

PHYTOCHEMICAL ANALYSIS OF BEE POLLEN IN IMPACT OF DIFFERENT STORAGE CONDITIONS AND DURATION

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Background. Bioactive compounds found in bee pollen (BP) are essential for human health. Health benefits are related to unique chemical composition of BP. BP may be used as fresh and dried. Since the therapeutic effects depend on the quality of BP, preparation and storage conditions of BP are of great importance, as it may affect amount of bioactive compounds [1,2].

The aim. The aim of this study was to determine botanical origin of BP and evaluate the influence of storage conditions and duration on amino acids (AA) amount, total phenolic content (TPC) and total flavonoids content (TFC) of BP.

Methods. BP were collected from the apiary, Pasvalio district, Talkoniai (55.9598°N, 24.3422°E). Samples were dried or fresh-frozen (at -20°C or -80°C). Botanical origin was detected by melissopalynological analysis [1,2]. TPC was evaluated by Folin-Ciocalteu method [2]. The reaction with AlCl₃ was used to determine the flavonoids content [3]. Qualitative and quantitative analysis of AA was evaluated by UHPLC-MS/MS method [4]. Tests were carried out every 3 months (total duration of the study – 15 months). Means and standards deviations were calculated with SPSS 20.0.

Results. After melissopalynological analysis, pollen from *Salix* spp., *Taraxacum officinale* L., *Brassica napus* L. *Quercus* spp. was detected. TPC in the start point was in a range of 23.61±0.36 mg GAE/g DW to 24.52±0.66 mg GAE/g DW. TFC in the start point was in a range of 14.90±0.42 mg RE/g DW to 15.67±0.37 mg RE/g DW. TPC and TFC were not affected up to 6 months of storage in dried and up to 9 months in frozen BP, but further decreased with storage time. After 15 months TPC in frozen (at -20°C and -80°C) BP decreased by 1.9 and by 1.5 times meanwhile in dried BP decreased by 2.5 times (p<0.05). TFC in dried BP decreased by 3.1 times and in frozen (at -20°C and -80°C) BP by 1.9 and 1.7 times, respectively (p<0.05). After analysis, 17 AA were detected in both, dried and frozen BP. All of AA, except for cysteine, were well preserved for 6 months in both, dried and frozen samples. Amount of leucine, isoleucine, valine, histidine and arginine decreased over time in frozen samples, meanwhile amount of glycine, threonine, methionine, tyrosine, alanine and lysine was higher in frozen BP as compared to dried BP. Proline, aspartic acid, phenylalanine, glutamic acid and serine after 15 months storage were well preserved in both, frozen and dried samples.

Conclusions. In conclusion, the total phenolic content and the total flavonoids content in dried bee pollen gradually decreased during storage whereas frozen bee pollen were less affected. Quantitative composition of amino acids amount varies depending on storage conditions and duration.

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