

Lumostatic operation controlled by the optimum light intensity per dry weight for the effective production of *Chlorella zofingiensis* in the high cell density continuous culture

ABSTRACT

To maximize the production rate of *Chlorella* *zofingiensis*, a lumostatic continuous culture was operated under light intensities of 250–1510 $\mu\text{E m}^{-2} \text{s}^{-1}$. The cell density and volumetric biomass production rate were increased without [photo inhibition](#) and reached 13.5 g-dry weight (dw) L^{-1} on day 21.5 and 2.41 g-dw $\text{L}^{-1} \text{day}^{-1}$ on day 10.5, respectively. These maximum values were higher than any previous [photoautotrophic](#) culture study with *C. zofingiensis*. The [specific growth rate](#) was maintained at a high level $> 0.5 \text{day}^{-1}$ until the light intensity per dry weight decreased below 28 $\mu\text{E g-dw}^{-1} \text{s}^{-1}$, which coincided with the value estimated in our previous study, verifying the reliability of this estimated value. There was a strong relationship between the [photosynthetic efficiency](#) and light intensity per dry weight for *C. zofingiensis*. This relationship may be useful for evaluating species-specific productivity to select productive species.

Keyword: Lumostatic operation; *Chlorella zofingiensis*; High-cell-density culture; Light intensity per dry weight; Continuous culture