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ESSENTIAL OIL COMPOSITION OF *Hypericum atomarium* Boiss

The essential oil of *Hypericum atomarium* Boiss. was analysed for the first time. Seven components were identified, accounting for 83.6% of the total oil. The three most abundant components (isocaryophyllene, γ -cadinene and 2.4 diisopropenyl-1-methyl-1-vinyl-cyclohexane) represented 64.5% of the oil. A high content of sesquiterpenes (79.6%) characterized the oil.

The greatest number of studies of the chemical composition of essential oils from species of the genus *Hypericum* L. relate to *H. perforatum* L. can be found in a literature [1–4], which has for decades been the center of interest of chemists and pharmacologists. Recently, the chemical composition of the essential oils of *H. olympicum* L. [4] and *H. maculatum* Crantz [5], originating from the South–East of Serbia, and the essential oils of *H. perforatum* L. [6] and *H. rumelicum* Boiss. [7], originating from Greece, was determined.

The aim of this paper was to determine the composition of the essential oil of *H. atomarium*. *H. atomarium* is perennial plant, located in shrubs and low woods, sometimes in rocky places. This plant species can be found in the West and South parts of the Balkan peninsula [8]. There are data about the qualitative contents and quantitative analysis of anthraquinone derivatives and flavonoids in *H. atomarium* [9] and the isolation of hyperatomarin, an antibacterial prenylated phloroglucinol from *H. atomarium* ssp. *degenii* [10]. To our knowledge, the *H. atomarium* essential oil has not yet been studied.

EXPERIMENTAL

Plant material

The *H. atomarium* used in this study originated from Rujan Mountain (South–East Serbia). The plants were collected in the flowering phase in July 1995, and identified by Dr. Vlastimir Stamenković (Pharmaceutical and Chemical Industry "Zdravlje", Leskovac, Serbia) [11].

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Hydrodistillation

The dried and ground material was hidrodistilled for 2.5 h using a Clavenger–type apparatus.

GC/MS Analysis

The oil composition was analyzed by gas chromatography/mass spectrometry (GC/MS) on a Hewlett Packard 5890 gas chromatograph with a Hewlett Packard 5971 mass spectrometer, under the following conditions: fused silica capillary column: 30 m x 0.25 mm, SPB-5 with a film thickness 0.25 μ m; temperature program: 50°C (2 min) and 50–250°C (5°C/min). The constituents were identified by comparison of their mass spectra with Wiley library spectra.

RESULTS AND DISCUSSION

The oil content of *H. atomarium* was 0.22%, which was lower than the oil content of *H. perforatum* (0.32%) [4], *H. maculatum* (0.35%) [5] and *H. olympicum* (0.45%) [4], pickerd in South–East Serbia.

Twenty–four components were detected, but only seven components were identified, accounting for 83.6% of the total oil (Table 1). The content of each unidentified

Table 1. Chemical composition of the *Hypericum atomarium* Boiss. essential oil

Constituents	Percentage
2,4 – diisopropenyl–1–methyl–1–vinyl– –cyclohexane	19.13
dodecanol	3.97
isocariophyllene	23.83
γ -cadinene	21.53
β -selinene	4.96
δ -guaiene	7.79
δ -cadinene	2.39

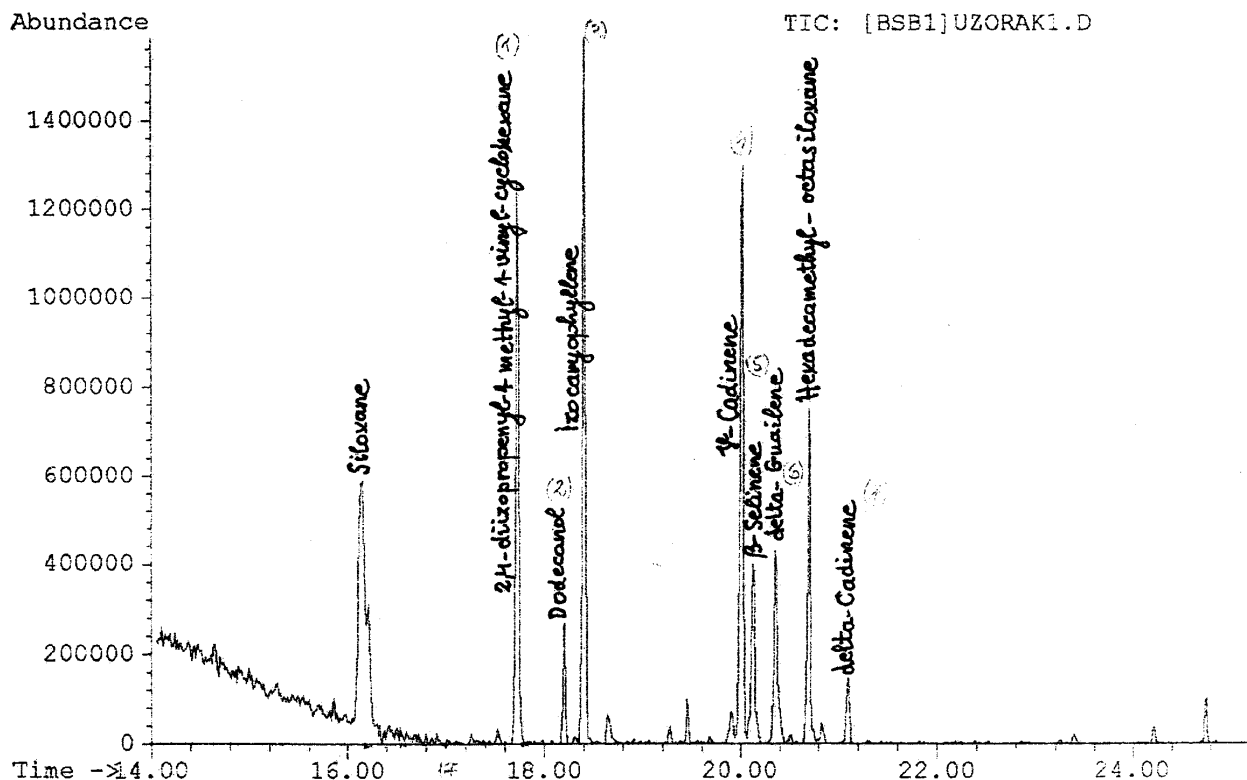


Figure 1. CG-MS chromatogram of the essential oil of *Hypericum atomarium* Boiss.

component was less than 1.6%. The three most abundant components (isocaryophyllene, γ -cadinene and 2,4-diisopropenyl-1-methyl-1-vinyl-cyclohexane) represented 64.5% of the oil. The component with the highest content was isocaryophyllene (23.8%). A high content of the sesquiterpenes (79.6%) characterized the oil. Monoterpenes were not identified.

The content of γ -cadinene in oils of the *Hypericum* L. genus [4–7] was considerably lower than in *H. atomarium*. Comparing the composition of the essential oil of *H. atomarium* and the essential oils of *H. perforatum* and *H. olympicum*, it can be seen that there were only two common compounds (γ -cadinene and δ -cadinene) from oils from the same location [4]. As in the essential oil of *H. atomarium*, the sesquiterpene in essential oils of *H. maculatum* [5] and *H. olympicum* [4] were dominant (61% and 56%, respectively). Two monoterpenes (α - and β -pinene) represent about 70% of the essential oil of *H. perforatum* of the North Indian origin [3]. Also, monoterpenes were the most abundant in the essential oils of *H. perforatum* [6] and *H. rumelicum* [7] growing in Greece.

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IZVOD

HEMIJSKI SASTAV ETARSKOG ULJA *Hypericum atomarium* Boiss

(Naučni rad)

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Etarsko ulje *Hypericum atomarium* Boiss. je ispitano po prvi put. Identifikovano je sedam komponenti, što iznosi 83.6% od ukupne količine ispitivanog ulja. Tri najzastupljenije komponente (izokariofilen, γ -kadinen i 2,4 diizopropenil-1-metil-1-vinil-cikloheksan) čine 64,5% ulja. Ukupan sadržaj seskviterpena u ispitivanom ulju iznosi 79.6%. Monoterpenke komponente nisu identifikovane. Poređenjem sastava ispitivanog etarskog ulja *H. atomarium* sa sastavom etarskih ulja *H. perforatum* i *H. olympicum*, sakupljenih na istoj lokaciji, uočene su samo dve komponente (γ -kadinen i δ -kadinen) zajedničke za sva tri ispitivana ulja.

Ključne reči: *Hypericum atomarium* Boiss • Sastav etarskog ulja • Seskviterpeni •
Key words: *Hypericum atomarium* Boiss • Essential oil composition • Sesquiterpenes •