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Algae Biofilms in Support of Improvements in Environment, Public Health, and the Bioeconomy

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Extended Abstract

Algae biofilm reactors for water reclamation through nutrient recovery from municipal and industry wastewaters are a mode of biological treatment utilizing naturally occurring mixtures of algae types and bacteria that self-organize into a fixed-film or attached-growth contiguous structure held together by a self-produced extracellular matrix that is easily harvested by physical scraping. These reactors therefore combine both an upstream process (biofilm nutrient uptake) and a downstream process (biofilm separation) in one unit process/operation. In addition to applications for removing nutrients, cultivated algae biofilms have recently received increased focus for producing value bioproducts, including liquid biofuels, biofertilizer, bioplastics, biohydrogen, and high value chemicals, as well as serving as sources of chemicals for improved animal gut health, cellular agriculture, and plant growth. The engineering of algae-based biofilm reactors for supporting global improvements in environment, public health, and the bioeconomy will be addressed including strengths, weaknesses, opportunities, and challenges.