

COMPARISON OF BEE POLLEN ANTIOXIDANT PROFILE AFTER ENZYMATIC HYDROLYSIS AND LACTIC ACID FERMENTATION

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Bee pollen is one of the most popular product of natural origin, which is known and is used for thousand years for its nutritional and medicinal properties. Recently, this natural product gain a huge attention of the due to its chemical composition, therapeutic properties and possibilities of uses. However, pollen wall structure is resistant to the human digestion system and limited bioavailability is determined. New tendencies in food biotechnology induce to use fermentation or enzymatic treatments due to make products more usable. Also, these processes help to increase amount of nutrients, peptides, amino acids, probiotics and vitamins [1].

The aim of this study was to compare the effect of fermentation with lactic acid bacteria and enzymatic hydrolysis on bee pollen antioxidant activity. Nine samples of bee pollen from Sweden, Spain, Italy, The Netherlands, Poland, Lithuania, Denmark, Malta and Slovakia were fermented and hydrolyzed using lactic acid fermentation and enzymes, respectively. Three types of bee pollen treatment were performed: spontaneous fermentation, bacterial fermentation with *L. rhamnosus* and enzymatic hydrolysis (using Viscozyme L, Clara-diestase, lipase, protease, amyloglucosidase and cellulase enzymes). Total phenolic compound content, total flavonoid content and antioxidant activity were determined in the bee pollen extracts by spectrophotometric methods in order to evaluate amount of bioactive compounds [2, 3, 4]. The total content of phenolic compounds was measured using Folin-Ciocalteu reagent. The total flavonoid content analysis was carried out performing colorimetric reaction with aluminum chloride. Antiradical activity, characterized by the total radical scavenging activity, was measured using 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical. Also, the oxidation-reduction potential (ORP) was measured with platinum electrode using a standard multimeter [5].

Additionally, the fermentation process or enzymatic treatment helps to break the bee pollen wall and increase total phenolic, total flavonoid compounds content or antioxidant activity. The following conclusion of which type of treatment has the greatest potential in obtaining high available biologically active compounds will be presented during the conference.

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- [1] S. Yan, Q. Li, X. Xue, K. Wang, L. Zhao, L. Wu. Analysis of improved nutritional composition of bee pollen (*Brassica campestris* L.) after different fermentation treatments, International Journal of Food Science & Technology **54**(6), 2169-2181 (2019).
 - [2] V. Kaškonienė, A. Katilėvičiūtė, P. Kaškonas, A. Maruška The impact of solid state fermentation on bee pollen phenolic compounds and radical scavenging capacity, Chemical Papers, 1-6 (2018).
 - [3] V. Kaškonienė, G. Ruočkuvienė, P. Kaškonas, I. Akuneca, A. Maruška, Chemometric analysis of bee pollen based on volatile and phenolic compound compositions and antioxidant properties, Food Analytical Methods **8**(5), 1150-1163 (2015).
 - [4] M. Stankevičius, I. Akuneca, I. Jakobsone, A. Maruška, Comparative analysis of radical scavenging and antioxidant activity of phenolic compounds present in everyday use spice plants by means of spectrophotometric and chromatographic methods, Journal of Separation Science **34**(11), 1261-1267 (2011).
 - [5] L. D. Mello, G. P. Quadros. Correlation between antioxidant activity and total phenolic content with physicochemical parameters of blended extracts of *Camellia sinensis*, Acta Scientiarum **36**, 97-103 (2014).