

УДК 581.135.51:582.949.27:668.52

COMPOSITION OF CO₂-EXTRACT OF *SALVIA STEPPOSA*

Ye.M. Suleimen¹, S. Machmudah², M.Yu. Ivanova³, M. Sasaki², M. Goto²

1 - L.N. Gumilyov Eurasian National University, Astana, Kazakhstan, suleimen_em@enu.kz

2 - Kumamoto University, Japan

3 - Zhezkazgan Botanic Garden, Kazakhstan

The genus *Salvia* (Sage) - the largest in the *Lamiaceae* family, includes over 700 species [1,2]. Some of its representatives - *S. sclarea* L. and *S. officinalis* L. - known as sources of essential oils with commercial value. Thus, *S. sclarea* L. is grown in the Ukraine and is included in the concept of essential oil industry of the Autonomous Republic of Crimea as a promising form.

In our study we investigated by GC/MS method a composition of CO₂-extract of *S. stepposa*, which was collected in Kazakhstan in Akmola region, Arshaly district in 14.06.2007 (flowering).

It should be noted that the composition of essential oil of *S. stepposa* has not been studied before.

Supercritical Fluid Extraction (SCFE)

parameters (Fig.1): Extraction was carried out at a pressure of 15 MPa, flow rate of CO₂ - 3 ml/min and temperature of extractor - 40 °C. The yield of extract is 1,01%. The obtained fraction was dissolved in 1 ml of ethanol, cooled overnight at -20 °C, filtered and analyzed by GC/MS.

GC/MS: System: Hewlett Packard GCD system. **Column:** an Innovax FSC (60 m x 0.25 mm id.). **Temperatures: Injection port:** 250 °C. **Column:** at 60 °C for 10 min and programmed to 220 °C at a rate of 4 °C/min, and then held isothermal for 10 min. **Carrier gas:** Helium, with 1ml/min. **Split Ratio:** 50 : 1. **Electron Energy:** 70 eV **Mass-range:** m/z 35-425. **Library:** Wiley GC/MS Library.

It has been found, that in the extract of *Salvia stepposa* 26 compounds (Fig. 2, Table) were found and main from them are: bis(2-ethylhexyl) phthalate - 78,1%, hexadecanoic acid ethyl ester - 3,3% and 2,4-dioctylphenol - 2,9%. Also revealed the presence of unidentified components 1 and 2 with area 2,8 and 1,3% respectively. the mass spectra of unidentified components are shown.

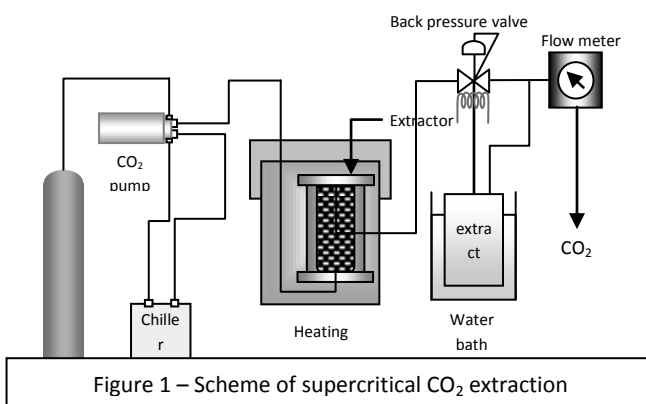


Figure 1 – Scheme of supercritical CO₂ extraction

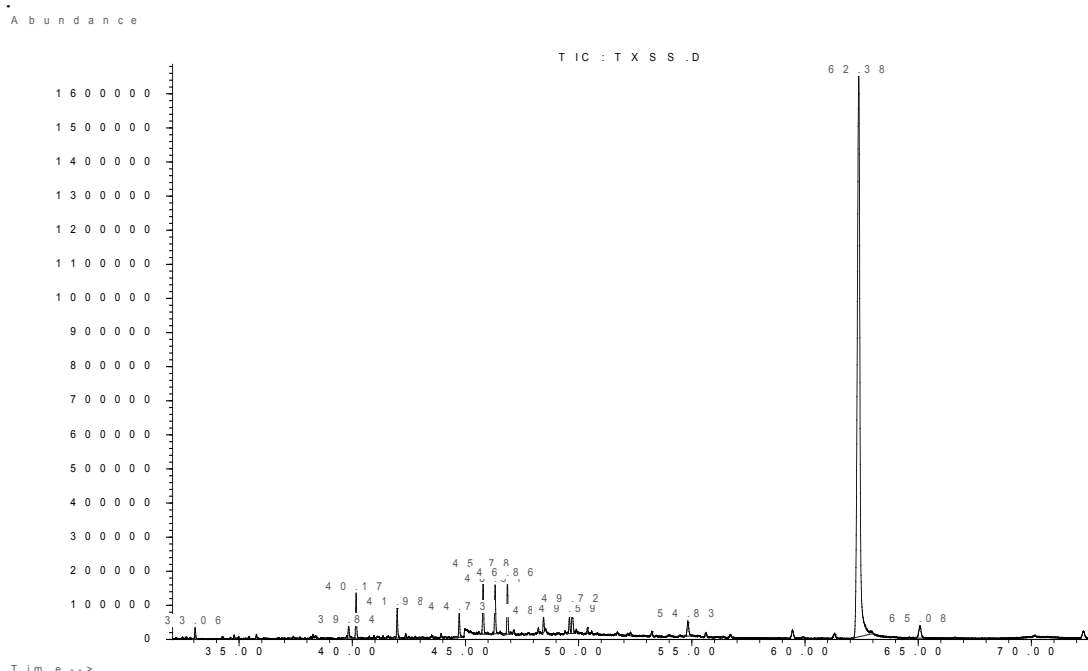
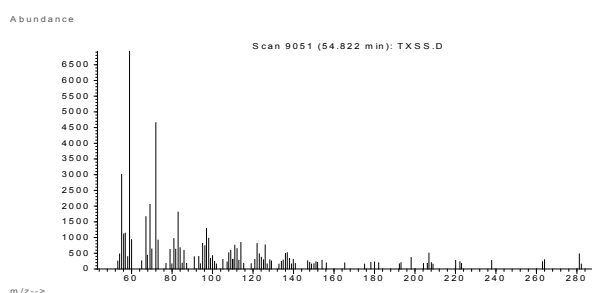
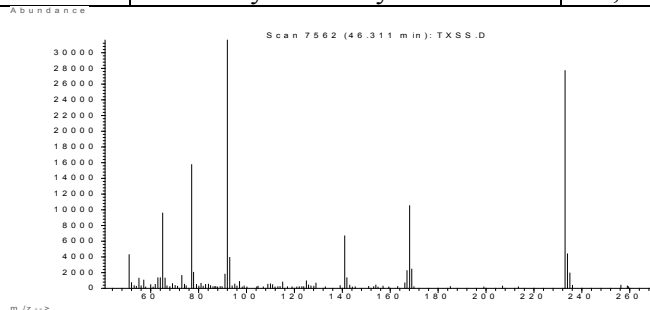


Figure 2 – The chromatogram of the CO₂-extract of *S. stepposa*

Table - Composition of CO₂-extract of *Salvia stepposa*

RT	Library	Area%	RT	Library	Area%
11.12	(E,E)-2,4-Heptadienal	tr	42.35	Butyl isobutyl phthalate	Tr
13.12	Limonene	tr	44.73	Dibutyl phthalate	1,3
13.27	1.8-Cineole	tr	45.78	Hexadecanoic acid ethyl ester	3,3
29.45	Tridecanal	tr	46.31	<i>Unknown 1</i>	2,8
30.59	Dimethyl phthalate	tr	46.85	2,4-Dioctylphenol	2,9
30.67	Ethyl <i>p</i> -methoxybenzoate	tr	48.45	Phytol	0,8
31.16	Octadecane	tr	49.59	Linoleic acid ethyl ester	1,0
33.06	Dihydroactinidiolide	0,6	49.72	Ethyl α -linolenate	1,8
35.76	Octadecanal	Tr	50.39	Octadecanoic acid ethyl ester	Tr
38.26	Heptadecane	Tr	54.83	<i>Unknown 2</i>	1,3
39.84	Methylisoeugenol	0,9	62.38	Bis(2-ethylhexyl) phthalate	78,1
40.17	2,4-Bis(1,1-dimethylethyl)phenol	2,3	65.08	Tetracosane	1,5
40.95	Docosane	Tr	TOTAL		99,9
41.98	Perhydrofarnesyl acetone	1,5			



Unknown 1. 256(1), 233(88), 168(33), 141(21), 125(3), 115(3), 115(2), 110(2), 97(3), 92(100), 77(50), 65(30), 51(14).

Unknown 2. 281(6), 264(4), 238(3), 220(4), 207(7), 198(5), 180(3), 165(3), 154(3), 147(4), 136(7), 126(11), 122(12), 114(12), 97(18), 83(26), 72(67), 59(100), 55(44).

The authors thank the *Matsumae International Foundation* for financial support.

Literature

1. Е.В. Байкова, Е.А. Королюк, А.В. Ткачев. Компонентный состав эфирных масел некоторых видов рода *Salvia* L., выращенных в условиях Новосибирска (Россия) // *Химия растительного сырья*, 2002, № 1, 37-42
2. Spiridon E Kintzios. Sage: The Genus *Salvia*. CRC Press, 2000, 289 pp.

SALVIA STEPPOSA CO₂-ЭКСТРАКТТЫҢ ҚҰРАМЫ

Е.М. Сүлеймен¹, S. Machmudah², М.Ю. Иванова³, М. Sasaki², М. Goto²

Хромато-масс-спектрометрия әдісімен *Salvia stepposa* өсімдігінің CO₂-экстрактының компоненттік құрамын зерттелді.

СОСТАВ CO₂-ЭКСТРАКТА SALVIA STEPPOSA

Е.М. Сүлеймен¹, S. Machmudah², М.Ю. Иванова³, М. Sasaki², М. Goto²

Методом хромато-масс-спектрометрии исследован компонентный состав CO₂-экстракта шалфея степного *Salvia stepposa*.