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EXPLORING THE POTENTIAL OF WATER COMPATIBLE STATIONARY PHASES FOR THE DETERMINATION OF BIOACTIVE COMPOUNDS IN AQUEOUS SAMPLES IN PLANT AND FRAGRANCE FIELDS

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Fragrances and products deriving from plants are often formulated or diluted in aqueous media. Gas Chromatography (GC) is the technique of choice to analyze volatiles. However, when using columns coated with conventional stationary phases its application to aqueous samples requires sometimes time-consuming and/or discriminative sample preparation techniques to extract the target analytes from the aqueous medium, to avoid the direct injection of water. In GC with conventional columns, water produces peak asymmetry, poor sensitivity and efficiency, strong adsorption and stationary phase degradation.

In 2012, Armstrong's group introduced new fully-water-compatible ionic-liquid (IL)-based GC capillary columns based on phosphonium and imidazolium derivative cations combined with trifluoromethanesulphonate [1]. These columns were recently made commercially available by Supelco, under the trade name Watercol™. These derivatives maintain IL's unique selectivity and chromatographic properties, and enable water to be used as injection solvent, thus avoiding sample preparation procedures required by conventional columns [2].

Many aqueous samples deriving from plants can be a source of bioactive compounds. Some of them are involved with humans (as foods or beverages, cosmetics, and so on) and should therefore be free from any potential health risks. To that end, potentially bioactive and toxic compounds, regulated by international organizations, have to be monitored to keep them into the limits of acceptability.

This study reports and critically discusses the possibility to adopt the commercially-available water-compatible IL columns for the qualitative and quantitative determination of bioactive compounds in aqueous samples in plant and fragrance fields by their direct injection and analysis by GC-MS or GC-FID-TCD. As a case study, two topics were considered: the qualitative-quantitative determination of suspected allergens [3] in aqueous cosmetic preparations (lotions, tonics, perfumes, etc.), and the quantification of target bioactive compounds in herbal teas.

References

- [1] Jayawardhana D.A., Woods R.M., Zhang Y., Wang C.L., Armstrong D.W. *LC GC North America* 30 (2012) 142
- [2] Cagliero C., Bicchi C., Cordero C., Liberto E., Rubiolo P., Sgorbini B., *Analytical and Bioanalytical Chemistry*, doi: 10.1007/s00216-018-0922-0
- [3] DIRECTIVE 2003/15/EC of the European Parliament and of the Council of 27 February 2003