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# SELECTED CYANOBACTERIA'S HEAVY METAL (NISO4) ABSORPTION CAPACITY FOR BIOREMEDIATION

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## ABSTRACT

As well as being known as blue-green algae, cyanobacteria. The majority are found in habitats that include soil, freshwater, and saltwater. Cyanobacteria can be used for bioremediation of a number of contaminants, including heavy metals, pesticides, crude oil, phenanthrene, naphthalene, and phenol. In this study, cyanobacteria from a particular species were collected from rice field soil in the Nuapada district of Odisha in order to examine their capacity to absorb heavy metals ($NiSO_4$). The results show that among the tested organisms, *Anabaena oryzae* and *Nostoc linckia* are more efficient at eliminating $NiSO_4$ from the environment, whereas *Cylindrospermum indicum* is less efficient. Additionally, it has been found that the OAEAGPS value, which stands for Over All Electro Absorption Great Point System, is useful in selecting species for industrial bioremediation programs.

**KEYWORDS:** Cyanobacteria, $NiSO_4$, OAEAGPS, Metal Absorption, Bioremediation.

## INTRODUCTION

Photosynthetic bacteria called cyanobacteria were historically referred to as blue-green algae. The majority are found in soil, freshwater, and saltwater habitats. Although most species are unicellular, some can stay connected and create filaments. Several pollutants, including heavy metals, pesticides, crude oil, phenanthrene, naphthalene, and phenol, can be bioremediated using cyanobacteria. According to studies by Micheletti et al. (2008), Al-Amin et al. (2021), and Singh et al. (2011)[1,2,3] cyanobacteria are capable of absorbing heavy metals.

In this study, an effort was undertaken to test the ability of specific species of cyanobacteria obtained from rice field soil in the Nuapada district of Odisha to absorb heavy metals (NiSO4).

## MATERIAL AND METHOD

Here, we determine the metal absorption capacity of six cyanobacteria in accordance with Mishra et al. (2014).[4] Determine the EC50 value for a particular organism in relation to a certain heavy metal $NiSO_4$ Use the Electrolyter-1005 Mishra et al. (2015)[5] instrument formula to calculate the weight of the material freed from the EC50 solution. The initial metal concentration is as shown. 1 ml of 0.2 OD organisms should be incubated for 15 days at 26°C with 7.5W/m2 of continuous illumination and the EC50 concentration of heavy metals in BG11/BG110 medium. Utilizing filters paper, filter the organism, and determine the weight of the substance released (which corresponds to the final metal concentration from step 2).

Then perform the OAEAGPS computation. OAEAGPS was calculate by following formula.

Q remain% = Final metal concentration / initial metal concentration × 100

= (X/96500×ct (after 15 days) / X/96500×ct) × 100

(As X/96500 for a specific metal is constant, rearrange the equation)

= (ct (after 15 days)/ ct) × 100

Total (100%) = Q remain% + Q absorb %

Q absorb % = 100%- Q remain%

**OPEAGPS= Q absorb % / 10 (where Q is quantity)**

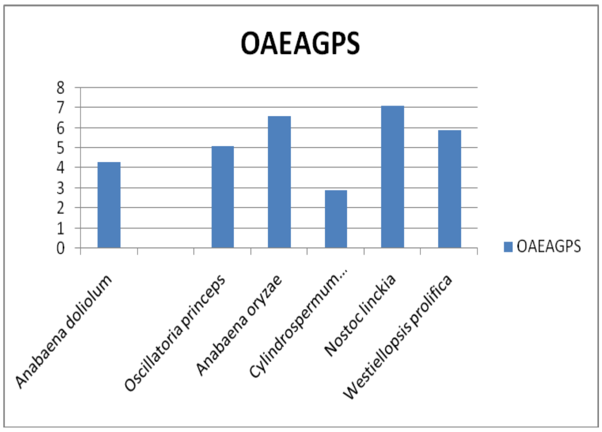
## RESULTS

Heavy metal $NiSO_4$ absorption capacity of selected cyanobacteria is given in table no -1 & graph-1.

**Table no. 1: Metal absorption capacity (OAEAGPS method) of cyanobacteria against HgCl2 (EC50) at 26±1°C under continuous light at an intensity of 7.5W/m² for 15 days.**

| No | Organism | Oaeagps | Impression |
|---|---|---|---|
| 1 | *Anabaena doliolum* | 4.3 | E |
| 2 | *Oscillatoria princeps* | 5.1 | E |
| 3 | *Anabaena oryzae* | 6.6 | ME |
| 4 | *Cylindrospermum indicum* | 2.9 | LE |
| 5 | *Nostoc linckia* | 7.1 | ME |
| 6 | *Westiellopsis prolifica* | 5.9 | E |

** LE=Less efficient (Absorption capacity less than 30%) E=Efficient (More than 30% & Less than 60%, ME=More efficient (More than 60%)




## CONCLUSION

*Anabaena oryzae* and *Nostoc linckia* are more effective organisms for removing $NiSO_4$ from the environment, whereas *Cylindrospermum indicum* is less effective among the test organisms, according to the results. It has also been discovered that the OAEAGPS (Over All Electro Absorption Great Point system) value is helpful in choosing species for programs for industrial bioremediation.

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