

# REMOVAL OF CONTAMINANTS OF EMERGING CONCERN USING THE ACLARUS AOWWT-10 UNIT

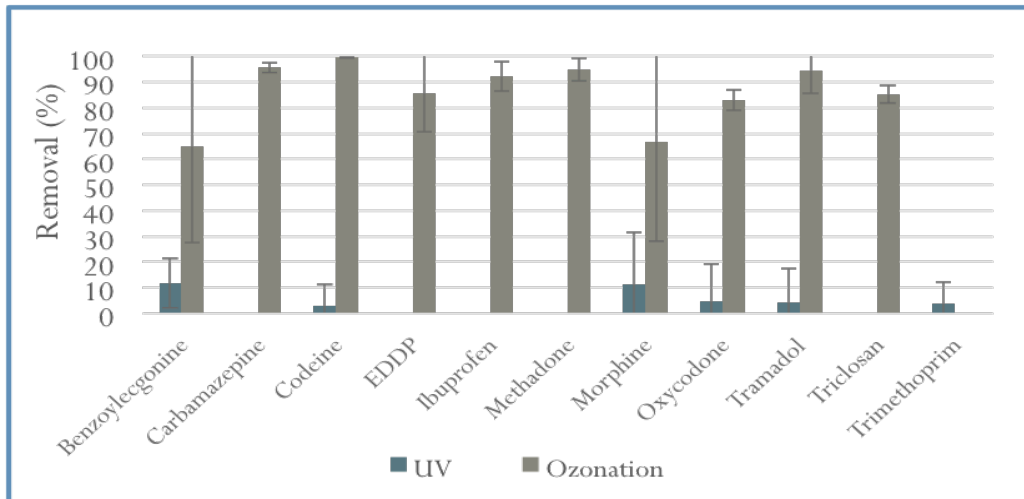
Melissa Djap and Viviane Yargeau, McGill University



YARGEAU LABORATORY

Controlling  
Contaminants of  
Concern

JUNE 2015



**FIGURE 1.** Removal of contaminants of emerging concern during disinfection of wastewater using the Aclarus AOWWT-10 unit

THERE IS A GROWING CONCERN ABOUT CONTAMINANTS OF EMERGING CONCERN (CECS) FOUND IN THE ENVIRONMENT, INCLUDING PHARMACEUTICALS, PERSONAL CARE PRODUCTS AND ILLICIT DRUGS, WHICH ARE OFTEN NOT EASILY REMOVED USING CONVENTIONAL TREATMENT TECHNOLOGIES. ACLARUS IS PROPOSING A SOLUTION!

Aclarus has developed a low-cost, low energy ozonation system that may be applied to the disinfection of wastewater. To assess the potential of ozonation used as a disinfection tool, to remove CECs from wastewater, ozonation experiments were performed using the Aclarus AOWWT-10 ozonation unit to treat the secondary effluent of a wastewater treatment plant. The unit was operated in parallel to a full-scale ultraviolet (UV) disinfection unit. A suite of illicit drugs and indicator compounds were monitored as a representative sample of CECs in wastewater. Wastewater

samples collected prior to and after ozone or UV exposure were extracted using solid-phase extraction, and analyzed by LC/MS-MS (Orbitrap XL, Thermo). Toxicity of the samples was also assessed using the Microtox® Bioassay Toxicity Testing System.

**DISINFECTION** - Results obtained indicate that ozonation treatment led to disinfection levels comparable to the level obtained in the full-scale UV treatment system available at the plant. A log reduction of 2.40 was reached with both systems based on *Escherichia coli* counts.

**REMOVAL OF CECs** - Results presented in Figure 1 demonstrate that the use of ozone yielded high removals of CEC for a large variety of target compounds, with an average of 86% for ozonation compared to 7% for UV disinfection.

**REMOVAL OF TOXICITY** - Toxicity analysis of the samples using the Microtox® systems indicated that ozone treated samples were less toxic than the secondary effluent, with a decrease in relative residual toxicity of 89% under the optimal conditions tested with the Aclarus AOWWT-10 unit.

## CONCLUSIONS

The use of Aclarus AOWWT-10 ozonation unit, as a wastewater disinfection tool, reduces the amount of contaminants of emerging concern present in the treated effluent, while further reducing toxicity.

The use of Aclarus ozonation technology can contribute to the protection of water resources.

