



Plant volatile fraction and essential oils: recent achievements in conventional and non-conventional routine-analysis.

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In chemical terms, the *volatile fraction of a plant* is a mixture of compounds that can be recovered because of their capability to be vaporised both spontaneously and/or through suitable sampling conditions or techniques. The term volatile fraction is a framework containing a group of approaches and/or techniques that produce samples representative of the volatiles characterizing a plant matrix. The resulting samples may have different and mutually non-comparable compositions, e.g. headspace, essential oils and/or extracts obtained by specific techniques. The essential oil of a plant is the best-known and used product representative of the composition of its volatile fraction. The overwhelming evolution of analysis in its three main aspects (i.e. sample preparation, analysis and data handling) over the last three decades has dramatically changed approaches and strategies also in the investigation of a plant volatile fraction. Over this period, ever-powerful techniques have been introduced, among others high concentration capacity sample preparation techniques, fast and ultrafast GC, enantioselective GC, GCxGC, tandem and high-resolution mass spectrometry, non-separative methods, etc. However, the step that has more dramatically gained of importance has been data handling; informatics has given a fundamental contribution to the full automation of analysis and instrumentation, and data managing (chemometrics), and increased its role to the same level of sample preparation and analysis. This lecture is an overview on the application of the most recent conventional and non-conventional methods and technologies to routine analysis of the plant volatile fraction not only in terms of instrumentation but also of operative strategies. In particular, it will be focused on two subjects of never-ended interest although often underestimated or not sufficiently considered: fast and quantitative analyses. These topics will be illustrated with real-world examples taken from the authors' everyday experience

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