

# Potential of water-compatible ionic liquid GC stationary phases for the GC-MS determination of bioactive compounds in aqueous samples in plant and fragrance fields

Cecilia Cagliero<sup>1</sup>, Manuel A. Minteguiaga<sup>1</sup>, Barbara Sgorbini<sup>1</sup>, Maria. Mazzucotelli<sup>1</sup>, Len Sidisky<sup>2</sup>, Carlo Bicchi<sup>1</sup>

<sup>1</sup> Dipartimento di Scienza e Tecnologia del Farmaco, Università degli Studi di Torino,  
Via P. Giuria 9, I-10125 Torino, Italy

<sup>2</sup> MilliporeSigma 595 N. Harrison Rd. | Bellefonte, PA | 16823 | USA

## Abstract

Enter your 250 word maximum abstract here. Products from plants and fragrances containing volatiles are often formulated or diluted in aqueous media. Gas Chromatography (GC) and GC-MS are the techniques of choice to analyze volatiles. However, water injection with columns coated with conventional stationary phases as solvent produces peak asymmetry, poor sensitivity and efficiency, strong adsorption and stationary phase degradation. Time-consuming and/or discriminative sample preparation techniques are therefore necessary to transfer the target analytes from the aqueous medium to a GC compatible solvent..

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] to quantify water as sample components. Supelco recently commercialized these columns with the trade name Watercol™. These derivatives also enable to analyze directly samples where water is the main solvent [2].

Many aqueous products from plants are involved with humans (as foods or beverages, cosmetics, etc.) contain bioactive compounds to be monitored to assess their health safety. This study critically discusses the possibility to adopt Watercol™ IL columns to quantify bioactive components in aqueous samples in the natural product and fragrance fields by their direct injection and analysis by GC-MS. The analytical approaches are critically discussed through some examples concerning the quantitation of both suspected allergens [3] in aqueous cosmetic preparations (perfumes), and bioactive components in herbal teas, whose human intake is limited by legislation [4].

## References

- [1] Jayawardhana D.A., Woods R.M., Zhang Y., Wang C.L., Armstrong D.W. *LC GC North America* **2012**, *30*, 142
- [2] Cagliero C., Bicchi C., Cordero C., Liberto E., Rubiolo P., Sgorbini B., *Anal. Bioanal. Chem.*, **2018**, *410*, *19*, 4657-4668; doi: 10.1007/s00216-018-0922-0
- [3] DIRECTIVE 2003/15/EC of the European Parliament and of the Council of 27 February 2003
- [4] Sgorbini B., Cagliero C., Acquadro S., Marengo A., Cordero C., Liberto E., Bicchi C., Rubiolo P., *J. Chromatogr. A* **2019**, doi: <https://doi.org/j.chroma.2019.02.012>