Feasibility and Optimization of Pigments Production in *Spirulina platensis* Mixotrophic Culture

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Received date: 2019.08.22
Reception date: 2019.12.08

Abstract

Although intensity of intracellular changes varies depending on the duration and intensity of the stress, the possibility of optimum productivity under salinity stress in certain dimensions is likely to increase the percentage of the desired compounds. In this case, if the conditions are provided to increase the total yield, then the compounds yields can be also enhanced. In this research, which has done during 2014-16, we experimentally investigate the effects of salt and carbohydrate levels on *Spirulina platensis* pigments in autotrophic and heterotrophic conditions. The levels used were 1, 1.5 and 3 g l^{-1} NaCl and 0, 0.5 and 6 g l^{-1} glucose in a completely randomized factorial experiment. Based on the results, mixotrophic culture containing 1 g l^{-1} NaCl and 0.5 g l^{-1} glucose introduced to increase the amount of biomass (108.6%, 11.97 g l^{-1} fresh weight and 1.56 g l^{-1} dry weight), Chlorophyll (136.0%, 0.34 g l^{-1}), carotenoids (137.5%, 0.11 g l^{-1}), flavonoid (103.5%, 0.09 g l^{-1}); and mixotrophic culture of 1/5 g l^{-1} NaCl and 0.5 g l^{-1} glucose presented to increase the anthocyanin (111.8%, 0.04 g l^{-1}) and allophycocyanin (134.3%, 0.47 g l^{-1}) contents compared to autotrophic control treatment, phycobilioproteins (1.09 g l^{-1}), phycocyanin (0.44 g l^{-1}) and phycoerythrin (0.47 g l^{-1}). This amount of different active substances of algae in the proposed treatments can be used in food (color, essence, flour, livestock feed) and pharmaceutical (supplementary food and medicine) industries.

Keywords: *Spirulina*, Autotrophy, Salinity, Glucose, Mixotrophy.