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Arthrospira platensis: cultivation under artificial light for protein, phycocyanin and polysaccharide production

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Abstract:
Arthrospira platensis has since long been consumed as a dietary supplement [1], rich in nutrients and bioactive compounds which make this cyanobacterium an attractive feedstock for the pharmaceutical field, for the food industry and for the aquaculture sector [2,3]. However, these properties are strain- and culture condition-dependent. We have compared two strains of *A. platensis*, F&M-C256 and F&M-C260, characterized by noteworthy differences in terms of morphology, photosynthetic efficiency, protein, phycocyanin (main responsible of the antioxidant activity in this cyanobacterium) and polysaccharide content. The two strains were grown in 6-L annular columns under two different culture regimes (batch and semi-continuous) and two different artificial light sources (LEDs and fluorescent lamps), which had similar light emission spectra. Under semi-continuous regime, both strains showed higher biomass productivity and photosynthetic efficiency than in batch regime for both light sources.

The two strains showed a protein content >50%, which was always higher in *A. platensis* F&M-C256. This strain also exhibited a higher polysaccharide content, which may explain the advantageous feature of forming clamps once aeration was stopped, facilitating its harvesting. On the contrary, phycocyanin content was higher in *A. platensis* F&M-C260 both with LEDs and fluorescent lamp lighting.

In conclusion, the strains showed to be suitable for stable production of different products, e.g. protein and polysaccharides with *A. platensis* F&M-C256, and phycocyanin with *A. platensis* F&M-C260.

Keywords:

Arthrospira platensis, spirulina, artificial light, biomass composition
References:

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