

Impact Of Uv-B 24- and 48-Hour Exposure on Growth and Cell Viability of *Chlorella Sp.*

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Structured Abstract

Background: The increasing depletion of the ozone layer has led to more ultraviolet-B (UV-B) radiation arriving at the Earth's surface, which poses a threat to photosynthetic organisms such as microalgae. *Chlorella sp.*, a green microalga containing high levels of valuable bioactive compounds, is widely utilized in biotechnology and environmental monitoring. However, its growth and metabolic balance may be adversely impacted by long-term UV-B exposure. It is worth understanding how *Chlorella sp.* that responds to UV-B stress is necessary to optimize its application in environmentally friendly technologies. This work examines the impact of 24 and 48-hour exposure to UV-B on *Chlorella sp.* viability and growth to evaluate its tolerance and biotechnological potential.

Methods: The experiment involved *Chlorella sp.* growth in BG-11 medium and monitoring of growth by optical density (OD) readings and hemocytometer cell counts. The sample was divided into control (PAR light) and treatment (UV-B exposure for 24 and 48 hours) groups. Viability was approximated by trypan blue staining, and the percent survival was calculated. Statistical t-tests were used in comparing growth and viability of the treated versus the control samples.

Results: The outcome showed that *Chlorella sp.* was within the log growth phase from Day 2 to Day 6 based on the increasing absorbance and viable cells. The viability of cells under PAR light was high and showed only a decrease after 48 hours. UV-B effects were more noticeable, however. Cell viability at 24 hours remained higher than 96%, but at 48 hours, it dropped significantly to around 81%, showing more cell damage. Statistical comparison confirmed survival difference between control and UV-B exposed groups at 48 hours, with long UV-B exposure having a negative effect on *Chlorella sp.* cell viability and growth.

Conclusion: The study concluded that *Chlorella sp.* works best between Day 2 and Day 6. Exposure to UV-B for a short time had minimal effects, while exposure for 48 hours significantly reduced cell viability. This proves that long-term UV-B stress damages cell health. The findings highlight the importance of the length of exposure and support the viability of *Chlorella sp.* in sustainable applications within controlled conditions.

Keywords: *Chlorella sp.*, UV-B, Radiation

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