

# Water-treatment plants are not supposed to harm the functioning of river ecosystems

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Researcher Ibon Aristi in the Segre river (Spain). Credit: Ibon Aristi

Despite the fact that the main function of water treatment plants is to clean the polluted waste water produced by human activity, "the effluent from them turns into a source of many pollutants in rivers", explained Ibon Aristi, researcher in the UPV/EHU's department of Plant Biology and Ecology. He has studied the impact of one of these effluents in the river Segre by observing the fluvial community, in other words, by

analysing its response to the pollutants in the effluent.

The compounds in the effluent of [water-treatment](#) plants could be divided into two groups in terms of how they affect the river ecosystem: the ones that boost the activity of the organisms, and the ones that harm or hamper it. The first group comprises organic matter and nutrients, the so-called assimilable ones. In their presence, the activity of the river organisms is increased since their growth is encouraged. "Yet above a certain point or concentration they may be toxic. One of the functions of water-treatment plants is in fact to lower the concentration of these compounds to acceptable levels," said Aristi.

However, the components of the other group are [toxic pollutants](#), ones that harm river organisms in one way or another. In the research they concentrated on drugs dissolved in the water. "We regard them as indicators of all the toxic pollutants, but one has to understand that together with the drugs there is a variety of [toxic compounds](#), such as heavy metals, pesticides and components of soaps, and that it is when they are taken together that they are harmful. None of them are removed in the water-treatment plants because these plants are not equipped for that purpose," explained the researcher.

## **Consequences of the lack of efficiency**

As they have been able to see, pollutants of one type and another affect the various river organisms. They have noticed the influence of assimilable compounds mainly in respiration, in other words, in the processing of organic matter. Aristi explains it thus: "When the concentration of assimilable compounds increases, respiration also increases. Respiration is much greater at the place where the effluent from the water-treatment plants is incorporated than in the upriver stretches, and when it heads downriver, the concentration of assimilable compounds gradually decreases and with it respiration".

On the other hand, the toxic pollutants affect [photosynthetic organisms](#) more. According to Aristi, "the toxic pollutants cause the level of production of these beings to be lower than what it should be at a specific point. Production usually depends on the level of light as it is essential for photosynthesis to take place. When mixed with the water from the treatment plant, however, we have not measured levels of production in accordance with the quantity of light existing. "We have also seen that these organisms have activated a mechanism to protect themselves from the stress produced by the toxic substances".

Aristi takes the view that the research has shown that "water treatment plants are not totally efficient, and it is something to which attention should be paid if we want the activity of the rivers to remain healthy." By way of conclusion, Aristi made a reflection: "One would have to see which is the more appropriate situation: the current one with lots of small water treatment plants that leave their impact on many stretches of the river, or harm fewer stretches by building fewer but bigger water-treatment plants". But there is also the possibility of increasing the efficiency of the [treatment plants](#) by, for example, fitting filters to collect the compounds that are not removed at the moment. "But in this matter it's the same old story: while the legislation in force does not require it, it will be difficult for the [water-treatment plants](#) to implement them owing to their high cost," he pointed out.

**More information:** Ibon Aristi et al. Mixed effects of effluents from a wastewater treatment plant on river ecosystem metabolism: subsidy or stress?, *Freshwater Biology* (2015). [DOI: 10.1111/fwb.12576](https://doi.org/10.1111/fwb.12576)

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