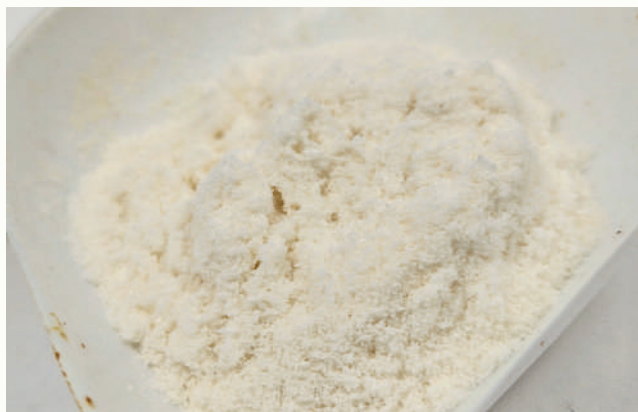


Characterization of Slovenian bee venom



Simon Golob, Slovenian Beekeepers' Association
 Brdo pri Lukovici 8, 1225 Lukovica, Slovenia (simon.golob@czs.si)

Bee venom is certainly one of the lesser-known and less-researched bee products, but it is a product with great potential. In recent years, the Slovenian Beekeepers' Association has carried out several in-house trials and researches on the production of bee venom. Between 2020 and 2022, we conducted a research project on the optimization of bee venom production technology in typical Slovenian AŽ hives and LR hives. In 2023, we launched the Characterization of Bee Products study, which also investigated the composition of Slovenian bee venom.



Results

The collected bee venom samples varied in color and appearance. Some samples were predominantly bright white, while others showed shades of grey and brown. In certain samples visible impurities were also present. Despite these differences, the samples were on average evaluated quite well. For purity, the average score was 3.8 out of 4 points, with the lowest-rated samples receiving 3 points and the majority receiving all 4 points. The samples were rated somewhat lower with regard to color, where the average score was 3.5 out of 4 points. The lowest-rated sample received only 1 point, while the majority received all 4 points.

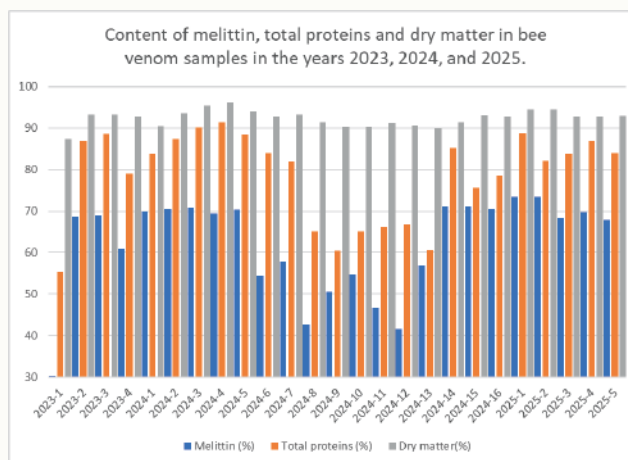
In terms of composition, the smallest differences between the bee venom samples were observed in the proportion of dry matter, which averaged 92.4%, ranging from 87.3% to 96.3%. The average total protein content in the bee venom samples was 78.6%, ranging from 55.4% to 91.4%.



Materials and Methods

As part of the Characterization of Bee Products and bee venom study, 25 samples of Slovenian bee venom were collected in 2023, 2024, and 2025. The samples were collected by 11 Slovenian beekeepers from 7 different regions of Slovenia. Upon arrival at our laboratory, the samples were weighed, visually inspected and evaluated based on the presence of larger impurity particles and the color of the bee venom. The evaluation was performed visually and scored on a scale of 1–4 for each parameter.

Further analyses of bee venom for melittin, total protein, and dry matter were carried out by subcontractors of the Dr. Andrija Štampar Institute of Public Health in Zagreb. To determine melittin content, total protein content and dry matter content.



The average melittin content, considered the main quality parameter, in the bee venom samples was 62%. The lowest melittin content was found in a sample with 30.4%, while the highest was in a sample with 73.5%. Across all three years, it was observed that melittin content was higher in samples that were visually rated as good—that is, in samples where no traces of impurities were detected. Sixteen out of the twenty-five samples included in the study received full points for the visual assessment of color and impurity content. These samples also had the highest melittin content, averaging 69.67%. Within this group, the lowest melittin content was 60.8%, and the highest was 73.5%.

Based on the obtained data, it can be concluded that Slovenian bee venom is of high quality and contains a high proportion of melittin.

PP-279 [Beekeeping Technology and Quality] Characterization of Slovenian bee venom

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As part of the Characterization of Bee Products study, 20 samples of Slovenian bee venom were collected in 2023 and 2024. The samples were visually assessed, and analyses of bee venom for melittin, total protein, and dry matter were carried out by subcontractors of the Dr. Andrija Štampar Institute of Public Health in Zagreb for the purposes of the survey. The results showed that the range of melittin content, as a key quality parameter, was large, ranging from 30.4% to 71%, with an average melittin content of 59.85%. Interestingly, in 2024, in half of the samples of bee venom, the melittin content was higher than 60%, ranging from 69.4% to 71%.

Samples of dried bee venom often contain impurities and contaminants, depending on the production method. Larger particles are visible in the extracted venom, while smaller particles and various impurities give the dried bee venom an uncharacteristic color. The study showed a correlation between the visual assessment of bee venom and the melittin content as a key quality parameter. Bee venom samples with a lower melittin content also received fewer points in the visual assessment, while bee venom samples with a high melittin content usually received all points in the visual assessment. These samples were predominantly white or slightly grey-white in color and had no impurities. In the bee venom samples from 2024, the average melittin content in the eight samples that scored all points in the visual assessment was as high as 70.44%. The melittin content in these samples is extremely high, even in light of the findings of other studies.