JAEFS

International Journal of Agriculture, Environment and Food Sciences

e-ISSN : 2618-5946 DOI: 10.31015/jaefs.18036 www.jaefs.com

Research Article

Int J Agric Environ Food Sci 2 (Special Issue 1):199-201 (2018)

The Fourth International Mediterranean Symposium on Medicinal and Aromatic Plants (MESMAP-4) 2018 Special Issue

A study on essential oil yield and components of dryed and fresh foliage of peppermint (*Mentha piperita* L.) cultivated in Turkey

İrem Ayran[1,*] **Sadiye Ayşe Çelik**[1] **Asuman Kan**[2] **Yüksel Kan**[1]

[1]Department of Medicinal Plants, Faculty of Agriculture, Selcuk University, Konya, Turkey,
[2]Department of Food Processing Vocational School of Technical Sciences, Selcuk University, Konya, Turkey

[*]Corresponding Author: irem.ayran@gmail.com

Abstract

In the study, essential oil yield and its components dryed and fresh foliage obtained from peppermint [*Mentha piperita* L. (Lamiaceae)] cultivated in Konya ecological conditions were investigated. The yield of essential oil from dryed and fresh peppermint foliage was determined to be 3.2 % and 2.9 %, respectively. The major essential oil components of dryed and fresh foliage peppermint oil were determined as mentone (50.80 %), mentol (34.55 %) and mentone (48.18 %), mentol (21.77), respectively. The aim of this research attempts to contribute to knowledge of differences between essential oil yield and components of the dryed and fresh foliage peppermint (*Mentha piperita* L.) cultivated Konya ecological conditions, Turkey.

Keywords: *Peppermint, Mentha piperita L.,* Essential oil, Component, Menthone, Menthol

Received: 23.05.2018 Accepted: 24.06.2018 Published: 15.10.2018

Introduction

The increase in the world population, the diversity of human needs and the increase in demand for natural products and the importance of medicinal and aromatic plants have also increased (Polatcı et al.,2009). Turkey is one of the rare countries with ecological conditions suitable for the agriculture of cultivated medical and aromatic plants. Medicinal and aromatic plants that are exported from our country or consumed in the inner market have been usually collected from flora of Turkey (Kan, 2005).

Mentha species are commercially cultivated in many countries because of the essential oil and herb. In Turkey, peppermint cultivated in the gardens, in front of the houses and on the fields since ancient times have been used for medicinal purposes such as antispasm, carminative, refreshing, stimulant and diuretic effects and ıt widely has been used as spices, culinary herb and herbal teas. Mint is the richest natural source of menthol, caffeic acids, flavonoids such as apigenin (Gruenwald, 2004) which has a wide application area in medicine, food and cosmetics industry (Baytop, 1984).

Pepermint (*Mentha piperita* L.) is a perennial, herbaceous that is belong to Lamiaceae (Labiatae) family. The origin of pepermint is the Mediterranean Region, especially Anatolia and Egypt (Esetlili et all., 2015) and widespread in cultivation throughtout all over the world(Rita and Animesh, 2011). Pepermint is a species that emerges as a result of hybridization of *Mentha aquatica* L. and *Mentha spicata* L. species (*Mentha piperita* L. *M. aquatica* x *M. spicata*) (Büyükbayraktar, 2009). In addition ıt is known as the British mint, this plant is also known as "nane" in Turkey (Baytop, 1994). This plant, has an important place in terms of essential oil and essential oil content and among to mint species is the most benefited from essential oil in the world. The essential oil of pepermint obtained from herb's leaves and widely uses in traditional medicine applications for the purpose of analgesic, anesthetic, antiseptic, astringent, carminative, decongestant, expectorant, nervine, stimulant, stomachic, inflammatory diseases, ulcer and stomach problems(Shrivastava, 2009).

The aim objective of the work presented was to determine the effects differences between essential oil yield and components of the dryed and fresh foliage peppermint (*Mentha piperita* L.) cultivated Konya ecological conditions in Turkey.

Materials and Methods

Plant material: The plant material used in the trial, is Pepermint (*Mentha piperita* L.). This study was carried out to essential oil yield and components of the dryed and fresh foliage peppermint cultivated, Selçuk University, Faculty of Agriculture, Medical Plants Research and Application Farm in Konya ecological conditions. The harvested leaves of this plant were dryed at the shade conditions.

Essential Oil Distillation and Analysis: The foliage of the plants were subjected to hydrodistillation for 3 h using Clevenger type apparatus to produce essential oil. Essential oil is calculated as volume (ml / 100 g) GC-MS instrument was used to determine the essential oil components. The essential oils were stored at -20^{0}C until analyzed. GC analysis was performed on a Agilent 6890N Network GC system combined with Agilent 5975C VL MSD Network Mass Selective Detector. The GC conditions were; column, DB Waxe tr; 60.0m x 0.25mm x 0.25µm; oven temperature programme: The column held initially at 60^{o}C for 10 min

Cite this article as : Ayran, I., Celik, S.A., Kan, A., Kan, Y. (2018). A study on essential oil yield and components of dryed and fresh foliage of peppermint (Mentha piperita L.) cultivated in Turkey. Int. J. Agric. Environ. Food Sci., 2 (Special Issue 1), 199-201. DOI: 10.31015/jaefs.18036

Available online at : www.jaefs.com - http://dergipark.gov.tr/jaefs

DOI: 10.31015/jaefs.18036

after injection, then increased to 220 °C with 4°C/min heating ramp for 10 min and increased to 240°C with 10°C/min heating ramp without hold; inject or temperature 250°C; carrier gas; He; in let pressure, 9.60psi; linear gasvelocity, 7 cm/sec; initial flow 0.3 ml/min ;split ratio,65.0:1; injected volume 1.0µl (EP6).

Results and Discussion

Essential oil yield (%): In the study, the yield of essential oil from dryed and fresh peppermint follage was determined to be 3.2 % and 2.9 %, respectively. It can be said that dryed pepermint on essential oil yield is effective in this study. At the same time, it is known that effect of plant genetic structure, ecological and cultivated conditions are important in the yield of essential oil. In the other researchs, The oil yield of pepermint obtained the fresh or partly dryed plant, varied from 0.1 -3.75 % (Aflatuni, 2005). The differences between the study in Konya ecological conditions and the results obtained from other works, it could be said that from research conditions.

Essential oil components (%): It was identified commonly total 23 chemical components of essential oils from dryed and fresh pepermint that cultivated in Konya ecological conditions. A total of 23, accounting for 89.88 and 83.39 % of the total oil, were identified in the *M. piperita* L. essential oils.

In this study, ıt was determined which menthol and menthone as major components of peppermint volatile oil. The major essential oil components of dryed and fresh foliage peppermint oil were determined as mentone (50.80 %), menthol (34.55 %) and mentone (48.18 %), menthol (21.77), respectively. the amount of 1.8 cineole in the pepermint essential oil components varied from 3.21 to 3.83 % (Table 1). It has been determined that the effect of dryed on the volatile oil components of the peppermint obtained from this work is important.

Table 1. Essential oil composition of dryed and fresh foliage peppermint (%)

RT*	Compounds	Percentage	
		Dryed peppermint	Fresh peppermint
1022	α-Pinene	0.24	0.54
1150	Camphene	0.05	0.02
1197	β-Pinene	0.46	0.83
1203	Sabinene	0.26	0.42
1218	Myrcene	0.18	0.27
1234	Menthol	34.55	21.77
1237	(Z)-β-Ocimene	0.23	0.24
1243	γ-Terpinolene	0.36	0.26
1577	L-Menthone	49.18	50.09
1584	Cis-3-Hexenyl Isovalerate	0.31	0.05
1687	Linalool	0.34	0.19
1695	Trans-SabineneHydrate	0.12	0.1
1724	Isopulegone	0.16	0.25
1751	Cis-Isopulegone	0.16	0.07
1760	Trans-Caryophyllene	1.11	1.81
1768	IsoMenthol	0.15	0.11
1828	1.8-Cineole	3.22	3.83
1943	Germacrene D	1.82	1.4
2007	Piperitone	0.75	0.99
2014	Delta Cadiene	0.03	0.03
2193	Limonen-10-yl Acetate	0.04	0.05
2236	Cis-Jasmone	0.05	0.06
2185	(E)-IsoEugenol	0.02	0.03
	Total	**89.88**	**83.39**

The chemical composition of *M. piperita* is characterized by the presence of oxygenated monoterpenes such as menthol, menthone, menthyl acetate, sabinene hydrate menthofurone and 1,8 cineole.

Kızıl et al. (2010) reported that menthol content 35.64 %, menthone content 38.06 % and cineole content 3.62% obtained from *M. piperita* essential oil. Moreover, menthol content of different peppermint origin varied from 10 to 63% and menthone content from 12 to 76%.

The other studies were determined main component as menthol (% 26-30), menthone (% 14-21) (Zheljazkov ve ark.2009). According to monographs of European Pharmacopoeia are cineole (3.5-14.0%), menthone (14.0-32.0%) and menthol (30.0-55.0%) (Shrivastava, 2009). The results obtained from this study were found to be appropriate when compared to the pharmacopoeia of Europe.

Conclusion

According to the results of our study, it was reported that differences between essential oil yield and components of the dryed and fresh foliage peppermint (*Mentha piperita* L.) cultivated in Konya ecological conditions, Turkey. Compared with these results, it was determined that dryed foliage had better yields of essential oil yield and essential oil contents than fresh foliage.

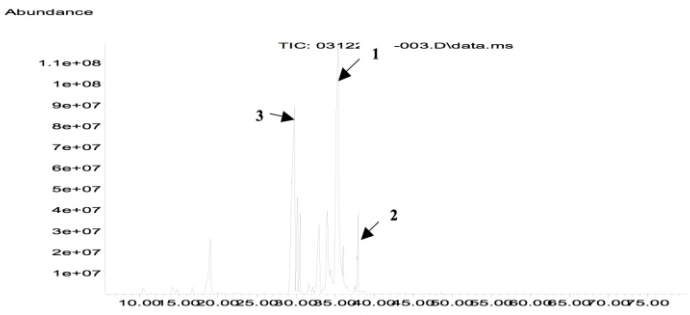

Figure 1. Essential oil composition of dryed foliage peppermint choromatogram 1. L-Menthone, 2. 1.8-cineole, 3. Menthole

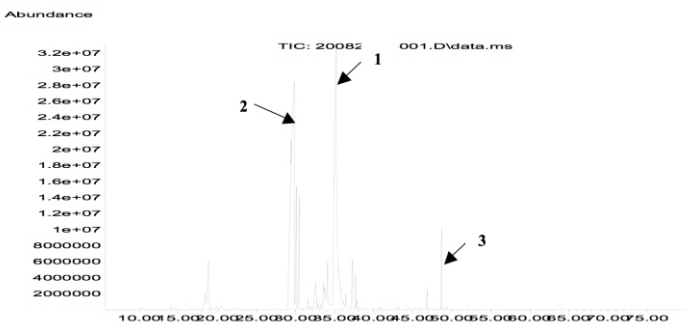

Figure 2. Essential oil composition of fresh foliage peppermint choromatogram. 1. L-Menthone, 2. Menthole, 3. 1.8-cineole

References

Aflatuni, A. (2005). The yield and essential oil content of mint (*Mentha* ssp.) in Northern Ostrobothnia. Faculty of Science, Department of Biology, University of Oulu. p:12-50.

Baytop, T. (1984). Therapy with medicinal plants in Turkey (Past and Present). Istanbul University, 520 p.

Buyukbayraktar, A. (2009). Investigation of drug utilization and some quality characteristics of species (Mentha piperita L. and Mentha spicata L.) cultivated in different nitrogen doses in Konya ecological conditions according to drying methods. S.U. faculty of Agriculture, Institute of Science and Technology (Master Thesis).

Esetlili, B.C., Cobanoglu, O., Tepecik, M., Ozturk, B. Anac, D. (2015). Yield, essential nutrients and essential oils of peppermint (Mentha x piperita L.) grown under organic farming conditions. U.U. Journal of Agricultural Faculty, 29 (1), 29-36.

Gruenwald, J., Brendler, T., Jaenicke, C. (2004). PDR for herbal medicines Londra, Thomson Healthcare, 546-548.

EP6, (2007). European Pharmacopoeia Sixth Edition, Council of Europe, Strasbourg: France.

Kan, Y. (2005). Production and consumption potential of medicinal and aromatic plants in Turkey. Pharmacognosy and Phytotherapy Symposium (27-28 May 2005, İstanbul) Proceedings Book, 56-61.

Kizil, S., Haşimi, N., Tolan. V. Kılınc, E. (2010). Mineral content, essentıal oil components and biological activity of two mentha species (M. piperita L., M. spicata L.). Turkish Journal of Field Crops, 15 (2), 148-153.

Polatci, H., Tarhan, S. (2009). Different drying methods effect on the quality and duration of plant drying of basil (*Ocimum Basilicum*). Gaziosmanpasa University Journal of Agricultural Faculty, 26 (1), 61-70.

Rita, P., Animesh, D.K. (2011). An update overview on peppermint (*Mentha piperita* L.). International Reserch Journal of Pharmacy, 2 (8), 1-10.

Shrivastava, A. (2009). A Review on peppermint oil. Asian Journal of Pharmaceutical and Clinical Research, 2 (2), 27-33.

Zheljazkov, V.D., Valtcho, D., Cerven, V., Cantrell, C.L., Ebelhar, W.M., Horgan, T. (2009). Effect of nitrogen, location and harvesting stage on peppermint productivity, oil content and oil composition. Hortscience. 44 (5), 1267-1270.