

INNOVATIVE APPROACHES TO ENRICHING BEER WITH FUNCTIONAL INGREDIENTS BASED ON PROPOLIS

Didukh D., Belinska A.

National Technical University

"Kharkiv Polytechnic Institute", Kharkiv

With the growing demand for natural and health-oriented beverages, modern brewing faces the challenge of combining traditional taste with added biological value. One promising direction is the introduction of propolis, a natural bee product known for its antioxidant, antimicrobial, and anti-inflammatory properties, into the brewing process. Recent studies highlight its potential to bridge the gap between conventional brewing and functional food trends, addressing consumer demands for both flavor and health benefits.

The aim of this study is to scientifically justify the use of propolis as a functional additive in pale beer production and to assess its impact on the physicochemical and sensory characteristics of the final product. Specifically, we evaluate how propolis influences key parameters such as pH, turbidity, phenolic content, and shelf-life extension, providing a holistic view of its technological applicability. The research explores biotechnological aspects of propolis dosing, extraction methods, active compound stability in the brewing environment, and flavor profile modulation. Advanced HPLC-MS analysis reveals that propolis introduces bioactive flavonoids and caffeic acid derivatives, which remain stable during fermentation and pasteurization. Our optimized ethanol-water extraction protocol maximizes polyphenol yield while minimizing undesirable waxes, achieving 85 % bioactive retention post-processing. Sensory analysis confirms that, when used in optimal concentrations, propolis contributes a subtle herbal note without overpowering the beer's characteristic taste. A trained panel noted enhanced complexity in aroma, with 78 % approval rates for balanced bitterness and a honey-like aftertaste in pilot batches. Preliminary results show that propolis increases the antioxidant capacity of beer, reduces the need for synthetic preservatives, and supports the development of innovative, health-oriented craft beverages. Microbiological testing demonstrates a 2-log reduction in spoilage bacteria, confirming its role as a natural preservative. This approach aligns with current trends in clean-label product development and functional brewing. The study's findings could redefine craft beer innovation, offering a template for merging ancient remedies with modern biotechnological precision to meet the evolving demands of health-conscious consumers.

References:

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