Cellular Bioenergetics in Spirulina platensis towards Growth and Phycocyanin Production Under Different Photon Flux Densities Using the Modified Zarrouk‘s Medium

Anyway Chofamba

Abstract

From all the pigments found in Spirulina platensis, phycocyanin has been found to have a diverse application in various fields, and has a high market demand, calling for a need to increase production and easy isolation methods. In general, phycocyanin production in cells depends on the light conditions, among other factors during the cultivation period. The focus of this study was to look at the effect of different light intensities on phycocyanin production in Spirulina platensis. Other cellular biochemical parameters, including chlorophyll content and protein, were explored under the different treatments. An experimental design containing 4 different light intensities of 20, 150, 300 and 600 Î¼mol photons m2/s was administered with 3 replicates. The results obtained from the study showed that high phycocyanin content was obtained from a low light intensity treatment. Chlorophyll results were a bit in contrary to the results obtained for phycocyanin, with high chlorophyll content obtained in high light intensity treatments. Protein and biomass accumulation also followed the same trend, where they were observed to be higher in high light intensities, with the maximum biomass achieved at 600 Î¼mol photons m2/s and maximum protein content achieved at 300 Î¼mol photons m2/s. Due to the commercial potential of phycocyanin to humans, its low cost downstream cultivation and processing of Spirulina platensis will be of economic advantage to the relevant stakeholders to fulfil the rampant demands and affordability of the blue phycocyanin pigment to both first and third World countries, hence the need of producing phycocyanin using the modified Zarouk‘s media which has cheaper if not affordable ingredients.