Analytical Flow Virocytometry Reveals Significant Differences and Correlations between Virus-Like Particles, Nutrients, and Taste & Odour Compounds in a Drinking Water Mesocosm Experiment

Isaac Meza-Padilla1, Jozef I. Nissimov1

1Department of Biology, University of Waterloo, Waterloo

Cyanobacteria are responsible for the production of taste & odour (T&O) compounds, such as Geosmin and 2-methylisoborneol (2-MIB), that cause recurring problems in certain drinking water reservoirs. T&O episodes often lead to considerable economic losses for the drinking water industry. Geosmin and 2-MIB are released from cells upon cyanobacterial death. The role lytic cyanophages play on the release of these metabolites, however, is obscure. To investigate this, a mesocosm experiment was conducted using water from a drinking water reservoir suffering T&O problems. Seven treatments with different concentrations of nitrogen and phosphorus were established, as high concentrations of nutrients promote cyanobacterial growth and consequently the production of T&O compounds. Virus-like particles (VLPs) were quantified using analytical flow virocytometry; cyanobacterial chlorophyll *a* (CyanoChl*a*), total nitrogen, total phosphorus, Geosmin and 2-MIB concentrations were measured. During the final day of the mesocosm experiment, significant differences in viral abundance, CyanoChl*a*, and the ratio of VLPs mL−1/CyanoChl*a* μg L−1 as a proxy for burst size were detected in the different treatments. Further, significant correlations were found between total phosphorus & VLPs, CyanoChl*a* & 2-MIB, and 2-MIB & VLPs. Altogether, these preliminary results hint towards an interplay between phosphorus and cyanophage-host systems on the concentration of 2-MIB.