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**MONITORING THE SAFETY OF HONEY DURING SALE  
AND DETECTING ITS FALSIFICATION USING  
EXPRESS METHODS**

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**INTRODUCTION**

Honey safety control is carried out in accordance with current regulatory documents that regulate access to the sale of honey on the domestic and foreign markets, in particular in European countries, on the basis of positive laboratory tests on the safety and quality of honey. Average consumers prefer high-quality and safe honey with good organoleptic characteristics, medicinal properties and attractive color<sup>1</sup>.

The issue of safety and quality of honey during production is becoming increasingly important, as consumers prefer safe food products, in particular as a product for the treatment and prevention of many diseases<sup>2</sup>.

The regulatory document "Requirements for Honey" regulates the requirements for proper labeling of each batch of honey of the same botanical origin, as well as the presence of pollen grains of the corresponding type of honey to ensure its naturalness, quality and safety<sup>3</sup>.

Regulated requirements have been established for the content of fructose and glucose – not less than 60 g per 100 g of honey; the content of sucrose for all types of honey – not more than 5 g/100 g, and for honey from white acacia – not more than 10 g/100 g; all types of honey must have no more than 20% moisture content; the content of free acids (or active acidity of honey) – not more than 50 milliequivalents of NaOH with a mass concentration of 0.1 mol/dm<sup>3</sup>

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<sup>1</sup> Adamchuk L. O., Silonova N. B., Sukhenko V. Yu., Pylypko K. V. Regulatory regulation of honey safety and quality indicators. *Animal Science and Food Technology*. 2020. Vol. 11. No. 4. ISSN 2706-8331. Doi: 10.31548/animal2020.04.005.

<sup>2</sup> Bernklau E., Bjostad L., Hogeboom A., Carlisle A., Arathi H.S. Dietary phytochemicals, honey bee longevity and pathogen tolerance. *Insects*. 2019 10:14. doi: 10.3390/insects10010014.

<sup>3</sup> Requirements for honey: regulatory document. Approved by order of the Ministry of Agrarian Policy and Food of Ukraine dated 06/19/2019 No. 330; as amended by order of the Ministry of Agrarian Policy and Food of Ukraine dated 11/12/2024 No. 409; registered with the Ministry of Justice of Ukraine on July 04, 2024 under No. 725/33696. URL: <https://zakon.rada.gov.ua/laws/show/z0725-19#Text>.

of acid per 1000 g of honey; diastase activity (according to the Scheid scale) – except for honey for confectionery products, must have no less than 8 units; the content of hydroxymethylfurfural (HMF) – in all types of honey, except for honey for confectionery products, must have no more than 40 mg/kg<sup>4</sup>

We tested different types of honey from family apiaries in Ukraine: No. 1 – “Konyushyna”, Cherkasy region, top-grade acacia honey; No. 2 – “Bartnik”, Khmelnytskyi region, first-grade buckwheat honey; No. 3 – “Beehive”, Cherkasy region, top-grade sunflower honey; No. 4 – “Vedmedyk”, Chernivtsi city, first-grade mixed herb honey. In terms of safety and quality, the studied samples of different types of honey met the requirements of the national standard DSTU 4497 according to the indicators of the highest and first grades. The organoleptic assessment of the studied honey samples corresponded to these types of nectar-bearing plants and grades – the highest and first. There were no signs of souring in all honey samples, and no mechanical impurities were detected. In honey sample No. 1, white acacia pollen grains made up 99.0%; in honey sample No. 2, 89.0% buckwheat pollen grains; in honey sample No. 4, 85.0% sunflower pollen grains; in honey sample No. 4, buckwheat – 29.0% buckwheat pollen grains, 25.0 sunflower pollen grains, 28% alfalfa pollen grains. It was found that the highest mass fraction of water was observed in sample No. 4 – 19.37±0.03%, the lowest – in sample No. 1 – 17.12±0.03%; the diastase number was the highest in sample No. 4 – 13.04±0.03 units, and the lowest – in sample No. 1 8.76±0.02 units.

The active acidity of honey was the highest in samples No. 3 and 4, respectively: 32.52±0.02 and 29.06±0.03 mEq of NaOH (0.1 mol/dm<sup>3</sup>) per 1 kg of honey; the mass fraction of reducing sugars in honey was the highest in sample No. 3 – 88.41±0.03%, the lowest in honey sample No. 2 – 83.64±0.03%; the sucrose content in honey samples was within the regulatory parameters, except for sample No. 3, where an increase in the indicator to 7.56±0.02% was observed; the hydroxymethylfurfural content in all honey samples did not exceed the regulatory parameters – within the range from 9.38±0.01 to 15.68±0.01 mg/kg of honey<sup>5</sup>.

For veterinary doctors, the search for modern effective express methods for determining the adulteration of honey with alkaline detergents using an alcoholic solution of rosolic acid with a mass concentration of 0.1% and

<sup>4</sup> Machado De-Melo A. A., Bicudo de Almeida-Muradian L., Sancho M. T., Pascual-Maté A. Composition and properties of *Apis mellifera* honey: A review. *Journal of Apicultural Research*. 2018. V. 57. I. 1. P. 5–37. doi: 10.1080/00218839.2017.1338444.

<sup>5</sup> Mitton G.A., Szawarski N., Mitton F.M., Iglesias A., Eguaras M.J., & Ruffinengo S.R. Impacts of dietary supplementation with p-coumaric acid and indole-3-acetic acid on survival and biochemical response of honey bees treated with tau-fluvalinate. *Ecotoxicol Environ Safety*. 2020. 189:109917. doi: 10.1016/j.ecoenv.2019.109917.

a sodium bicarbonate solution using an alcoholic solution of bromothymol blue with a mass concentration of 0.05% remains an urgent issue. These express patented methods have the reliability of quality indicators in tests, respectively, – 99.8 and 99.9%<sup>6</sup>.

### 1. Organoleptic and physicochemical indicators of honey

We conducted tests on the organoleptic characteristics of different types of honey in terms of appearance, color, consistency, aroma, and taste. The organoleptic characteristics of honey are influenced by the type of various nectar-bearing plants, the method of honey production, storage, crystallization, the presence of mechanical impurities, etc. The best in terms of organoleptic characteristics are acacia, sunflower, sainfoin, linden, and buckwheat honey<sup>7</sup>.

Tests were also conducted for the presence of honey souring and the presence of foreign mechanical impurities. The results of determining the organoleptic indicators are presented in Table 1.

Table 1

#### Organoleptic characteristics of different types of honey produced from different family apiaries, $M \pm m$ , $n=7$

Researched indicators	Sample No. 1	Sample No. 2	Sample No. 3	Sample No. 4
	Organoleptic characteristics of different types of honey			
Appearance	Honey packaging – glass jars with a capacity of 250 to 500 cm <sup>3</sup> , the container is clean, contains labels with information about this type of honey from the corresponding family producer			
Color	light yellow	yellow-brown	intense yellow	intense yellow
Consistence	liquid, no crystallization, no sediment at the bottom of the container	very viscous, no crystallization, no sediment at the bottom of the container	viscous, no crystallization, no sediment at the bottom of the container	viscous, at the bottom of the container – a slight sediment up to 0.4–0.7 cm in the form of crystals
Aroma	specific to acacia, pleasant, strong, gentle, without foreign odors	specific to buckwheat, pleasant, strong, gentle, without foreign odors	pleasant, strong, gentle, without foreign odors	pleasant, strong, gentle, without foreign odors

<sup>6</sup> Yatsenko I. V., Lotskin I. M., Bogatko N. M., Evstafieva V. O., Mazanna M. G., Degtyarev M. O. Detection of adulteration of honey with sodium bicarbonate admixture using bromothymol blue indicator. *Theoretical and Applied Veterinary Medicine*. 2021. 9 (3). 135–139. doi: 10.32819/2021.93021.

<sup>7</sup> Berenbaum M.R., Calla B. Honey as a functional food for *Apis mellifera*. *Annu Rev Entomol*. 2020. 66:185–208. doi: 10.1146/annurev-ento-040320-074933.

## Continuation of table 1

Taste	sweet, delicate, pleasant, tart and irritating to the oral mucosa, without foreign flavors	sweet, delicate, pleasant, tart, irritates the mucous membrane of the oral cavity, without foreign flavors	very sweet, delicate, pleasant, not tart and does not irritate the oral mucosa, without foreign flavors	sweet, delicate, pleasant, tart and irritating to the oral mucosa, without foreign flavors
Signs of souring	missing	missing	missing	missing
Presence of mechanical impurities	missing	missing	missing	missing

The results of Table 1 indicate that honey of various types produced by family apiaries had positive organoleptic indicators that met the requirements of the national standard DSTU 4497: sample No. 1 of acacia honey – the highest grade, sample No. 2 of buckwheat honey – the first grade, sample No. 3 of sunflower honey – the highest grade, sample No. 4 of honey from various herbs – the first grade. However, in sample No. 4 of honey of viscous consistency, a slight sediment of up to 0.4–0.7 cm in the form of crystals was observed at the bottom of the container, which does not worsen the organoleptic indicators<sup>8</sup>. All honey samples were natural, which indicated an irritating effect (tartness) on the mucous membrane of the oral cavity<sup>9</sup>. There were no signs of souring in all honey samples, and no mechanical impurities were detected<sup>10</sup>.

Subsequently, physicochemical indicators of different types of honey were measured, which are presented in Table 2.

According to the indicators in Table 2, we have the results that all the studied honey samples in terms of pollen grain composition were dominated by these nectariferous plants: in sample No. 1, white acacia pollen grains accounted for 99.0%; in sample No. 2, 89.0% buckwheat pollen grains; in sample No. 4, 85.0% sunflower pollen grains; in sample No. 4, buckwheat – 29.0% buckwheat pollen grains, 25.0 sunflower pollen grains, 28% alfalfa

<sup>8</sup> On beekeeping: Law of Ukraine dated 22.02. 2000 No. 1492-III. Date of update: 29.09.2013 No. 442-VII; edition dated 02.03.2026, basis – 4718-IX. URL: <https://zakon.rada.gov.ua/laws/show/1492-14/comp20280117>

<sup>9</sup> Yiğit Y., Yalçın S., Onbaşlar E.E. Effects of different packaging types and storage periods on physicochemical and antioxidant properties of honeys. *Foods*. 2022. 13(22):3594. doi: 10.3390/foods13223594.

<sup>10</sup> Quirantes-Piné R., Sanna G., Mara A., Borrás-Linares I., Mainente F, Picó Y, & Ciulu M. Mass spectrometry characterization of honeydew honey: A critical rReview. *Foods*. 2024. 13(14):2229. doi: 10.3390/foods13142229.

Table 2

**Physico-chemical parameters of honey produced from different family apiaries,  $M \pm m$ ,  $n=7$**

Indicators	Sample No. 1	Sample No. 2	Sample No. 3	Sample No. 4
Pollen analysis result and species composition of pollen grains, %	white acacia – 99.0%, phacelia – 1.0%	buckwheat – 89.0%, red clover – 11.0%	sunflower – 85.0%, espartate – 15.0%	buckwheat – 29%, sunflower – 25%, alfalfa – 28%, field thistle – 11% phacelia – 7%
Mass fraction of water, %	17.12±0.03	18.45±0.03	19.11±0.04	19.37±0.03
Mass fraction of water	8.76±0.02	12.21±0.03	10.05±0.02	13.04±0.03
Acidity (active), mEq NaOH (0.1mol/dm <sup>3</sup> ) per 1 kg of honey	22.13±0.02	25.08±0.02	29.06±0.03	32.52±0.02
Mass fraction of reducing sugars (to anhydrous substance), %	85.77±0.03	83.64±0.03	88.41±0.03	84.09±0.03
Mass fraction of sucrose (on an anhydrous basis), %	3.61±0.01	5.17±0.02	7.56±0.02	5.86±0.02
GMF content, mg per 1 kg	9.38±0.01	10.44±0.01	13.16±0.01	15.68±0.01

*Note: The content of GMF is no more than 40 mg per 1 kg of honey in the highest and first grades, respectively.*

pollen grains. Our results were consistent with those of researchers in the field of honey safety control<sup>11</sup>.

The highest mass fraction of water was observed in sample No. 4 – 19.37±0.03%, the lowest – in sample No. 1 – 17.12±0.03%. The diastase number according to the Shade scale was the highest in sample No. 4 (forbs) 13.04±0.03 units, and the lowest – in sample No. 1 8.76±0.02 units. The active acidity of honey in all samples varied within the normal range from 22.13±0.02 to 32.52±0.02 mEq of NaOH with a mass fraction of 0.1 mol/dm<sup>3</sup> per 1 kg of honey (sample No. 4). All types of honey samples were natural, in which the mass fraction of reducing sugars was more than 70%, in particular, sample No. 3 had the highest content of them – 88.41±0.03%. In sample No. 3, the sucrose content was higher than the norm, and was 7.56±0.02%, which

<sup>11</sup> Akpınar S., Mutlu N. Multidimensional analysis of honey from Eastern Anatolia (Kars): Pollen spectrum, physicochemical properties, and antimicrobial activity. *PLoS One*. 2025. 20(7): e0327861. doi: 10.1371/journal.pone.0327861.

confirmed the too sweet taste of sunflower honey. Our results were consistent with those of researchers in the field of honey safety control<sup>12</sup>.

The content of hydroxymethylfurfural in all honey samples did not exceed the norms – no more than 40 mg per 1 kg of honey.

### 3. Microbiological indicators of honey produced from different family apiaries

We conducted microbiological tests on honey of all types and grades based on the number of mesophilic aerobic and facultative anaerobic microorganisms; the presence of *Escherichia coli* bacteria; pathogenic microorganisms, in particular *Salmonella* bacteria, the content of yeast and mold fungi). The results of microbiological research of honey obtained from various Ukrainian producers are presented in Table 3.

Table 3

#### Microbiological indicators of honey produced from different family apiaries, $M \pm m$ , $n=7$

Indicators	Sample No. 1	Sample No. 2	Sample No. 3	Sample No. 4
Number of MAFAnM, CFU/g	$(0.72 \pm 0.02) \times 10^2$	$(1.12 \pm 0.02) \times 10^2$	$(1.27 \pm 0.02) \times 10^2$	$(1.52 \pm 0.03) \times 10^2$
BGKP (not allowed in 0.1 g of honey)	not detected	not detected	not detected	not detected
<i>Escherichia coli</i> , in 1 g of honey	not detected	not detected	not detected	not detected
<i>Staphylococcus aureus</i> , в 1 г меду	not detected	not detected	not detected	not detected
Pathogenic microorganisms, including <i>Salmonella</i> bacteria, in 25 g of honey	not detected	not detected	not detected	not detected
Yeast content, in 50 g of honey	not detected	not detected	not detected	not detected
Presence of mold fungi, CFU/g	$2.1 \pm 0.2$	$8.8 \pm 0.3$	$17.4 \pm 0.3$	$58.6 \pm 0.5$

*Note: standards for the content of MAFAnM in natural honey –  $2.5 \cdot 10^4$  CFU/g; the content of mold fungi –  $1.0 \times 10^3$  CFU/g; the content of BGCP (coliform bacteria), *Escherichia coli*, *Staphylococcus aureus* in 1 g of honey; yeast in 50 g, pathogenic microorganisms, including bacteria of the genus *Salmonella* in 50 g – are not allowed.*

<sup>12</sup> Abeslami A., El Farissi H., Cacciola F., El Bachiri A., Sindic M., Fauconnier M.L., Bruneau E., Talhaoui A. Unveiling the mineral and sugar richness of moroccan honeys: A study of botanical origins and quality indicators. *Molecules*. 2025. 30(1):150. doi: 10.3390/molecules30010150.

According to microbiological indicators, the content of yeast and mold fungi, it was established that all honey samples from different producers met the regulatory requirements of the national standard of Ukraine DSTU 449713. However, the highest content of KMAFAnM was found in sample No. 4 ( $1.52 \pm 0.03$ )x 102 CFU/g, the lowest in sample No. 1 – ( $0.72 \pm 0.02$ ) x102 CFU/g<sup>14</sup>. It was found that the number of mold fungi in all honey samples was within the standards and varied from  $2.1 \pm 0.2$  to  $58.6 \pm 0.5$  CFU/g, which indicated the naturalness and safety of honey<sup>15</sup>. Honey safety scientists confirmed our test results<sup>16</sup>.

#### 4. Determination of adulteration of sodium honey with sodium bicarbonate and alkaline detergents

We have developed express methods for detecting honey adulteration with alkaline detergents and sodium bicarbonate solution<sup>17</sup>. To prevent the adulteration of honey with various chemical reagents, veterinary and sanitary requirements should be observed during the production and circulation of honey<sup>18</sup>.

For the first time, tests were conducted to determine the adulteration of honey samples with alkaline detergents using an indicator of an alcoholic solution of hydrochloric acid. The patented technique was based on a change in the color of the tested honey solution upon adulteration – the formation of a pink color<sup>19</sup>. A honey solution was prepared in a ratio of 1:2, filtered and 2 cm<sup>3</sup> of the honey solution was taken with a graduated pipette and 0.2 cm<sup>3</sup> of an alcoholic solution of hydrochloric acid with a mass concentration of

<sup>13</sup> Natural honey. Technical conditions: DSTU 4497:2005. [Valid from 2005-12-28]. K: Derzhspozhyvstandart of Ukraine, 2007. 21 p. (National standard of Ukraine).

<sup>14</sup> Almasaudi S. The antibacterial activities of honey. *Saudi Journal of Biological Sciences*. 2021. 28:2188–96. doi: 10.1016/j.sjbs.2020.10.017.

<sup>15</sup> Rosiak E., Madras-Majewska B., Teper D., Lepecka A., Zielińska D. Cluster analysis classification of honey from two different climatic zones Based on Selected Physicochemical and of Microbiological Parameters. *Molecules*. 2021. 26(8):2361. doi: 10.3390/molecules26082361.

<sup>16</sup> Al-Waili N., Salom K., Al-Ghamdi A., Ansari M.J. Antibiotic, pesticide, and microbial contaminants of honey: human health hazards. *Scientific World Journal*. 2012. 2012:930849. doi: 10.1100/2012/930849.

<sup>17</sup> Bogatko A.F., Bogatko N.M. Hygiene and medical expertise. Methods for determining honey falsification: scientific and practical recommendations for postgraduate students of veterinary medicine managers and specialists and students in the specialty H6 "Veterinary Medicine". Bila Tserkva, 2024.70 p.

<sup>18</sup> Hygienic requirements for facilities where beekeeping products are produced and/or traded: regulatory document. Approved by order of the Ministry of Agrarian Policy and Food of Ukraine dated 15.11.2023 No. 1968; registered with the Ministry of Justice of Ukraine on December 27, 2023 under No. 2262/41318. URL: <https://zakon.rada.gov.ua/laws/show/z2262-23#n7>.

<sup>19</sup> Brudzynski K. Honey as an ecological reservoir of antibacterial compounds produced by antagonistic microbial interactions in plant nectars, honey and honey bee. *Antibiotics*. 2021. 10:551. doi: 10.3390/antibiotics10050551.

0.1% was added, and the color of the contents of the test tube was recorded for 1–2 seconds: in the absence of adulteration – the formation of a yellow color; in the case of adulteration – the formation of a pink color. Also, tests were conducted for the presence of adulteration of honey with a sodium bicarbonate solution using an alcohol solution of bromothymol blue as an indicator. The patented technique was based on a change in the color of the tested honey solution upon adulteration – the formation of a green color.

A honey solution was prepared in a ratio of 1:2, filtered and 2 cm<sup>3</sup> of the honey solution was taken with a graduated pipette and 0.05 cm<sup>3</sup> of an alcoholic solution of bromothymol blue with a mass concentration of 0.05% was added, and the color of the contents of the test tube was recorded for 3–4 seconds: in the absence of adulteration – the formation of a blue color; in the case of adulteration – the formation of a green color.

The test results are presented in Table 4.

Table 4

**Indicators of detection of honey adulteration with sodium bicarbonate and alkaline detergents by the intensity of the color of the honey solution, M±m, n=7**

Indicators	Sample No. 1	Sample No. 2	Sample No. 3	Sample No. 4
Adulteration of honey with alkaline detergents using an alcoholic solution of hydrochloric acid (0.1%) in the number of honey samples/in %				
Presence of falsification	pink color, n=0/0	pink color, n=4/57,1	pink color, n=2/28,6	pink color, n=6/85,7
No falsification	yellow color, n=7/100	yellow color, n=3/42,9	yellow color, n=5/71,4	yellow color, n=1/14,3
Фальсифікація меду розчином натрію гідрокарбонату за використання спиртового розчину бромтимолового синього (0,05%) у кількості зразках меду/у %				
Presence of falsification	green color, n=0/0	green color, n=5/71,4	green color, n=4/57,1	green color, n=7/100
No falsification	blue color, n=7/100	blue color, n=2/28,6	blue color, n=3/42,9	blue color, n=0/0

From the results of Table 4, it was found that the sample of honey No. 1 from white acacia did not contain an admixture of alkaline detergents and sodium bicarbonate solution. However, the largest number of honey samples No. 2 and No. 4 were adulterated with alkaline detergents, 57.1 and 85.7% respectively, and honey samples No. 2, No. 3, No. 4 were adulterated with sodium bicarbonate solution, 71.4, 57.1 and 100.0% respectively. It should be noted that the reliability of qualitative indicators for determining impurities of alkaline detergents in honey was 99.8%, and sodium bicarbonate solution

– 99.9% compared to the indicators of conventional methods for determining the safety and quality of honey. Counterfeit honey samples are dangerous and are not allowed for sale, as this will harm the health of the average consumer<sup>20</sup>.

Scientists share the opinion that the adulteration of food products, in particular natural honey, poses a danger to consumers. Therefore, a judicial investigation should be conducted in accordance with legal documents, taking into account the cause and factors of honey adulteration, the social problem and impartiality in conducting tests. Methods for detecting honey adulteration should be developed that would be accessible to veterinary medicine specialists<sup>21</sup>.

Veterinary inspectors should carry out tests to determine the adulteration of honey with alkaline detergents and sodium bicarbonate solution during the production and circulation of honey. Guided by EU Regulation 625/2017, risk-based control of honey during production and circulation should be carried out, which should be transparent and clear, taking into account hazardous factors and applying the systems of control of hazardous factors at critical control points – HACCP and the system of prevention of adulteration – VACCP at production facilities<sup>22</sup>.

It is the VACCP system implemented by food market operators that will prevent food fraud during their production, storage and sale.

## CONCLUSIONS

When producing honey in family apiaries, sanitary and hygienic requirements should be observed during the production, storage and sale of honey. Therefore, the primary task of veterinary medicine inspectors of the State Service for Food Safety and Consumer Protection of Ukraine is perfect impartial control of the safety and quality of honey according to organoleptic, physicochemical and microbiological indicators. It was established that the data studied indicators of all honey samples produced in family apiaries of Ukraine complied with regulatory and legal documents. According to express methods, the reliability of qualitative indicators of detection of alkaline detergents and sodium bicarbonate solution was, respectively, 99.8 and 99.9% compared to the indicators of conventional methods for determining the safety and quality of honey.

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<sup>20</sup> Mara A., Mainente F., Soursou V., Picó Y., Perales I., Ghorab A., Sanna G., Borrás-Linares I., Zoccatelli G., Ciulu M. New Insights on Quality, Safety, Nutritional, and Nutraceutical Properties of Honeydew honeys from Italy. *Molecules*. 2025. 30(2):410. doi: 10.3390/molecules30020410.

<sup>21</sup> On forensic examination: Law of Ukraine dated 02.25.1995, No. 4038-XII. Current version dated 01.01.2026, basis – 5695-IX. URL: <https://zakon.rada.gov.ua/laws/show/4038-12#Text>

<sup>22</sup> Regulation (EU) No 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the verification of compliance with feed and food law, animal health and welfare rules and plant health rules. URL: [https://zakon.rada.gov.ua/laws/show/984\\_026-17#Text](https://zakon.rada.gov.ua/laws/show/984_026-17#Text).

## SUMMARY

Tests were conducted on the quality and safety indicators of various types of honey samples: from family apiaries of Ukraine: No. 1 – “Konyushyna”, Cherkasy region, acacia honey of the highest grade; No. 2 – “Bartnik”, Khmelnytskyi region, buckwheat honey of the highest grade; No. 3 – “Beehive”, Cherkasy region, sunflower honey of the highest grade; No. 4 – “Vedmedyk”, Chernivtsi city, honey from various herbs of the highest grade. It was found that the organoleptic indicators of different types of honey corresponded to certain types of nectar-bearing plants, in particular, honey sample No. 3 (sunflower honey) had a too sweet taste, which was explained by the increased sucrose content to  $7.56 \pm 0.02\%$ . The pollen composition of the studied floral honeys was also established: in honey sample No. 1, white acacia pollen grains accounted for 99.0%; in honey sample No. 2, 89.0% buckwheat pollen grains; in honey sample No. 4, 85.0% sunflower pollen grains; in honey sample No. 4, buckwheat, 29.0% buckwheat pollen grains, 25.0 sunflower pollen grains, 28% alfalfa pollen grains. It was found that the highest mass fraction of water was observed in sample No. 4,  $19.37 \pm 0.03\%$ , the lowest in sample No. 1,  $17.12 \pm 0.03\%$ ; the diastase number was the highest in sample No. 4,  $13.04 \pm 0.03$  units, and the lowest in sample No. 1,  $8.76 \pm 0.02$  units; The active acidity of honey was the highest in samples No. 3 and 4, respectively:  $32.52 \pm 0.02$  and  $29.06 \pm 0.03$  mEq of NaOH with a mass fraction of 0.1 mol/dm<sup>3</sup> per 1 kg of honey; The mass fraction of reducing sugars in honey was the highest in sample No. 3 –  $88.41 \pm 0.03\%$ , the lowest in honey sample No. 2 –  $83.64 \pm 0.03\%$ ; the sucrose content in honey samples was within the regulatory parameters, except for sample No. 3, where an increase in the indicator was observed; the content of hydroxymethylfurfural in all honey samples did not exceed the regulatory parameters – within the range from  $9.38 \pm 0.01$  to  $15.68 \pm 0.01$  mg/kg of honey. Honey samples were tested for adulteration with alkaline detergents and sodium bicarbonate solution: honey sample No. 1 from white acacia did not contain any impurities of alkaline detergents and sodium bicarbonate solution. However, the largest number of honey samples No. 2 and No. 4 were adulterated with alkaline detergents, 57.1 and 85.7%, respectively, and honey samples No. 2, No. 3, No. 4 were adulterated with sodium bicarbonate solution, 71.4, 57.1 and 100.0%, respectively. The reliability of qualitative indicators for determining impurities of alkaline detergents in honey was 99.8%, and of sodium bicarbonate solution – 99.9% compared to the indicators of conventional methods for determining the safety and quality of honey.

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