Modelling of green microalgal growth and algal storage processes using wastewater resources - DTU Orbit (31/12/2018)

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Recent research focuses on the recovery of nutrients, water and energy from wastewater. Microalgal cultivation on wastewater resources is considered as a more sustainable means to produce fertilizers or biofuels. Innovative systems that incorporate microalgal cultivation into conventional wastewater processes have been developed. The effective design, optimisation and control of these systems require modelling tools that can readily extend existing benchmark models with new sub-models. Several process models have been developed to simulate algal growth. Some models include only one variable, e.g., light, whereas others include multiple variables, such as pH, nitrogen, phosphorus and organic carbon. This chapter aims to collect and describe green microalgal process models that can be used in wastewater resource recovery systems together with their limitations. Some of the listed models have been developed according to the activated sludge modelling (ASM) framework to facilitate the integration with existing modelling frameworks in water treatment. This chapter presents in detail the recently developed ASM-A biokinetic green microalgal process model. The model includes photoautotrophic and heterotrophic algal growth and uptake and storage of nutrients, including both nitrogen and phosphorus.

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