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A comparison study between morphological, anatomical and some elements in *Mentha piperita* and *Ocimum basilicum*

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Abstract

In this study, morphological and anatomical findings were studied. The two species showed great variation in phenotypic traits such as habit; *Mentha piperita* L is herbaceous, while *Ocimum basilicum* L is a shrubby plant. Blade length was 3.18 cm and 6.4 cm in *M. piperita* L and *O. basilicum* L. respectivly. The leaves are simple in shape, oval in *O. basilicum* L and the blade with a serrated edge is whole and compound in *M. piperita* L . The color of the leaves was dark green in *M. piperita* L while in *O. basilicum* L it was light green. The length of the roots of *M. piperita* L (21.6 cm), *O. basilicum* L (8.76 cm). The color of the flower is white in *O. basilicum* L and white to purplish in *M. piperita* L. On the fresh stems and roots of both species, they show their similarities and differences. Both species have square stems, and a cortex, epidermis, xylem, phloem, and phloem are found in the stem, as well as angular tissue cells in the cortex. However, Collenchyma tissues are spread more or less uniformly at the four corners of the stem in *M. piperita* L, in contrast to *O. basilicum* L which is spread all over the stem. The cortex in the femoral *M. piperita* is wide, and this is due to the presence of vacuole parenchyma tissue. The presence of stomata tissues in mint is due to the fact that the plants originate from soils that are waterlogged or partially submerged in water. The amounts of potassium in *O. basilicum* L and *M. piperita* L were variable, respectively (4.46) (4.01). Sodium, calcium, and phosphorous were found in *M. piperita* L (0.03, 1.53 and 0.59), and in *O. basilicum* L (0.56, 2.67 and 0.46) respectively. For phytochemicals, *M. piperita* L and *O. basilicum* L were similar in the presence or absence of secondary metabolites, except tannin is present in *M. piperita* L.

Key words: Lamiaceae, *M. piperita*, *O. basilicum* Morphological, Anatomical.

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Introduction

Lamiaceae (Labiatae) is an important plant family, that consists of 250 genera and more than 7000 species. The largest that belong to this family are *Salvia, Scutellaria, Stachys, Plectranthus, Hyptis, Teucrium, Thymus, Vitex, Nepeta* ,etc. A large number of Lamiaceae species inhabit different ecosystem and have a great diversity with a cosmopolitan distribution. Most of the species are aromatic and possess a complex mixture of bioactive compounds that contribute to overall biological activity in vitro and in vivo conditions. It is an important medicinal plant family .The species of this family are cosmopolitans showing worldwide distribution. They distributed throughout the world in both temperate and tropical regions; its main distribution is in the Mediterranean (*1, 2*).Most of species belongs to this family are shrubby and herbaceous, trees extremely rare. This family has great importance due to its economic value (3) The genus *Ocimum* Linn. belongs to the tribe *Ocimeae*, subfamily Nepetoideae, family Lamiaceae and the order Lamiales. It is one of the economically important groups of aromatic herbaceous plants extensively used in perfumery, flavouring and pharmaceutical products (*4*). There are about 150 species in this genus broadly dispersed over the warm regions of the globe (*5, 6*).

Ocimum species differ in growth habit; physiological appearance and chemical and aromatic composition .They grow in wide variety of soil and climatic conditions. All *Ocimum* species yield essential oils which are responsible for the medicinal uses including antimicrobial, antioxidant,antifungal and anti-inflammatory activities; yet their taxonomy and nomenclature are in a bit of muddle (*7*). In Libya there is only one species of this genus known as *O. basilicum* L (*8*). Basils (*O. basilicum*) is a frost sensitive low-growing herb which belonges to the family Lamiaceae (mint family). Basilis is native to southern Asia. It has ovate pointed leaves that are simple with pinnate venation 20-60cm length and white-purple flowers that are normally self-pollinated .There are more than 60 cultivars of basil which differ in appearance and taste. Scientific studies *in vitro* have established that compounds in basil oil have potent antioxidant, anticancer, antiviral and antimicrobial properties. *Mentha* are herbaceous, perennial, rarely annual, aromatic plants which belong to more than 18 species and 11 hybrids in the genus *Mentha* that is distributed across Africa, Asia, and North America. The genus *Mentha* is a member of family Lamiaceae, order Lamiales (*9*).

Mentha are cultivated for their essential oils used both for medicinal and aromatic purposes. It was noted that *Mentha* are mainly used to cure gastrointestinal disorders, but the spectrum of medical activities is broader (*10*). In Libya, this genus includes five species, and they are: *M. pulegium* L,*M. spicata* L, *M. longifolia* L, *M. aquatic* L, *M. piperita* L (*8*). Traditionally, plant taxonomy has depended mainly upon comparative morphological features because the help in taxa delimitation and identification (*11*). Many publications pointed out on the importance of morphological characters in delimitation and identification in some Lamiaceae species (*12-16*). The anatomical characters of vegetative organs are important for characterization of Lamiaceae taxa (*14, 17*).

The morphological and anatomical account of a medicinal plant is the first step towards establishing the correct identity and the degree of purity of such materials (*18*). The morpho-anatomical structure may be directly affected by variations in the environmental conditions to which plants are exposed during development. The morphological variations help in understanding the genotypic difference in the species and population studied (*19*). This study aimed to compare between two different genus of the oral family. This comparison is in terms of morphology, anatomical, some minerals and phytochemicals.

Materials and Methods

Collection of Samples

The healthy and fresh plants which were located in the Al-Arbaeen area east of Sirte City, and were collected in the flowering condition in June and July 2021. These plant species were identified, described and the classification as (*M. piperita* L. and basial *O. basilicum* L inn) with the literature data available in the represented in: (Flora of Libya), (*8*). In the present study two species namely mint (*M. piperita* L. and basil *O.basilicum* L.) Were stem and root were collected from the parent plants for morphological and anatomical study respectively.

Anatomical Study

The experiment was conducted in the laboratory of Botany Department of the Faculty of Science, Sirte University. Stems and Root of these species were washed thoroughly with tap water. Uniformly dissected fine, thin

transverse hand sections were selected for each species separately, observed under compound microscope.

Estimation of minerals

The plants were carefully and thoroughly cleaned, blotted dry between absorbing paper and their dry weights were measured after oven drying at 70°C for 72h.Oven dry samples of plants were finely ground and assayed for mineral ion content by the wet digestion method (*20*). Minerals (K, Ca, Na, and p) were determined using an atomic absorption spectrophotometer (Perkin-Elmer, 2380) and expressed on the basis of dry weight. The extract obtained was subjected for assaying K and Ca concentrations using flame photometer (CORNNG 400).Total phosphor was determined Spectrophoto-metrically using the procedure of Watanabe and Olsen (*21*). After digestion with H SO and 2 4 HClO4 acid then determined using Spectrophotometer according to the method described by (*21, 22*).

Phytochemical Analysis of the Plants

The extracts were subjected to phytochemical tests for plant secondary metabolites, tannins, saponins, phenolics, and alkaloids in order to know the nature of phyto-constituents present in them according to the methods of (*23*).

Results and discussion

Morphological comparisons between two genera were illustrated in Table 1 and Figures 1-6. *M. piperita* L: A perennial aromatic herb plant growing 25–75 cm tall with square stems that are brownish-purple. The leaves are [2.6–4.5] cm long, simple, dark green in color, an acute apex and coarsely toothed margins, ovate. The leaves and stems are slightly hairy, the primary root is [21-22] cm long, root hairs is [1.5- 17.5] cm long. The flowers are white to purple. Flowering occurs generally from mid to late summer morphological characters of studied species were summarized in (Table 1). The two species were shown a great variation of phenotypic characters like the habit; herb in *M. piperita*, shrub in *O. basilicum*. This result agreed with that of (*2, 24, 25*). *M. piperita* is procumbent, *O. basilicum*is erect. Stem length of *M. piperita* [47 cm], *O. basilicum* [41.4cm]. Stem color is brownish purple in *M. piperita*, light green in *O. basilicum*.Shape of stem is square in *M. piperita*, quadrangular in *O. basilicum*.Lamina length of *M. piperita* [3.18cm], *O. basilicum* [6.4cm]. The leaves are simple in *M. piperita,*

compound in *O. basilicum.* Lamina shape is ovate in *M. piperita*, lanceolate in *O. basilicum*,

Lamina margin is dentate in *M. piperita,* entire in *O. basilicum*. Lamina color is dark green in *M. piperita*, light green in *O. basilicum*. Lamina apex is a cute in *M. piperita* and *O. basilicum.* Flower color is white to purple in *M. piperita,* white in *O. basilicum*, inflorescence type is compound raceme in *M. piperita,* simple raceme in *O. basilicum.* Calyx in *M. piperita* tubular or campanulate, 10-13- veined . Bracteoles small or 0 , in *O. basilicum* calyx persistent ,c 5-6mm long,7mm broad accrescent in fruit. 5 toothed inflated – campanulate, the upper tooth flat rounded and larger than the other membranous, pubescent. The calyx differs in the two genus, so we use it in comparison between them, as it is distinguished in shape in the *O. basilicum* from the *M. piperita* ,flower color is taxonomically significant for Lamiaceae taxa identification and delimitation. This result is in accordance with that of (*14, 24, 25*). (Table 1).Earlier studies confirmed great morphological variability available in *O. basilicum (18, 26, 27)*. Morphological variability in holy basil was earlier reported by (*28*).

Figure (1) Shows the general shape of the *M. piperita*

Figure 2: Shows the general shape of *O.basilicum*

Figure 3: The inflorescence of the *M. piperita*

Figure 4: The inflorescence of the *O.basilicum*

Figure 5: Shape of the leaf for *M. piperita*

Figure 6: Shape of the leaf for *O. basilicum*

Table 1: Morphological characters of the two species of Lamiaceae

	Species	
Parameters	*M. Piperita*	*O. Basilicum*
Stem length (cm)	47	41.4
Stem color	Brownish purple	Light green
Shape of stem	Square	Quadrangular
Lamina length (cm)	**3.18**	**6.4**

Lamina color	Dark green	Light green
Lamina shape	Ovate	Lanceolate
Lamina margin	Dentate	Entire
Shape of calyx	Tubular or campanulate	5 toothed inflated – campanulate

Anatomical study

The anatomical studies that are carried out on young fresh stems and roots of both species show similarities and differences between them. Both species have square stems, cortex, epidermis, xylem, phloem and pith are found in stem, in addition to angular collenchyma tissue in cortex cells. However, collenchyma tissue is more or less uniformly spread out in four corners of the stem in *M. piperita*, unlike in *O. basilicum* where it is spread out all over the stem. Cortex in *M. piperita*is wide and this is due to lacunous parenchyma tissue being present .The presence of lacuna tissues in *M. piperita* is due to the fact that plants stem in waterlogged soil or partly submerged in water .This is supported by (*29*) who mentioned that aquatic (hydrophyte) plants have this characteristic feature.External secretory structures such as glandular hairs are found in *O. basilicum.* Previous study mentioned the presence of external secretory structures such as glandular hairs 8.76mainly in labiatae family to which *mentha* belongs (*30*). In another study found on *M. citrata* found that these plants contain glandular trichomes which have short stalks and unicellular globule heads (*31*). Previous finding emphasized that species of labiatae family like *Basilic, Rosmarin, Origan, Lavende* have on the surface of their leaves two types of glandular hairs.scleranchyma tissue that surrounds the phloem groups of vascular bundlesin *O. basilicum* thicker than *M. piperita (32)* . This is supported by (*17*) who determined some scleranchy matous tissue surrounds the phloem groups of vascular bundles, as can be seen the same in the two species of basil (*O. basilicum* var. thyrsiflora and *O. gratissimum*). The sclerenchyma is the predominant support tissue for species that grown in dry environments.

Cross sections of roots in the two species are similar in terms of number of tissue zones (epidermis, cortex, vascular tissues and pith), number of vascular tissues as shown in Figures 7-10. But general form of Cross-sectional

of *M. piperita* L. rootis almost square in shape with flexures, while the cross-section of root *O. basilicum* L. root is irregular and serrated. This result agreed with that of (*33*) on *O. basilicum* L. (*34*).

The amount of sodium in *Mentha* was very low compared to *Ocimum*, while K was higher in *O. basilicum* than *M. piperita* (Table 2). Usually the absorption of K depends on the soil type. It seems that foliage from shrubs that grow in semiarid regions contains K as lower levels from costal and this not accordance with (*35*)**.** In this study the contents of Na are lower than those reported before (*36*) , which it was (0.48 ppm) but they are lower than result found in (*37*). P can be low in *O. basilicum* (0.46) compared to *M. piperita* (0.59) and Ca low in *M. piperita* (1.53), and high in *O. basilicum* (2.67). Calcium is one of the most important macro elements in plants and humans need it in building and developing bones, and it is an essential element in the safety of nerves and muscle tissue (*38*). Table 3 illustrated phytochemical screening flavonoids, steroide and saponins present in *M. piperita* and *O. basilicum*. Phlobatannins was absent in *M. piperita* and *O. basilicum*. tannins present in *M. piperita* , but absent in *O. basilicum*. Terpenoids were absent in *M. piperita* but present in *O. basilicum*, which were supported by previously recorded data (*39-41*).

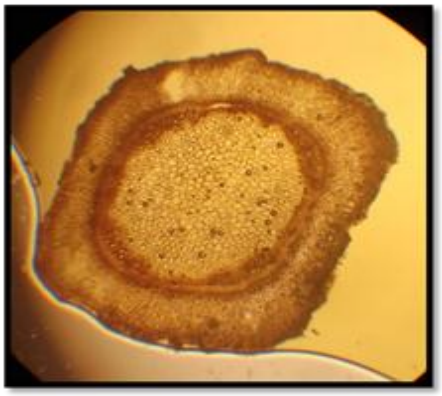

Figure 7: Sector showing the cross-sectional structure of the root of *M. piperita* L

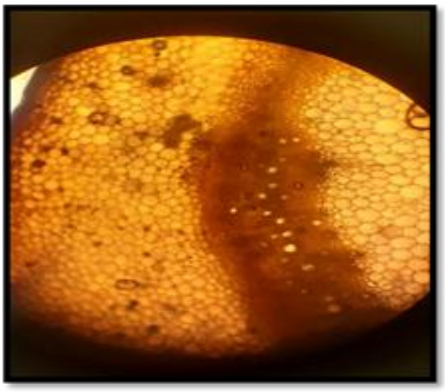

Figure 8: Cross-section of the root of *M. piperita* L

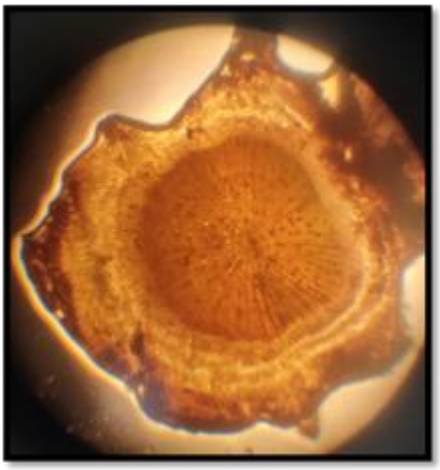

Figure 9: Section showing the structure of the root cross section of *O. basilicum* L.

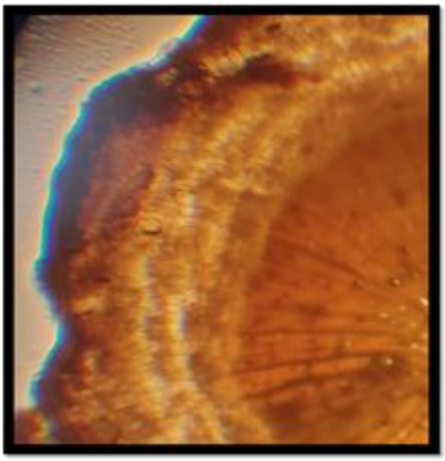

Figure 10: Cross section of the root of *O. basilicum* L.

Table 2: Mineral element contents of *Mentha* and *Ocimum* (ppm)

Mineral contents (ppm)	*M. piperita*	*O. basilicum*
Na	0.03	0.56
Ca	1.53	2.67
K	4.01	4.46
P	0.59	0.46

Table 3: Phytochemical screening of the studied plants

	M. piperita	*O. basilicum*
Flavonoids	+	+
Steroids	+	+
Tannins	+	–

Terpenoids	–	+
Saponins	+	+
Phlobatannins	–	–

Conclusion

In this study, the importance of morphological and anatomical characteristics in the classification of plants, especially plants of the Lamiaceae family, were addressed. The morphology and anatomical structure of some vegetative parts of two medicinal plants of the Lamiaceae family *(M. piperita* L., and *O. basilicum* L.) were studied. A taxonomic comparison was made between them as well. Some of the elements found in plants and phytochemicals were studied, and through the results obtained, the importance of morphological, anatomical, and chemical studies was shown in identifying, defining, describing, and classifying plant species belonging to the Lamiaceae family, because of their importance in differentiating between species.

References

1. S. Gurcharan, Plant systematics: an integrated approach. *Plant systematics: an integrated approach.*, (2004).
2. R. M. Harley, S. B. Atkins, L. Andrey, P. D. Cantino, B. J. Conn, R. Grayer, R. Morales. *Flowering Plants· Dicotyledons: Lamiales (except Acanthaceae including Avicenniaceae)*. (Springer, 2004), pp. 167-275.
3. V. H. Heywood, *Flowering plants of the world*. Oxford University Press., Oxford,, (1978).
4. M. Khosla, Study of inter-relationship, phylogeny and evolutionary tendencies in genus dcimum. *Indian Journal of Genetics and Plant Breeding* **55**, 71 (1995).
5. W. C. Evans, *Trease and Evans' pharmacognosy*. Elsevier Health Sciences, (2009).
6. S. Kumar, *A Textbook of plant taxonomy*. Campus Books, (2009).

7. G. Nahak, R. Mishra, R. Sahu, Taxonomic distribution, medicinal properties and drug development potentiality of Ocimum (Tulsi). *Drug Invention Today* **3**, (2011).
8. S. M. H. Jafri, A. El-Gadi, *Flora of Libya. Lamiaceae*. Al Faateh University, Faculty of Science, Department of Botany,, Libya, (1985), vol. 118.
9. A. O. Tucker, R. F. Naczi, Mentha: an overview of its classification and relationships. *Mint: the genus Mentha. CRC Press, Boca Raton*, 1 (2007).
10. D. L. McKay, J. B. Blumberg, A review of the bioactivity and potential health benefits of peppermint tea (Mentha piperita L.). *Phytotherapy Research :An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives* **20**, 619 (2006).
11. B. P. Pandey, *Taxonomy of angiosperms*. S. Chand Publishing, (2001).
12. P. Baran, C. Özdemir, K. Aktas, The morphological and anatomical properties of Salvia argentea L.(Lamiaceae) in Turkey. *Research journal of agriculture and biological sciences* **4**, 725 (2008).
13. F. Celep, A. Kahraman, M. Dogan, A new taxon of the genus Salvia (Lamiaceae) from Turkey. *Plant Ecology and Evolution* **144**, 111 (2011).
14. A. Kahraman, F. Celep, M. Dogan, Anatomy, trichome morphology and palynology of Salvia chrysophylla Stapf (Lamiaceae). *South African Journal of Botany* **76**, 187 (2010).
15. Ö. Kiliç, A Morphological Study on Nepeta fissa CA Mey.(Lamiaceae) from Bingöl (Turkey). *Bilecik Şeyh Edebali Üniversitesi Fen Bilimleri Dergisi* **1**, 59 (2014).
16. F. Satil, M. Ünal, E. Hopa, Comparative morphological and anatomical studies of Hymenocrater bituminosus Fisch. & CA Mey.(Lamiaceae) in Turkey. *Turkish Journal of Botany* **31**, 269 (2007).
17. C. R. Metcalfe, L. Chalk, Anatomy of the dicotyledons, Vols. 1 & 2. *Anatomy of the dicotyledons, Vols. 1 & 2*, (1950).
18. R. Rawat, V. Tiwari, K. Negi, A comparative study of morphological and anatomical structures of four Ocimum species in Uttarakhand, India. *Journal of Drug Delivery and Therapeutics* **6**, 1 (2016).
19. O. N. Saraswati, Kumaun University, (2014).

20. J. Vallès, S. Garcia, O. Hidalgo, J. Martín, J. Pellicer, M. Sanz, T. Garnatje. Biology, genome evolution, biotechnological issues and research including applied perspectives in Artemisia (Asteraceae). *Advances in botanical research* **60**, 349 (2011).
21. F. Watanabe, S. Olsen, Test of an ascorbic acid method for determining phosphorus in water and NaHCO3 extracts from soil. *Soil Science Society of America Journal* **29**, 677 (1965).
22. M. L. Jackson, *Soil chemical analysis: advanced course*. UW-Madison Libraries parallel press, (2005).
23. O. Classics Lowry, N. Rosebrough, A. Farr, R. Randall, Protein measurement with the Folin phenol reagent. *J biol Chem* **193**, 265 .(1951)
24. J. Ibrahim, A. Ayodele, Taxonomic significance of leaf epidermal characters of the family Loranthaceae in Nigeria. *World Appl Sci J* **24**, 1172 (2013).
25. J. R. I. Wood, H. Haig-Thomas, A handbook of the Yemen flora. *(No Title),* (1997).
26. R .Nurzyńska-Wierdak, Analiza zawartości i składu chemicznego olejku dwóch form bazylii wonnej (Ocimum basilicum L.). *Annales UMCS, Sect. EEE* **9**, 189 (2001).
27. R. Rawat, K. S. Negi, P. S. Mehta, V. Tiwari, S. K. Verma, I. S. Bisht. Study of six varieties of sweet basil (Ocimum basilicumL.) and their morphological variations. *Journal of Non-Timber Forest Products* **23**, 1 (2016).
28. P. Malav, A. Pandey, K. Bhatt, S. Gopala Krishnan, I. Bisht, Morphological variability in holy basil (Ocimum tenuiflorum L.) from India. *Genetic Resources and Crop Evolution* **62**, 1245.(2015)
29. R. Gorenflot. *Biologie végétale plantes supérieures 1. appareil végétatif*. 4e édition. éd Masson Paris, (1994).
30. A. N. Chaker, H. Boukhebti, F. Sahli, R. Haichour, R. Sahraoui, Morphological and anatomical study of two medicinal plants from genus Mentha. *Advances in Environmental Biology* **5**, 219 (2011).
31. A. Spencer, J. D .Hamill, M. J. Rhodes, Production of terpenes by differentiated shoot cultures of Mentha citrata transformed with Agrobacterium tumefaciens T37. *Plant Cell Reports* **8**, 601 (1990).
32. I. Zizovic, M. Stamenić, A. Orlović, D. Skala, Supercritical carbon dioxide essential oil extraction of Lamiaceae family species:

Mathematical modelling on the micro-scale and process optimization. *Chemical Engineering Science* **60**, 6747 (2005).

33. S. Parida, B. K. Mohapatra, G. Mahalik, Anatomical study of six Ocimum species :The valuable method used in Indian Systems of Medicines (ISM). *International Journal of Ayurvedic Medicine* **11**, 278 (2020).
34. M. Nassar, M. El-Sagai, S. Azoz, Anatomical and Phytochemical studies on Ocimum basilicum L. plant (Lamiaceae). *Int. J. Adv. Res* **2**, 204 (2014).
35. R. Abdullah, *Chemical Studies of some Medical plants in Al-Gabal Al-Akhder region*. Msc. Thesis. Environmental Sciences and engineering Department–Libyan. (2013).
36. A. Botanica, Micromorphological studies of Lallemantia L.(Lamiaceae) species growing in Turkey. *Acta Biol. Crac. Ser. Bot* **51**, 45 (2009).
37. N. Nait Said, Batna, Université El Hadj Lakhdar. Faculté des Sciences (2007).
38. R. H. Wickramasinghe, Adrenodoxin, Ferredoxins and Other Iron-Sulphur (Nonheme-Iron) Proteins. *Enzyme* **17**, 227 (1974).
39. T. Arnason, R. J. Hebda, T. Johns, Use of plants for food and medicine by Native Peoples of eastern Canada. *Canadian Journal of Botany* **59**, 2189 (1981).
40. A. Harborne, *Phytochemical methods a guide to modern techniques of plant analysis*. springer science & business media, (1998).
41. M. Kivilompolo ،T. Hyötyläinen, Comprehensive two-dimensional liquid chromatography in analysis of Lamiaceae herbs: Characterisation and quantification of antioxidant phenolic acids. *Journal of Chromatography A* **1145**, 155 (2007).

دراسة مقارنة بين الشكل الظاهري والتشريحي وبعض العناصر في *Ocimum basilicum* و*Mentha piperita*

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[2]قسم النبات بكلية العلوم جامعة سرت

المستخلص العربي

كانت النتائج المورفولوجية والتشريحية في هذه الدراسة على النحو التالي: أظهر النوعان تباينًا كبيرًا في الصفات المظهرية ؛ النعناع عشبي بينما الريحان نبات شجيري . طول النصل في النعناع البري (3.18 سم) و الريحان (6.4 سم). الأوراق بسيطة ذات شكل بيضاوي في الريحان والنصل كامل ومركبة في النعناع والنصل ذو حافة مسننة، لون الأوراق اخضر غامق في النعناع بينما في الريحان اخضر فاتح. طول جذور النعناع البري (21.6 سم) ، الريحان (8.76 سم). لون الزهرة أبيض في الريحان وابيض الي ارجواني في النعناع ،اظهرت الدراسات التشريحية التي أجريت على السيقان والجذور الطازجة لكلا النوعين أوجه التشابه والاختلاف بينهما. كلا النوعين لهما سيقان مربعة ، وقشرة ، وبشرة ، ونسيج خشبي ، ولحاء متواجد في الجذع ، بالإضافة إلى خلايا نسيج النسيج الزاوي في القشرة. ومع ذلك ، تنتشر أنسجة Collenchyma بشكل موحد إلى حد ما في أربع زوايا من الجذع في النعناع ، على عكس الريحان حيث تنتشر في جميع أنحاء الساق. القشرة في النعناع الفخذية واسعة وهذا يرجع إلى وجود نسيج حمة فجوة. وجود أنسجة الثغرة في النعناع يرجع إلى حقيقة أن النباتات تنبع من تربة مشبعة بالمياه أو مغمورة جزئيًا في الماء.بالنسبة للعناصر كانت الكميات متفاوتة كمية البوتاسيوم في الريحان والنعناع علي التوالي(4.46)(4.01) كان الصوديوم كميته قليلة جدا في النعناع (0.03)،بينما في الريحان (0.56)،الكالسيوم كان في الريحان اعلي من النعناع (2.67)وفي النعناع (1.53)، اما الفوسفور كان كمية قليلة في الريحان(0.46)والنعناع (0.59). بالنسبة للفيتو كيميكل كان النعناع والريحان متشابهان في وجود او عدم وجود نواتج الايض الثانوي ماعدا التانين موجود في النعناع وغير موجود في الريحان والتربينودس غير موجود في النعناع وموجود في الريحان .

الكلمات المفتاحية: النعناع ، الريحان ، دراسة ظاهرية وتشريحية