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UBC study measures endocrine disruptors in Okanagan wastewater

UBC researchers conducting the ongoing Okanagan Endocrine Disruptor Study have determined that concentrations of endocrine disrupting compounds (EDCs, referred to collectively as estrogens) are low in Kelowna, Vernon and Penticton wastewater treatment effluents.

Jeff Curtis, Associate Professor of Earth and Environmental Sciences at UBC's Okanagan campus, and graduate student Tricia Brett are sampling municipal wastewater and receiving waters to determine levels of four estrogenic compounds -- the EDCs -- and rates at which they break down in the environment.

Since 2008, sampling has been underway at the sewage treatment plants in Penticton, Kelowna and Vernon. Samples have been taken of the treated effluent, and the waters receiving the wastewater. In Penticton, the treated wastewater is discharged into the Okanagan River Channel. Kelowna's treated wastewater is discharged into Okanagan Lake, and in Vernon it is discharged into the MacKay Reservoir which supplies a spray irrigation system for nearby lands.

On average, concentrations of EDCs in wastewater are usually in the mid teens of nanograms per litre (parts per trillion). Levels actually observed were 39 ng/L, 0.5 to 1 ng/L, and 3.9 ng/L for the Kelowna, Vernon and Penticton treatment facilities, respectively.

"Endocrine disruptors are an emerging issue that we should pay attention to," says Stu Wells, Chair of the Okanagan Basin Water Board (OBWB). "This research puts a spotlight on low-level endocrine disruptor compounds detected in our wastewaters. It is important that the OBWB -- in partnership with all levels of government -- be proactive and responsible in supporting new water research. Our environment, economy and quality of life depend on it."

When discharged into the environment, EDCs contained in treated wastewater are diluted and they degrade over time. Dilution is easy to determine and for the effluents, the dilution was always over 100-fold. However few studies of degradation have been done.

The research suggests that EDCs rapidly degrade in the environment. The combination of dilution and losses results in the low levels (generally less than 0.03 ng/L) measured in receiving waters. Sampling will continue this summer in Okanagan Lake at Kelowna, Vernon's MacKay reservoir, and the Okanagan River Channel.

At chronic high levels of exposure, EDCs have long been noted to cause feminization of male fish and amphibians and even the collapse of fish populations, says Curtis. None of the measurements in the receiving waters are in the range implicated in fish population collapse.

The study, which will continue for at least one more year, is funded by Health Canada, the Okanagan Indian Band, the Interior Health Authority, B.C. Ministry of Environment, and the OBWB.

"Some of the next tasks will be to determine the effects of seasons on EDC levels in wastewater and receiving water, and on environmental loss rates," says Curtis.

"This will allow for more confidence in very low values and detection of EDCs in water where the compounds were previously undetected. In addition, the increased sampling and analysis will confirm and add confidence to the current levels and preliminary loss rates we have found."

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A PDF copy of the research report can be downloaded from:
https://people.ok.ubc.ca/publicaffairs/news/2010_endocrine/report_2009.pdf

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