

# Venlafaxine and Desvenlafaxine and Drinking Water

## Venlafaxine and Desvenlafaxine

Venlafaxine and desvenlafaxine are prescription medications used to treat depression. Venlafaxine is sold under the brand name Effexor, as well as in generic forms, and is one of the most widely prescribed antidepressant medications. Desvenlafaxine is sold under the brand names Pristiq and Khedezla, in addition to some generic forms.<sup>1</sup>

## Venlafaxine and Desvenlafaxine in Minnesota Waters

Several studies have detected venlafaxine in wastewater and surface water in Minnesota. The Minnesota Pollution Control Agency (MPCA) estimates that approximately 5 percent of stream miles in Minnesota have detectable levels of venlafaxine, with levels up to 0.034 µg/L\*.<sup>2</sup> In 2022, venlafaxine was detected in MN groundwater in concentrations up to 0.0045 µg/L.<sup>3</sup>

Desvenlafaxine was detected at low levels (0.0747 µg/L) in the Mississippi River in one study.<sup>4</sup>

\*One microgram per liter (µg/L) is the same as one part per billion (ppb).

## MDH Guidance Value

Based on available information, MDH developed a guidance value of 10 ppb for venlafaxine and 20 ppb for desvenlafaxine in drinking water. MDH does not use guidance values to regulate water quality, but they may be useful for situations in which no regulations exist. MDH develops guidance values to protect people who are most vulnerable to the potentially harmful effects of a contaminant. A person drinking water at or below the guidance values would have little or no risk of health effects.

## Potential Health Effects

Exposure to drinking water containing higher levels than the guidance values may cause adverse health effects. Venlafaxine and desvenlafaxine have beneficial antidepressant effects on the nervous system. However, even the lowest prescription doses are associated with some adverse effects including tremor, dizziness, sweating, blood pressure effects, constipation and decreased male sex drive and erectile dysfunction. Effects on newborns exposed during pregnancy include effects on the lungs, breathing and seizures.

## Potential Exposure to Venlafaxine and Desvenlafaxine

The most significant exposure to venlafaxine and desvenlafaxine is when they are taken as prescription medications. Both medications have been found in breast milk when nursing mothers are taking them. The Food and Drug Administration (FDA) indicates a potential for adverse reactions in nursing infants. Nursing mothers and their doctors should discuss options to stop nursing or to stop using the drug while nursing, taking into account the importance of the drug to the mother's health.<sup>5</sup>

Venlafaxine and desvenlafaxine have been found in surface water that is used as a source of drinking water at levels below MDH guidance values. Neither venlafaxine nor desvenlafaxine have been looked for in finished drinking water.

## Using Venlafaxine and Desvenlafaxine Safely

As prescription drugs, venlafaxine and desvenlafaxine have health benefits for people who use them. Always read the prescribing information or package inserts for more information when you pick up medicines from your pharmacy. Discuss any concerns with your doctor or pharmacist.

## Venlafaxine and Desvenlafaxine in the Environment

When a person takes venlafaxine or desvenlafaxine, a small portion of the dose is not used by the body and leaves the body in the urine. Wastewater treatment is not able to remove all of the venlafaxine or desvenlafaxine. Contaminants enter the environment when treated wastewater is released into rivers or streams.

## Potential Environmental Impacts of Venlafaxine and Desvenlafaxine

Limited studies show that venlafaxine may cause harm to fish, snails, and plants living in streams impacted by wastewater. Venlafaxine may adversely affect fish behavior and may disrupt normal endocrine function at concentrations detected in Minnesota waters. There is less information available for desvenlafaxine.

## Health Risk Assessment Unit

The MDH Health Risk Assessment Unit evaluates the health risks from contaminants in drinking water sources and develops health-based guidance values for groundwater. MDH works in collaboration with the Minnesota Pollution Control Agency and the Minnesota Department of Agriculture to understand the occurrence and environmental effects of contaminants in water.

## References

1. U.S. National Library of Medicine. Hazardous Substances Data Bank (HSDB). Searched "[Venlafaxine Hydrochloride CASRN: 99300-78-4](https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB)" (<https://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>). Accessed September 2011.
2. MPCA. 2013. [Pharmaceuticals and Personal Care Products in Minnesota's Rivers and Streams: 2010](http://www.pca.state.mn.us/index.php/view-document.html?gid=19426) (<http://www.pca.state.mn.us/index.php/view-document.html?gid=19426>).
3. Minnesota Department of Health. 2022 Unregulated contaminants monitoring.
4. Elliott, S. M., & VanderMeulen, D. D. (2017). A regional assessment of chemicals of concern in surface waters of four Midwestern United States national parks. *Science of the Total Environment*, 579, 1726-1735.
5. U.S. Food and Drug Administration. 2017. [Label for EFFEXOR XR® \(venlafaxine Extended-Release\) Capsules \(fda.gov\)](https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/020699s107lbl.pdf)[https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2017/020699s107lbl.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/020699s107lbl.pdf).

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