

Biomass production of *Arthrospira* strain producing indole-3-acetic acid (IAA) and its extract effect on plant growth

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Abstract

Cyanobacteria, which are known as O₂-releasing photoautotrophic microorganisms and contribute widely in soil and water, are considered to be useful for agriculture. To be more specific, some cyanobacteria strains are able to high nitrogen molecular fixation and create cyanobacteria floors that become natural humus layers for the soil. Some strains are also capable of releasing bioactive compounds which are able to stimulate plant growth. Therefore, cyanobacteria play a significant role in maintaining the sustainability of agricultural ecosystems. Despite remarkable values of cyanobacteria, the application of this species as biological solution in order to improve the soil and plants quality has not been paid much attention.

Arthrospira sp. is one of cyanobacterial strain, which has potential to produce bioactive compounds, such as auxin. The results of our study show that the growth of *Arthrospira* sp. reaches the highest after 18 days of culturing in Z8 medium under cultural condition in flasks of 50 mL. The best condition for *Arthrospira* sp. cyanobacterium's growth was achieved at pH 7.5 after 18 days of biomass culturing and the highest concentration of Indole-3-acetic acid (IAA) was 10,56 x 10⁴ cells per mL and 10,26 µg IAA per mL, respectively.

Impact assessment of cyanobacteria extracts demonstrated that they acted as a fertilizer which is useful for germination and growth stimulation of red bean and rice. Furthermore, using biological fertilizer extracted from cyanobacteria extracts is considered to be an optimal solution that is eco-friendly and could apply for safe agricultural products.

Keywords: *Arthrospira* sp., cyanobacteria, fertilizer, germination, growth stimulation, IAA.