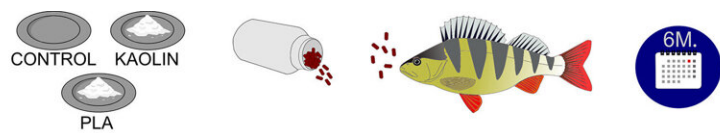


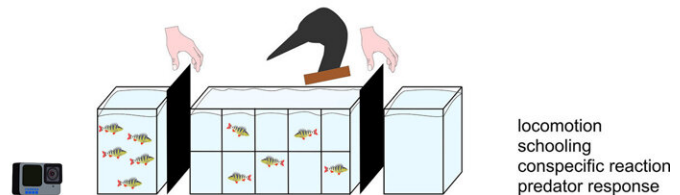
Biodegradable plastic from sugar cane also threatens the environment, finds new research

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chronic feeding exposure



behavior endpoints



physiological and molecular endpoints



Graphical abstract. Credit: *Science of The Total Environment* (2023). DOI: 10.1016/j.scitotenv.2023.163425

Traditional plastic, based on fossil oil, has flooded the Earth and there is microplastic in all living things. This has led to intensive research for alternatives that decompose faster in nature. Bio-based polymers based on cane sugar are one such option. The most common bioplastic is poly-L-lactide (PLA), which is used in 3D printers, textiles, food packaging, disposable cutlery and other applications.

Bioplastics also have a negative impact on biological life. Doctoral student Azora König Kardgar at the University of Gothenburg has found that the behavior of small perch exposed to bioplastics in fish food changed over a period of six months. They reacted far more when they met fellow perch than normal. In addition, there were signs of reduced movement, altered ability to form shoals and altered reaction when approached by danger.

"Toxicological experiments that analyze animal behavior are very rare. Most commonly, researchers look at physiological changes. We can see that something in PLA [plastic](#) causes changes in the fish, but we can't see what," says Azora.

Because this research looked at PLA [microplastic particles](#), the researchers also tested feeding the perch with kaolin particles, a white clay used for porcelain and to coat paper. Fish fed with kaolin showed some minor changes in behavior. However, a [male sex hormone](#) was affected and some other gene expressions in the fish was curbed, such as the response to stress.

"We see that PLA is not harmless to fish, so it should not be sold as an environmentally friendly alternative to ordinary plastic. It should be considered as equivalent to ordinary plastic," says Azora.

Fish were fed for six months with food containing 2 percent PLA, which is about the concentration of ordinary petrochemical plastic used in previous studies. The quantity of kaolin fed to another group of fish was also 2 percent. In addition, there was also a control group of perch fed with uncontaminated food.

The research is published in the journal *Science of The Total Environment*.

More information: Azora König Kardgar et al, Chronic poly(l-lactide) (PLA)- microplastic ingestion affects social behavior of juvenile European perch (*Perca fluviatilis*), *Science of The Total Environment* (2023). [DOI: 10.1016/j.scitotenv.2023.163425](https://doi.org/10.1016/j.scitotenv.2023.163425)

Provided by University of Gothenburg

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