Improving the WFD purposes by the incorporation of ecotoxicity tests

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The approval of the European Water Framework Directive (WFD) supposed a big step regarding aquatic ecosystems protection. According to this Directive, assessment of ecological status is based on three quality elements: biological, physicochemical and hydromorphological, but ecotoxicological status is still not included. Some studies have observed that biological status is not always in coherence with physicochemical status, maybe due to the adaptation mechanisms of aquatic organisms under chronic chemical exposure. In these situations, ecotoxicity tests could be useful to obtain a better characterisation of these specific ecosystems.

The general aim of this work is to add a battery of ecotoxicity tests to the current analyses defined by WFD in order to obtain a better ecological characterization of freshwater systems. The specific aims of this work are: (1) to compare the effectiveness and viability of different ecotoxicity tests performed with freshwater sediments (directly and with pore water) taking as target organisms different aquatic species, and (2) to evaluate the relationship between stream pollutants concentrations (organic pollutants and metals), biological and hydromorphological status and sediments ecotoxicity. For this purpose, thirteen sampling sites within the Ebro river watershed were selected. Data about priority pollutants in water, sediment and fish as well as biological and hydromorphological status of each sampling point will be achieved. Moreover, in each sampling reach, composite samples of sediment were collected by using a Van Veen grab. Sediment samples were stored at 4ºC prior to the ecotoxicity analyses.

The ecotoxicity of pore water was evaluated by different bioassays (*Vibrio fischeri, Pseudokirshneriella subcapitata* and *Daphnia magna*) while the ecotoxicity of whole sediment was evaluated in *Vibrio fischeri, Nitzschia palea* and *Chironomus riparius*In addition, the concentration of total heavy metals and metal bioavailability was calculated by a sequential extraction according to the Community Bureau of Reference (BCR) method. To distinguish the potentially toxic fraction associated to heavy metals burden of sediments, an analysis of acid-volatile sulphide (AVS) and simultaneously extracted metals (SEM) was performed. Complementary sediment variables as humidity, porosity, percentages of fines (<63 µm) organic carbon and organic matter were determined.

This study expect to demonstrate that the integration of chemical, biological and ecotoxicological analyses could be crucial to understand the hazard of pollutants in aquatic ecosystems, especially, in freshwater sediments. Future research in this area is needed in order to obtain more data and be able to establish a tree decision of freshwater analyses evaluation. The poster will present the methodology purposed for this study as well as the first preliminary results obtained from ecotoxicity tests.

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