

## Physical properties of some honeys produced from different plants in Banat area

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### Abstract

In this study, water content, pH, salinity, refractive index and brix grades were all determined in 4 different types of bee honey, which include multifloral and unifloral species: Acacia flower (lat. *Robinia pseudoacacia*), Rape flower (lat. *Brassica rapa*) and Linden flower ( lat. *Tilia cordata*).

The water content shows values from 15.8% until 11.4%, respectively from 11.5 until 16.02 in case of indirect method, pH between 3.69 and 4.4, brix grades between 78° and 80.8°, refractive index between 1.49663 until 1.50825 and salinity from 70.8% until 76%.

The principal purpose of this study was to bring more contribution to the knowledge of various types of honey originating from the Banat area in terms of physical properties.

**Keywords:** honey, water content, pH, salinity, refractive index, brix grades

### 1. Introduction

Natural honey is a sweet food product obtained by honey bees from sugary solution of nectar flowers as their source of food in time of scarcity or during harsh weather conditions [3,7]. Honey is one of the most widely sought products because of its unique nutritional and medicinal qualities. These properties had been attributed to the influence of separated groups of substances it contained: mainly sugars (glucose and fructose and other types), proteins, minerals, phytochemicals (organic acids, vitamins, enzymes), and water. Composition of honey depends on the type of flowers used by the bees as well as the climatic conditions, and each one of the constituents was known to have nutritional and medicinal properties [5,12].

Some physical properties of honeys have been found to be useful for comparison of different honey samples from different locations and also serve as important indicators that can help to appreciate quality of these food products.

Because of its melliferous variety sources, Banat area is considered to be a valid territory for honey production. Starting from these assumptions, we can consider that honey is not only used as nutrition but also used in wound healing and as an alternative treatment for clinical conditions [6,8,10]. In the last years new products based on fortified honey appeared on Romanian market in. Therefore, we consider important evaluation of some quality parameters of these products.

## 2. Materials and methods

**Honey samples.** In this study, we used 16 different types of unifloral and multifloral honey samples collected from beekeepers from different parts of Banat area. Samples obtained were stored for 30 days at 22–25°C room temperatures.

**Analytical procedures.** Water content (moisture) was determined by an Abbe – type refractometer - (Model KRÜSS) by reading refractive index (nD) at 26°C, according to the relationship between honey, water content and nD index [2,4]. Water content determination by indirect method was made by using tables from [11]. According to them, correction was made as it follows: nD - 0.00023 for each 1°C.

pH was measured by using a digital pH meter (Tester pH ExStick™ PH-100, Extech Instruments a FLIR Company) calibrated with pH 4 and 7 buffers.

Refractive index, salinity and brix grades were also determined by using the same Abbe – type refractometer - (Model KRÜSS).

## 3. Results and disussions

The values of water content, water content by indirect method, pH, salinity, refractive index and brix degrees are given in Table 1.

**Table 1.** Physical parameters of honey samples

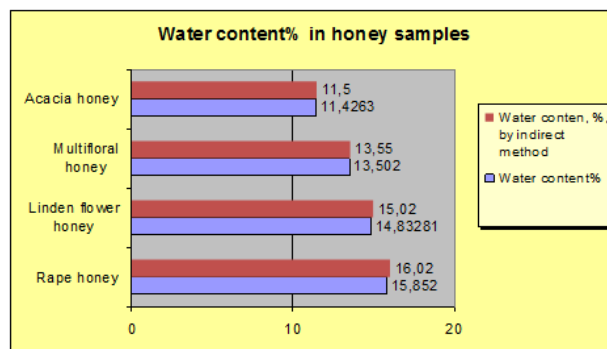
Physical parameters	Specification			
	Acacia honey	Linden flower honey	Rape honey	Multifloral honey
Water content (%)	11.4263	14.83281	15,852	13.502
Water content by indirect method (%)	11.5	15.02	16.02	13.55
pH	4.01	4.40	3.78	3.69
Salinity %	72.2	76	70.8	70.8
Refractive index at 20°C	1.50825	1.49926	1.49663	1.50312
Brix degrees	79.2	80.8	78	78

Water content is a parameter related to the maturity of honey and temperature. In the present study water content values are between 11.42% and 15.85%. These data was in according with the values allowed by European Community regulations [1].

Water content by indirect method was made by using literature tables [11]. According to these,

correction was made as it follows: nD - 0.00023 for each 1°C.

The obtained data through the two methods are presented graphically in figure 1.

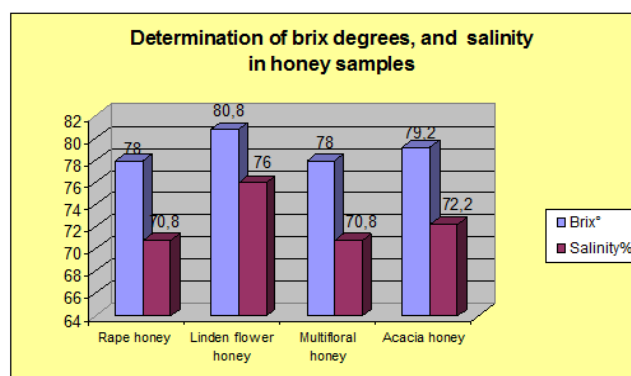


**Figure 1.** Water content in honey samples

The pH of samples has values between 3.69 and 4.40. Comparison of the pH values with % of water content of the samples did not reveal any obvious relationship.

Refractive indexes of honey samples were between 1.49663 (Rape honey) and 1.50825 (Acacia honey).

The salinity and brix grades are presented in figure 2.



**Figure 2.** Brix degrees and salinity in honey samples

It was observed that in case of rape and multifloral honey, the values of salinity are identical (70.8), and in case of linden flower honey the value is increased (76%).

Brix degrees (sugar content) of honey samples was between 78 degrees (identical in rape and multifloral honey) and 80.8 degrees in linden flower honey. The values obtained in honey samples were in according to other researches [9].

#### 4. Conclusions

The physical properties of four honey samples obtained from Banat area was determined and used to evaluate their behavior.

The antimicrobial properties of honey may be attributed to the low pH values, and the percentage water content can be an important parameter used to access quality of honey samples.

Although honey whose nectar source was floral has been studied, the knowledge of physical features of samples from Banat area is very important in order to set up certification marks and improve the local beekeeping.

**Compliance with Ethics Requirements.** Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human / or animal subjects (if exist) respect the specific regulation and standards.

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