



**Entrepreneurship Development Program  
on  
'Technologies Developed by ICAR-NRRI  
to Strengthen Rice Production'**

**21-26 December, 2020**



**Editors**

Sai Krishna Repalli  
Rakesh Kumar Nayak  
Trusha Das  
G.A.K. Kumar



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ICAR-National Rice Research Institute, Cuttack - 753006, Odisha



एक कदम स्वच्छता की ओर

**Compendium**  
**on**  
**‘Technologies developed by ICAR-NRRI**  
**to strengthen rice production’**

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## ***Azotobacter* a potential biofertilizer to enhance rice yield**

Upendra Kumar, Scientist, ICAR-NRRI, Cuttack

The harmful effect of the chemical fertilizers will start during its manufacturing time, whose products and byproducts are also toxic chemicals or gases like  $\text{NH}_4$ ,  $\text{CO}_2$ ,  $\text{CH}_4$  etc. which will cause air, water and soil pollution. Moreover, its continuous use degrades the soil health and quality. The adverse effect of these synthetic chemicals on human health and environment can only be reduced or eliminated by adopting new agricultural technology such as biofertilizer for enhancing nutrient use efficiency, crop yield and soil fertility, creates a healthy natural environment and ecosystem.

### **Recommended dose**

It is recommended that 5-6 kg solid or 500 ml/ha liquid inoculum of *Azotobacter* is required for rice crop, which can supply around 15-25 kg N/ha with increasing grain yield by 5- 15%

### **Entrepreneurial opportunity**

The total annual cost of production for 50 tons of *Azotobacter* grown in 1200 square meter area (Rs. 24 lakhs) with an additional instrumental and operational cost (Rs. 41 + 17 lakhs) is 58 lakhs. If it can be sold @ Rs. 100 per / kg, one can reap a benefit of Rs.51 lakhs/ year.

### **Economics of *Azotobacter***

Liquid inoculum of *Azotobacter* (500 ml) @ Rs.150/- is required to mobilize 20 kg of Nitrogen per hectare

### **Salient features**

- *Azotobacter* species are free living, non-symbiotic, heterotrophic, N-fixing bacteria.
- They are capable of fixing nitrogen at an average of 20 kg N/ha/year.
- They help in synthesis of growth regulating substances like auxins, cytokinin and gibberellins and regarded as Plant Growth Promoting Rhizobacteria (PGPR).
- *Azotobacter* improves seed germination and enhances crop growth rate.
- They inhibit phytopathogenic bacteria.
- It helps to increase nutrient availability and to restore soil fertility.
- It is an important component of integrated nutrient management system due to its significant role in soil sustainability.

