Liquid phase extraction and separation of natural compounds

Nowadays, suitable extraction processes and analytical methodologies are needed in order to deal with the ever-increasing interest on natural compounds. In this regard, bioactive natural compounds attract a lot of attention as new relationships between those components and an improved health are discovered. However, the extraction of those components is at present strongly influenced by Green Chemistry. Sustainability is a must, and thus, new extraction protocols should be focused not only on efficiency but also on the development of environmentally-green processes. Within this field, the use of compressed fluids emerges with great potential, as the extraction conditions employed are able to increase the recovery of the target compounds while, at the same time, greener conditions are employed and less amounts of solvents are consumed. Moreover, the good scalability of these processes is also highly valued. In any case, the use of new solvents, such as deep eutectic solvents could improve further these processes in the near future. On the analytical side, powerful and sensitive separation methods are required to unravel the great complexity beneath most natural matrices. The present issue on "Liquid phase extraction and separation of natural compounds" provides with some excellent examples of these recent trends. To start with, three review papers devoted to i) extraction of phospholipids, ii) determination of apocarotenoids and, iii) extraction of cyclitols, polyphenols and saponins from plants are presented.

Moreover, the potential of compressed fluids for the extraction of natural compounds is well represented in this Issue. Firstly, the use of pressurized liquids to i) produce the valorization of different fractions from *Nannochloropsis gaditana* microalga, ii) to recover phenolic compounds from basil distillation wastewater, iii) for the extraction of β -glucans from *Cantharellus tubaeformis*, iv) to recover bioactive compounds from artichoke and, v) avocado by-products is demonstrated. In second place, the use of supercritical fluids might also be very interesting for other less polar natural components, such as seed oils from tamarillo vi) or vii) artemisin from *Artemisia annua*. In addition, a series of original contributions related to other liquid phase extraction protocols are also presented in this Issue. These are related to the extraction of i) apple pomace, ii) antioxidants from rosemary, iii) terpenoids from *Mentha rotundifolia* using microwave-assisted extraction, iv) cyclitols and sugars from *Solidago virgaurea*, v) natural colourants from onion wastes and, vi) pectin from sunflower heads. These works appropriately represent other successful approaches to improve the sustainability and efficiency of other extraction techniques. In the field of separation, some interesting original contributions are included, involving the use of advanced analytical techniques such as comprehensive two-dimensional liquid chromatography for the separation of secondary metabolites from licorice, ultra-high performance liquid chromatography coupled to tandem mass spectrometry for the quantification of polyphenols in old and modern wheat varieties, a comparison between centrifugal partition chromatography and preparative liquid chromatography as first dimensions in off-line two-dimensional separations of bioactive compounds, and liquid chromatography for the determination of carbohydrates from lotus seeds.

Finally, three manuscript present other approaches based on i) the use of ion concentration polarization for the isolation and preconcentration of exosomes, ii) the potential of molecularly imprinted polymers for the separation of catechins in black tea, and, iii) the use of graphene particles to facilitate the analysis of antibiotics in milk samples.

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