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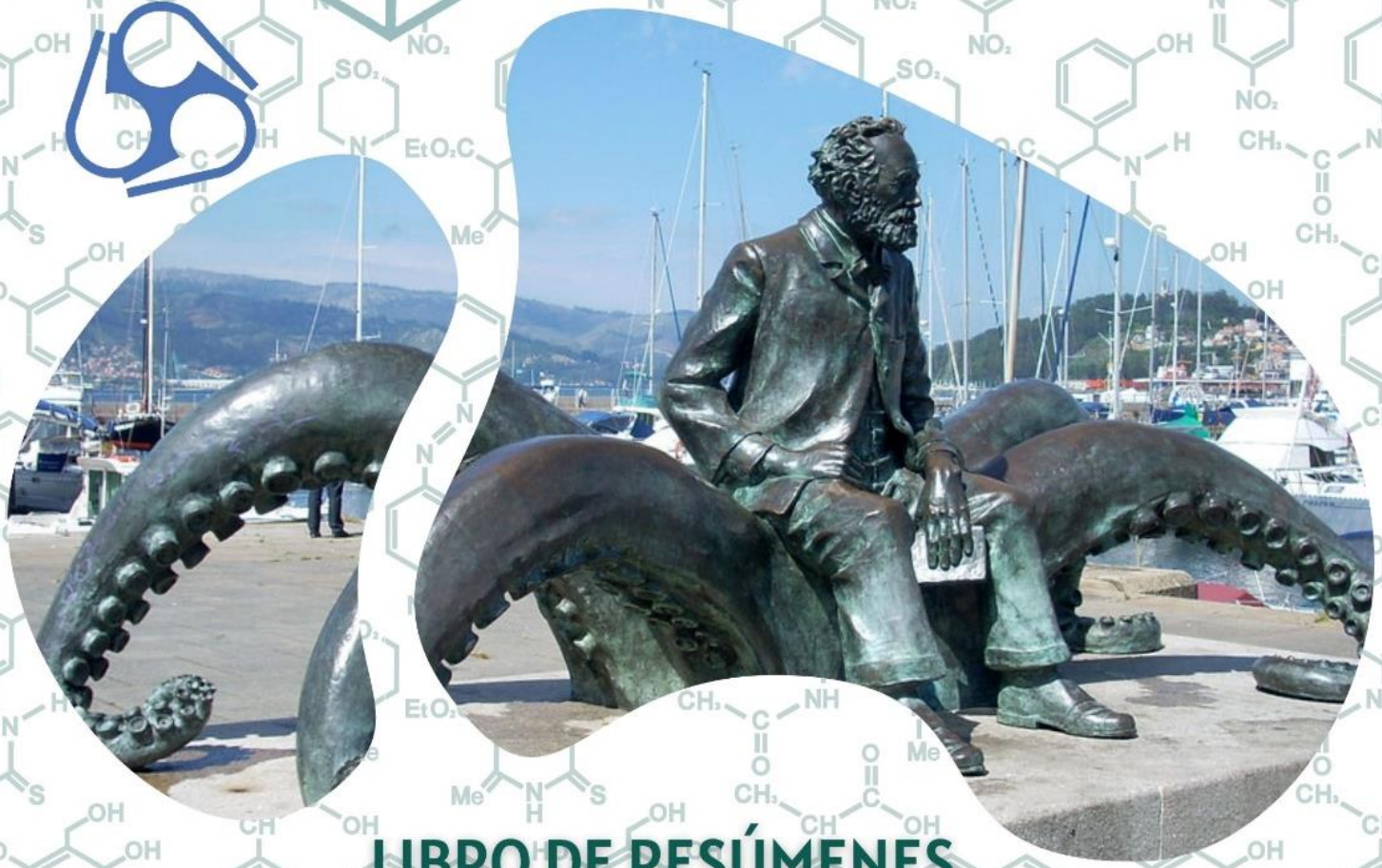

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Unveiling the Geographical Influence on Honey's Physicochemical Profile: A Case Study from Montesinho Natural Park

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In recent years, global honey consumption has significantly increased due to the rising demand for natural products with health benefits. Consumers are particularly drawn to honey recognized for its superior quality, such as Protected Designation of Origin (PDO) honey or honey produced in protected areas, which is associated with distinctive characteristics [1,2]. Portugal stands among the top producers of PDO honey, with Montesinho Natural Park (MNP) being a notable example of high-quality Portuguese honey. Despite its reputation, environmental challenges threaten both honey production and quality in this region [1].

This study aims to evaluate the physicochemical parameters and nutritional characteristics of honey from MNP and investigate the correlation between these properties and the geographical location of the apiaries. Honey samples (n=13) were collected from local producers and supermarkets. Standard physicochemical parameters, including 5-hydroxymethylfurfural (HMF), diastase activity, moisture and ash content, free acidity, electrical conductivity, and pH, were analysed following honey legislation guidelines. Additional parameters, such as colour, protein content, low-molecular-weight carbohydrates, and mineral composition, were also assessed [1].

The findings indicate that all honey samples complied with legal standards and align with previously published data, showing a high degree of homogeneity across the physicochemical properties analysed. Principal Component Analysis (PCA) revealed that parameters such as colour, HMF, and specific minerals (Mg, Ca, K, Mn, Sr, Cu, Ba) contributed to the clustering of honey samples, suggesting that geographical variations among apiary locations might influence these properties. However, these differences do not affect the overall quality of the PDO honey produced in MNP.

This study represents the first comprehensive characterization of honey from different apiaries within MNP. While the results demonstrate the consistency and quality of MNP honey, further research is necessary to explore the relationship between geographic origin and quality under varying environmental conditions. These insights could be valuable for maintaining sustainable beekeeping practices in the region and preserving the unique attributes of MNP honey.

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