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Biomorphological Properties, Phytochemical Composition and Medical Importance of the *Ocimum*.

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Abstract: At the Absheron Experimental Station (Bina settlement) of the Fruit and Tea Research Institute of the Ministry of Agriculture of the Republic of Azerbaijan, *Ocimum basilicum* L. - ordinary basil species belonging to the family *Lamiaceae* Lindl. were collected in accordance with standards in the laboratory. The biomorphological features of the species were studied, the phytochemical composition of the plants, the possibilities of its use in folk and scientific medicine were given a detailed explanation. *Ocimum basilicum* L. - solvents of different basil leaves and stems of ordinary basil were extracted by hexane and ethanol and their spectra were recorded by Hitachi U-2900 UV-VIS spectrophotometer. According to the results of the analysis, the leaves and stems of the species contain essential oil α -pinene, β pinene, carene 3, α -terpinene, 1.8 sieno 1 (eucalyptol), μ terpinene, terpinolen, cyclohexanone 5-m-2 (1-me) -cis, linaool, cariophyllen, terpinene-4-ol, citronellol, N, N di methyi acetamide, α -terpineol, camphene, myrtenol, nerol, geraniol, camphor, α -terpenilacetate, heranyl oleate, neril acetate, citron heranyl tiglate substances.

Keywords: *Alpha terpineol, Camphene, Camphor, Caryophyllene, Myrtenol*

Introduction

At the Absheron Experimental Station (Bina settlement) of the Fruit and Tea Research Institute of the Ministry of Agriculture of the Republic of Azerbaijan, *Ocimum basilicum* L. - ordinary basil species belonging to the family *Lamiaceae* Lindl. were collected in accordance with standards in the laboratory. The biomorphological features of the species were studied, the phytochemical composition, the possibilities of its use in folk and scientific medicine, its distribution in the world and in Azerbaijan were given a detailed explanation. Solvents of ordinary basil leaves and stems of different polarity were extracted by hexane and ethanol for 3 hours and their spectra were recorded by Hitachi U-2900 UV-VIS spectrophotometer. The main purpose of the study was to detect biologically active substances in *Ocimum basilicum* L. - common basil species.

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As for its use, it should be noted that basil leaf tea is used to strengthen the heart, increase the activity of the stomach and appetite. It improves metabolism in the body, it eliminates inflammation of the kidneys and urinary tract, it is very useful against bloating and it also revitalizes the skin and it has a soothing effect. Due to its sedative effect, it is used against neuroses, neurocirculatory dystonia, arterial hypertension and in the regulation of male sexual activity. In folk medicine, it is prescribed for tuberculosis, and in scientific medicine for stroke, convulsions, asthenia, gynecological diseases, flatulence, and skin rashes. Infusions and teas have a diuretic effect. The extract is used in the expulsion of nematodes and cestodes during helminthiasis, in the dyeing of wool and silk. In obstetric and gynecological practice, amenorrhea is useful as a diuretic in postpartum women. It is used as a spice in marinating vegetables and mushrooms. Essential oils are used in the perfumery, perfumed soap, cologne and eau de toilette, and the leaves are used in cooking to make sausages and surrogate teas. The extract of the leaves and flowers is useful for the treatment of malignant tumors, and they are used for making ointment against eczema. It has been shown that the antibacterial activity of lactic acid affects the interaction of bacteria. It dyes the wool orange-red. The fruits are useful for shortness of breath, vomiting and hiccups. The oil from the seeds is used in the varnish and painting industry.

Ocimum basilicum L., rich in microelements, is used as a vegetable among some peoples. This vegetable plant is used regularly in the spring, summer and autumn, as well as other vegetable crops. This plant is grown and is used in an indoor greenhouse during winter season. There is a difference in the chemical composition of *Ocimum basilicum* L. products grown in the greenhouse and *Ocimum basilicum* L. products grown in the open environment. To eliminate this difference, we obtained natural oil from this plant grown in the open field. Based on the latest results of our research, we recommend using this oil in the fall and winter by sprinkling 5-7 drops of pure oil on vegetables when using vegetables for eating.

Method

Solvents of different polarities prepared from its leaves and stems to detect biologically active substances in ordinary basil species were extracted for 3 hours by hexane and ethanol and their spectra were recorded by Hitachi U-2900 UV-VIS spectrophotometer. At the same time, the obtained oil analyzes were performed on "Crystal" 2000 M gas chromatography. Biomorphological features, phytochemical composition and perspectives of the use of ordinary basil plant were analyzed in detail.

In most countries of the world, basil is now grown from seed. The body is quadrangular, 20-60 cm high, the leaves are stalked, ovate, the edges are sparsely toothed, weakly hairy, the cup is 5 mm long, the fruits are bell-shaped, 12 mm long, the edges are short-haired, the hair is coarse. The flower crown is 6-8 mm, whitish-pink, the lower lip is intact and the upper lip is fringed (Alakbarov, 2014, 2017). Nuts are 2 mm, dotted. It blooms in August-September and bears fruit in September-October. Its homeland is Ceylon. This plant has been used in medicine and cuisine for more than 5,000 years.

In ancient times, people on the shores of the Mediterranean considered it a "king's fragrant plant". The word basil is of Arabic origin and means "beautiful smell". The Latin name of the plant means "fragrance worthy of kings". In ancient Rome, there was a belief that basil was revived when eaten, and in India, it was considered a sacred plant. Despite the fact that there are several types of basil, only ordinary types of basil are grown in our country. Ordinary basil has a fragrant and spicy property, reminiscent of cloves due to its pleasant smell. Basil is used both separately and in combination with other herbs and spices. Due to its aroma, it is not exposed to heat and is added to both hot and cold dishes. Dried basil keeps freshness in closed containers for 3-6 months, and fresh basil in the refrigerator for up to a week (Mehdieva, 2011 ; Alakbarov, 2014).

At the Absheron Experimental Station of the Fruit and Tea Research Institute of the Ministry of Agriculture of the Republic of Azerbaijan (Bina settlement), *Ocimum basilicum* L., a type of basil belonging to the genus *Ocimum* L., was grown and dried in accordance with standards in the collected laboratory conditions (Figure 1). The biomorphological features of the species have been studied, the phytochemical composition of the plant, the possibilities of its use in folk and scientific medicine have been given a detailed explanation (Sadiqov, 2011; Mehdiyeva, 2011).

Phytochemical composition: essential oil contains α -pinen, sienol (eucalyptol), μ terpinen, terpinolene, β pinen, carene 3, α -terpinen, linalool, caryophyllene, neryl acetate, geraniol, camphor and other substances (Ibadullaeva et al., 2014).



Figure 1. *Ocimum basilicum* L.

Results and Discussion

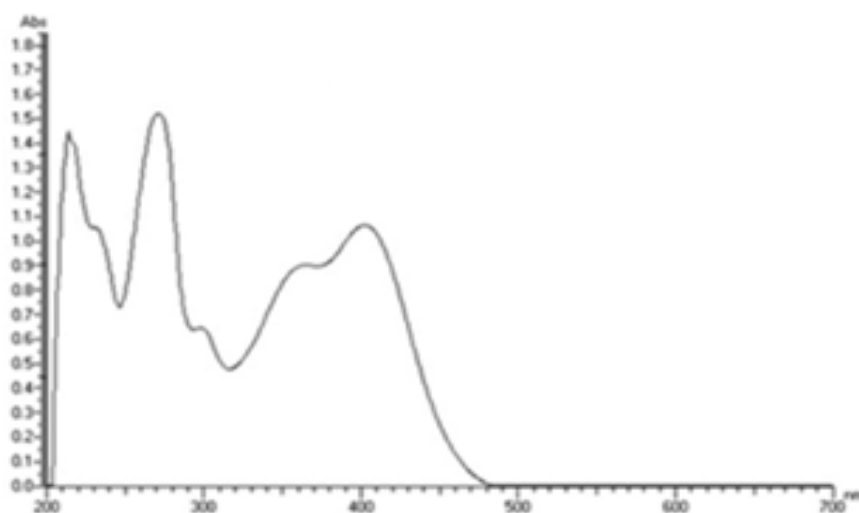
Basil is very important for health. The liquid extract made from the leaves of the plant increases the amount of prothrombin in the blood and accelerates blood clotting. In folk medicine, tea brewed from the fruits of basil is considered a natural remedy for chest pains caused by colds. The tea of basil leaves is drunk to strengthen the heart, and the infusion is drunk to increase the activity and appetite of the stomach. It improves metabolism in the body, eliminates inflammation of the kidneys and urinary tract, it has a positive anti-inflammatory effect. It also revitalizes the skin and has a calming effect. Due to its sedative effect, it is used in neuroses, neurocirculatory dystonia, arterial hypertension and in the regulation of male sexual activity. In folk medicine, it is prescribed for tuberculosis, and in scientific medicine for stroke, convulsions, asthenia, gynecological diseases, flatulence, and skin rashes. Its infusions and teas have a diuretic effect. The extract is used in the expulsion of nematodes and cestodes during helminthiasis, in the dyeing of wool and silk. It is used as an official medicinal plant in Austria, Denmark, Norway, Poland, the Czech Republic, Slovakia and France. In scientific medicine, the essence is a cough medicine, increases intestinal peristalsis, baths are antiseptic and it is general body strengthening. In practical medicine, in the complex treatment of diuretics, sedatives, anticonvulsants against malignant neoplasms, cholecystitis, dyskinesia, urticaria, enterocolitis, acute and chronic bronchitis, gargling, angina, gingivitis, skin diseases, diathesis, neurodermatitis, eczema, vitiligo disease, positive effects are determined during its use. It is useful in obstetric and gynecological practice as amenorrhea, dehydration, used in homoeopathy and hysteria. In Indian folk medicine, balms and ointments are prescribed for neuralgia, rheumatism, paralysis, paresis, dental and ear diseases. The infusion experimentally lowers blood pressure. It is used in veterinary medicine for intestinal atony, gastric and intestinal spasms in animals. It is used as a spice in marinating vegetables and mushrooms. Essential oils are used in the perfumery, perfumed soap, cologne and eau de toilette, and the leaves are used in cooking to make sausages and surrogate teas. The extract of the leaves and flowers is useful in the treatment of malignant tumors, and the ointment is useful in eczema. It has been shown that the antibacterial activity of lactic acid affects the interaction of bacteria. It dyes the wool orange-red. The fruits are very useful for shortness of breath, vomiting and hiccups. The oil from the seeds is used in the varnish and paint industry. The nectar yield as a honey plant is 100 kg/ha. The natural dry productivity of the surface mass is 10.8-135 g / m². It is an ornamental plant (Flora of Azerbaijan, 1957; Alakbarov, 2015). Ordinary basil was collected and dried by the standard method, the extract was prepared and analyzed.

The collected plant samples were dried using standard methods and prepared for laboratory research. Solvents of different polarities were extracted with hexane and ethanol for 3 hours and their spectra were recorded using a Hitachi U-2900 UV-VIS spectrophotometer, while other analyzes were performed on “Crystal 2000 M” gas chromatography. Results of the analysis are given in the Table 1. The detailed analyses are given in Figure. 3, Figure. 4.

Table 1. Chromatography results of *Ocimum basilicum* L.

Time, min	Component found	Area, %
8, 702	α-pinen	0,903%
9,441	β pinen	0,050%
9,721	carene 3	0,059%
10,265	α-terpinen	0,395%
10,425	1,8 dienol (eucalyptol)	1,387%
11,072	μ terpinen	0,313%
13,089	terpinolene	0,142%
13,883	cyclohexanone 5-m-2 (1-m e)-cis	0,153%
14,157	linalool	18,033%
14,589	caryophyllene	0,038%
15,037	terpinen-4-ol,	2,439%
15,303	citronellol	0,276%
15,645	N,N dimethylacetamide	0,764%
16,163	α- terpineol	1,664%
16,331	kamfen	0,559%
16,427	myrtenol	0,069%
16, 597	nerol	2,165%
16,737	geraniol	0,500%
17,009	camphor	0,138%
17,681	α- terpenilasetat	0,189%
18,186	heranyl oleate	0,045%
19,719	neril asetat	0,091%
20,843	geranyl tiglata	46,853%

Spectra of substances of ethanol extract from the leaves and stems of ordinary basil species were recorded at a wavelength of 200-700 nm by means of a Hitachi U-2900 UV-VIS spectrophotometer. Spectra obtained at 210-240 nm wavelengths were found to be characteristic of flavanols, 300-390 nm wavelengths for flavonoids, and 420-480 nm wavelengths for carotenoid pigments (Figure.2).



04.10.2021 Etanol+HCL
Ocimum basilicum L. - Adi reyhan

Figure 2. *Ocimum basilicum* L. - UV spectrum of ethanol extract

According to the results of the analysis of “Crystal” 2000 M gas chromatography, the essential oil contains 0.903% α -pinene, 0.050% β pinene, 0.059% carene 3, 0.395% α -terpine, 1.387% 1.8 sienol (eucalyptol), 0.313% μ terpine. , 0.142% terpinolen, 0.153% cyclohexanone 5-m-2 (1-me) -cis, 18.033% linaool, 0.038 cariophyllen, 2.439% terpinen-4-ol, 0.276% citronellol, 0.764% N, N di methyi acetamide, 1. % alpha terpineol, 0.559% camphene, 0.069% myrtenol, 2.165% nerol, 0.500% geraniol, 0.138% camphor, 0.189% alpha-terpene acetate, 0.045% heranyl oleate, 0.091% neryl acetate, 0.060% citronyll tiglata, 46%.

Отчет хроматограммы

Паспорт хроматограммы

Проект: _____
 Название метода: _____
 Дата и время: _____
 Анализ.Хроматограмма: _____
 Оператор: _____

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Колонка:
 Проба: _____
 Метод расчета: _____
 Объем, мкл: _____
 Разведение: _____
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Расчет по компонентам

Время, мин	Компонент	Группа	Площадь	Высота	Площадь, %	Концентрация	Ед. концентрации	Детектор
8.061								
8.702	alfa-Pinen		809.784	216.850	0.903			ПИД-1
9.441	beta-Pinen		150.598	51.684	0.168			ПИД-1
9.721	Carene-3		44.518	9.585	0.050			ПИД-1
10.059			52.672	18.317	0.059			ПИД-1
10.265	alfa-Terpinen		19.324	7.640	0.022			ПИД-1
10.425	1,8-Cineol (Evkaliptol)		353.936	117.601	0.395			ПИД-1
10.671			1243.487	401.586	1.387			ПИД-1
10.747			292.277	99.669	0.326			ПИД-1
11.072	gamma-Terpinen		120.460	40.402	0.134			ПИД-1
11.200			281.061	93.533	0.313			ПИД-1
12.473			47.295	17.004	0.053			ПИД-1
12.804			8.391	3.963	0.009			ПИД-1
12.901			29.475	10.950	0.033			ПИД-1
13.089	Terpinolen		17.858	7.359	0.020			ПИД-1
13.311			127.379	39.580	0.142			ПИД-1
13.441			301.418	62.296	0.336			ПИД-1
13.595			67.891	23.196	0.076			ПИД-1
13.883	Cyclohexanone 5-m-2(1-m e)-cis		155.900	52.300	0.174			ПИД-1
14.157	linaool		136.999	40.354	0.153			ПИД-1
14.265			16169.566	4381.939	18.033			ПИД-1
14.409			105.674	31.970	0.118			ПИД-1
14.589	Cariophyllene		579.087	140.996	0.646			ПИД-1
14.700			33.700	11.919	0.038			ПИД-1
14.700			30.131	11.721	0.034			ПИД-1
14.919			3274.357	844.897	3.652			ПИД-1
15.037	Terpinen-4-ol		2187.408	637.608	2.439			ПИД-1
15.127			3326.626	885.384	3.710			ПИД-1
15.303	Citronellol		247.135	64.662	0.276			ПИД-1
15.415			50.052	16.579	0.056			ПИД-1
15.645	N,N di methyl acetamid		684.799	239.194	0.764			ПИД-1
15.763			29.616	9.873	0.033			ПИД-1
15.987			1372.702	417.410	1.531			ПИД-1
16.163	alfa-terpineol		1492.334	434.937	1.664			ПИД-1
16.331	kamfen		501.499	137.466	0.559			ПИД-1
16.427	mirtenol		62.242	20.425	0.069			ПИД-1
16.597	Nerol		1940.840	501.803	2.165			ПИД-1
16.737	geraniol		448.412	97.105	0.500			ПИД-1
17.009	camphor		123.702	41.666	0.138			ПИД-1
17.131			1806.473	549.424	2.015			ПИД-1
17.461			25.068	9.679	0.028			ПИД-1
17.661	alfa-Terpenilacetat		169.130	54.635	0.189			ПИД-1
17.877			18.945	7.700	0.021			ПИД-1
17.953			93.463	31.067	0.104			ПИД-1
18.186	Geranyl Oleate		40.270	12.298	0.045			ПИД-1
18.677			14.864	5.415	0.017			ПИД-1
19.179			53.209	17.262	0.059			ПИД-1
19.295			3988.888	1056.136	4.449			ПИД-1
19.719	neril acetat		81.740	21.501	0.091			ПИД-1
19.847			167.797	47.931	0.187			ПИД-1
19.924	citronellyl tiglata		53.932	17.065	0.060			ПИД-1
20.569			541.078	124.924	0.603			ПИД-1
20.843	Geranyl tiglata		42011.081	7617.792	46.853			ПИД-1
21.209			280.414	78.924	0.313			ПИД-1
21.407			32.785	10.522	0.037			ПИД-1
21.700			2668.539	714.717	2.976			ПИД-1
21.877			8.887	3.578	0.010			ПИД-1

Figure 3. Detailed analysis of “Crystal 2000 M” gas chromatography results

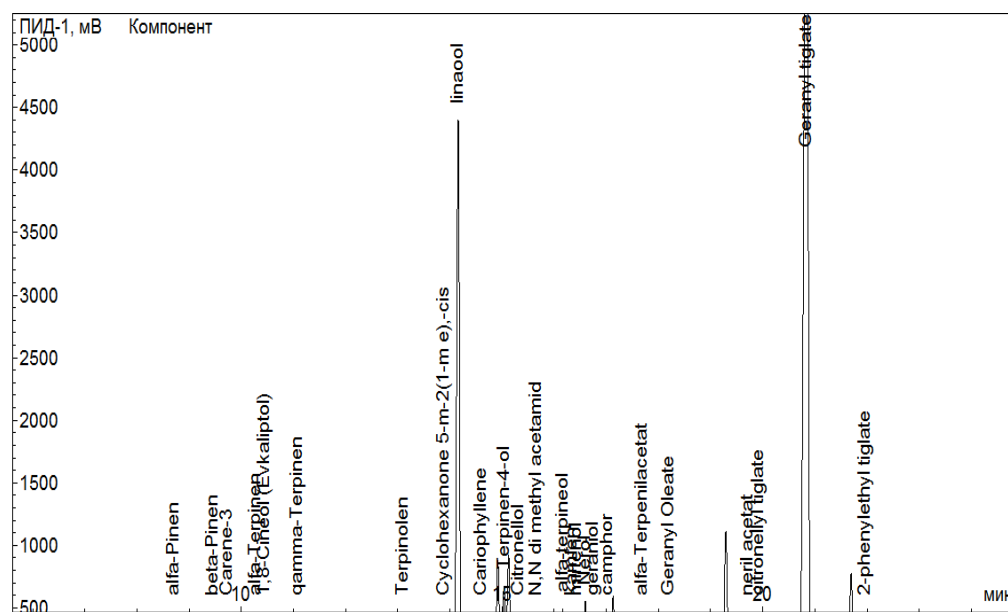


Figure 4. *Ocimum basilicum* L. - Chromatography of ordinary basil oil

Conclusion

Based on the results of the analysis, the spectra of ethanol extract of the leaves and stems of *Ocimum basilicum* L. were taken at a wavelength of 200-700 nm using a Hitachi U-2900 UV-VIS spectrophotometer. The spectra obtained at 210-240 nm were found to be characteristic of flavanols, 300-390 nm at flavonoids, and 420-480 nm at carotenoid pigments. According to the results of the analysis of “Crystal” 2000 M gas chromatography, 0.903% α -pinene, 0.050% β pinene, 0.059% carene 3, 0.395% α -terpinene, 1.387% 1.8 sienol (eucalyptol), 0.313% μ containing essential oil terpene, 0.142% terpinolene, 0.153% cyclohexanone 5-m-2 (1-me) -cis, 18.033% linaool, 0.038 cariophyllene, 2.439% terpinene-4-ol, 0.276% citronellol, 0.764% N, N di methyi acet 1.664% α -terpineol, 0.559% camphene, 0.069% myrtenol, 2.165% nerol, 0.500% geraniol, 0.138% camphor, 0.189% alpha-terpenilacetate, 0.045% heranyl oleate, 0.091% neryl acetate, 0.060% citranyl, 0.060% citronellyl tiglate substances were found. As for its use, it should be noted that basil leaf tea is used to strengthen the heart, increase the activity of the stomach and appetite. It improves metabolism in the body, it eliminates inflammation of the kidneys and urinary tract, it is very useful against bloating and it also revitalizes the skin and it has a soothing effect. Due to its sedative effect, it is used against neuroses, neurocirculatory dystonia, arterial hypertension and in the regulation of male sexual activity.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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