

Study of Siderophore Production in Salt Tolerant *Azotobacter salinestris* Species for Sustainable Approach under Saline Soil

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Abstract: *Azotobacter* is a non-symbiotic nitrogen-fixing bacteriawell known for siderophore production. Siderophores are small, high-affinity iron-chelating compounds that play a vital role in augmenting iron availability in soil, thereby promoting plant growth by sequestering free iron molecules and aiding in their transportation. Its adaptability to salt stress conditions will have significance as the salinity problem is prevailing due to various reasons. This study investigates the siderophore production under salt stressed condition by *Azotobacter* species isolated from salt pan area of Mumbai region. The isolate was identified as *Azotobacter salinestris* species using 16S rRNA sequencin gand showed tolerance upto 8% NaCl concentration. Siderophore production was confirmed through a CAS assay and identified as Hydroxamate type by Csaky's assay. The effect of different salt concentration on siderophore production was studied and the production was found to increase with increase in salt concentration showing maximum production at 4% NaCl (8.6×10^{-1} mM). The growth stimulant property of the siderophore was assessed by bioassay method against various bacterial strains was evaluated. The combined biostimulant and iron-chelating properties of the siderophore under salt stress suggest that this approach could enhance biofertilizer efficiency, providing a natural alternative to chemical agents in agriculture.

Keywords: *Azotobacter salinestris*; siderophore; salinity; biostimulant; biofertilizer

