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PP32. From medicinal and aromatic plants to herbal teas: quantitative determination of volatile bioactive secondary metabolites

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Aromatic plants are worldwide used for their attractive aroma characterized by several volatile components, some of them presenting relevant biological activities. One of the most popular uses of aromatic plants is for herbal teas, therefore quality control of both raw plant materials and herbal teas is mandatory to guarantee the effective and, mainly, safe use of the finished product. Quali- and quantitative analysis of herbal teas evaluate the concentration of key-markers responsible for aroma and biological activities thus assessing a safe use of an herbal tea containing components limited by law or for which EMA (European Medicinal Agency) gives a recommendation on the maximum quantities to be consumed [1].

One of the issues concerning the analysis of aqueous samples is their not full compatibility with conventional stationary phases; this drawback can induce stationary phase degradation or problems in stability of column performance. An appropriate sample preparation procedure should, therefore, be used. Several conventional extraction techniques (i.e. solvent extraction) are time-consuming and often require a large volume of solvent; on the contrary, solvent-free sample preparation techniques (i.e. Solid Phase Micro Extraction both in solution and in headspace modes) make possible a direct sampling of an herbal tea, by adopting a fully automatic approach (TAS: Total Analysis System). To bypass completely the sample preparation step and, therefore, to speed up quality control, a new generation of gas chromatography columns, coated with ionic liquid-based stationary phases (Watercol^{TM}), compatible with aqueous samples, have been recently introduced [2].

The present work is focused on the quantification of biologically active secondary metabolites (e.g. menthol, α- and β-thujone, estragole, etc.) present in several plants most commonly used for herbal teas (i.e. wormwood, peppermint, sage, fennel, aniseed). Both approaches gave comparable results, together with a high repeatability, linearity, and accuracy.

References:
[1] European Medicinal Agency website: http://www.ema.europa.eu/ema/
[2] Cagliero, C. et al., 2018. Anal. Bioanal. Chem. 410, 4657–4668.

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