Announcing the Final Examination of Paula Campesino for the degree of Master of Science

Time & Location: June 26, 2020 at 9:00 AM in Virtual Defense http://ucf.zoom.us/j/98505081973
Title: Ultraviolet irradiation combined with chlorine dioxide pre-oxidation for disinfection by-product control

The use of ultraviolet (UV) light and chlorine dioxide (ClO2) as an advanced oxidation process (AOP) has been investigated at the bench-scale to understand the effects of their use on disinfection by-product (DBP) formation potential (FP) in chlorinated groundwater (GW) and surface water (SW) supplies. Two GWs and two SWs of varying qualities were subject to a series of AOP treatment sequences at the bench scale: sodium hypochlorite, to serve as a baseline; ClO2-CI2, UV-CI2, and UV-ClO2-CI2. In these treatment sequences, CI2 is used as a primary and secondary disinfectant. Several water quality parameters were measured throughout the experiments, including chlorite (ClO2-) and chlorate (ClO3-) when ClO2 was used for process testing. Total trihalomethane (TTHM) FP curves were developed for each experiment along with the 7-day haloacetic acid (HAA) FP. The treatment sequence UV-ClO2 followed by CI2 addition for GW supplies was shown to remove between 8 and 35 percent of the TTHM FP as compared to little to no change in formation potential with UV treatment alone followed by CI2 addition. The SW supplies resulted in reductions between 16 and 27 percent for the treatment sequence UV-CI2 followed by CI2, approximately double the reduction from ClO2 alone followed by CI2. GW treatment using the UV-ClO2 AOP followed by CI2 was found to increase HAA formation, in one case by almost 50 percent compared to the baseline HAA concentrations. The research indicated the reduction of DBP FP AOP effectiveness to reduce DBP formation was highly dependent on the specific source water type and quality.

Major: Environmental Engineering

Educational Career:
Bachelor’s of Environmental Engineering, BS, 2018, University of Central Florida

Committee in Charge:
Steven Duranceau, Chair, Civil, Environmental and Construction Engineering
Woo Hyoung Lee, Civil, Environmental and Construction Engineering
A. H. M. Anwar Sadmani, Civil, Environmental and Construction Engineering

Approved for distribution by Steven Duranceau, Committee Chair, on June 11, 2020.

The public is welcome to attend.