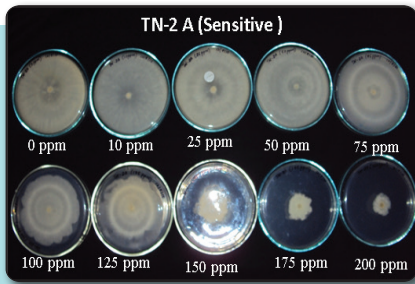


## Bioformulation of carbendazim tolerant *Trichoderma harzianum* for biological management of plant diseases



### Technology Description

- It is a bioformulation of a fungal antagonist *Trichoderma harzianum*
- The formulation has the carbendazim tolerant isolate of *T. harzianum*
- The carbendazim tolerance is upto 500 ppm
- It has good biocontrol potential against soil borne pathogens that has been verified by pot and field experiments with groundnut and sorghum
- There is no carbendazim tolerant formulation of *Trichoderma* available in the market
- Besides carbendazim tolerance, it is tolerant to Carboxin, Oxycarboxin and Imidacloprid which are commonly used seed treatment chemicals.

### Background

Bio-formulation of carbendazim tolerant *T. harzianum* isolate (NBAIL-GJ16B) has biocontrol efficiency against major plant pathogens besides tolerance to fungicide - carbendazim (500 ppm). Bio-formulation of *T. harzianum* with carbendazim tolerance is new to the market. Besides carbendazim, it is tolerant to commonly used seed treatment chemicals like Carboxin, Oxycarboxin and Imidacloprid. This formulation will certainly help in decreasing accumulation of synthetic fungicide in the environment and residues in plants. The isolates used in this formulation have good biocontrol potential besides fungicide resistance thus help in control of plant pathogens.

### Benefits /Utility

This bio-formulation of carbendazim tolerant isolate of *T. harzianum* with biocontrol potential applicable to different crops. Combined effectiveness of carbendazim tolerant *Trichoderma* along with carbendazim will be effective against different plant pathogens. The impact of this technology (bio-formulation) will help in control of

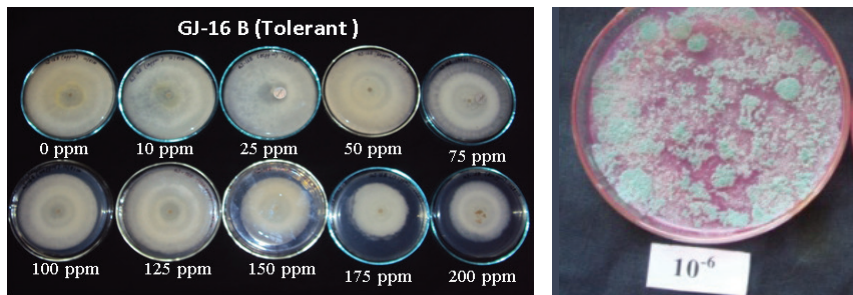
plant diseases and also helps in plant germination and growth. The isolates of *T. harzianum*, *T. asperellum* or other species used in these bio-formulations are tolerant to carbendazim up to 200 ppm. Liquid fermentation derived talc formulation and solid state derived talc formulations were tested for their bio-efficacy and the bio-control potential of these bio-formulations has been confirmed against soil borne diseases of groundnut caused by *Macrophomina phaseolina*, *Sclerotium rolfsii* and *Aspergillus* spp. infection on sorghum. The bio-formulations of these carbendazim tolerant isolates will be very useful in chemical free management of plant pathogens.

### Scalability

As there is great demand for the bioagents the production can be scaled up based on the capacity of fermentation units procured.

### Business and commercial potential

There is great demand for the quality bioagents. Our country has met only less than 3% area covered with bioagents for plant disease management. *Trichoderma* seed treatment is a proven technology for managing soil borne diseases and there is huge demand.



Carbendazim tolerant assay of *T. harzianum*

### Financial requirement

(for 50 batches in a year, each with 200 kg using 100L fermentor)

- Total Capital Investment (excluding Land and licensing fees): Rs 25 lakh
- Break of capital investment
  - Equipment – Rs. 18 lakh
  - ▲ License fee, Registration cost – Rs. 5 lakh & Miscellaneous – Rs. 2 lakh
- Variable cost (per year/unit): Rs2.5 lakh

## Technologies Ready for Agribusiness

- Break of variable cost
  - ▲ Chemicals and talc – Rs. 0.25 lakh, Packing material – Rs. 0.10 lakh
  - ▲ Electricity and rent – Rs. 0.35 lakh, Man power – Rs. 1.80 lakh
- Expected sale/unit: Rs (can take selling price of a similar product):
- No. of units to be sold for monthly break even on variable cost:

Selling price per kg	Income*(Rs. In lakhs) with 50 batches in a year each with 200 kg
Rs. 150	15 lakh
Rs. 175	17.5 lakh
Rs. 200	20 lakh

### Target Market/Customer

- All types of farmers, seed producers, farmers in protected cultivation, plantation crops. This technology already commercialized to one firm.

### Social impact of the technology

- Unit production cost (maximum): Rs.100 per kg Predicted per unit selling price of product/services generated by the technology: Rs. 175 to Rs.200 per Kg.

### Toxicological data

- Toxicology data for primary culture and wettable powder formulation of *Trichoderma harzianum* has been generated as per CIBRC guidelines.