Physico-Chemical Evaluation of Honey Fortified with Oleaginous Seeds

Ariana – Bianca VELCIOV, Adrian RIVIȘ, Corina – Iuliana COSTESCU, Georgeta-Sofia PINTILIE, Anca – Maria JIDIC

Banat’s University of Agricultural Sciences and Veterinary Medicine “King Michael I of Romania” Timisoara, Faculty of Food Processing Technology

* Corresponding author e-mail: ariana.velciov@yahoo.com

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Abstract
Honey and oleaginous fruits are extremely valuable for human diet. The aim of this research was to obtain 3 natural-fortified foods, based on acacia honey and oleaginous fruits: pumpkin seeds, sunflower seeds and hemp seeds. Samples obtained were stored in appropriate conditions until analysis. The following physico-chemical determinations were performed for all samples: quantitative determination of ascorbic acid and humidity.

From the analyzed data we can observe that experimental results could be influenced both by the quality of honey and nutritional value of pumpkin, sunflower and hemp seeds.

Keywords: ascorbic acid, humidity, seeds, honey

Introduction. Honey is not only used as nutrition but also used in wound healing and as an alternative treatment for clinical conditions (Khan et al., 2007; Gibson, 2007). In the last years new products based on fortified honey appeared on Romanian market in. Therefore, authors consider important evaluation of some quality parameters of these products.

Seeds are a complete source of all essential amino acids and fatty acids and should not miss from our daily diet. Sunflower seeds are exceptional source of vitamin E, as well as a source of selenium (40 g of sunflower seeds provides 30% of the RDA for selenium). Pumpkin seeds contain phytosterols, and are rich source of fiber. Regarding the nutritional content of shelled hemp seeds, they contain 30% protein, 42% fat and 15% carbohydrates. (Leizer et al., 2000).

The authors considered that some physico-chemical parameters determinations of these products would be of great interest for consumers and producers, as well as researchers.

Materials and methods. Acacia honey samples were purchased directly from the producer in May 2014. The new fortified products were obtained by mixing acacia honey with pumpkin seeds, sunflower seeds and hemp seeds ratio 1/4 (seeds/honey - w/w)

Quantitative determination of vitamin C from all raw materials and final products was performed spectrophotometrically by using UV - VIS Analytical Jena Spectrophotometer.

Humidity of seeds was evaluated thermogravimetrically by using Sartorius thermo-balance.

Results and Discussions. In this study, authors obtained 3 different types of fortified honey, using pumpkin seeds, sunflower seeds and hemp seeds. Samples obtained were stored for 30 days at 22–25°C room temperatures. In order to obtain fortified products with high nutritional value, the mixture must be kept at rest for at least 4-5 months. Humidity evaluation of honey and final fortified products it will be subject to further determinations.

The results regarding the quantity of vitamin C from fortified honey products, honey without seeds and seeds are shown in Figure 1. From these values we can observe that the highest content of
vitamin C is present in pumpkin seeds and lowest in sunflower seeds. Honey without the addition of seed has an average content of vitamin C about 0.18 mg%.

Thermo-gravimetric analysis of humidity in the analyzed samples was performed by using Sartorius thermo balance. Results are expressed in figure 2.

The data presented show that the high humidity recorded at hemp seeds (5.73%) and lowest at pumpkin seeds (2.98%). Regarding EC 110/2001, maximum humidity of honey is 20%.

**Conclusions.** The content of ascorbic acid (mg %) in samples of seeds, honey and mixture of honey and seeds were in range of 0.135-0.37 mg%. The highest concentration was identified in pumpkin seeds. In case of fortified products the highest ascorbic acid concentration was found in honey from honey with sunflower seeds. The seeds humidity was in range of 2.98-5.73%.

**References**