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Effect of cyanolytic bacterium, *Pseudomonas fluorescens* BG-E on the photosynthesis of *Pseudanabaena lonchoids*: An attempt to understand cyanolytic mechanism

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Cyanolytic bacteria inhabited in freshwaters play a major role in controlling cyanobacterial blooms. Disruption of photosynthesis processes, synthesis, and maintenance of photosynthetic pigments in cyanobacteria leading to death is one of the major strategies utilized by cyanolytic bacteria in controlling cyanobacterial blooms. However, the mechanisms by which cyanolytic bacteria disrupt photosynthesis and its' efficiency are species-specific. Therefore, the objective of the study was to explore the effect of *Pseudomonas fluorescens* BG-E (MZ007859) on the photosynthetic pigments of *Pseudanabaena lonchoids* (MW288940) during the cyanolytic process as an attempt to understand cyanolytic mechanism. In the experimental setup, 15% (v/v) of the total volume of bacterial cell-free supernatant was inoculated into *P. lonchoids* grown in BG11 liquid medium at a cell density of 0.020 (OD_{730}) and incubated at 26 ℃. Photosynthetic pigments (chlorophyll *a* and carotenoids) and phycobiliproteins contents (phycocyanin and allophycocyanin) were analyzed at 0, 2, 5, 8, and 10 days after incubation. Results indicated time-dependent significant ($p < 0.05$) reductions in all the analyzed pigments of *P. lonchoids* following 2 days of incubation compared to the controls. The % inhibition of chlorophyll *a*, carotenoids, phycocyanin, and allophycocyanin contents were 72, 71, 83, and 86% respectively after 10 days. The chlorophyll stability index (CSI) also showed a time-dependent reduction. It had reduced to 28% after 10 days. These findings infer that the secreted metabolite/s of bacteria in the cell-free supernatant might have reduced or impaired photosynthetic and accessory pigments as an efficient cyanolytic mechanism to disrupt photosynthesis leading to declining the population growth of *P. lonchoids*.

Keywords: Bacterial cell-free supernatant, Chlorophyll stability index, Photosynthetic pigments, Phycobiliproteins

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