



Category: Metagenomics

Deciphering the advanced methodology to investigate the survival of *A. sphaerica* in iron enriched region of Chhattisgarh

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Abstract

Cyanobacteria are among those tremendous microbial community that adds both aesthetic and ethnic value to the nature. They majorly contribute as a primary producer via photosynthesis due to the presence of various photosynthetic pigments (chlorophyll a, carotenoids, and phycobilisomes) and nitrogen fixation. Apart from this, cyanobacteria also work differently from the league because they bear enormous plasticity in their nature and can survive in the most extreme situations such as saline, thermocline environment, metal and heavy metal prone environment, etc. Iron, one of the second most abundant metal, third most limiting nutrient and fourth most abundant trace element that achieves equal position to that of macro element because of its contribution in all the vital life supporting activities such as photosynthesis, nitrogen fixation and electron transport chain mechanism. The availability and unavailability of iron leads to production of ROS within the cell which is directly linked to an oxidative stress via Haber weiss reaction and Fentons mechanism. So to assess the iron induced stress in cyanobacteria, soils from different locations of Chhattisgarh, have been tested for iron concentration by using Atomic Absorbtion Spectrophotometry (AAS). Then, number of cyanobacterial species was isolated from Turkadih, Bilaspur, and Chhattisgarh having highest iron concentration (140 ppm). They were treated with different concentrations of iron (0, 20, 50, 75, 100, 150 and 200 μM FeCl_3). Result suggested that only *Anabaena sphaerica* a filamentous, heterocystous cyanobacterium could survive up to 100 μM FeCl_3 (5 times higher concentration as is used for standard growth medium) and rest of the concentrations were found to be lethal for all the cyanobacterial species. The alterations in morphological, physiological and biochemical attributes were assessed and investigated. Further, proteome analysis (2D- Gel Electrophoresis) of *A. sphaerica* suggested that some unique proteins need proper investigation via MALDI-TOF. Concisely, it can be said that this part of research creates an interest to investigate at higher and advanced level for the most iron tolerant species isolated from the iron enriched region of Chhattisgarh.

References

- [1] Kunui, K., Minj, R.A. and Singh, S.S. (2017) 'Iron uptake strategies, transportation and storage relevant to plants and microorganisms'. In *Plants and Microbes in an everchanging Environment* (Singh SS, Ed). Nova Science Publisher, New York, 211-255.
- [2] Singh, S.S., Singh, P., Kunui, K. and Minj, R.A. (2014) Diversity analysis and distribution pattern of cyanobacteria isolated from different sites of Chhattisgarh, India. *Journal of Asia-Pacific Biodiversity* 7: 462-470.
<https://doi.org/10.1016/j.japb.2014.10.009>
- [3] Kunui, K. and Singh, S.S. Protective role of antioxidative enzymes and antioxidants against iron induced oxidative stress in cyanobacterium *Anabaena sphaerica* isolated from iron rich paddy field of Chhattisgarh, India. (communicated)

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