

Researchers discover high levels of estrogens in some industrial wastewater

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In a groundbreaking study, civil engineering researchers in the University of Minnesota's Institute of Technology have discovered that certain industries may be a significant source of plant-based estrogens, called phytoestrogens, in surface water. They also revealed that some of these phytoestrogens can be removed through standard wastewater treatment, but in some cases, the compounds remain at levels that may be damaging to fish.

Civil engineering associate professor Paige Novak and her graduate student researcher Mark Lundgren studied [wastewater](#) streams from 19 different industrial sites in Minnesota and Iowa and analyzed them for six phytoestrogens. They found very high concentrations of these hormone-mimicking phytoestrogens -- up to 250 times higher than the level at which feminization of fish has been seen in other research -- in the wastewater discharged from eight industrial sites, including biodiesel plants, a soy milk factory, a barbecue meat processing facility and a dairy. They also detected high concentrations of phytoestrogens in the water discharged by some municipal wastewater treatment plants.

The good news is that the researchers revealed that phytoestrogens can be removed from water as it goes through standard treatment. In fact, they saw more than 90 percent removal of these compounds from the water. Unfortunately, sometimes 99 percent removal is needed to reach levels that are considered harmless to fish.

Plant-based phytoestrogens are naturally occurring but have been shown

to function as hormone mimics and alter development and reproductive patterns in fish. These effects include decreased aggression, immunosuppression, and decreased testosterone production. Other estrogens that cause similar effects have been linked to population-level collapse in fish, Novak said.

"Many people have looked at human-related chemicals such as those in birth control pills as the primary source of estrogens in the water supply, but they have not looked at plant-based estrogens from a wide variety of industries," Novak said. "Our research is the first study of its kind to provide a snapshot in time of what is going on in these industries. We hope that it can be used in planning new industrial sites and expansion of current sites."

Novak pointed out that some of these industrial facilities are in small towns without sophisticated wastewater treatment plants. In these locations, there is potential for impacts on fish and wildlife, she said.

"Our nation needs to do some careful planning as we rapidly expand various plant processing industries," Novak said. "We need to include good wastewater treatment into our industrial plant designs. We also need to think broadly as we look for the causes of [fish](#) feminization in various streams, rivers and lakes, as well as possible solutions."

More information: To read the entire research report, visit the *Environmental Toxicology and Chemistry* Web site at: [www.setacjournals.org/perlserv ... abstract&doi=10.1897%2F09-029.1](http://www.setacjournals.org/perlserv...abstract&doi=10.1897%2F09-029.1)

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