

PP-317 [Beekeeping Technology and Quality] Glyphosate in honey: determination of contaminating vectors

Estela Santos¹, Ciro Invernizzi¹, Romina Sánchez², Lucas Archondo³, Katherine Esquibel³
Verónica Cesio³, Verónica Cesio⁴, Horacio Heinzen⁴, Silvina Niell³

¹Universidad de la República, Facultad de Ciencias, Montevideo, Uruguay

²Los Espinillos, Sauce, Canelones, Uruguay

³Universidad de la República, CENUR Litoral Norte, Paysandú, Uruguay

⁴Universidad de la República, Facultad de Química, Montevideo, Uruguay

Honey produced by honeybees in environments where the herbicide glyphosate is widely used may contain this molecule, causing trade problems for honey-exporting countries. This herbicide is widely used in extensive agriculture worldwide. However, the mechanisms by which glyphosate is contaminated in honey are unknown. A semi-field trial was conducted with hives in 12 m² tents, where they were cross-contaminated, with three replicates and compared with a control: pollen, water, and nectar, with known doses of glyphosate. In an effort to conduct the test with actual concentrations of glyphosate reported in the literature, nectar was supplied at 0.3 mg glyphosate acid equivalent/L; pollen at 6 mg/L; and water at 3 mg/L. The bees produced their honey in these enclosures. At the end of the trial, the honey produced exclusively with the supplied substrates was analyzed following a validated methodology according to the European guideline SANTE/11312/2021 using coupled ion chromatography-tandem mass spectrometry (IC-MS/MS). The glyphosate concentration ranges in the honey obtained in the 3 replicates of each treatment were: when contaminated pollen was fed: <LOQ - 0.011 mg/kg (LOQ = 0.010 mg/kg), when contaminated water was fed: 0.072–0.085 mg/kg, when contaminated nectar (syrup) was fed: 0.69–0.89 mg/kg. Control: Not detected in any replicate. It was found that pollen, water, and nectar can be vectors of contamination in honey. Water is a more important vector than pollen in carrying this molecule into honey. Measurements were also taken directly on soybean flowers: on nectar obtained with microcapillaries and on nectar expelled from the honey crop of bees. They found that soybean nectar may contain the incorporated molecule glyphosate, which is the most significant vector of contamination in honey. With these results, recommendations can be made to the productive sector to avoid incorporating this molecule into honey.