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Effects of Nickel, Molybdenum, and Cobalt Nanoparticles on Photosynthetic Pigments Content in Cyanobacterium *Arthrospira Platensis*

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Abstract

Nanoparticles are utilized in the cultivation media of cyanobacteria and microalgae to enhance productivity and the accumulation of biologically active compounds. This study focused on investigating the impact of Ni, Mo, and Co nanoparticles stabilized with polyethylene glycol, which was added to the cultivation medium of the cyanobacterium *Athrospira platensis* (spirulina), at concentrations ranging from 0.25 to 2.5 mg/L, on photosynthetic pigments. *A. platensis* was cultured in a laboratory setting using a mineral medium supplemented with nanoparticles for 6 days. The results revealed that Ni nanoparticles, within the concentration range of 0.25 to 1.5 mg/L, did not alter the levels of chlorophyll and phycobiliproteins but led to an increase in the content of β-carotene in the biomass. On the other hand, the decrease in photosynthetic pigment content caused by Mo and Co nanoparticles was compensated by an augmentation in phycobiliprotein levels. These nanoparticles inhibitory or stimulatory effects correlated with their concentrations in the cyanobacterium's cultivation medium. The study concluded that the type of nanoparticles plays a crucial role in shaping the response of the spirulina culture by redirecting biosynthetic activity to maintain photosynthetic processes. Mo and Co nanoparticles, particularly at concentrations that stimulated phycobiliprotein synthesis, can be employed as stimulators in the cultivation technologies of the cyanobacterium *Arthrospira platensis*.

Keywords: Arthrospira Platensis, spirulina, nickel, molybdenum, cobalt,·nanoparticles, chlorophyll, carotene, phycobiliproteins

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