

Study shows transfer of heavy metals from water to fish in Huelva estuary

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A team of researchers from the University of Cadiz has confirmed that zinc, copper and lead are present at high levels in the water and sediments of the Huelva estuary, and have studied how some of these heavy metals are transferred to fish. The study shows that zinc, cadmium and copper accumulate in the body tissues of sole and gilthead bream.

"We found positive correlations between the levels of some metals in the waters of the Huelva estuary and those in the tissues of gilthead bream (*Sparus aurata*) and sole (*Solea senegalensis*)", M^a Dolores Galindo, a professor of Analytical Chemistry at the University of Cadiz and the head of the study published recently in the *Journal of Hazardous Materials*, tells SINC.

The researchers focused their analysis on the "bioavailability" of heavy metals in [coastal waters](#) and their impact on commercially important species, such as the two studied. The results showed elevated levels of zinc, copper and lead, both in water and sediment, although the most "available" elements for the fish were zinc, [cadmium](#) and copper.

"Numerous laboratory studies have looked at the effects of pollutants on aquatic organisms, but our research observes this phenomenon in the natural environment, in one of the few estuaries in Spain with high levels of metals contamination", says Galindo. The Huelva estuary and the Tinto and Odiel rivers which flow into it are all affected by discharges from industries and historic mining activities locally. The area, in which fishing is forbidden, is globally significant in terms of its levels of heavy

metal contamination.

For this reason it is an ideal area for scientists in which to examine the effects of contaminants on the environment. The researchers, who are working on developing environmental quality criteria, studied the levels of copper, cadmium, lead and arsenic on three types of samples - water, sediments and fish tissue.

By using a statistical index (Pearson coefficient), the scientists found a link between the presence of zinc and cadmium in the water and in the tissues of the fish, above all in the gilthead bream, a species that lives in open water. There was a lower correlation in the case of the sole, which tends to be a bottom dweller, although it also contained lead. Zinc and cadmium appeared in the gills and muscles, but above all in the liver, where copper was also detected at high concentrations.

This research forms part of the project "Production and validation of environmental quality criteria in sensitive coastal ecosystems" financed by the former Ministry of Education and Science, and which also includes analysis of the levels of organic pollutants in the Huelva estuary, as well as the "hystopathological" damage to fish caused by this contamination.

The central government of Spain and the regional government of Andalusia have been developing pollution reduction policies for the estuary since 1997. The measures adopted have included waste water treatment, metal retention processes, waste treatment and reduction of discharges.

Source: FECYT - Spanish Foundation for Science and Technology

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