Selected Topics on Chemical Fingerprinting – Examples and Challenges

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Abstract: The research has been focused on the phytochemical fingerprinting from different natural sources (aromatic plants, honey, or marine algae), using advanced chemical methods and hyphenated techniques. Gas chromatography with mass spectrometry (GC-MS) is appropriate hyphenated technique for the research of headspace, volatile and semi-volatile compounds present in different samples that could be useful for their classification, particularly since specific or non-specific chemical markers of the botanical origin can be found and/or specific chemical fingerprints can be determined. Different classes or natural organic compounds can be found such as terpenes (particularly monoterpenes and sesquiterpenes), norizoprenoids, benzene derivatives, others. However, before the analysis it is necessary to perform adequate preparation steps such as: ultrasonic solvent extraction (USE), headspace-solid phase microextraction (HS-SPME), solid-phase extraction (SPE), supercritical CO_2 extraction (SC-CO_2), hydrodistillation (HD) and simultaneous hydrodistillation extraction (SDE). However, the artefacts can be generated during the extraction steps (particularly due to the influence of heat and/or water) and different methods should be used to establish the artefacts formation. To obtain reliable chemical profiles it is often necessary to use different preparative techniques since the use of only one extraction method can neglect certain group of compounds.