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Volatile Oil Composition of Some Commercial Medicinal Plants Sold in Konya, Turkey

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

This study was conducted to determine the essential oil composition of some medicinal plants from herbalists that local community have interest in; The research was carried out in the Medicinal Plants Laboratory of Konya, in 2014 – 2015. The medicinal plants used in the research were supplied by herbalists and wholesalers who supply medicinal plants in Konya. At the end of this study, essential oil composition of medicinal plants ranged from 0.71 % (Daphne) to 5% (Thyme). The lavender essential oil composition ranged between 2% and 5%, while the composition of thyme essential oil ranged between 1% and 5%. There are several reasons for the change observed in the essential oil content of medicinal plants. In general, the effect of difference in the proportion of essential oils of the medicinal plants used in the study was as a result of the difference in regions, domestically and abroad where these plants were collected.

Keywords: Volatile oils; herbalists; Turkey.

1. INTRODUCTION

Historical use of plants for medicinal purposes has shown variability over time. Plant-derived drugs continued to be the largest fraction of pharmacological treatment agents, although they lost their former value through the arrival and progression of the chemical period. In recent

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years, the increase in secondary effects of synthetic medicines has led to people to reuse plants grown in natural and cultural surroundings for treatments [1,2]. The investigation of the plants used as local medicine and further researches on them may be important in the treatment. For this reason, many plants are being evaluated as local medicine in different regions. ethnopharmacognosy, ethnobotany, ethnopharmacology, etc. which examines them have been established, developed and become popular science branches today [3].

When we look at the distribution of plant diversity in the world, it decreases from the tropical regions towards the poles but does not decrease the amount of the fertilizer [4]. As it is known today, there are about 1,000,000 plant species in the world. Nearly half of them are identified and named [5]. It is estimated that the number of high plants on the earth is around 270,000 [4]. It is stated that about 13% of plants in the world are endangered, and most of them are formed by endemic plants and this rate likely to be increased based researches that are yet to be conducted. It is stated that the number of cultivated species is around 7000, only 0.26% of the total plant species are cultured, only 10% of the utilized plants are cultivated [4].

Turkish people are closely related to medicinal plants. It uses these plants for various purposes such as food, spices, stains, fragrance and medicine [6,7]. At the same time Turkey is the genetic resources of many culture plant. However, careful planting of medicinal plants has not been given good attention as it supposed to be in an advanced agricultural country. Apart from some important plants (anise, tuber, tea, rose, poppy, hops, tobacco etc.) there is no planting of medicinal plants. Vegetable drug exporters use natural plants for this business, instead of selling plants and growing them. This is because, it is much easier and less costly. However, the unplanned irregular collection of naturally grown medicinal plants destroying and causing destruction to nature as plants disappear [5,8,9].

Biologically active substances of plants accumulate in different parts of the plants and only at a certain stage of their development. In some plants, active materials, buds, leaves and trunk are deposited in some flowers and berry, others in root and underground parts. Biologically active substances vary in amount at different stages of plant development, sometimes even during the day. For this reason, the time must be well determined in order to collect the plants.

Essential oils are complex mixtures obtained from plant leaves, fruits, shells and root parts of plants by distillation or pressing [10,5]. Essential oils are also known as volatile oils, liquid at room temperature, easily crystallizable, usually colorless or pale yellow, volatile, strongly aromatic, natural. Because they do not mix with water they look like oil but they are not [10,11,12, 13,14,15]. Essential oils can be dragged with water. They do not leave stains on the filter paper [10,16,17]. The terpenoids (isoprenoids) found in the constructions are mostly monoterpenes and sesquiterpenes. In addition, diterpenes include homologs of low molecular weight aliphatic hydrocarbons, acids, alcohols, aldehydes, acyclic esters or lactones, except for compounds containing nitrogen and sulphur, coumarins and phenylpropanoids [10,4,18]. Composition and quantities of essential oils; depending on the type of plant, from which part of the plant is obtained, the shape of the plant, the climatic conditions and the geographical structure of the region where it is cultivated [18,19]. The plant families that contain essential oils are: *Apiaceae, Asteraceae, Brassicaeae, Chenopodiaceae, Compositaceae, Cupressaceae, Iridaceae, Lamiaceae, Lauraceae Myrtaceae, Pineaceae, Poaceae, Rosaceae, Rutaceae*, and *Zingiberaceae* [10,17,20].

2. MATERIALS AND METHODS

The study was carried out in Çumra Vocational School's Medicinal Plants Laboratory in 2014-2015. Plants used in the research were obtained from herbalists, wholesalers who supply them medicinal plants and some medicinal plants derived from experimental parcels in Konya.

Lavender, Thyme (*Origanum onites* L.), Sage, Balm, Rosemary, Daphne and Mint were used in the study. Since these supplied plants have been processed, species identification has not been made [13,14,15] Essential oil extraction process Volatile oils were obtained in laboratory environment of Selcuk University Cumra Vocational School. Clevenger device was used by water distillation method to obtain essential oil. The volatile oil ratios of the plants and the different parts used in this study are given in Table 1 for the places indicated where they are procured and for the year of procurement.

Table 1. Volatile oil composition of commercial medicinal plants (Turkey/Konya 2015)

Plant name	Part of plant	Origen	Volatile oil composition (%)
Salvia spp.	Leaf	Cengelkoy	2
Salvia sp.p	Leaf	Denizli/Pamukkale	2
Salvia spp.	Leaf	Izmir	2
Salvia spp.	Leaf	Cumra	2
Rosmarinus spp.	Leaf	Cengelkoy	1
Rosmarinus spp.	Leaf	Akdeniz	1
Rosmarinus spp.	Leaf	Konya/Hatunsaray	2
Rosmarinus spp.	Leaf	Denizli/Tavas	1
Rosmarinus spp.	Leaf	Mersin	2
Rosmarinus spp.	Leaf	Mersin	1
Daphne spp.	Leaf	Izmir	2
Daphne spp.	Leaf	Denizli	2
Daphne spp.	Leaf	Cengelkoy	3
Daphne spp.	Leaf	Denizli/Babadag	3
Daphne spp.	Leaf	Antakya	0,7
Thymus spp.	Leaf	Denizli	2
Thymus spp.	Leaf	Canakkale	1
Thymus spp.	Leaf	Konya/Hadim	3
Thymus spp.	Leaf	Denizli/Gozler	4,4
Thymus spp.	Leaf	Cumra	5
Lavandula spp.	Leaf	Isparta	5
Lavandula spp.	Leaf	Isparta	5
Lavandula spp.	Leaf	Cengelkoy	4
Lavandula spp.	Leaf	Ermenek	3
Lavandula spp.	Leaf	Denizli/Gozler	2
Lavandula spp.	Leaf	Cumra	4
Melissa spp.	Leaf	Izmir	1
Melissa spp.	Leaf	?	1
Melissa spp.	Leaf	Konya/Hadim	1
Melissa spp.	Leaf	Denizli/Akkoy	2,4
Melissa spp.	Leaf	Import	1,4
Melissa spp.	Leaf	Cumra	1
Mentha spp.	Leaf	Gaziantep	2
Mentha spp.	Leaf	Cengelkoy	2
Mentha spp.	Leaf	Konya	2
Mentha spp.	Leaf	Gaziantep	1
Mentha spp.	Leaf	Cumra	3

3. RESULTS AND DISCUSSION

Today, in many developed countries, including western countries, people spend millions of dollars each year on natural products such as medicinal and spice plants. People use these plants not to treat their illness, but to stay away from the disease in a natural and safe way, or to accelerate the healing process [21]. In our country, the situation is different and people are able to use these plants as a therapeutic against diseases mostly according to their educational status [22]. It should be noted here that medicinal plants are not medicines.

There was no difference in the ratio of essential oils of sage to medicinal plants used in our research. Essential oil composition are between 1% and 2% in Rosemary, between 0,71% and 3% in Laurel, between 1% and 5% in Thyme, between 2% and 5% in Lavender, between 1% and 2.44% in Balmand in Mint varied between 1% and 2%. Essential oil composition in medicinal plants vary by region [15]. The volatile oil content of medicinal plants used in the research is 2 to 5 times, except for sage.The most difference is Thyme with 5 times more than and the least difference level is 2 with rosemary and mint.

The types of medicinal plants used in the research are not known except the plants coming from Cumra. So it is not exactly known whether the difference in essential oil ratios is due to the ecological environment in which the medicinal plants were obtained or the differences between the species.

It is unclear when some of the medicinal plants used in the research are procured. This may be due to the locations where the herbalists got the medicinal plants. Production or collection time on indicated on the packages. Therefore, it is not known whether there is any difference between the volatile oil ratios by years. Medicinal plants in Turkey are for different purposes in each region and are consumed by passing through many different processes.

For therapeutic purposes, plant parts such as leaves, hulls, roots, flowers, seeds and sprouts are either boiled with water or by adding boiled water, placed in oil, are used as blends prepared in the form of mashes or honey [23].

4. CONCLUSION

It is necessary for users to pay attention to the production or collection year and area in which they receive their product. More in information about the origin of the products sold at the herbalists centres are needed.

Essential oil components are also as important as the volatile oil composition in medicinal aromatic plants. It should be determined in which parts of the plants where the essential oil is obtained that the fragrance is high in quality, and these parts should be given more importance in the harvesting and drying processes [24]. Abolishing such problems depends on adding medicinal plants into culture and increasing the production amounts by cultivation. The increase in the cultivation of medicinal plants will bring along some standardization. This situation will automatically help to wash away many problems.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Aumeeruddy-Elalfi Z, Ismaël IS, Hosenally M, Zengin G, Mahomoodally MF. Essential oils from tropical medicinal herbs and food plants inhibit biofilm formation in vitro and are non-cytotoxic to human cells. 3 Biotech. 2018;8(9):395.
DOİ: 10.1007/s13205-018-1413-x
Epub 2018 Sep 1.
2. Rengasamy KRR, Khan H, Gowrishankar S, Lagoa RJL, Mahomoodally FM, Khan Z, Suroowan S, Tewari D, Zengin G, Hassan STS, Pandian SK. The role of flavonoids in autoimmune diseases: Therapeutic updates. Pharmacology Therapeutics; Sep 28, 2018.
pii: S0163-7258(18)30174-8.
DOI: 10.1016/j.pharmthera
3. Yucel E. Tulukoglu A. Plants used as folk drugs in and around Gediz (Kutahya). Protect of Environment. 2000;9:12-14.
4. Arslan N. Cultivation of natural plants. Turk Agriculture. Ministry of Agriculture and Forestry. Ankara; 2004.
5. Erdemir AD. Horse chestnut (and propegel) Great Drug of Nature. Nobel Medical Bookstore. İstanbul; 1998.
6. Ceylan A. Medicinal Plants I. Department of field crops. Ege U. Faculty of Agriculture No: 312 İzmir; 1995.
7. Uysal A, Ozer OY, Zengin G, Stefanucci A, Mollica A, Picot-Allain CMN, Mahomoodally MF. Multifunctional approaches to provide potential pharmacophores for the pharmacy shelf. Computational Biology and Chemistry 2018;20(78):64-73.
DOI: 10.1016/j.compbiolchem
8. Sut S, Zengin G, Dall'Acqua S, Gazdová M, Šmejkal K, Bulut G, Dogan A, Haznedaroglu MZ, Aumeeruddy MZ, Maggi F, Mahomoodally MF. 2018. *Paeonia arietina* and *Paeonia kesrounansis* bioactive constituents: NMR, LC-DAD-MS fingerprinting and *in vitro* assays. J Pharm Biomed Anal. 2018;165: 1-11.
DOI: 10.1016/j.jpba
9. Zengin G, Llorent-Martínez EJ, Molina-García L, Fernández-de Córdova ML, Aktumsek A, Uysal S, Rengasamy KRR, Aumeeruddy MZ, Bahadori MB, Mahomoodally MF. Chemical profile, antioxidant, and enzyme inhibitory properties of two Scutellaria species: *S. orientalis* L. and *S. salviifolia* Benth. J Pharm Pharmacol; Oct 10, 2018.
DOI: 10.1111/jphp.13030
10. Dogan M. Plant Biological Diversity in the European Union harmonization process of the attachment of Conservation Efforts in

Turkey. Environment and Human. Ministry of Forestry. Ankara. 2003;57.
11. Erdemir DA. Colchicum and (*Colchicum dispert*) nature's grievous drug. Nobel Medical Bookstore. İstanbul; 1999.
12. Dogan M. The Role of Flora Studies in Conservation of Biodiversity in Plants and Flora of Turkey. Environment and Human. Ministry of Forestry. Ankara. 1998;41.
13. Mahomoodally MF, Mollica A, Stefanucci A, Aumeeruddy MZ, Stefanucci A, Zengin G. Volatile components, pharmacological profile, and computational studies of essential oil from *Aegle marmelos* (Bael) leaves: A functional approach. Industrial Crops and Products. 2018a;126:13-21.
14. Mahomoodally MF, Zengin G, Aladag MO, Ozparlak H, Diuzheva A, Jeko J, Cziaky Z, Aumeeruddy MZ. HPLC-MS/MS chemical characterization and biological properties of Origanum onites extracts: A recent insight. International Journal of Environmental Health Research; 2018b. Available:https://doi.org/10.1080/09603123.2018.1558184
15. Mahomoodally F, Aumeeruddy-Elalfi Z, Katharigatta NV, Hosenally M. Antiglycation, comparative antioxidant potential, phenolic content and yield variation of essential oils from 19 exotic and endemic medicinal plants. Saudi Journal of Biological Sciences; 2018c. Available:https://doi.org/10.1016/j.sjbs.2018.05.002
16. Ekiz H. The Importance of genetic tesources and genetic erosion in terms of ecological agriculture. Turkey 2. Symposium on Ecological Agriculture. Antalya; 2001.
17. Anonymous. Eighth 5-Year development plan. State Planning Organization. SPO: 2648-OIK:656. SPO. Ankara; 2001.
18. Kaya Z, Kun E, Guner A. National plan or *in-situ* conservation of plant genetic diversity in Turkey. Ministry of Environment. Ankara; 1998.
19. Baytop T. Treatment plants with Turkey past and present. Nobel Books Home. İstanbul; 1999.
20. Ilisulu K. Substances Involved by Some Drug Plants and Production Problems. IV Herbal Pharmaceutical Raw Materials Meeting. Presentation 71. Eskisehir; 1983.
21. Nicholson T. Complementary and alternative medicines (Including Traditional Māori Treatments) used by presenters to an emergency department in New Zealand: A survey of prevalence and toxicity. Journal of the New Zealand Medicinal Association. 2006;119: 1233.
22. Ersin F, Aksoy S. A pediatrician in sanliurfa “Herbalist Isa”. T-Klin Medical-Law-History. 2004;12:87–91.
23. Shimsek I, Aytekin F, Yesilada E, Yıldırımlı S. The purpose of using plants in anatolian peoples an ethnobotanical study. 14. Herbal Pharmaceutical Raw Materials Meeting. Presentation. Eskisehir; 2002.
24. Rangasamy O, Mahomoodally MF, Subratty AH, Fakim AG. Essential oil composition, antimicrobial potential, phytochemical profile and toxicity of essential oils and crude extracts of sweet basil prior and after flowering. International Journal of Biotechnology for Wellness Industries; 2012.

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