cm height from land and dried in shadow and room temperature. Then they were kept in separated envelopes and transferred to Qom Agricultural and Natural Resource Center Medical Herb Lab to determine the percentage of essence oil. In each experimental unit, five bushes were samples in all of which, experimental group differed significantly. To do this and based on different reported methods, it was attempted to use a method with the highest outcome namely distillation by water to extract the essence (Rahimi Bigdeli and Sefidkon, 1999). Dried herb was diced by electrical mill. After weighting 100g of dried powder, its essence was extracted for four hours by water distillation in Clevenger Apparatus based on British Pharmacopoeia (British Pharmacopoeia, 1988). After four hours of essence extraction, the dried weight was computed and after gathering by special syringes, it was dewatered by waterless sodium sulfate. Data variance analysis was conducted by SAS software package.

#### Findings:

Concerning all properties, experimental group differed very significantly in 0.01 levels. The results from comparing 12 thyme ecotypes indicate that the amount and percentage of essence, ecotypes of Semnan (Shahmirzad) (19.29kg per hectare) and Western Azerbaijan (Urumiye) (3.33kg per hectare) had the highest and lowest rates respectively.

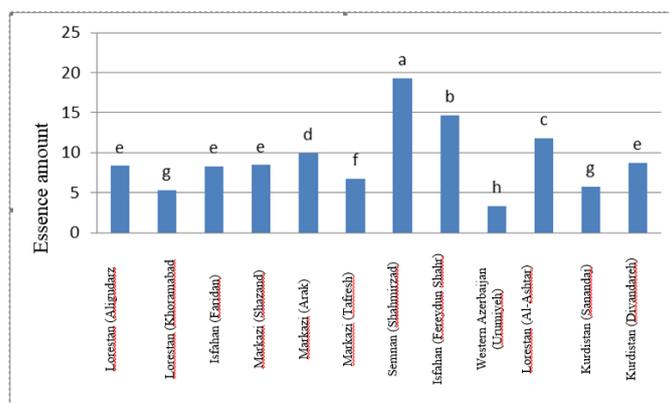


Fig. 1: Comparing the average of essence amount in 12 thyme ecotypes.

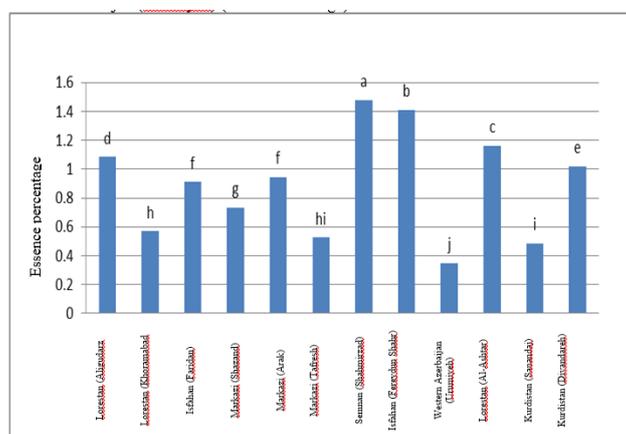
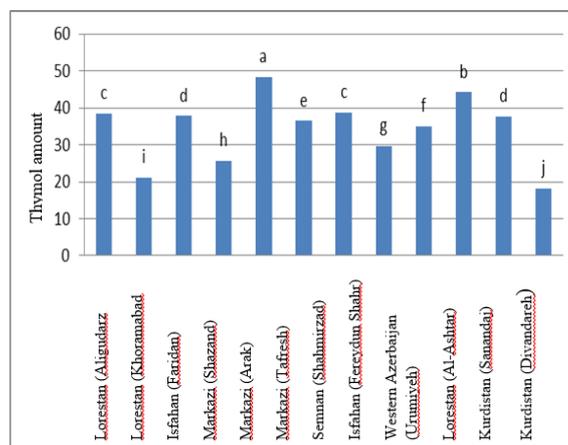


Fig. 2: Comparing the average of essence percentage in 12 thyme ecotypes.

Essence percentage was the highest in Semnan (Shahmirzad) (1.48% in average) and the lowest in Western Azerbaijan (Urumiyeh) (0.34% in average).

Thymol amount was the highest in Markazi (Arak) (48.28% in average) and the lowest in Kurdistan (Divnadareh) (18.06% in average).



**Fig. 3:** Comparing the average of thymol amount in 12 thyme ecotypes.

**Table 1:** Comparing the averages of morphological traits of 12 mountain thyme ecotypes

Thymol amount	Essence percentage	Essence amount	Ecotype	Ecotype number
d1.08	e8.35	c38.39	Lorestan (Aligudarz)	14
h0.56	g5.27	i21.16	Lorestan (Khoramabad)	15
f0.90	e8.30	d37.81	Isfahan (Faridan)	17
g0.73	e8.44	h25.66	Markazi (Shazand)	27
f0.94	d9.91	a48.28	Markazi (Arak)	29
hi0.52	f6.74	e36.44	Markazi (Tafresh)	30
a1.48	a19.29	c38.69	Semnan (Shahmirzad)	31
b1.40	b14.7	g29.73	Isfahan (Fereyduh Shahr)	35
j0.34	h3.33	f35.01	Western Azerbaijan (Urumiyeh)	37
c1.16	c11.84	b44.20	Lorestan (Al-Ashtar)	43
i.048	g5.72	d37.72	Kurdistan (Sanandaj)	51
e1.01	e8.7	j18.06	Kurdistan (Divandareh)	52

**Table 2:** Analyzing the variances of 12 mountain thyme ecotypes

Square averages			Df	Change sources
Thymol amount	Essence percentage	Essence amount		
0.06ns	0.01 <sup>ns</sup>	0.0006 <sup>ns</sup>	2	Repetition
57.24**	242.8**	0.4**	11	Experimental group
0.18	0.11	0.001	22	Experimental error
4.72	0.98	3.6	-	Change ratios

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