Advanced analytical techniques based on chromatography for the detection of organic micropollutants in aquatic environments.

Expósito Torres, Jesús (1), Bouza Deaño, Ramón (1), Hamad Gómez, Said (2)
(1) Labs & Technological Services AGQ., Ctra. A433, KM. 24, 3, 41220, Burguillos, Spain.
(2) Department of Physical, Chemical and Natural Systems, Pablo de Olavide University, Ctra de Utrera Km1, 41013 Seville, Spain,
Tutor académico: Hamad Gómez, Said.

Keywords: micropollutants; cromatographic techniques

ABSTRACT

Motivation: The abundance of organic micropollutants, e.g., Pesticide Residues (RP), Polycyclic Aromatic Hydrocarbons (PAHs), Chlorinated Polybibenyls (PCBs) and Volatile Organic Compounds (VOCs), in aquatic environments poses an environmental and public health threat. Despite the notable advances in analytical chemistry, the identification of organic contaminants in water continues to be a challenge today due to the high number of contaminants that may be present in the samples (Hernández et al., 2015). This problem gives rise to the need to develop analytical methodologies that allow these contaminants to be detected at ng/L levels (Muter & Bartkevics, 2020).

Methods Gas chromatography (GC) or liquid chromatography (LC) coupled to mass spectrometry (MS) are the most appropriate techniques for identifying and/or quantifying organic micropollutants in aquatic samples. These techniques allow to monitor the quality of the water in order to comply with the Spanish legislation established in Royal Decree 817/2015, of September 11, which establishes the criteria for monitoring and evaluating the state of surface waters and environmental quality standards.

Results: It can be said that these analytical chemistry techniques are capable of unequivocally identifying and quantifying the presence of organic micropollutants in aquatic samples.

Conclusions: Gas chromatography (GC) or liquid chromatography (LC) coupled to mass spectrometry (MS) is a reliable analytical technique for the identification and quantification of organic micropollutants in aquatic samples, which allows their monitoring and evaluation based on what is marked by Royal Decree 817/2015, of September 11. However, there is still a need to develop analytical methodologies that are capable of identifying and quantifying a long list of contaminants in a single analytical technique.

REFERENCES

Hernández, F., Ibáñez, M., Portolés, T., Cervera, M. I., Sancho, J. V., & López, F. J. (2015). Advancing towards universal screening for organic pollutants in waters. *Journal of Hazardous Materials*, *282*, 86–95. https://doi.org/10.1016/j.jhazmat.2014.08.006

Muter, O., & Bartkevics, V. (2020). Advanced analytical techniques based on high-resolution mass spectrometry for the detection of micropollutants and their toxicity in aquatic environments. In *Current Opinion in Environmental Science and Health* (Vol. 18, pp. 1–6). Elsevier B.V. https://doi.org/10.1016/j.coesh.2020.05.002