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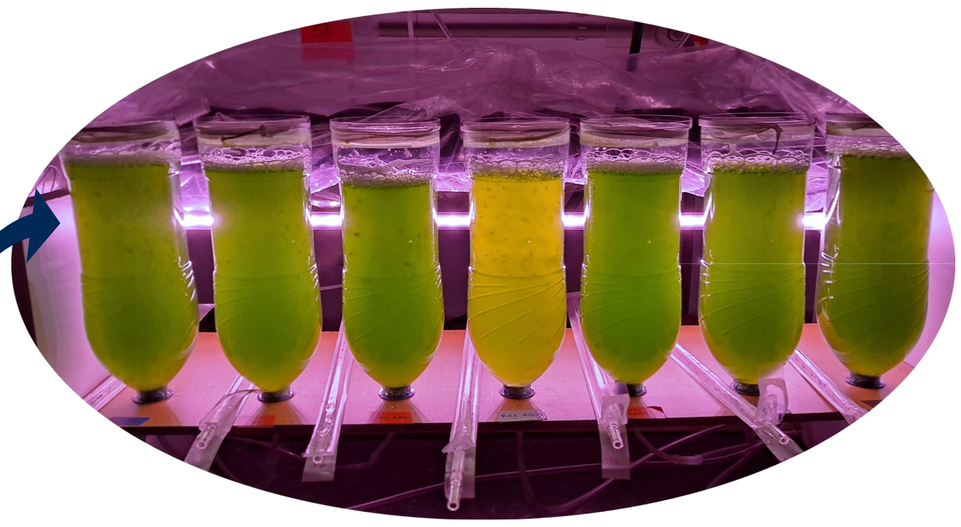
MIDAS
Microalgae Digital Applications

Biomass production and nutrient removal efficiency of *Chlorella vulgaris* cultured in nutrient-rich effluent and CO_2 from a recirculating aquaculture system



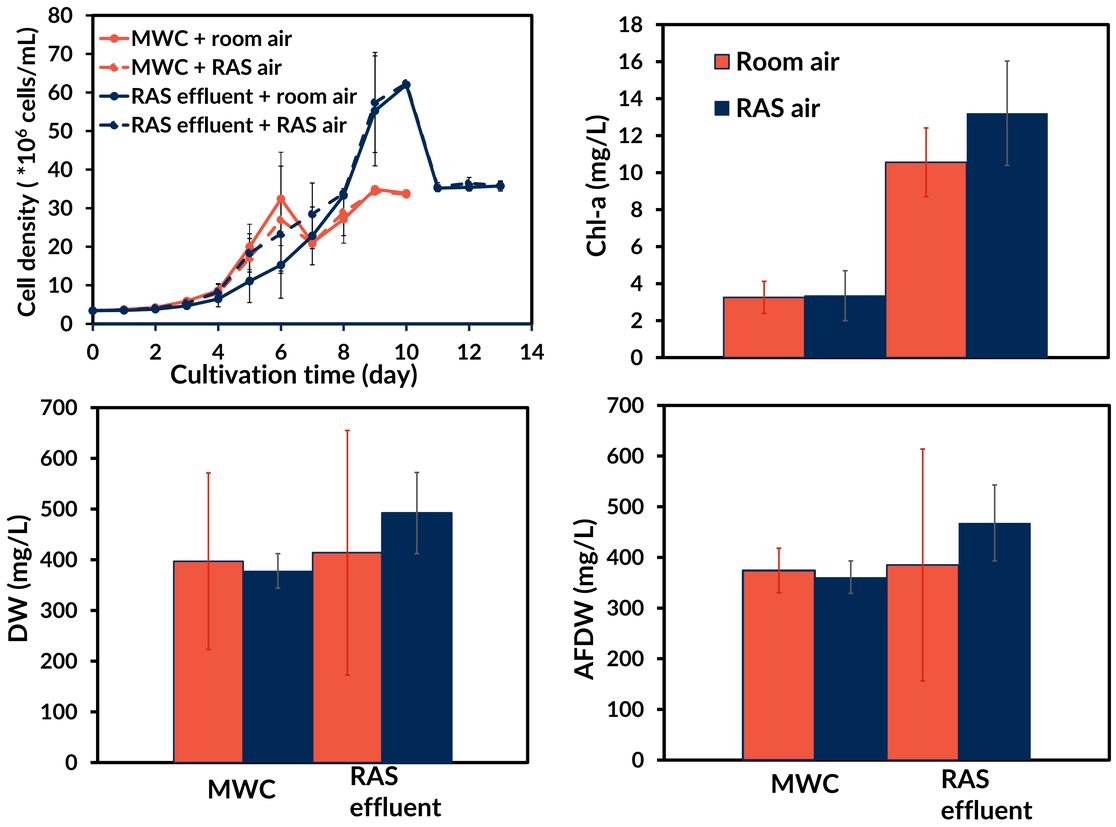
INTRODUCTION

The effective management of nutrient and carbon emissions from RAS is vital for ensuring sustainable aquaculture practices. Cultivation of *Chlorella vulgaris* in RAS effluent shows significant potential in biomass production and nutrient removal.

METHODS

C. vulgaris was cultivated in 1.2 L photobioreactors. Two factors with five replicates were investigated in a full factorial design.

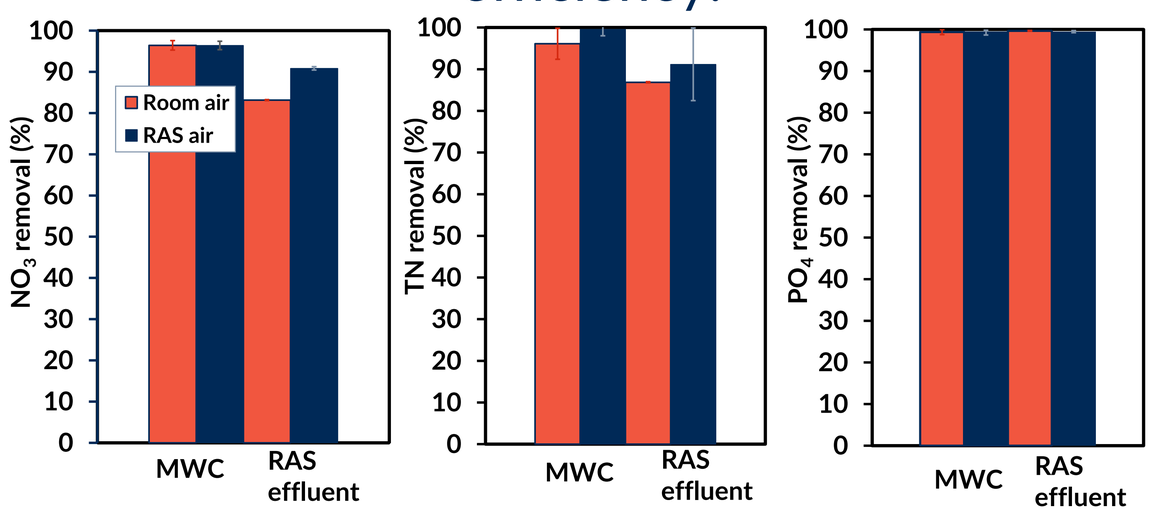
1) Media: RAS effluent and algal culture media (modified Wright's cryptophyte medium, MWC)
2) Aeration: room air with ~400 ppm CO_2 and air from the RAS trickling filter (RAS air) with 700-1000 ppm CO_2



Cell density, Chlorophyll-a (Chl-a) content, dry weight (DW), and ash-free dry weight (AFDW) (mean ± SD) of *C. vulgaris* during the stationary growth phase cultivated in algal culture medium (MWC) or RAS effluent using either room air or RAS air.

RESULTS

C. vulgaris cultivated in RAS effluent had higher cell density, DW, AFDW and Chl-a levels than those in the MWC medium. Varying CO_2 concentration (room air vs. RAS air) had minimal impact on growth, biomass production and nutrient removal efficiency.



Nutrient (NO_3, total nitrogen (TN), and PO_4) removal efficiencies of *C. vulgaris* grown in algal culture medium (MWC) or RAS effluent using either room air or RAS air.

CONCLUSIONS

The cultivation of *C. vulgaris* in RAS effluent was highly effective, yielding substantial biomass and nutrient removal with the additional CO_2 from the RAS having minimal effects.