PP-341 [Apitherapy]
From rapeseed to honeydew: comparative analysis of antimicrobial, antioxidant, and bioactive properties of different honey types

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BACKGROUND
Honey is a product with antibacterial, antioxidant, and wound-healing properties. Its biological activity varies depending on botanical origin. This study integrates two independent research projects evaluating the antibacterial, antioxidant, and bioactive properties of different Polish honey varieties. The first study assessed antimicrobial and antioxidant activity of buckwheat, rapeseed, linden, and honeydew honey collected from the IMMUNO University of Szczecin's apiary. The second study analyzed heather, buckwheat, rapeseed, and linden certified honey "Miód Drahimski", focusing on phenolic acid composition, skin penetration, and formulation stability. By combining these studies, we provide a broader understanding of honey's therapeutic potential.

Problem Description:
Despite increasing interest in honey's pharmacological applications, beekeepers and consumers lack detailed comparative data on its bioactivity. Moreover, while honey-based formulations are gaining popularity in dermatology, little is known about their effectiveness in delivering bioactive compounds through the skin. This study aims to address these gaps by evaluating honey's antimicrobial properties, polyphenol content, and its ability to enhance skin permeation of phenolic acids.

METHODOLOGY:
Honey samples were tested for antibacterial activity using spectrophotometric determination of Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) against Staphylococcus aureus, Bacillus subtilis, and Escherichia coli. Antioxidant potential was assessed using the Folin–Ciocalteu method and Ferric Reducing Antioxidant Power (FRAP) assay. Vitamin C content was determined spectrophotometrically. In "Miód Drahimski" we also analyzed phenolic acid composition using HPLC and examined skin permeation with Franz diffusion cells. Biodegradability of honey-based hydrogels and emulsions was also tested.

Results and CONCLUSION: Buckwheat and honeydew honey exhibited the highest antibacterial activity. Heather honey showed the highest antioxidant potential and polyphenol content. Phenolic acids, especially gallic acid and 3,4-dihydroxybenzoic acid, penetrated the skin more effectively when incorporated into hydrogel formulations. Biodegradability tests classified honey-based formulations as partially biodegradable, supporting their use in eco-friendly cosmetics. These findings suggest that different honey types may be optimized for medical, pharmaceutical, and cosmetic applications.

Practical Implications for Beekeepers:
Beekeepers can utilize these findings to promote honey's value beyond nutrition. The demonstrated antimicrobial and antioxidant effects support honey's application in apitherapy and dermatology. Proper harvesting and storage can preserve its bioactive properties, enhancing product quality.