

CHEMICAL STANDARDIZATION AND ANTIMICROBIAL ACTIVITY OF COMMERCIALY AVAILABLE PROPOLIS EXTRACTS IN SLOVENIA

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The current trend towards utilizing natural products have resulted in an increased demand for bee products, which can bring health benefits. Propolis is one of the bee products with functional properties and it is widely use in apitherapy, products for human consumption like drinks, foods and cosmetics. In Slovenia, propolis is recognized as a food supplement and up to the present, there is no regulations regarding the quality of propolis.

Considering the diversity in composition of propolis it is necessary the chemical standardization that guarantees its quality, safety and efficacy. Flavonoids, one of the main groups of phenolic compounds in propolis, are the key compounds for estimating of propolis quality.

The objective of the present study was to analyse and to compare the bioactive compounds and antimicrobiological activity of propolis extracts from Slovenian market.

MATERIALS AND METHODS

- samples: 8 different commercial ethanolic extracts
- three spectrophotometric methods for the quantitative determination of different flavonoids groups and total phenolics were used.
 - flavones and flavonols: method with $AlCl_3$ (galangin as reference).
 - flavanones and dihydroflavonols: method with 2,4-dinitrophenylhydrazine (pinocembrin as reference).
 - total phenolic: Folin-Ciocalteu method (pinocembrin+galangin, 2:1, as reference)
- determination of principal flavonoids and phenolics acids by HPLC/UV
- antibacterial activity
 - agar cup method against *Staphylococcus aureus*
 - microtiter test with six serially dilution against *Escherichia coli*

RESULTS AND DISCUSSION

- % of propolis declared varied from 5% to 25%
- contents of total phenolics compounds varied from 0,86% to 4,73% . (Fig.1)
- the levels of flavones and flavonols varied from 0,02 to 1,02% (Fig.1)
- the content of flavanones and dihydroflavonols in propolis extracts studied varied from 0,05 to 0,68% (Fig.1)
- all samples presented similar chromatographic pattern, characterized by the presence of phenolic acids and flavonoids (poplar propolis)
- the samples demonstrated significant antibacterial activity against *Staphylococcus aureus* (Gram positive bacteria) (Fig. 2)
- all samples inhibited the development of *Escherichia coli* (Gram negative bacteria)
- there were differences in extract dilution that showed inhibition of *Escherichia coli*

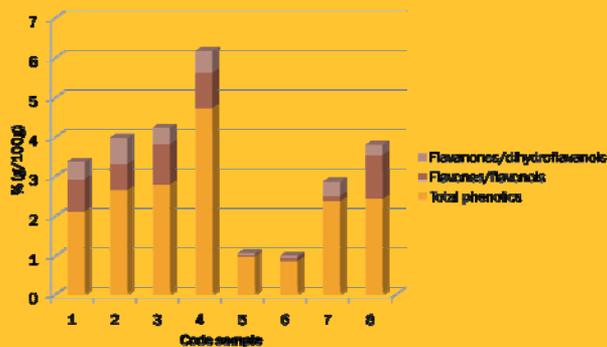


Fig.1: Levels of flavones/flavonols, flavanones/dihydroflavonols and total phenolics in propolis extracts.



Fig.2: Antibacterial activity of sample 5 and sample 6.

CONCLUSION

- great variability in relation to the concentration of total phenolics and flavonoids
- all the samples were active against *Staphylococcus aureus* (Gram positive bacteria) and *Escherichia coli* (Gram negative bacteria)
- the results show the need for regulation both in determinating the botanical origin and the chemical characterization of extracts