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USE OF ALGAE IN A NOVEL WASTEWATER TREATMENT SYSTEM

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There is an imminent need for sewage treatment systems that provide clean and safe water to an ever-growing human population, particularly in urban environments. Algae are capable of removing excess nutrients from wastewater that would otherwise be discharged into the Chicago River, causing blooms of disease-causing bacteria. In collaboration with the Metropolitan Water Reclamation District of Greater Chicago, we are characterizing the algal communities of a Revolving Algal Biofilm system, a wastewater treatment system that allows algae to grow on a 10-ft vertical substrate that revolves through a wastewater tank. Algal cells attached to the substrate incorporate nitrogen, phosphorus, and other nutrients from the wastewater into biomass that can be removed and repurposed for valuable bioproducts. The types of algae in the system are unknown and will need to be identified as different algal species remove nutrients from wastewater at different efficiencies. Algal samples were collected biweekly from the O'Brien Water Reclamation Plant in Skokie, Illinois, from 01/13/2021-02/24/2021 and examined with light microscopy at 1000x magnification. The most common species and their average relative abundances were *Sellaphora saugerresii* (76%), *Navicula cryptocephala* (12%), and *Nitzschia palea* (12%). Chlorophyll-*a*, which is a measure of algal biomass, averaged 2.59 $\mu g/cm^2$. Algal communities will be characterized through July 2021 to determine if the species composition and biomass change over time. These data will be related to the amount of nitrogen and phosphorus that is removed by the RAB treatment to determine the ability of algae to clean wastewater.