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THE IMPORTANT COMPOUNDS OF FLOWERS AND LEAVES OF *OTOSTEGIA MEGASTEGIA*

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Relevance. The search and implementation of drugs based on natural compounds is currently relevant. First of all, this is due to the fact that medicinal plants remain indispensable sources for obtaining certain drugs and occupy an important place in pharmaceutical practice. Herbal preparations, along with a complex multilateral effect on the human body, usually have fewer side effects and are less toxic compared to synthetic ones.

The *Lamiaceae family* is one of the largest and most distinctive families of flowering plants, numbering about 220 genera and almost 4000 species worldwide [1, 2]. The most well-spread genus of the Lamiaceae family is the genus *Otostegia* , which includes about 33 species, of which *Otostegia is one of them. megastegia* Vved. in Not. Syst. herb. Inst. Bot. Acad. sci. Uzbek. - squat plants, ear bract large bract, are a perennial shrub about 1 m high, growing in the Surkhandarya region on the Babatag ridge, on steep rocky slopes, on the outcrops of variegated rocks. Annual branches are simple, tetrahedral and hairy. [3, 4]. This species has not been studied phytochemically.

Purpose of the study. In this regard, the foregoing indicates the relevance and expediency of conducting phytochemical studies of plants of the genus *Otostegia* by chromato-mass spectroscopy. This report presents the results of a chromato-mass spectral analysis of essential oils obtained by hydro distillation from flowers and leaves of *O . megastegia* .

The raw materials for the study of volatile components were flower petals and *O leaves . megastegia* , collected during the flowering period at the end of the first decade of May 2019, Boysun district, Surkhandarya region of Uzbekistan. The species affiliation was determined by comparing the collected herbarium specimen with the herbarium *material O. megastegia* (Herbarium code No. C-87), stored in the Central Herbarium of Uzbekistan.

Methods of research. Essential oils from flower petals and leaves were obtained by hydro distillation from air-dry raw materials for 3 hours using a glass flask and Clevenger nozzle. The resulting essential oils of both samples were a pale yellow mobile liquid with a specific odor, which was stored at 4 °C in sealed ampoules before analysis.

The analysis of the components of essential oils was carried out on an Agilent gas chromatograph 7890 A GC with quadruple mass spectrum Agilent 5975C inert MSD as a detector. Separation of the mixture components was carried out on a HP - 5 MS quartz capillary column (30 m ×250 μm ×0 . 25 μm) in the temperature regime: 5 0 °C (2 min) - 10 °C/min up to 200 °C (6 min) - 15 °C/min up to 290 °C (15 min). The volume of the introduced sample was 1 μl (hexane, benzene), the flow rate of the mobile phase was 1.3 ml/min. The components were identified based on a comparison of the characteristics of the mass spectra with the data of electronic libraries (Wiley Registry of Mass Spectral Data -9 th Ed ., NIST Mass Spectral Library , 2011), as well as comparison of their mass spectral fragmentation with those described in the literature [5].

Table 1. Component composition of the essential oil of *Otostegia flower petals and leaves megastegia*

No.	Component names	R.I.	WU	1 * , %	2 * , %
1	camphene		2.753	0.14	

2	Hexanal		2.962	1.01	0.28
3	Tigloaldehyde		3.109	0.80	1.01
four	β-Pinene		3.269	0.29	0.05
5	*trans* -2-Pentanal		3.608		0.07
6	Butan-1-ol		3.835	0.55	
7	D-Limonene		4.849	0.36	0.10
8	Eucalyptol		5.015	0.99	
9	*trans* -2-Hexanal		5.261	0.79	1.04
10	2-Pentylfuran		5.581	0.24	
eleven	γ-terpinene		5.852	2.72	0.42
12	o-Cymen		6.399	1.75	0.37
13	*cis* -3-Hexen-1-ol		9.430	1.23	
fourteen	*trans* -3-Hexen-1-ol		9.437		1.07
15	(2 *cis* ,4 *cis*)-2,4-Hexadiene		10.076	0.40	
16	1-Methylethylidene cyclopropane		10.076		0.38
17	β-Thujone		10.254	1.60	0.32
eighteen	*trans* -Sobrerol		10.389	0.31	
19	*trans* -4-octene		11.428	8.43	
20	**cis *-3-octene***		11.429		1.55
21	Furfural		11.508	6.76	2.75
22	3-Ethylidene-1-methylcyclopentene		11.632		0.31
23	2-Methyl-1,4-hexadiene		12.388	0.18	
24	1,1,2-Trimethyl-3-methylenecyclopropane		12.394		0.26
25	(-)-Camphor		12.714	1.36	0.27
26	Benzaldehyde		13.033	1.24	1.65
27	4-Acetyl-1-methyl-1-cyclohexene		14.245	3.71	
28	β-Myrcene		14.275		3.88
29	dimethyl sulfide		14.423	0.36	
thirty	Dihydro-3-methyl-2(3H)-furanone		14.835	6.38	
31	α-Methyl-γ-butyrolactone		14.847		2.22
32	α-Bulnesen		15.173		0.20
33	3-Karen		15.505	1.81	
34	(+)-2-Karen		15.536		1.18
35	2- Ethyl- *p* - xylene		15.850		1.27
36	4-Methyl-2,4,6-cycloheptatrien-1-one		16.415	2.06	
37	Phenylacetaldehyde		16.440		5.40
38	1,3,8 - *p* - Menthatriene		17.018		1.13
39	2-Methylfuran		17.177	2.12	1.28
40	1(7),4,8- *o* - Mentatriene		17.589	1.19	
41	1,5,8- *p* -Menthatriene		17.651		4.52
42	(-)-α-Copaene		17.823		0.77

43	R(+)-Limonene		18.217	1.64	
44	γ-1-Kadinen		18.291		3.92
45	α - Methyl - γ - crotonolactone		18.321	1.37	
46	gemimelliten		18.463	3.55	
47	2,6-Dimethylbenzaldehyde		18.500		7.75
48	α-Muurolen		18.850		0.70
49	Zingiberen		19.010	0.32	
50	*p* -Methylacetophenone		19.471		2.48
51	(+)-δ-Kadinene		19.699		0.70
52	2,3,5-Trimethylfuran		20.547		0.53
53	*m* -Ziemen		21.162	1.15	0.76
54	β-Damascenone		21.420		1.79
55	*p* -Cymen		21.721	0.16	2.85
5 5	Dehydro- *p* -cymene		22.275	0.45	
5 7	*o* -Isopropenyltoluene		22.410		0.71
5 8	4-Methyl-2(5H)-furanone		22.711	0.41	
59	1,2-Diphenylethanol		22.797	1.90	
6 0	N-Acetyl Tribenzylgalactosamine		22.920		1.51
6 1	Hexahydro-1-(2-pyridinyl)-1H-1,4-diazepine		24.556		1.04
6 2	(+)-Aromadendren		25.238	0.46	0.47
6 3	Gwai-9,11-diene		25.386		1.09
6 4	α-ionene		25.743	1.31	
6 5	2-(1,5-Dimethyl-4-hexenyl)-4-methyl-3-cyclohexen-1-ol		25.921	1.42	
6 6	1,1,6-Trimethyltetralin		25.970		1.08
6 7	1-Methyl-4-(methylsulfonyl)bicyclo[2.2.2]octane		26.093		3.64
6 8	5,7-diethyl-5,6-decadien-3-yne		26.388		1.47
69	(-)-Caryophyllene		26.849		0.42
7 0	1,3-Diisopropenyl-6-methylcyclohexene		26.868	1.23	
7 1	*trans* -8-tert-Butyl-bicyclo(4,3,0)non-3,7-diene		27.231		2.33
7 2	δ-Selinene		27.446		0.40
7 3	(+)-β-Gurjunen		28.097	0.47	
74 _	(+)-Valencen		28.202		0.23
7 5	β-Vatirenen		29.186	3.24	
7 6	(+)- *trans* -Longipinan		29.715	1.49	
7 7	(+)-Longifolen		30.827	1.37	
7 8	(-)-Alloaromadendren		31.024		1.92
79	(+)-α-Kadinene		31.455		1.55
8 0	Carvacrol		31.713	7.25	

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8 1	3-Isopropyl tricyclo[4.3.1.1(2.5)]undec-3-en-10-ol		31.867		1.24
8 2	α-Zedren		31.953	4.35	10.01
8 3	9,10-Dehydro isolongifolene		33.588	1.24	7.24
8 4	β-guayan		35.107	0.84	0.59
8 5	(+)-α-Longipinene		35.279		0.34
8 6	1-Deoxy capsidiol		36.134		1.05
8 7	*o* -Tolunitrile		36.527	1.08	
8 8	Eremophilen		41.415	1.82	
Σ				**87.3 0**	**93.56**

1* - the content of the components of the flower petals
2* - content of leaf components

Results. According to the results, in the composition of the essential oil of *flowers O. megastegia* , 50 components were found (Table 1), dominated by γ-terpinene (2.72 %), *trans* -4-octene (8.43%), furfural (6.76%), 4-acetyl-1-methyl-1-cyclohexene (3.71 %), dihydro-3-methyl-2(3H) -furanone (6.38%), 4-methyl-2,4,6-cycloheptatrien-1-one (2.06%), 2-methylfuran (2.12%), gemimelliten (3.55%), β-vatirenene (3.24%), carvacrol (7.25%), α-cedren (4.35%), 9,10-dehydro-isolongifolin (1.24%) and sesquiterpene eremophilen (1.82%).

A, 55 components were identified in the composition of the leaves of this plant, among which tiglycaldehyde (1.01%), *trans* -2-hexanal (1.04%), *trans* -3-hexen-1-ol (1.07%), **cis *-3-octene dominated*** (1.55%), furfural (2.75%), benzaldehyde (1.65%), β -myricene (3.88%), α-methyl-γ-butyrolactone (2.22%), (+)-2-karene (1.18%), 2- ethyl - *p* -xylene (1.27%), phenylacetaldehyde (5.40%), 1,3,8- *p* -menthatriene (1.13%), 2-methylfuran (1.28%), 1,5,8- *p* -menthatriene (4.52%), γ-1-cadinene (3.92%), 2,6-dimethylbenzaldehyde (7.75%), *p* -methylacetophenone (2.48%), *p* -cymene (1.42%), β -damascenone (1.79%), guai-9, 11-diene (1.09%), α-ionene (1.08%), 1-methyl-4-(methylsulfonyl)bicyclo[2.2.2]octane (3.64%), 5,7-diethyl-5,6-decadiene-3 -ene (1.47%), *trans* -8-tert-butyl-bicyclo(4.3.0)non-3.7-diene (2.33%), 9.10-dehydro-isolongifolene (7.24%), (-)-alloaromadendren (1.92%), (+)-α-cadinene (1.55%), 3-isopropyl tricyclo [4.3.1.1(2.5)] undec-3-en-10-ol (1.24%), α-cedren (10.01%) and 1-deoxy capsidiol (1.05%), respectively.

A comparative analysis of tabular data shows that the component composition of essential oils obtained from flower petals and leaves by hydrodistillation method differs qualitatively and quantitatively. At the same time, there is a decrease in the quantitative content of γ-terpinene, o-cymene, β-thujone, furfural, (-)-camphor and the like in the leaves . Along with this, the content of thigloaldehyde , trans-2-hexanal , *p* -cymene and α-cedren increased . In addition, certain compounds were missing from the flower petals or leaves of *Otostegia. megastegia* .

Conclusions. As a result of the research, the composition of the essential oil components of the flower petals and leaves of *Otostegia was studied for the first time. megastegia* by chromato-mass spectral analysis. Comparison of the data of chromato-mass spectral analysis of flower petals and leaves showed the difference in their composition of volatile compounds.

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