



Simultaneous biomass production and water desalination concentrate treatment by using microalgae

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ABSTRACT

Environmental effects associated with concentrate disposal have restricted the practical deployment of desalination technologies for inland brackish water, reducing the ability of desalination to alleviate global water shortages. In order to increase the feasibility of deploying desalination processes for inland brackish water sources, a beneficial use for concentrate from inland desalination systems is required. This study purposed the idea of microalgae cultivation in the concentrate stream to solve problems associated with desalination while simultaneously meeting energy needs by providing feedstock for biofuel production. A full factorial experiment was conducted in which two species of algae (*Nannochloropsis oculata* and *Dunaliella tertiolecta*) were cultivated in three different media (concentrate, f/2, and a 50:50 combination of f/2 and concentrate) to investigate the ion removal ability of microalgae from concentrate and examine how well they can grow in the concentrate compared to other conventional media. Based on experimental data, concentrate was found as a better medium for biomass production relative to the conventional f/2 medium. Combination of the concentrate medium with *Dunaliella tertiolecta* produced the highest dry biomass. Furthermore, the contribution of both species of algae to nitrogen, phosphate, and fluoride removal was significant.

Keywords: Concentrate; Desalination; Microalgae; Water treatment; Biomass

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