



UNIVERSITY OF LIFE SCIENCES
"KING MIHAI I" FROM Timisoara
**Multidisciplinary Conference on
Sustainable Development**
30-31 May 2024



Characterization of amino acids, polyphenols and flavonoids of some bee products collected in the Banat region

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Abstract:

Bee products have a millennia-long tradition in human apitherapy due to their numerous healing properties. The aim of this study was to evaluate the chemical characterization of the amino acid, polyphenol, and flavonoid content of certain bee products, such as apilarnil, royal jelly, and propolis. Samples were collected from our apiary in the Banat region of Romania in 2022, as well as from commercial sources. Apilarnil and royal jelly were analyzed in both pure and lyophilized forms, while propolis was analyzed in pure form and as a tincture. Our results show that there is a great variability in the chemical composition of the three studied bee products, depending on the form of presentation and source of origin. The best results for amino acids were found in apilarnil and royal jelly from our own apiary, while for polyphenols and flavonoids, the best results were obtained from pure propolis samples.

• Introduction

Bee products possess abundant amino acids, polyphenols, and flavonoids, with their bioactivity significantly influenced by factors such as flower sources, environmental conditions, bee species, and apiary location. The intricate composition of bee products, coupled with the diverse laboratory methodologies employed in their analysis, contributes to the wide array of reported findings regarding their chemical makeup.

This study aimed to assess the amino acid, polyphenol, and flavonoid profiles of bee products obtained from an apiary in the Banat region (including apilarnil, royal jelly, and propolis), comparing them with similar raw products sourced from the market, lyophilized commercial variants (apilarnil and royal jelly), and propolis in tincture form.

• Material and method

In May 2022, we conducted an analysis of apilarnil, royal jelly, and propolis products. The propolis samples we analyzed were sourced from both our own apiary and the market, presented in raw form and as a tincture prepared by macerating 20 grams of propolis (from our own apiary) in 100 milliliters of 96% ethyl alcohol. Royal jelly underwent testing in freeze-dried and pure forms, sourced commercially and freshly harvested. Similarly, apilarnil was examined in the same forms as royal jelly, with lyophilized apilarnil obtained by subjecting commercial pure apilarnil to lyophilization using the Unicryo MC4L -60°C lyophilizer (Uniequp Germany).

The samples collected in fresh form were sourced from an apiary located in Caransebeș, Banat region, Romania (coordinates: 45°24'48.6"N 22°12'53.7"E), and stored in glass containers at a temperature of 0±5°C in a refrigerator. The analyses were conducted at the Multidisciplinary Research Unit (PCI) of the University of Life Sciences "King Mihai I", Timisoara.

• Results and discussions

The chemical composition of the analyzed bee products, apilarnil, royal jelly, and propolis, exhibits a high variability, depending on the form of presentation and the source of origin. In general, the bee products from the Banat apiary showed the best results in terms of polyphenols and flavonoids, while the amino acid content was higher in commercial bee products. All analyzed samples had values of determinations within the permitted limits of quality standards.

• Conclusions

The characterization from the point of view of the content of amino acids, polyphenols and flavonoids of some bee products from the Banat region is important for the promotion of these products and their use in fields such as pharmaceutical, medical or biotechnological. The study is all the more important because comparisons are made with the same bee products but of commercial origin.