

DEVELOPMENT OF A MULTI-GROUP AND MULTI-RESIDUE SCREENING METHOD FOR THE DETERMINATION OF VETERINARY DRUG RESIDUES IN POLLEN, BEE BREAD (PERGA), PROPOLIS, AND ROYAL JELLY BY LC-MS/MS

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THESIS ABSTRACT

In this doctoral study, a multi-group and multi-residue screening analytical method based on the LC-MS/MS technique was developed and analytically validated for the determination of veterinary drug residues in different bee products, including pollen, bee bread (perga), propolis (alcohol-based and water-based), and royal jelly. The performance of the developed method was evaluated through validation studies conducted in five different matrices. Blank sample responses, threshold values, mean responses of fortified samples, and Fm values were calculated for alcohol-based propolis, water-based propolis, pollen, royal jelly, and perga matrices. The suitability of the method was demonstrated by meeting the $F_m > T$ criterion for all validated analytes. Adequate sensitivity was achieved even in challenging matrices with high protein and lipid content, such as royal jelly, while the low blank sample responses observed in water-based propolis supported the selectivity of the method. Although certain analytes were excluded due to the complex structure of the perga matrix, the overall performance of the method was considered acceptable.

APPLICATION AREAS OF THE THESIS RESULTS

The LC-MS/MS-based multi-residue screening method developed and validated within the scope of this thesis is directly applicable to the routine monitoring of veterinary drug residues in bee products. The method enables the screening of different bee products using a single analytical approach in official control laboratories and research centers, providing significant advantages in terms of time, cost, and labor efficiency. Its integration into national residue monitoring programs would support the strengthening of regulation-based controls for bee products other than honey. In this way, food safety would be enhanced, while contributing to the protection of public health and the development of sustainable beekeeping practices.

ACADEMIC ACTIVITIES

- Ülkü, N., Tayar, M., Kiraz, D., Özcan, A., Yibar, A., Kaygisiz, M., ... & Adaş, A. (2025). Transfer of Some Macrolide Group Antibiotics from Spiked Milk to Melting Cheese and Determination of Their Processing Factor with LC-MS/MS. *Food and Bioprocess Technology*, 18(2), 1905-1918.
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KEY WORDS

- ✓ Bee products
- ✓ Method validation
- ✓ Veterinary drug residues
- ✓ LC-MS/MS residue analysis
- ✓ Screening method validation

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