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Background/Purpose. Unifloral honey is predominantly derived from a single plant species and is often considered more valuable than multifloral honey. Due to its high added value, botanical labeling is widely used in the European market; therefore, monoflorality must be checked before labeling and marketing to protect consumers and producers.

Problem description. The natural variability in honey composition complicates the classification of unifloral honeys. Currently, classification relies on UNI standards and characterization sheets for Italian (Persano Oddo et al., 2000) and European unifloral honeys (Persano Oddo et al., 2004).

This study characterizes 14 Chestnut honeys from the Tuscan-Emilian Apennines (Emilia-Romagna, Italy) using volatile fingerprinting, physicochemical parameters, and total polyphenol content (TPC) to evaluate their compliance with botanical classification.

Methodology. Volatile profiles of Chestnut honey samples (CHER01 to CHER14) were analysed using Headspace Solid-phase Microextraction (HS-SPME) coupled with Gas Chromatography-Mass Spectrometry (GC-MS). Electrical conductivity and color were measured as physicochemical parameters, while TPC was determined using the Folin-Ciocalteu method. Additionally, selected samples with distinctive features were submitted to melissopalynological analysis. Principal component analysis (PCA) was performed to assess possible sample groupings based on volatile profiles, physicochemical parameters, and TPC.

Results and conclusions. All samples met Directive 2001/110/EC standards for electrical conductivity (>0.8 mS/cm) and exhibited similar colors (reddish to dark amber), except CHER03 and CHER04, which showed darker yellowish tones. TPC results aligned with literature data (Castiglioni et al., 2017) for chestnut honey. Major volatile compounds identified in all the analyzed samples included 2-aminoacetophenone, phenylethanol, benzyl alcohol, nonanal, decanal, and benzaldehyde. PCA revealed CHER03 as distinct from the main clusters along PC1 and PC2.

Melissopalynological analysis of CHER03 confirmed its classification as chestnut honey. However, a minor presence of pollen of *Erica carnea* was observed (also detected in the sensory analysis performed by the same analyst), suggesting its significant role in the nectar composition.

Practical implications for beekeepers. The study highlights the challenges in verifying honey's botanical origin due to its inherent variability. Accurate uniflorality assessment requires a comprehensive approach, combining volatile and polyphenol analyses with morphological methods, as no single compound currently serves as a definitive unifloral marker.