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THE USE OF SPMDs AND IMPLANTED OYSTERS FOR MONITORING PAHs AND PCBs IN AN AQUATIC ENVIRONMENT IN THE ESTUARY OF URDAIBAI (WESTERN PYRENEES)

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Abstract

Sentinel organisms like mussels and oysters have been largely used as indicators of the pollution level in water. However, passive samplers like semipermeable membrane devices (SPMDs) are emerging as an alternative to the use of sentinels. SPMDs mimic the bioconcentration of hydrophobic organic pollutants in fatty tissues of organisms without being affected by natural variations like spawning events and lipid content, and providing a simpler matrix for the subsequent analysis.

The aims of this work are to study and compare the effectiveness of SPMDs and implanted clean oysters to autochthonous oysters as indicators of polycyclic aromatic hydrocarbons (PAH) and polychlorinated biphenyls (PCB) pollution and to discuss critically the advantages and disadvantages of both matrixes from an analytical point of view.

Implanted clean oysters and SPMDs were deployed in two selected points of the estuary of Urdaibai (Basque Country, western Pyrenees) and collected for chemical analysis two and four weeks after deployment. Sampling campaigns were carried out in April 2008, December 2008, June 2009, December 2009 and June 2010. After studying the results for SPMD and implanted oysters, even if both matrixes show in almost every cases an increase in the concentration of the analytes, no clear similarities among the accumulation profiles could be listed. In order to find an answer to these differences, in the last campaign autochthonous oysters and sediments were collected together with each deployment and retrieval process. This last combined sampling methodology was pretty usefull in order to understand the different results obtained and planify future campaigns.

Key words: oyster, PAH, passive sampling, PCB, SPMD

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