

## INORGANIC COMPONENTS IN HONEYS AS POTENTIAL INDICATORS OF BOTANICAL ORIGIN AND OF ANTHROPOGENIC ENVIRONMENTAL POLLUTION

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Aim of this study was to investigate the quali/quantitative profile by IC (Ion Chromatography) technique of the inorganic constituents (cations: Na<sup>+</sup>, Ca<sup>++</sup>, Mg<sup>++</sup>, NH<sub>4</sub><sup>+</sup> and anions: Cl<sup>-</sup>, Br<sup>-</sup>, SO<sub>4</sub><sup>2-</sup>, NO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup>) and compare the results obtained from honeys of different Italian Regions (Lombardy, Piedmont, Sardinia, Calabria, Tuscany) with those from countries of the Western Balkan area (Slovenia, Croatia, Serbia, Kosovo, Macedonia and Albania). The mineral concentrations of the two honeys groups were further analyzed by multivariate statistical techniques such as principal component analysis (PCA) and hierarchical cluster analysis (HCA). The results provide a detailed and exhaustive view of the ionic composition of the different honeys, up to now never reported. They can be applied for the detection of differences in mineral concentrations among honeys allowing, from a botanical point of view, a sharp differentiation between nectar honeys and arboreal/honeydew honeys (discrimination of the floral source) and used as an index of the purity of the matrix or of its fraudulent adulteration with sugars, syrups, etc.. Finally the obtained results can be used to individuate the natural (by bees) or artificial blending between different honeys. Furthermore the multivariate analysis allows to demonstrate the potential of honey as bioindicator of the distribution of impact of various environmental pollutants of industrial and urban origin (Br<sup>-</sup>, SO<sub>4</sub><sup>2-</sup> and PO<sub>4</sub><sup>3-</sup> contents) which show a steep increase in honeys of Western Balkan area. In particular for what concerns arboreal honeys the concentrations of SO<sub>4</sub><sup>2-</sup> and of PO<sub>4</sub><sup>3-</sup> in honeys from Balkan area were three times greater than those present in the Italian ones (SO<sub>4</sub><sup>2-</sup>=90.3±60.3 ppm vs. SO<sub>4</sub><sup>2-</sup>=29.6±20.8 ppm; PO<sub>4</sub><sup>3-</sup>=772.6±530.3 ppm vs. PO<sub>4</sub><sup>3-</sup>=222.0±74.2 ppm respectively). Br<sup>-</sup> was undetectable in almost all the Italian honeys and its presence in Balkan honeys could be attributed the use of methyl-bromide for agricultural use. The findings reported in this presentation fit into a research program that aims to typify the quality of honeys in different countries.