

## ISOLATION AND CHARACTERIZATION OF A MINERAL SOLUBILIZING *AZOTOBACTER SP.* OBTAINED FROM SOIL SAMPLE COLLECTED FROM RANGWASA JAIVIK FARM

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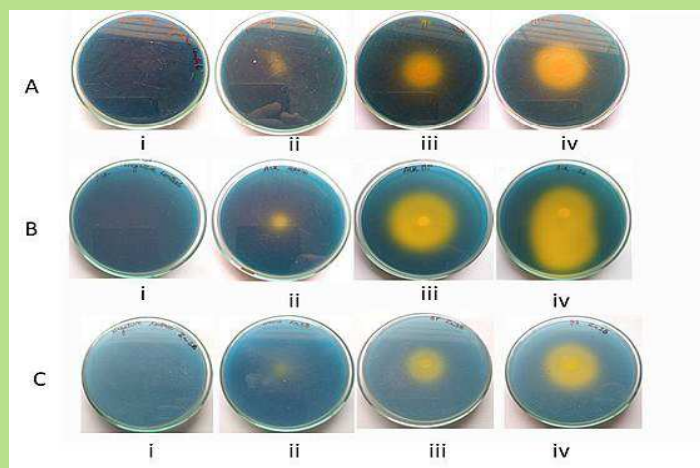
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**Abstract-** A bacterial strain with the ability to grow on nitrogen free media under aerobic condition was isolated from the soil collected from Rangwasa Jaivik farm which has been practicing traditional and organic farming practices for the last twenty-five years. The strain was identified as *Azotobacter sp.* and was found to have the ability to solubilize minerals such as phosphate, potassium and zinc. The isolate also produced Indole Acetic Acid and was found to improve germination of seeds in Fenugreek when used as bio-inoculant. The plants from the seeds inoculated with the isolated strain showed significant reduction in yellowing of the leaves.

**Keywords-** *Azotobacter*, Nitrogen Fixing Bacteria, Phosphate solubilizing bacteria, Potassium solubilizing bacteria, Zinc solubilizing bacteria



**Figure -** In-vitro mineral solubilization by various bacterial cultures on various selective media. A. Phosphate solubilization of PVK-BPB media (i. control, ii. *Azotobacter chroococcum*, iii. *Bacillus megatarium*, iv. IBAc3); B. Potassium solubilization of ALK-BTB media (i. control, ii. *Azotobacter chroococcum*, iii. *Panaebacillus polymyxa*, iv. IBAc3); C. Zinc solubilization of Zn-BTB media (i. control, ii. *Azotobacter chroococcum*, iii. *Panaebacillus polymyxa*, iv. IBAc3)

S.No.	Name of Bacteria	Average diameter of culture +halo zone (in cm) on various media		
		PVK-BPB	ALK-BTB	Zn- BTB
1	Control	-	-	-
2	<i>Paenibacillus polymyxa</i>	NA	4.00	2.14
3	<i>Azotobacter chroococcum</i>	1.06	1.06	0.80
4	<i>Bacillus megatarium</i>	2.40	NA	NA
5	IBAc3	3.47	4.27	3.47

In the qualitative confirmatory analysis, the strain IBAc3 produces yellow halos by de-colorization of blue colour of PVK-BPB, ALK-BTB and Zn-BTB, agar media. Visually, the de-colorization of PVK-BPB, ALK-BTB and Zn-BTB media and formation of yellow halos by bacterial isolate IBAc3 was like the positive control used in each experiment, while not much discoloration was observed in *Azotobacter chroococcum*. It clearly defines the pH drop in the medium due to the release of organic acids by the activity of mineral solubilizing bacteria. Indeed, the yellow halos observed on selective media for Potassium and Zinc solubilization seemed larger in diameter as compared to the positive controls. These results indicate that IBAc3 is efficient in mineral solubilization.

### Conclusion

It is concluded that the isolated bacteria in this study is a multifunctional bacteria which has a number of plant beneficial activities including nitrogen fixation, mineral solubilization, production of plant growth promoting molecules and hence can be used as an excellent bio-inoculant as well as for enriching nutrient deficient soils.