

# Waste water treatment plants fail to completely eliminate new chemical compounds

October 8 2015

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Credit: Cylonphoto/Dollar Photo Club

Deformities, feminisation and fall in reproductive capacity are some of the effects that living organisms can be afflicted by due to changes in the endocrine system caused by these compounds. A study conducted on the Basque coast by a research group indicates that the most polluted waters, the ones with the highest levels of bioconcentration, the highest

percentage of intersex fish, etc. exist around waste water treatment plants. Most of these plants are not equipped to eliminate the new compounds, because legislation in this matter has yet to catch up with the development of the chemical industry. The journal *Science of The Total Environment* has recently published a paper on the subject.

The fishing port of Ondarroa, the Deba marina, the estuary at Gernika (beside the discharge stream of the [waste water treatment](#) plant) and the industrial ports of Pasaia and Santurtzi are the scenarios where the research was carried out between May and June 2012. The fish chosen for the study was the thicklip grey mullet (*Chelonlabrosus*). Water samples were taken from the above-mentioned locations on the days when the mullet were caught and three months later to relate the samples to the concentrations of the [compounds](#) in the fish."As we expected, Gernika was where the highest concentration of compounds was found and where the highest number of intersex fish were caught," stressed Asier Vallejo, one of the researchers in the group.

But why Gernika? And why "as we expected"? This is Vallejo's explanation:"The function of waste [water treatment](#) plants is to clean the waste that humans discharge into the water. What happens, however, is that most [treatment plants](#) are not equipped to eliminate the new chemical compounds appearing on the market. That is why even if they are discharged into rivers and seas in very low concentrations, they have serious consequences for fish because the flow is constant. That is why we expected to find such high concentrations in Gernika. But it is not a phenomenon exclusive to the Basque Country, it affects the whole planet."

However, there is no reason to be particularly alarmed, according to the researcher:"Not yet, at least. The fish we have analysed belong to the mullet family which are not usually eaten in the Basque Country. These animals are normally scavengers."Vallejo acknowledges that endocrine

disrupting compounds probably affect humans, too "but we don't know to what extent, we don't know what concentration these compounds need to reach to affect humans. Doctors are the ones who will have to clarify these unknowns".

## **In the bile**

With respect to the technical aspects of the study, the most salient ones are as follows: firstly, to find out the concentration of the compounds, their level in the bile of the fish caught was analysed. To do this, a new analytical method based on solid phase extraction was used. The analysis itself was carried out by means of gas chromatography-mass spectrometry.

The bile samples contained various compounds not detected in the water (certain pesticides, alkylphenols, hormones, etc.) which confirms, according to the research team, the capacity of this substance to accumulate these compounds. In the view of these researchers, bile could provide an interesting tool for biomonitoring purposes in the future. It has also been confirmed that many compounds tend to accumulate in [fish](#) and that the concentration values are higher in male and [intersex fish](#). In any case, further research needs to be done into this matter according to the authors of the study.

**More information:** O. Ros, J.K. Izaguirre, M. Olivares, C. Bizarro, M. Ortiz-Zarragoitia, M.P. Cajaraville, N. Etxebarria, A. Prieto, A. Vallejo: "Determination of endocrine disrupting compounds and their metabolites in fish bile", Science of The Total Environment, Volume 536, December 2015, Pages 261–267

Provided by University of the Basque Country

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