

DETERMINATION OF PHYSICO-CHEMICAL PARAMETERS OF POLYFLORAL

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Summary: The article presents the results of studies made on polyfloral honey from various local producers. The paper describes the methods for determining the physico-chemical properties of honey by using research methods such as refractometry, titrimetry, spectrophotometry. Attention is drawn to the fact that high demand for apiculture products is often attractive and leads to falsification of honey, which can only be detected by laboratory research methods. Determining the presence of oximethylfurfural has made it possible to identify the natural character of honey and determine the degree of preservation of its natural qualities as well as being a criterion for detection of falsification.

Keywords: Natural honey, physico-chemical indicators, oximethylfurfural

Introduction

Honey is a complex natural product, resulting from the floral nectar of plants, which is enriched by bees with its own substances, through the action of juice secreted by their glands. Bees often produce handmade honey, which comes from various sweet liquids from the plant, but not from the flower.

From the food, hygiene and sanitary point of view, honey means the natural food extracted from the honeycombs when they have been bee-hatched on at least 3/4 of their area in such a way as to avoid the penetration of larvae, bee corpses, wax fragments or other impurities (Bulanca, 2002).

Polyfloral honey comes from the nectar harvested from different plants that flourish during the same period without the predominance of one of them.

The composition of honey is complex. It pools groups of inorganic and organic substances: carbohydrates, enzymes, organic acids, vitamins, proteins (amino acids), all solubilized or dispersed in the water contained in the honey.

Honey is highly appreciated for its qualities with therapeutic uses. Honey is a valuable food for health.

In the study of honey are used organoleptic, microscopic and measuring methods.

Organoleptic research allows us to determine the color, flavor, texture, taste, presence of foreign substances, fermentation of honey.

Physicochemical methods determine water content, invert sugar, sucrose, diastase index, acidity, amount of hydroxymethylfurfural.

The high demand for honey on the market often leads to falsification, which can only be detected by laboratory methods. The purpose of the research is to study the physico-chemical indices in the polyfloral honey from different producers present on the local market.

Materials and methods of research

In order to evaluate physico-chemical parameters, 10 samples of honey were purchased and selected from three different producers, and they are part of the group collected from June to September 2018.

The physico-chemical studies of honey were made using the following methods:

Determination of water content or moisture content: The water content is determined by measuring the refractive index at 20 ° C using a refractometer, and the water content corresponding to the refractive index is determined from the table.

Determination of pH and free acidity: The pH is measured at 20 ° C on a 10% honey solution in distilled water using a pH meter.

Determination of hydroxymethylfurfural: The amount of hydroxymethylfurfural (HMF) was obtained by the GOST-32169-2013 method. The principle is based on reading HMF absorbance at a wavelength of 284 nm and then at 336 nm using a UV-Visible spectrophotometer.

The mass fraction of water, pH and free acid content of oximethylfurfural in honey samples were determined according to GOST 31774-2012, GOST-32169-2013, GOST-31768-2012

Results

Honey samples analyzed polyphlora have a clean, homogeneous appearance without impurities and foam, with a fluid-viscous consistency some crystallized, the color varies from light yellow to dark yellow. In terms of taste and smell - sweet, pleasant.

Moisture: The maximum water content regulated by the official rules in our country for all types of honey is 20%. This condition is based on the fact that at the end of the bee processing process (cell capacity), honey's humidity ranges from 17-20%.

The honey of the studied lots had a mass of water of 17% on average; two samples with a water content of 15.7%, two samples from 19-19.3%, and six samples with a water content from 16.9%, a sample of 17.8%, (Table 1).

The excess water content reduces the nutritional value of honey in proportion to the fermentation.

Honey Acidity: The active (actual) acid refers to acids in dissociated form and is expressed as pH units. The pH of honey depends on the amount of organic acids, such as gluconic, pyruvic, malic and citric acids, and minerals (Cavia et al., 2007). The chemical reaction of honey is acidic because of the rich content of organic acids. The normal pH values of nectar honey range from 3.5-4.5 (Bogdanov S., 1999) and exceeds 4.5 for honey. The chemical character of honey is pronounced acidic. Determining acidity helps to appreciate the freshness of honey.

Table 1. Physico-chemical parameters of honey samples studied polyphlora

	Humidity, %	pH	Acidity/kg	HMF, mg/kg
Norme UE, Codex Alimentar	17 < 21,0	3,5 < pH <4,5	<50mechiv/kg	<40mg/kg
Sample 1	15,7	3,83	16,4	22,4
Sample 2	15,8	4,15	14	31
Sample 3	17	4,41	10	18,5
Sample 4	19,2	4,25	21	21,8
Sample 5	17,8	4,37	18	28,3

	Humidity, %	pH	Acidity/kg	HMF, mg/kg
Sample 6	17,2	4,81	15	41,6
Sample 7	16,9	4,16	17	24
Sample 8	17	4,24	16	35,6
Sample 9	17,1	3,9	20	26,7
Sample 10	19	4,2	18	38,3

From the data presented (Table 1), we note that the new analyzed samples are within the established pH limits, and only the sample no. 6 has a pH of 4.81. This indicates that we have a honey or a honey fermentation.

According to Schweitzer (2004), the natural acidity of honey increases when honey matures when extracted with propolis and especially when it is modified by fermentation. Acidity is an important criterion of quality and provides very important indications of the state of honey (Bogdanov, 1999).

The pH value for all honey samples indicates their acidic reaction: the maximum pH was 4.81, the minimum was 3.83, on average 4.23 pH units.

Hydroxymethylfurfural (HMF). The presence of this product in honey originates either in the partial decomposition of fructose from its composition under the influence of external factors or exogenous origin in case of falsification.

In acidic and hot environment, fructose decomposes with the formation of furfurolic products, the most significant of which is hydroxymethylfurfural (HMF). HMF formation occurs as a result of long-term honey at a temperature of 21-26 ° C (a slow process under these conditions) and after heating of more than 55 ° C. The value of oximethylfurfural must not exceed 40mg / kg

The analysis of the ten samples shows a variation in HMF from 18.5 to 41.6 mg / kg. Again sample 6 has a higher HMF content, the maximum allowable being 40mg / kg. We can assume that this sample was not kept in optimal conditions. Otherwise, all samples have an HMF content of less than 40mg / kg and meet the required standards.

Conclusions

The quality of honey's natural honey depends on organoleptic, microscopic and physico-chemical parameters. In nine of the ten samples analyzed, these indices were in accordance with GOST 19792-2001 "Natural Honey, Technical Conditions". These honey samples can be characterized as a quality product with acceptable aromatic properties.

Honey from sample 6 did not meet the requirements of the standard for the pH index and the high level of hydroxymethylfurfural, which can be explained by inadequate storage conditions or falsification of honey. To say that it is a forged honey, other physicochemical indices need to be determined, such as the diastase index.

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