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PHYSICOCHEMICAL CHARACTERISTICS OF BEESWAX

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Abstract

The purpose of the study was to develop and validate methods for the determination of physicochemical parameters of beeswax: melting point and acid, saponification and iodine numbers. Methodologies for the determination of the above parameters were developed using instrumental techniques with modern apparatus that allow to obtain better resolution, accuracy and repeatability than the classical physicochemical methods recommended by Polish Standards for Beeswax.

For the developed methodologies, uncertainties of the measured parameters for natural wax and beeswax comb foundation samples were determined. The samples were obtained in 2022-2023 from the ecological apiary of the Department of Apiculture of National Institute of Horticultural Research located in the Polesie National Park. To compare the physicochemical properties, samples of beeswax comb foundation and wax from other known sources were also tested, including wax from conventional apiaries, virgin wax, wax and beeswax comb foundation stored for about 20 years, and beeswax comb foundation from outside the national territory.

The average results of individual parameters for all samples were within the following ranges: melting point - $63.5^{\circ}\text{C} \pm 0.8^{\circ}\text{C}$, acid number - $17.2 \text{ mg KOH/1 g} \pm 0.9 \text{ mg KOH/100 g}$, saponification number - $91.8 \text{ mg KOH/1 g} \pm 7.9 \text{ mg KOH/100 g}$, iodine number - $9.9 \text{ g I}_2/100 \text{ g} \pm 1.2 \text{ g I}_2/100 \text{ g}$. The obtained values for the individual parameters were in accordance with the requirements of the Polish Standards for Beeswax and with the literature data.

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