Effects of light intensity on the content of photoprotective compounds of *Tolypothrix* sp. and *Oscillatoria* sp.

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Abstract

Light intensity is a key factor in the growth rate and production of photoprotective compounds of cyanobacteria and alteration of light intensities can affect their physiology, biomass, and biochemical composition. However, there is a knowledge gap in the species-specific characterization of photoprotective compounds of cyanobacteria growing under different light intensities. Hence, the objective of this study was to conduct quantitative analysis of the photoprotective compounds in the selected algae. Two filamentous cyanobacteria as *Oscillatoria* sp. and *Tolypothrix* sp. were selected for this study growing at similar laboratory conditions. The similar wet weights (1g) of these algae species were taken from the two original laboratory cultures into four replicates under two light intensities of twelve hours of light and dark conditions. The two light intensities were 190 ± 10 lux and 885 ± 5 lux those were visible as white and purple color respectively. The duration of the experiment was four weeks and measurements were taken at every seven days duration. Fresh weights, total chlorophyll and total carotenoids were measured to find the growth rate of both species and then dried samples were macerated with absolute methanol. The highest biomass (1.598 ± 0.087) g and the highest Sun Protection Factor (SPF, 6.726 ± 0.023) for *Oscillatoria* sp. were observed at the light intensity of 190 ± 10 lux. In contrast, the highest biomass (0.304 ± 0.001) g and the highest SPF (7.674 ± 0.007) for *Tolypothrix* sp. were observed at the light intensity of 885 ± 5 lux. The light intensity significantly affected on the content of total chlorophyll, chlorophyll-a and growth rate for both species ($p<0.05$). However, there was no significant effect of the light intensity on the production of carotenoid in both algae. A further study is recommended to analyze photoprotective compounds of algae under UV-A and UV-B light intensities.

Keywords: *Filamentous cyanobacteria, light intensity, photoprotective compounds, sun protection factor*