



**PTEP 2023**

**INOPTEP 2023**

# **BOOK OF ABSTRACTS**

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INOPTEP 2023**

and

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## HONEY FROM THE REGION OF RTANJ MOUNTAIN

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The Republic of Serbia is characterized by a long tradition in beekeeping with a large annual honey production of about 7000 t and a high average annual export growth rate. These facts point to the necessity of continuous quality control of honey produced in Serbia with the focus on special honey types with protected botanical and geographical origin (linden honey from Fruška gora, honey from Homolje, Đerdap honey, and Kačar honey).

Honey from the region of Rtanj Mountain (Rtanj honey) became the product with geographical indication certificate obtained at the national level in 2022.

The geographical area where Rtanj honey is produced is located in eastern Serbia and includes the area of two municipalities, Sokobanja and Boljevac. From the aspect of beekeeping and honey production, it is important to emphasize the meadow phytocenoses of great floristic diversity, with the presence of endemic and relict species, which represent one of the most characteristic centers of diversity in Eastern Serbia.

Several studies have proposed different chemical markers to determine the region of honey origin. Pollen types, chemical composition, mineral content, polyphenol profile and sensory characteristics of honey are strongly influenced by its geographical origin.

Therefore, physicochemical parameters, minerals and sensory profile of honey samples (76) were used to characterize Rtanj honey with the focus on establishing the geographical origin of this honey type. Among physicochemical parameters moisture content, electrical conductivity, pH, free acidity and HMF were determined.

Although moisture content of Rtanj honey samples was in the wide range of  $13.6 \pm 0.23$ – $19.2 \pm 0.07\%$  all of them were below the limit (max 20%) recommended by Codex Alimentarius Commission.

Free acidity of Rtanj honey values ranged from  $23.2 \pm 0.14$  to  $65.6 \pm 0.38$  meq/kg with only one sample being above the limit (50 meq/kg). The pH values in examined Rtanj honey samples varied from  $3.42 \pm 0.10$  to  $5.54 \pm 0.22$ .

Electrical conductivity of honey samples ranged from 114 to 1251  $\mu\text{S}/\text{cm}$  indicating that some honey samples contained honeydew.

The contents of in all samples of Rtanj honey HMF indicated that honey was fresh (HMF < 10 mg/kg).

Rtanj honey dominantly contained K (> 3000 mg/kg), but also Mg (cca 150 mg/kg), Ca (> 100 mg/kg), Na (15 mg/kg), Mn (8 mg/kg), Fe (> 1,50 mg/kg) and other minerals.

Rtanj honey colour varied from light yellow ochre to light amber (12–65 mm, rated on Pfund's colour scale). Taste of Rtanj honey developed from moderately sour to moderately sweet, with the appearance of a slightly bitter aftertaste. Depending on the dominant honey plants, Rtanj honey aroma represented a harmonious combination of herbal, fruity and floral notes. Rtanj honey odour was reminiscent of dried herbs, fermented fruit, interspersed with light floral scents. Rtanj honey aroma had a weak persistence with noticeable notes of caramel and fried sugar, as well as those of fresh and fermented fruit and fresh flowers during consumption. Rtanj honey was of moderate to high viscosity, and upon crystallization it crystallized in the form of moderately coarse to coarse crystals.

**Key words:** *honey, Rtanj Mountain, geographical origin*

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## MED IZ REGIONA PLANINE RTANJ

*Pavle JOVANOV<sup>1\*</sup>, Marijana SAKAČ<sup>1</sup>, Aleksandra NOVAKOVIĆ<sup>2</sup>, Predrag IKONIĆ<sup>1</sup>,  
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Republiku Srbiju odlikuje duga tradicija u pčelarstvu sa velikom godišnjom proizvodnjom meda od oko 7000 t i visokom prosečnom godišnjom stopom rasta izvoza. Ove činjenice ukazuju na neophodnost kontinuirane kontrole kvaliteta meda proizvedenog u Srbiji sa fokusom na posebne vrste meda sa zaštićenim botaničkim i geografskim poreklom (fruškogorski lipov med, homoljski, đerdapski i kačarski med).

Med sa područja planine Rtanj (rtanjski med) postao je proizvod sa sertifikatom zaštićenog geografskog porekla dobijenim na nacionalnom nivou 2022. godine.

Geografsko područje na kome se proizvodi rtanjski med nalazi se u istočnoj Srbiji i obuhvata područje dve opštine, Sokobanje i Boljevca. Sa aspekta pčelarstva i proizvodnje meda, važno je istaći livadske fitocenozne velikog florističkog diverziteta, sa prisustvom endemskih i reliktnih vrsta, koje predstavljaju jedan od najkarakterističnijih centara diverziteta u istočnoj Srbiji.

Nekoliko studija je predložilo različite hemijske markere za određivanje/definisanje geografskog porekla meda. Vrste polena, hemijski sastav, sadržaj minerala, profil polifenola i senzorne karakteristike meda su u tesnoj sprezi sa njegovim geografskim poreklom.

Stoga su fizičko-hemijski parametri, minerali i senzorni profil uzoraka meda (76) korišćeni za karakterizaciju rtanjskog meda sa fokusom na utvrđivanje geografskog porekla ove vrste meda. Fizičko-hemijski parametri određivani u rtanjskom medu su sadržaj vlage, električna provodljivost, pH vrednost, slobodna kiselost i sadržaj HMF.

Iako je sadržaj vlage u uzorcima rtanjskog meda bio u širokom rasponu od  $13,6 \pm 0,23$ – $19,2 \pm 0,07\%$  svi uzorci su bili ispod granice (max 20%) koju je definisala Codex Alimentarius Commission.

Vrednosti slobodne kiselosti rtanjskog meda kretale su se od  $23,2 \pm 0,14$  do  $65,6 \pm 0,38$  meq/kg pri čemu je samo jedan uzorak bio iznad granične vrednosti (50 meq/kg). pH vrednosti u ispitivanim uzorcima rtanjskog meda varirale su od  $3,42 \pm 0,10$  do  $5,54 \pm 0,22$ .

Električna provodljivost uzoraka meda kretala se od 114 do 1251  $\mu\text{S}/\text{cm}$ , što ukazuje da su neki uzorci meda sadržali medljiku.

Sadržaj HMF u svim uzorcima rtanjskog meda ukazao je da je med bio svež (HMF < 10 mg/kg).

Rtanjski med je dominantno sadržao K (> 3000 mg/kg), ali i Mg (> 150 mg/kg), Ca (> 100 mg/kg), Na (15 mg/kg), Mn (8 mg/kg), Fe (1,50 mg/kg) i druge minerale.

Boja rtanjskog meda je varirala od svetlo okeržute do svetlo ćilibarne (12–65 mm, ocenjeno na Pfund-ovoj skali boja).

Ukus rtanjskog meda se razvijao od umereno kiselog preko umereno do intenzivno slatkog, sa pojavom blago gorkog naknadnog ukusa. U zavisnosti od dominantnog medonosnog bilja, miris i aroma rtanjskog meda predstavljale su harmoničnu kombinaciju biljnih, voćnih i cvetnih nota. Miris rtanjskog meda podsećao je na osušeno bilje, fermentisano voće, protkan laganim cvetnim mirisima. Aroma rtanjskog meda je bila slabe postojanosti, a tokom konzumiranja su se uočavale note karamela i prženog šećera, kao i one na sveže i fermentisano voće i sveže cveće. Rtanjski med je bio od umerene do izrazite viskoznosti, a pri kristalizaciji kristalisao je u obliku umereno grubih do grubih kristala.

**Ključne reči:** med, planina Rtanj, geografsko poreklo

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