HIGH RESOLUTION MASS SPECTROMETRY BASED METABOLOMIC FINGERPRINTING, AN EFFICIENT TOOL TO DETECT FRAUD ON HERBS AND SPICES: CASE STUDIES

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Alike in case of other food commodities, consumers´ interest in spices authenticity has become more and more important. Being aware of various fraud scandals in the past time (synthetic days added, dilution or even replacement with contaminated / toxic plant material) consumers are willing to pay even higher cost as far as the authenticity is guaranteed. This is specifically the case of saffron (*Crocus sativus*), which one of the oldest and most expensive spice in the world – very popular for its unique aroma, taste and color. Another spice which is often be subject of fraud is ground black pepper (*Piper nigrum*). The cases of adulteration with a cheaper plant materials including spent (residue lef after essential oil extraction), or mislabeling have been many times documented. In this research, high resolution mass spectrometry (HRMS) based platforms have been used for fingerprinting of a broad spectrum of compounds occurring in tested species. Volatile metabolites extracted from headspace by solid phase microextration (SPME) were separated by gas chromatography (GC), for separation of nonvolatile and semi-volatile metabolites extracted by aqueous ethanol ultra-high resolution liquid chromatography (U-HPLC) was used. Principal component analysis (PCA) of metabolomic fingerprinting was employed for samples classification. Characteristic ´markers´ enabling rapid screening aimed at distinguishing of respective spice origin and/ or processing practice have been identified.

Keywords: saffron, pepper, non-targeted fingerprinting methods, high resolution mass spectrometry, authentication