Water-sediment partition and bioaccumulation in fish of selected endocrine disrupting UV filters

M. P. Serra-Roig[1], D. Molins-Delgado[1], M.S Díaz-Cruz[1] and D. Barceló[1]

[1]Dept. Environmental Chemistry, IDAEA-CSIC, C/ Jordi Girona 18-26, 08034 Barcelona (Spain)

E-mail contact: silvia.diaz@idaea.csic.es

Personal care products (PCPs) is a generic term that describes a group of chemicals included in many different products widely used in daily life (aftershave, toothpaste, shampoo, cosmetics, etc), being used in considerable quantities. After use, they may be absorbed by the body and excreted, or washed off after its application [1]. PCPs and their metabolites enter the aquatic environment and reach WWTPs [2]. There, they are partially eliminated and either retained in the sludge or released to the water bodies through the effluents [3]. The last decade, the concern about the potential hazardous risk associated to them and their byproducts, that can be more persistent and toxic [4], has been on the rise. Once in the environment and depending on their physicochemical properties PCPs can adsorb onto the sediments and also be accumulated in the ecosystems' biota. Among PCPs, UV filters is the group attracting more attention by scientists as they are increasingly used in in more and more daily-use products worldwide to prevent diseases caused by exposure to UV sunlight.

In the present study we investigated the water-sediment partition and biota bioaccumulation potential of selected organic UV filters in water, sediment and fish samples from Evrotas River (Greece). Occurrence of target compounds in water was determined through the analysis by on-line SPE- HPLC-MS/MS, and in solid samples by PLE-HPLC-MS/MS.

The results demonstrated that in the water column, 7 UV filters were present. Adsorption onto sedements was observed for less polar compounds, but BP3 and two of its hydroxyl-metabolites, BP1 and 4HB were also present. In particular, very high concentrations were observed, with values for 4MBC > 1700 ng/g dw. BP2, which is a known powerful thyroid disruptor, was found to accumulate the most in fish tissues, with concentrations in the range 10-45 ng /g dw. The determination of the UV filters' concentrations in the three matrixes allowed us to estimate de bioaccumulation factor (BAF) of the detected UV filters; which will be presented and discussed in the Communication.

Acknowledgements - This work was financed by the EU Project GLOBAQUA (Grant Agreement 603629) and by the Generalitat de Catalunya (Consolidated Research Group "2014 SGR 418 - Water and Soil Quality Unit").

References

[1] Tolls J, Berger H, Klenk A, Meyberg M, Beiersdorf AG, Müller R, Rettinger K, Steber J. Environ. Toxicol. Chem. 28 (2009) 2485.
[2] Negreira N, Rodríguez I, Rodil R, Cela R Anal. Chim. Acta 743 (2012) 101.
[3] Nieto A, Borrull F, Marcé RM, Pocurull E. J. Chromatogr. A 1216 (2009) 5619.
[4] Bester K. J. Chromatogr. A 1216 (2009) 470.