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WV INTERNATIONAL CONGRESS

V ENGINEERING, ENVIRONMENT AND MATERIALS IN PROCESS INDUSTRY EEM2023

BOOK OF ABSTRACTS



JAHORINA
MARCH 20-23, 2023

REPUBLIC OF SRPSKA
BOSNIA AND HERZEGOVINA

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THERAPEUTIC PROPERTIES OF HONEY FROM THE WESTERN BALKANS

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Abstract

Honey is a natural sweetener produced not only for food, but also for therapeutic purposes. Carbohydrates (glucose and fructose (85–95%)) dominate in honey composition, but it contains about 200 substances present in small amounts (minerals, proteins, enzymes, amino acids, organic acids, vitamins, polyphenols and other phytochemicals).

The health benefits of honey, used for centuries for therapeutic purposes, derive from its antioxidant nature, antimicrobial and antiproliferative activity.

The antioxidant capacity of honey primarily depends on the phenolic profile of honey, which depends on its botanical and geographical variations. The antibacterial activity of honey results from the high osmolarity and acidity of honey, as well as the presence of hydrogen peroxide and phenolic compounds.

With the aim to assess the antioxidant capacity and antibacterial activity of different types of honey characteristic for the region, nineteen samples (acacia, linden, heather, sunflower, phacelia, basil, anise, sage, chestnut, hawthorn, buckwheat, lavender and meadow) were collected from different locations from the Western Balkans region and examined. Honey samples were also tested for physicochemical parameters (moisture, pH value, electrical conductivity, free acidity and HMF) to ensure that they meet the requirements for honey quality.

Based on the physicochemical profile of honey samples, it was concluded that all of them were in accordance with the regulations of national and EU regulations.

The antioxidant potential of honey samples was assessed by determining the total phenol content (TPC) and evaluating the antiradical activity on diphenylpicrylhydrazyl radicals (DPPH·).

The highest phenol content was found in basil honey (101 ± 2.72 mg GAE/100 g), while the lowest was determined in rapeseed honey (11.5 ± 0.70 mg GAE /100 g). Heather, anise, phacelia, sage, chestnut and lavender honey samples were also abundant in phenolics (80–100 mg GAE/100 g). Scavenging activity on DPPH· was the highest in lavender honey ($IC_{50} = 88.2 \pm 2.11$ mg/mL) and the lowest in rapeseed honey ($IC_{50} = 646 \pm 8.72$ mg/mL).

Antibacterial activity was estimated in vitro using agar diffusion tests and measuring minimal inhibitory concentration (MIC). Among investigated bacterial strains following resistant potencies were determined: *E. coli* > *E. coli* ATCC 8739 > *E. faecalis* > *Proteus mirabilis* > *S. aureus* > *S. epidermidis*. The linden honey from Fruška Gora (MIC values of 3.12% and 6.25% against *S. aureus* and *S. epidermidis*, respectively) and phacelia honey (MIC values of 6.25% and 3.12% against *S. aureus* and *S. epidermidis*, respectively) showed the strongest antibacterial activity.

Key words: honey, antioxidant activity, antibacterial activity

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