Title: Assessment of Cyanolytic Potential of a bacterium isolated from a non-axenic culture of *Synechocystis* sp. CACIAM 05.

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Abstract

Anthropogenic modifications in the aquatic environment have enriched its nutritional content mainly by nitrogen and phosphorus in which contribute to the bloom formation by cyanobacteria. In this process, the entirely ecosystem can be destroyed since the plants photosynthetic activity is compromised. The ongoing methods to remove cyanobacterial cells usually possess a great environmental and economic cost. Biological control with heterotrophic bacteria has been proposed as a promising alternative. The present work aimed to evaluate the antagonist potential of a heterotrophic bacterium identified by 16S rRNA sequencing as *Pseudomonas alcaligenes*. This bacterium was isolated from non-axenic culture of *Synechocystis* sp. CACIAM 05, previously collected from the surface of the freshwater lagoon Bolonha, situated in the municipality of Belém, Pará state, northern Brazil. The investigated bacterium was cultivated in LB medium for 120 h at 37 °C while the cyanobacterial cells were cultivated in BG11 medium for 45 days. The target cyanobacteria used were *Microcystis* sp. CACIAM 03, *Synechocystis* sp. CACIAM 05, *Cyanobium* sp. CACIAM 13, *Tolypothrix* sp. CACIAM 22 and *Synechococcus* sp. CACIAM 66. The cyanolytic potential was firstly investigated by the agar overlay diffusion test. Subsequently, the intracellular content obtained after pellet sonication followed by centrifugation for 10 minutes at 4 °C was tested along with the supernatant by agar-well diffusion method. The optimum pH was determined by resuspending the freeze-dried bacterial supernatant in buffer with differents pHs (4-10). The cyanolytic compound production was followed during the bacterial growth for 5 days. The experiment was accomplished in triplicate. Supernatant activity and cell growth were monitored every 6 hours. The agar overlay diffusion test revealed antagonist activity against the cyanobacteria *Synechocystis* sp. CACIAM 05 e *Tolypothrix* sp. CACIAM 22. Cyanolytic activity was detected in both extracellular and intracellular contents. it was observed that the production of the metabolite occurred during lag, exponential and stationary phases. The optimum pH was 6. In closing, this study was important since demonstrated the cyanolytic potential of a *Pseudomonas alcaligenes* isolated from a non-axenic culture of *Synechocystis* sp. CACIAM 05. Future research will focus on the purification and characterization of this compound.

Keywords: cyanobacteria, biologic control, biotechnology, cyanolytic potential.

Development Agency: CAPES, CNPq and FAPESPA.