

## Impact of Light Intensity, Illumination Strategy and Self-Shading on Sustainable Algal Growth in Photo Bioreactors

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**Abstract :** Algal photo bioreactors were operated at incident light intensities of 0.24, 2.52 and 5.96 W L<sup>-1</sup> to determine the impact of light on algal growth. Low specific Chlorophyll-a content of algae was a strong indicator of light induced stress on algal cells. It was concluded that long term operation of photo bioreactors in the continuous illumination mode was infeasible under the range of incident light intensities examined and provision of a dark period after each light period was necessary for algal cells to recover from light-induced stress. Long term operation of photo bioreactors in the intermittent illumination mode was however possible at light intensities of 0.24 and 2.52 W L<sup>-1</sup>. Further, the incident light intensity in the photo bioreactors was found to decline exponentially with increase in algal concentration in the reactor due to algal 'self-shading'. This may be an important determinant for photo bioreactor performance at higher algal concentrations.

**Keywords :** Algae, algal growth, photo bioreactor, photo-inhibition, 'self-shading'

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