ملخص البحث

تقدير الخصائص الفيزيوكيميائية والحسية والفيتامينات والمركبات الفينولية وتجزؤات الليبيدات الكلية في زيت النعناع وزيت الريحان

كان الهدف الأساسي من البحث الحالي تقدير الخصائص الحسية والفيزيائية وبعض الفيتامينات (أ ، هـ، د، ك، ج) والمركبات الفينولية في كل من زيت النعناع وزيت الريحان.

أوضحت النتائج قيم الوزن النوعي، معامل الانكسار، الرقم اليودي، رقم التصبن، الرقم الحامضي، رقم البيروكسيد في كل من زيت النعناع وزيت الريحان.

أظهرت النتائج أن فيتامينات (أ، د، هـ) كان ترتيبها على النحو التالي (٤٣٩,٣٣٧)، (٢٦٩,١٢٦)، (١٨,٥٣٣) في زيت النعناع على التوالي، في حين أن فيتامينات (أ، ك، ج، هـ) سجلت قيماً (١٩٣,٧٢)، (٥٦,٠٤١)، (٥,٨٣)، (٢,٦٥) في زيت الريحان على التوالي، علاوة على ذلك فإن زيت النعناع احتوى على ٨ مركبات فينولية، وقد سجل السلسليك والبنزويك والكيومارين أعلى القيم بينما احتوى زيت الريحان على ١٠ مركبات فينولية، وقد سجل البنزويك والإلجيك أعلى القيم.

كما تضمنت تفريد وتقييم تجزؤات الليبيدات الكلية في كل من زيت النعناع وزيت الريحان حيث سجلت زيادة طفيفة تراوحت بين (٢,٣٦% . ١٥,٨٤%) في زيت النعناع بينما تراوحت بين (٢,٤٦% . ١٦,٤٦%) في زيت الريحان، كما تم استخدام جهاز (TLC) لتقدير تجزؤات الليبيدات الكلية حيث احتوت على ٧ تجزؤات وقد سجلت المنوجلسيريدات أعلى نسبة (٦٢,٤٣%)، (٦١,٧٧%) يليها الفوسفوليبدات (١٥,٨٤%) في زيت النعناع والسيترولات (١٦,٦٤%) في زيت الريحان.

لذا نوصي باستخدام كل من زيت النعناع وزيت الريحان نظراً لأنهما من أكثر الزيوت العطرية النباتية أهمية في الصناعات الغذائية والدوائية.

الكلمات المفتاحية:

الخصائص الفيزيائية، الخصائص الحسية، الفيتامينات، المركبات الفينولية، تجزؤات الليبيدات الكلية، زيت النعناع، زيت الريحان.

richspearmint (Mentha spicata L.), Industrial Crops and Products., Vol. (32): 588 – 592.

Verma, R. S.; Rahman, L.; Verma, R. K.; Chauhan, A. and Singh, A. (2010): Essential Oil Composition of Menthol Mint (Mentha arvensis) and peppermint (Mentha piperita) Cultivars at Different Stages of Plant Growth from Kumaon Region of Western Himalaya. Journal of Medicinal and Aromatic Plants. Vol. (1): 13 – 18.

Vicente, G., Mertinez, M., Aracil, J. and Estefan, A. (2005): Kinetics of sunflower oil methanolysis. Ind. Eng. Chem. Res. 44: 5447 – 5454.

Zheng, W. and Wang, S. Y. (2001): Antioxidant activity and phenolic compounds in selected herbs. Journal of Agricultural and Food Chemistry, 49: 5165 – 5170.

Naidu, J. R.; Ismail, R. B.; Chen Yeng; Sasidharan, S. and Kumar, P. (2012): Chemical Composition and antioxidant activity of the crude methanolic extracts of Mentha spicata, Journal of Phytology, 4(1): 13 – 18.

Neuhouser, M. L. (2004): Dietary flavonoids and cancer risk: Evidence from human population studies. Nutrition and Cancer, 50: 1 – 7.

Nguyen, P. M.; Kwee, E. M. and Niemeyer, E. M. (2010): Potassium rate alters the antioxidant capacity and phenolic concentration of basil (*Ocimum basilicum L*) leaves, Food Chem. 123: 1235 – 41.

Paranjpe, P. (2001): Indian Medicinal Plants-Forgotten Healers, Chaukhambha Sanskrit Partishatan, New Delhi, pp 316.

Politeo, O.; Jukic, M. and Milos, M. (2007): Chemical composition and antioxidant capacity of free volatile aglycones from basil (*Ocimum basilicum L.*) compared with its essential oil, Food Chemistry 101: 379 – 385.

Putievsky, E. and Galambosi, B. (1999): Production systems of sweet basil. In R. Hiltunen & Y. Holm (Eds.). Basil: The genus Ocimum 10: 39 – 65. Amsterdam: Harwood Academic Publishers.

Rice-Evans, C. A.; Miller, N. J. and Paganga, G. (1997): Antioxidant properties of phenolic compounds. Trends in Plant Science, 2: 152 – 159.

Sangwan, N. S.; Farooqi, A. H. A.; Shabih, F. and Sangwan, R. S. (2001): Regulation of essential oil production in plants. Plant Growth Regul., 34: 3 – 21.

Scherer, R. and Godoy, H. T. (2009): Antioxidant activity index (AAI) by the 2, 2-diphenyl-1-picrylhydrazyl method. *Food Chemistry*, 112: 654 – 658.

Shan, B.; Cai, Y. Z.; Sun, M. and Corke, H. (2005): Antioxidant capacity of 26 spice extracts and characterization of their phenolic constituents. Journal of Agricultural and Food Chemistry, 53: 7749 – 7759.

Simon, J. E.; Quinn, J. and Murray, R. G. (1999): Basil a source of essential oils. In: Janick, J., Simon, J. E. (Eds.), Advanced in New Crops. Timber Press, Portland, OR, pp. 484 – 489.

Suppakul, P.; Miltz, J.; Sonneveld, K. and Bigger, S. W. (2003): Antimicrobial properties of basil and its possible application in food packaging. Journal of Agricultural and Food Chemistery, 51: 3197 – 3207.

Surveswaran, S.; Cai, Y. Z.; Corke, H. and Sun, M. (2007): Systematic evaluation of natural phenolic antioxidant from 133 Indian medicinal plants. Food Chemistry, 102: 938 – 953.

Telci, I.; Bayram, E.; Yilmaz, G. and Avci, B. (2006): Variability in essential oil composition of Turkish basils (*Ocimum basilicum L.*), Biochemical Systematics and Ecology 34: 489 – 497.

Telci, I.; Demirtes, I. Bayramc, E.; Arabacid, O. and Kacare, O. (2010): Environmental variation on aroma components of pulegone / piperitone

Kanatt, S. R.; Chander, R. and Sharma, A. (2007): Antioxidant potential of mint (*Mentha spicata L.*) in radiation-processed lamb meat, Food Chemistry 100: 451 – 458.

Kates, M. (1972): Techniques of lipidology isolation. Analysis and identification of lipids. North Holland Publishing Co. Amsterdam, London.

Khanna, D.; Sethi, G.; Ahn, K. S.; Pandey, M. K.; Kunnumakkara, A. B. and Sung, B. (2007): Natural products as a gold mine for arthritis treatment. *Opinion in Pharmacology*, 7: 344 – 351.

Kizil, S.; Hasimi, N.; Tolan, V.; Kilinc, E. and Yuksel, U. (2010): Mineral Content, Essential oil Components and Biological Activity of Two Mentha Species (M. Piperita L., M. Spicata L.) Turkish Journal of Field Crops, (15): 148 – 153.

Kwee, E. M. and Niemeyer, E. D. (2011): Variations in phenolic composition and antioxidant properties among 15 basil (*Ocimum basilicum L.*) cultivars, Food Chemistry 128: 1044 – 1050.

Lawrence, B. M. (2007): The composition of commercially important mints. In: Lawrence, B.M. (Ed.), Mint: Genus Mentha. Taylor & Francis Group, Boca Raton, FL, pp: 218 – 319.

Lee, J. and Scagel, C. F. (2009): Chicoric acid found in basil (Ocimum basillicum L.) leaves. Food Chemistry, 115: 650 – 656.

Lee, J. and Scagel, C. F. (2010): Chicoric acid levels in commercial basil (Ocimum basillicum L.) and Echinacea purpurea products. Journal of Functional Foods, 2: 77 – 84.

Lee, S. J.; Umano, K.; Shibamoto, T. and Lee, K. G. (2005): Identification of volatile components in basil (cimum basilicum L.) and thyme leaves (Thymus vulgaris L.) and their antioxidant properties. Food Chem. 91: 131 – 137.

Lu, Y. and Foo, L. Y. (2002): Polyphenolics of Salvia: A review. Photochemistry, 59: 117 – 140.

Makinen, S. M. and Paakkonen, K. K. (1999): Processing and use of basil in foodstuffs, beverages and in food preparation. In R. Hiltunen & Y. Holm (Eds.). Basil: The genus Ocimum 10: 137 – 152. Amsterdam: Harwood Academic Publishers.

Makri, O. and Kintzios, S. (2007): Ocimum sp. (basil): Botany cultivation, pharmaceutical properties and biotechnology. Journal of Herbs, Spices & Medicinal Plants, (13) 123 – 150.

Malins, D. C. and Mangold, H. K. (1960): Fractionation of fats, oils and waxes on thin-layer of silica acid. J. Am. Oil Chem. Soc., 37: 383.

(Eds.), Plant secondary metabolites: Occurrence structure and role in the human diet (pp. 1 – 24) Oxford Blackwell Publishing.

Djenane, D.; Yanguela, J. and Roncales, P. (2011): Antioxidant activity of crude extract from Algerian Chemical olive leaves and application in stored meat. 59th International Congress and Annual Meeting of Society for Medicinal Plant and Natural Product Research. Antalya, Turkey. Planta Medica, 77: 1407.

Elmasta, M.; Dermirtas, I.; Isildak, O. and Aboul-Enein, H. Y. (2006): Antioxidant activity of Scarvone isolated from spearmint (*Mentha spicata L. Fam. Lamiaceae*). J. Liq. Chromatgr. Relat. Technol. 29: 1465 – 1475.

Figueiredo, A. C.; Barroso, J. G.; Pedro, L. G. and Scheffer, J. J. C. (2008): Factors affecting secondary metabolite production in plants: volatile components and essential oils. Flavor Fragr. J. 23: 213 – 226.

Freire, C. M. M.; Marques, M. O. M. and Costa, M. (2006): Effects of seasonal variation on the central nervous system activity of Ocimum gratissimum L. essential oil. Journal of Ethnopharmacology, 105, 161 – 166.

Gharib, F. A. E. L. and Da Silva, J. A. T. (2013): Composition Total Phenolic Content and Antioxidant Activity of the Essential Oil of Four Lamiaceae Herbs, Medicinal and Aromatic Plant Science and Biotechnology, 19 – 27.

Goupy, P. H.; Biovin, M. P. and Amiot, M. J. (1999): Antioxidant composition and activity of barley (Hordum vulgare) and malt extracts of isolated phenolic compounds. J. Food Sci. Agric. 79: 1625 – 1634.

Gross, M. (2004): Flavonoids and cardiovascular disease. Pharmaceutical Biology, 42 (supplement), 21 – 35.

Grulova, D. P.; Sersen, L. F. and Salamon, I. (2012): Seasonal Variation in DPPH Scavenging Activity of Mentha X Piperita. In Advances in Environmental Biology, 6(4): 1477 – 1480.

Hakkinen, M., Heinonen, S., Karenlampi, M., Mykkanen, J. Ruskanen, R., Torronen (1999): Food Res. Int. 32: 345 – 353.

Holm, Y. (1999): Bioactivity of basil. In R. Hiltunen & Holm, Y. (Eds.). Basil: The genus Ocimum 10: 113 - 135. Amsterdam: Harwood Academic Publishers.

Javanmardi, J.; Khalighi, A.; Kashi, A.; Bais, H. P. and Vivanco, J. M. (2002): Chemical characterization of basil (Ocimum basilicum L.) found in local accessions and used in traditional medicines in Iran. Journal of Agricultural and Food Chemistry, 50: 5878 – 5883.

Juliani, H. R. and Simon, J. E. (2002): Antioxidant activity of basil. In: Janic, J., Wahipkey, A. (Eds.), Trends in New Crops and New Uses. ASHS Press, Alexandria, VA, pp. 575 – 579.

In conclusion, both mint oil and basil oil contain a complex mixture of bioactive compounds covering a number of demands for human health exhibiting different biological properties and activities. Therefore, they could be recommended to utilize both mint oil and basil oil as two of the most important aromatic oils in food and pharmaceutical industries.

References

A. O. A. C. (1995): Official Methods of Analysis, 16th ed. Association of Official Analytical Chemists Washington.

Al-Surmi, N. Y. L. (2009): Chemical and Technological Studies on Seeds of Some Sunflower Cultivars Grown in Yemen. M. Sc. Thesis. Faculty of Agriculture. Assiut University.

Al-Tawaha, A. D. R.; Al-Karaki, G. and Massadeh, A. (2013): Comparative response of essential oil composition, antioxidant activity and phenolic contents spearmint (*Mentha spicata L.*) under protected soilless vs. open field conditions, Advances in Environmental Biology, 7 (5): 902 – 910.

Anon. (2004): Maimes Report on Holy Basil, Ocimum sanctum-Tulsi. Version 1 – November 2004 – www.holy-basil.com.

Bajaj, K., L. and Kaur, G. (1981): Spectrophotometeric determination of L-ascorbic acid in vegetables and fruits analyst 106: 117 – 120.

Bakkali, F.; Averbeck, S.; Averbeck, D. and Idaomar, M. (2008): Biological effects of essential oils – A review. Food and Chemical Toxicology, 46: 446 – 475.

Biswas, A. K.; Chatli, M. K. and Sahoo, J. (2012): Antioxidant potential of curry (*Murraya koenigii L.*) and mint (*Menta spicata*) leaf extracts and their effect on colour and oxidative stability of raw ground pork meat during refrigeration storage, Food Chemistry 133: 467 – 472.

Bourgou, S., Ksouri, R., Bellila, A., Skandrani, I., Falleh, H. and Marzouk, B. (2008): Phenolic composition and biological activities of Tunisian Nigella sativa L. shoots and roots. Comptes Rendus Biologie 331: 48 – 55.

Carovic-Stanko, K.; Orlic, S.; Politeo, O.; Strikic, F.; Kolak, I.; Milos, M. and Satovic, Z. (2010): Composition and antibacterial activities of essential oils of seven Ocimum taxa. Food Chemistry, 119: 196 – 201.

Chalchat, J. C. and Ozcan, M. M. (2008): Comparative essential oil composition of flowers, leaves and stems of basil (Ocimum basilicum L) used as herb. Food Chem., 110: 501 – 3.

Chambers, H. L. and Hummer, K. (1994): Chromosome counts in the Mentha collection at the USDA-ARS National Clonal Germplasm Repository, Taxon (43) 423 – 432.

Crozier, A.; Jaganath, I. B. and Clifford, M. N. (2006): Phenols, polyphenoles and tannins: An overview. In A Crozier, M. N. Clifford and Ashihara, H.

hydrolyzed, which resulted in higher proportions of free fatty acids, monoglycerides and diglycerides in agreement with (Al-Surmi 2009).

Table (6): Total lipid fractions of mint oil and basil oil (% of total lipids)

Total lipid fractions	Mint oil	Basil oil
Hydrocarbons	2.36	5.34
Triglycerides	3.74	6.74
Free fatty acids	4.90	2.81
Diglycerides	5.39	2.46
Sterols	5.35	16.46
Monoglycerides	62.43	61.77
Phospholipids	15.84	4.41

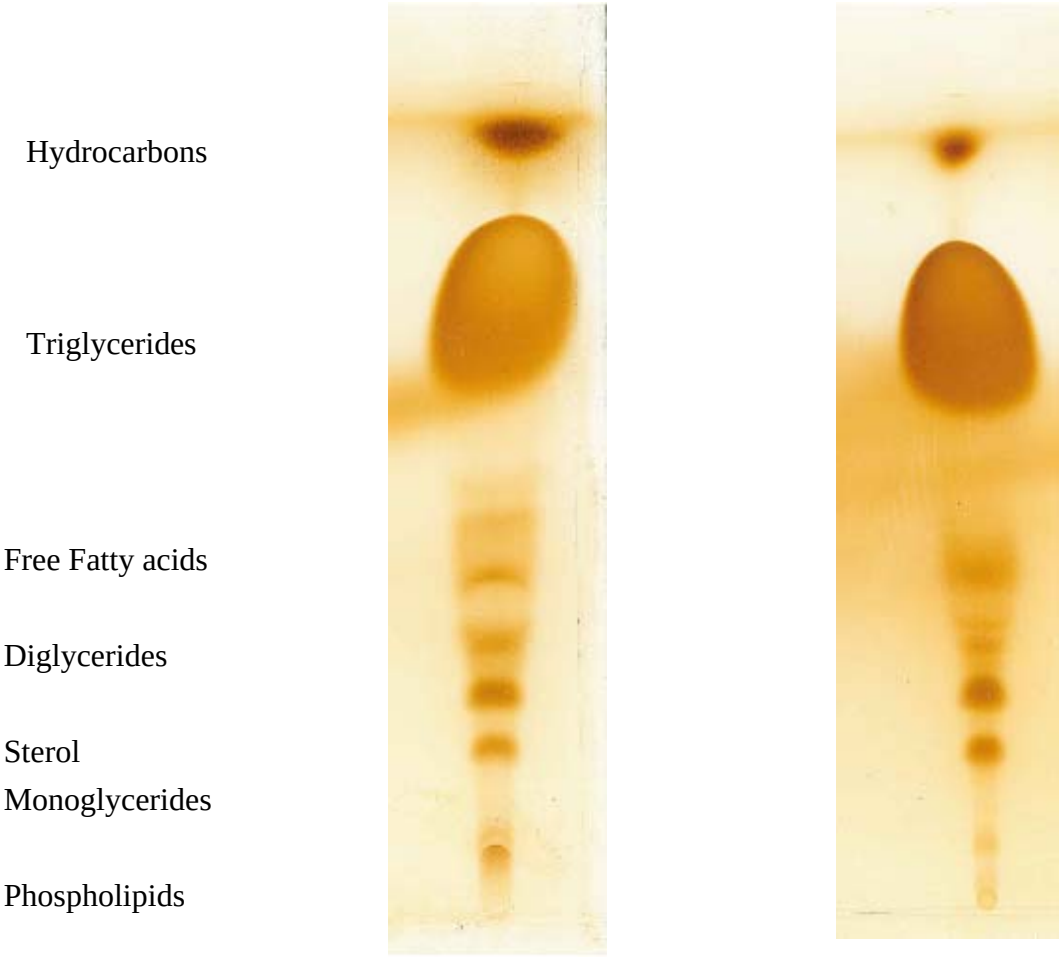

Figure (1): Total lipid fractions of mint oil and basil oil (% of total lipids)

Phenolic compounds*	Mint oil (ppm)	Basil oil (ppm)
Ferulic	0.75	13.99
Caffeic	1.43	-
Salicylic	11.88	-
Coumarin	3.93	-
Catechin	-	33.55
Chlorogenic	-	55.30
Caffiein	-	45.29
Ellagic	-	131.40
Chrysin	-	52.53

* Mean of three replicates.

(Naidu *et al*. 2012) confirmed our data by clarifying the potential importance of phenolic compounds in both studied oils in food products and medicinal practice.

Polyphenols are secondary plant metabolites that have a variety of structures and functions in plant (Crozier, *et al*. 2006) and are known antioxidant in the human diet (Rice-Evans, *et al*. 1997).

Recent research had shown that the consumption of plant polyphenolics may have a protective effect against the occurrence of cardiovascular disease and certain forms of cancer (Gross, 2004) and (Neuhouser, 2004).

In recent years, there had been growing interest in finding natural antioxidant, phenols as well as flavonoids in extractions oil of spearmint plants because they inhibit oxidative damage and may consequently prevent inflammatory conditions and their important role in the prevention of various degenerative diseases (Khanna, *et al*. 2007).

Basil contains high level of phenolic acid that contribute to its strong antioxidant capacity (Zheng and Wang, 2001), (Javanmardi, *et al*. 2002), (Shan, *et al*. 2005), (Surveswaran, *et al*. 2007) and (Lee and Scagel, 2009, 2010).

3.5. Total Lipid Fractions:

TLC chromatograms of the several lipid fractions isolated from mint oil and basil oil are shown in Table (6) and Figure (1). Such lipid fractions were identified as seven fractions namely: hydrocarbons; triglycerides; free fatty acids; diglycerides, sterols; monoglycerides and phospholipids.

The results revealed that the major component of the fractionated lipid fractions was monoglycerides in mint oil and basil oil recording (62.43%) and (61.77%); respectively followed by phospholipids (15.84%) and sterols (16.46%) in mint oil and basil oil; respectively. Triglycerides showed lowest percentage in both studied oils indicating that its lipid might had been

(Grulova *et al*. 2012) for mint oil and (Anon, 2004) for basil oil. Antioxidants are considered an important nutaraceuticals having many health benefits (Lu and Foo, 2002).

Table (4): Mean values of vitamins content of mint oil and basil oil*.

Vitamins	Mint oil	Basil oil
A (ug/100g)	18.533	193.72
D (ug/100g)	269.126	-
E (ug/100g)	439.237	2.65
K (ppm)	-	56.041
C (ug/100g)	-	5.83

* Mean of three replicates.

Data are in good accord with (Telci, *et al*. 2006), (Kanatt, *et al*. 2007), (Kwee and Niemeyer, 2011) and (Gharib and Da Silva 2013), who reported the antioxidant importance of vitamins A, E and C in both studied oils, since they exhibited an excellent antioxidant activity.

The antioxidant activity of plant extracts are widely used in the food industry as potential inhibitors of lipid peroxidation as additives in food and cosmetics which become important and interesting object of research because of the increasing usage of natural antioxidant (Bourgou, *et al*. 2008), (Scherer and Godoy, 2009) and (Grulova, *et al*. 2012).

Spearmint oil contains monoterpenoids like carvone, limonene, menthone, menthol, pulegone, dihydrocarveol and s. carvone. Some of them were found to possess high antioxidant activity (Elmasta, *et al*. 2006).

3.4. Phenolic Compounds Content of mint oil and basil oil:

The mean value of phenolic compounds of mint oil and basil oil are outlined in Table (5). Mint oil contained 8 phenolic compounds among them salicylic, benzoic and coumarin recorded the highest values. On the other hand basil oil contained 10 phenolic compounds among them benzoic and ellagic recorded the highest values.

The data are in agreement with (Politeo, *et al*. 2007), (Nguyen, *et al*. 2010), (Biswas, *et al*. 2012) and (Al-Tawaha, *et al*. 2013) in mint oil and basil oil.

Table (5): Phenolic compounds content of mint oil and basil oil (ppm)*

Phenolic compounds*	Mint oil (ppm)	Basil oil (ppm)
Catechol	1.83	77.16
Cinnamic	1.62	4.24
Benzoic	7.27	141.89
Vanillic	1.85	64.27

two studied oils. The results are in good agreement with (Naidu *et al*. 2012) for mint oil and basil oil.

Table (2): Physical properties of mint oil and basil oil*

Physical properties	Mint oil	Basil oil
Specific gravity	0.9202	0.9180
Refractive index	1.4705	1.4735

* Mean of three replicates.

3.2. Chemical Characteristics:

The results of the chemical characteristics of mint oil and basil oil are given in Table (3). The data indicated the mean values of iodine value, saponification value, free fatty acids and peroxide value of mint oil and basil oil.

The basil oil recorded higher values in iodine value, saponification value and peroxide value (122.6, 160.9 and 1.39), (142.8, 198.6 and 1.60) than that of mint oil; respectively.

Table (3): Chemical characteristics of mint oil and basil oil*

Chemical characteristics	Mint oil	Basil oil
Iodine value	122.6	142.8
Spanofication value (mg KOH/g of oil)	160.9	198.6
Acids value (mg, KOH/g of oil)	0.11	0.056
Peroxide value (m EqO/kg of oil)	1.39	1.60

* Mean of three replicates.

High values of refractive index and iodine value might be due to a high concentration of unsaturated fatty acids. Saponification value is useful in refereeing the chain length of fatty acids in the oil, since it is inversely comparatively to the molecular weight of the oil.

On the other hand, peroxide value is an index of the oil quality, which is in good agreement with (Vicente, *et al*. 2005).

3.3. Vitamins Content:

The data outlined in Table (4) represented the mean values of vitamins content in mint oil and basil oil. The data revealed that vitamins E, D and A were in descending order (439.237 ug/100g, 269.126 ug/100g and 18.533 ug/100g) in mint oil, while vitamins A, K, C and E were (193.72 ug/100g, 56.041 ppm, 5.83 ug/100g and 2.65 ug/100g) in basil oil. Such data are in good agreement with (Bourgou, *et al*. 2008), (Scherer and Godoy, 2009) and

and quarter HP pump (series 1050). The column temperature was maintained at 35^{o}C. Gradient separation was carried out with methanol and acetonitrile as a mobile phase at flow rate of 1 ml/min. Phenolic acid standard from sigma Co. were dissolved in a mobile phase and injected into HPLC. Retention time and peak area were used to calculation of phenolic compounds concentration by the data analysis of Hewllet Packared software.

2.2.4. Thin Layer Chromatographic for Total Lipids

The total lipids of mint oil was fractionated by the method of (Malins and Mangold, 1960) using silica gel (Gf 254, type 60) glass plates (20×20 cm) with 0.25 mm thickness were used for qualitative and quantitative determinations of lipid fractions. The developing solvent system was petroleum ether: diethyl ether and glacial acetic acid (80:20:1 v/v/v) (Kates 1972).

The lipid fractions were visualized by exposure to iodine vapor. All lipid fractions were identified on thin layer plates by comparing their intermediate value between the start point and the fraction point (Rf) values with those of known lipid standers. For quantitative analysis, the different lipid fractions were scanned by using densitometer model (Seroscan elvi 146) and the data were analyzed by computer program analysis J scans.

3. Results and Discussion:

3.1. Physical Properties:

The organoleptic and physical properties of mint oil and basil oil established its capability of application in either nutrition or in food and pharmaceutical industries. Data of organoleptic and physical properties of mint oil and basil oil are outlined in Table (1). The color, odor and taste of the two studied oils were: Pale yellowish, aromatic and agreeable; yellow, aromatic and agreeable for mint oil and basil oil; respectively. The taste values were assessed as a mean of 10 panelists for the three replicates.

Table (1): Organoleptic properties of mint oil and basil oil*

Organoleptic Properties	Mint oil	Basil oil
Color	Pale yellowish	Yellow
Odor	Aromatic	Aromatic
Taste	Agreeable	Agreeable

* Mean of three replicates.

Essential oil physico-chemical composition of aromatic plants depend on their genetic structure, the climatic factors and the agronomical practices (Sangwan *et al*. 2001), (Telci *et al*. 2006) and (Figueiredo *et al*. 2008).

The results presented in Table (2) indicated the mean values of refractive index and specific gravity of mint oil and basil oil. Data revealed that there were slight variations in specific gravity and refractive index between the

basil are used in pharmacy for diuretic and stimulating properties, in perfumes compositions (Chalchat and Ozcan, 2008) and (Nguyen *et al*. 2010). In addition basil is a digestive stimulant with antimicrobial (Suppakul *et al*. 2003), antibacterial (Carovic-stanko *et al*. 2010), anticonvulsant (Freire *et al*. 2006) and anticarcinogenic properties (Holm, 1999). Basil is the major essential oil crop around the world and cultured commercially in many countries as a medicinal herb in medical treatments such as for headaches, coughs, diarrhea, worms and kidney malfunctions. Basil essential oil had been utilized extensively in food industry as a flavoring agent and inperfumery medical industries as well as a source of aroma compounds (Simon *et al*. 1999), (Lee *et al*. 2005) and (Juliani and Simon, 2002).

The present investigation was performed in an attempt to clarify the physicochemical characteristics, sensory properties, some vitamins composition, phenolic compounds contents as well as total lipid fractions of mint oil and basil oil.

2. Materials and Methods:

2.1. Materials:

Two liter of natural mint oil (*mentha spi*cata) and 2 liter of natural basil oil (*Ocimum basilicum*) were procured from Cairo local market in November, 2012. Mint oil (*mentha spicata*) and basil oil (*Ocimum basilicum*) were stored at 18^{o}C in refrigerator till the analysis.

2.2. Methods:

2.2.1. Determination of Physical and Chemical Properties:

At 25^{o}C, specific gravity, Refractive Index, acid value, peroxide value, iodine value and saponification value were determined as outlined in (A. O. A. C. 1995).

2.2.2. Determination of Vitamins Content:

Vitamin C was determined according to the methods described by (Bajaj and Kaur, 1981) while the other vitamins A, D, E and K were determined according to the methods described in (A. O. A. C. 1995)

2.2.3. HPLC-separation and Identification of Phenolic Compounds:

Phenolic compounds were determined by HPLC according to the method of (Goupy, *et al*. 1999). Five g of sample were mixed with methanol and centrifuged at 10,000 rpm for 10 min and the supernatant was filtered through a 0.2 µm millipore membrane filter then 1-3 ml was collected in a vial for injection into HPLC Hewllet Packared (series 1050) equipped with auto sampling injection, solvent degasser, ultraviolet (UV) detector set at 280 nm

1. Introduction:

Today, the herb is not used for cooking but also in commercial fragrances, flavorings and for increasing the shelf life of food products (Makinen and Paakkonen,1999) and (Suppakul *et al*., 2003).

Mint, commonly known as pudina in most Indian Languages, belongs to the genus Mentha in the family Labiatae (Lamiaceae) that includes other commonly grown oil yielding plants such as basil, sage, rosemary, marjoram, lavender and thyme. There are 25 – 30 species within the genus Mentha, including spearmint, peppermint, wildmint, corn mint, curledmint, bergamot, American mint, Korean mint, etc. of which spearmint in the most common of all (Paranjpe, 2001). It is one of the most important aromatic herbal plants and cultivated for widely use in food, cosmetic, confectionary, chewing gum, toothpaste, pharmaceutical industries and for essential oil productions. Spearmint is one of most important flavor in the world that coming after vanilla and citrus flavors (Lawrence, 2007), (Kizil, *et al.*, 2010), (Telci, *et al*., 2010) and (Verma, *et al*. 2010). The leaves crushed with sugarcane forms excellent recipe in hot Indian summers just as dried powdered leaves added to yoghurt also provides relief from heat strokes (Hakkinen, *et al*., 1999). Shoots and leaves of mints are used as condiments in food and their essential oil components are processed into flavorings and fragrance elements for use in a variety of products (Chambers and Hummer, 1994)). In addition spearmint is used popularly as tea flavoring agent as well as used as fresh and dried for folk medicine such as stimulant and carminative. Spearmint contains a complex mixture of bioactive compounds covering a number of demands for human health and exhibiting different biological properties and activities (Bakkali, *et al*. 2008) and (Djenane, *et al*. 2011).

Basil (*Ocimum basilicum L.*) is a popular culinary herb that originated in India, Africa and Southern Asia and is now cultivating world wide (Makri and Kintzios, 2007) and (Putievsky, and Galambosi, 1999). It known for its considerable genetic diversity with between 65 and 150 species reported, based on variations in morphological characteristics such as growth habit, leaf colour, size and shape and aromatic composition (Makri and Kintzios, 2007). Basil is one of the species used for the commercial seasoning. Fresh and dried basils are widely used in the Mediterranean kitchen such as tomato product, vegetables, salads pizza, meat, soups and marine foods. The leaves of

Determination Physiochemical Characteristics, Vitamins, Phenolic Compounds and Total Lipid Fractions in Mint Oil (*Mentha Spicata*) and Basil Oil (*Ocimum Basilicum*)

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Abstract:

The core objective of the present investigation was to determine the physicochemical characteristics, vitamins content (A, E, D, K and C), phenolic compounds in mint oil and basil oil. The data indicated specific gravity, refractive index, iodine value, saponification value, acid value and peroxide value in both mint oil and basil oil. Likewise data revealed that vitamins D, E and A were in descending order (439.237 ug/100g, 269.126 ug/100g and 18.533 ug/100g) in mint oil, while vitamins A, K, C and E were (193.72 ug/100g, 56.041 ppm, 5.83 ug/100g and 2.65 ug/100g) in basil oil. Furthermore mint oil contained 8 phenolic compounds among them salicylic, benzoic and coumarin recorded the highest values. On the other hand basil oil contained 10 phenolic compounds among them benzoic and ellagic recorded the highest values. The study included fractionation and quantifications of lipids in the mint oil and basil oil. Besides mint oil recorded slight increase in lipid fractions which ranged from (2.36% to 15.84%) in mint oil, while it ranged from (2.46% to 16.46%) in basil oil. Using TLC technique the total lipids of mint oil and basil oil were fractionated to seven fractions with monoglycerides recording the highest percentage (62.43%) and (61.77%) followed by phospholipids (15.84%) in mint oil and sterols in (16.46%) basil oil. Consequently it is recommended to utilize both mint oil and basil oil as two of the most important aromatic oils in food and pharmaceutical industries.

Key Words:

Physicochemical characteristics, Sensory characteristics, Vitamins, Phenolic compounds, Lipid fractions, Mint oil, Basil oil.