



Presence of emerging contaminants in Natural Wetlands: L'Albufera Lake in Valencia as study case

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A wide range of pharmaceutical compounds have been identified in the environment, and their presence is a topic of growing concern for human and ecological health. The antibiotics group are relevant in the formation of antibiotic resistances in pathogenic bacteria. Other pharmaceuticals, such as analgesics and lipid regulators, are consumed in large quantities and have been frequently found in high concentrations in several environmental compartments.

L'Albufera Lake (Valencia, Spain) is a marsh area of a great interest because it is the habitat of a large quantity of unique species of flora and fauna, and a zone of refuge, feeding and breeding for a large number of migratory birds, because of that, was included in the RAMSAR network. However, this area is threatened by the tourist industry; urban, industrial, and agricultural pressures; and the disappearance of its marshes by transformation to rice or orchard fields. The aim of this work was to establish the occurrence and distribution of pharmaceuticals in water, as indicative of human sewage pouring into the lake. A representative set of pharmaceuticals of different therapeutic classes was chosen for this purpose, including: analgesics, antibiotics, anti-inflammatories, β -blockers, anticonvulsants, antidepressants and lipid regulators.

In April 2008 and October 2008 a total of 65 samples of water were collected, corresponding to different sampling points previously designed, and covering the most important channels that flow in to the lake. Water samples were concentrated by Solid Phase Extraction through an Oasis HLB cartridge, and subsequently eluted with methanol. Quantification was carried out by LC-MS/MS with an ESI interface. Separation was made with a Sunfire 3.5 μ C18 (Waters[®]) analytical column. When possible, two transitions were selected to obtain unambiguous confirmation.

Acetaminophen (paracetamol) and carbamazepine were the pharmaceuticals that more frequently appeared in water samples, being the latter found in 63 of the 65 analyzed samples in concentrations between 0.01 μ g/L and 248 mg/L. Others pharmaceuticals present in less quantities were: ciprofloxacin, codeine, diazepam, fenofibrate, ibuprofen, norfloxacin, metoprolol, ofloxacin, propanolol, sulfamethoxazole and trimethoprim. These results demonstrate the incidence of these pollutants in the Natural Park of L'Albufera, probably because raw sewage flows into the lake from houses and industries nears its shores. Increased pollution is threatening the sustainable use of L'Albufera, a vital resource for this touristic area.

References:

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