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Editorial

Special Issue on Authentication of Honey

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Honey is an appreciated and widely used product, not only due to its nutritional aspects, but also its medical properties. The promising antimicrobial and antioxidant properties of honey can be applied in prophylaxis and therapeutical use for many diseases. This makes honey particularly susceptible to adulteration, fabricated declarations of botanical origin, and multiple other forms of fraudulent conduct. Hence, there is a justified need for techniques capable of reliably ascertaining the authentic origin of honey.

This Special Issue aimed to collect and present the criteria for authenticating honey, the development of accurate sensory profiles for unifloral honeys, screening methods developed to economise testing, analytical methods to detect emerging fraud, the physicochemical and biological characteristics of genuine honeys, and botanical and geographical characterization by melissopalynological analysis.

Six research papers discussing different methods of honey authentication are presented in this Special Issue. Xagoraris et al. [1] reported the identification of Greek honey samples derived from pine, thyme, fir, and citrus using SPME-GC-MS and FTIR spectroscopy according to their botanical origin. The SPME-GC-MS-stepwise-LDA chemometric model was based on six volatile compounds associated with a botanical origin and not with thermal processing or storage conditions. The ATR-FTIR-stepwise-LDA chemometric model was mainly based on the spectral region of sugar absorption. The results show that the two chemometric models are equivalent. Comparing the two chemometric models, ATR-FTIR-stepwise-LDA has the advantages of simplicity and speed and is also more economical. Xagoraris et al. [2] introduced a promising alternative novel method to distinguish honey based on fluorophore compounds, mainly hydroxycinnamic and other phenyl carboxylic acids. The novel methodology based on right-angle fluorescence spectroscopy and the stepwise-LDA algorithm can be used for routine analyses in the industry for the differentiation of honey's botanical origins, thereby enhancing the competitiveness of producers and suppliers in national and international markets. Rodríguez et al. [3] have contributed to a better characterization of Greek islands' thyme honey by determining its sensory profile based on pollen content. A single qualitative profile was obtained, with all of the honeys being medium in color intensity and thick, and having floral olfactory notes, a sweet and salty taste, and a low–medium persistence. Within this profile, there were significant differences between groups with different pollen grain contents ($p < 0.01$) for all the attributes except floral aroma, with the Group A samples (thyme pollen content > 60%) being the lightest in color and having the highest floral odor intensity and a salty taste. Tananaki et al. [4] reported the identification of volatile components in monofloral honey types using GC–MS with a P&T extraction system to highlight the characteristic volatile chemical compounds of each kind, assisting in their authentication, quality control and, in turn, market promotion, including investigated honey types such as erica and cotton honeys, which are widely produced and consumed in Greece. Additionally, the creation of a prediction model would contribute to the possibility of categorizing the different monofloral honey types, facilitating their authentication. Kanelis et al. [5] investigate the effect of the type of supplementary feeding and its applied quantity throughout honey's production on the carbohydrate profile and invertase activity of the final product. The

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study showed that honey adulteration can be detected through economical routine analyses. Hegazi et al. [6] characterized the Sidr honey samples collected from the Saudi market that had been imported from 12 different countries through their melissopalynological, physicochemical, and biochemical properties, antimicrobial and antioxidant activities and total phenolic and flavonoid contents.

Although submissions for this Special Issue are now closed, more in-depth research in the field of honey authentication continues to address the fight against fraud by obtaining a better knowledge of the different types of honey according to their botanical and geographical origins.

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References

1. Xagoraris, M.; Revelou, P.-K.; Dedegkika, S.; Kanakis, C.D.; Papadopoulos, G.K.; Pappas, C.S.; Tarantilis, P.A. SPME-GC-MS and FTIR-ATR Spectroscopic Study as a Tool for Unifloral Common Greek Honeys' Botanical Origin Identification. *Appl. Sci.* **2021**, *11*, 3159. [CrossRef]
2. Xagoraris, M.; Revelou, P.-K.; Alissandrakis, E.; Tarantilis, P.A.; Pappas, C.S. The Use of Right Angle Fluorescence Spectroscopy to Distinguish the Botanical Origin of Greek Common Honey Varieties. *Appl. Sci.* **2021**, *11*, 4047. [CrossRef]
3. Rodríguez, I.; Tananaki, C.; Galán-Soldevilla, H.; Pérez-Cacho, P.R.; Serrano, S. Sensory Profile of Greek Islands Thyme Honey. *Appl. Sci.* **2021**, *11*, 9548. [CrossRef]
4. Tananaki, C.; Liolios, V.; Kanelis, D.; Rodopoulou, M.A. Investigation of Volatile Compounds in Combination with Multivariate Analysis for the Characterization of Monofloral Honeys. *Appl. Sci.* **2022**, *12*, 264. [CrossRef]
5. Kanelis, D.; Liolios, V.; Tananaki, C.; Rodopoulou, M.-A. Determination of the Carbohydrate Profile and Invertase Activity of Adulterated Honeys after Bee Feeding. *Appl. Sci.* **2022**, *12*, 3661. [CrossRef]
6. Hegazi, A.G.; Al Guthami, F.M.; Ramadan, M.F.A.; Al Gethami, A.F.M.; Craig, A.M.; Serrano, S. Characterization of Sidr (*Ziziphus* spp.) Honey from Different Geographical Origins. *Appl. Sci.* **2022**, *12*, 9295. [CrossRef]