

ESSENTIAL OIL COMPOSITION OF *HYSSOPUS OFFICINALIS* L. CULTIVATED IN SERBIA

UDC 581.135.5:66 Hyssopus Officinalis L.

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Abstract. *The composition of the essential oil of Hyssopus officinalis L. was analyzed by GC and GC/MS. The main components of the oil were cis-pinocamphone (42.9%), trans-pinocamphone (14.1%), germacrene-D-11-ol (5.7%) and elemol (5.6%).*

Key words: *Hyssopus officinalis, Labiateae, essential oil, pinocamphone.*

1. INTRODUCTION

H. officinalis L. has been known as a culinary and medicinal herb for hundreds of years. It grows wild in the coastal areas of France, Italy and Yugoslavia and cultivated in these countries and in Bulgaria, Hungary and Holland. Hyssop oil finds its greatest use in flavoring preparations for alcoholic beverages, meat products and seasonings.

A great number of studies refer to the composition of *H. officinalis* oil. [1-17] The aim of this paper was to determine the composition of the oil of *H. officinalis* cultivated and used in the Pharmaceutical Company "Zdravlje" for the first time and compare our results to those previously published.

2. EXPERIMENTAL

The plant material was collected in the blooming stage (July, 1999.) on the experimental field of the Pharmaceutical Company "Zdravlje"- Leskovac. Voucher specimen is deposited in herbarium of Dr Novica Randelović, the professor at Faculty of Tehnology, University of Niš.

The air-dried and milled drug was hydrodistilled for 2.5 h in a Clevenger-type apparatus to give pale yellow colored oil in 0.5 % yield.

Analytical GC was performed on a Varian model 3700 Gas Chromatograph, equipped with a 60m × 0,32mm fused silica capillary column, with a 0,3 µm film thickness of

PTE-5 (stationary phase) and FID. The operating condition were: temperature program 60⁰–285⁰C at 4,3⁰/min and an injector and detector temperature of 250⁰C; carrier gas was H₂ (2mL/min). The percentage of the oil components was computed from GC (FID) peak areas without using correction factors.

GC/MS analyses were performed on a Finigan Mat, model 8230, equipped with fused silica 30m × 0,25mm, PTE-5 capillary column, with a film thickness 0,25 μm, a carrier gas was H₂ (2,5 mL/min.) with the same temperature program as for analytical GC. Ionization was performed by electron impact at 70 eV. Constituents were identified by comparison of their mass spectra to those from the MS library (Adams89 and Nist92) and obtained results were correlated with retention indices [19].

RESULTS

The oil content of the aerial dried parts of *H. officinalis* (v/w) was 0.5%. It was more than previously found which was ranged from 0.07 to 0.29% [20].

The composition of the oil is given in Table 1. Eighteen constituents were identified representing 93.8% of the oil. The main component was *isopinocampone* (44.7%), followed by *pinocampone* (14.1%), *germacrene-D-11-ol* (5.7%) and *elemol* (5.6%). In 1997, Veres et al. [17] found that the oils from nine collections of *H. officinalis* grown from seed of different sources could be categorized depending upon their percentage composition of *beta*-pinene, limonene, *pinocampone* and *isopinocampone*. The oils were rich in *isopinocampone* (5-50%), *pinocampone* (3-50%) or contained *beta*-pinene and limonene (1-60%) as major components. According to this, examined sample belong to oils rich in *pinocampone* and *isopinocampone*. Our results are in accordance with the most of previously published except for *H. officinalis* oil of Montenegro [15] and Spain [16] origin. Although, *beta*-pinene was not detected in our oil it was found in significant amount (5.3% -22.9%) in previously examined Hyssop oils [1-17].

Table 1. Composition of the essential oil of *H.officinalis*

Component	Retention Index (KI)	Percentage
sabinene	976	5.2
beta-myrcene	991	0.8
beta-phellandrene	1031	2.4
linalool	1098	1.1
<i>trans</i> -pinocampone (pinocampone)	1160	14.1
<i>cis</i> -pinocampone (<i>isopinocampone</i>)	1173	44.7
terpin-4-ol	1177	1.0
myrtenol	1194	2.8
methyleugenol	1401	0.4
<i>cis</i> - <i>alpha</i> -bergamotene	1415	1.4
<i>beta</i> -caryophyllene	1418	1.3
<i>alpha</i> -caryophyllene	1454	0.9
germacrene D	1480	1.6
germacrene D-11-ol	–	5.7
elemol	1549	5.6
spathulenol	1576	2.8
caryophyllene oxide	1581	1.6
<i>delta</i> -selinene	–	0.4

The main component in the Hyssop oil from Montenegro was methyl-eugenol (38.3%) while in our sample its amount was only 0.4%. The main component in the oil from Spain was 1,8-cineole (52.9%) which was not detected in our sample. Conversely, the main components in our oil and other previously examined, pinocamphone and isopinocamphone were found in a very low amounts in the oil from Montenegro (0.05% and 1.28% respectively) and from Spain (0.1% and 3.12%, respectively).

The all results (our and previously reported) suggest an great infraspecific variation of essential oil composition in *H. officinalis* L.

It is interesting to note that, isopinocamphone was found only in a very low level in *H. seravschanicus* oil (less than 0.1%) while pinocamphone amounted 71.0% [18].

Pinocamphone, isopinocamphone and pinocarpone were also the main compounds of the pentane/diethyl ether (1:2) and supercritical carbon dioxide extracts of the four phenotypes of *H. officinalis* [14].

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SASTAV ETARSKOG ULJA GAJENE BILJNE VRSTE *HYSSOPUS OFFICINALIS L.*

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Određen je sadržaj i sastav etarskog ulja gajene biljne vrste Hyssopus officinalis L gasnom hromatografijom i gasno-masenom hromatografijom. Sadržaj ulja je 0,5% a glavne komponente su: cis-pinocamphone (44,7%), trans-pinocamphone (14,1%), germacrene-D-11-ol (5,7%) i elemol (5,6%).