Abiotic Stress Tolerant Biocontrol Agents

Technology Description

ÿ Bio-formulation of salinity resistant isolates of ***T. harzianum*** isolate (NBAII-HAR4B) with biocontrol potentials applicable to the crops grown in salinity or sodic condition. This formulation, which not only helps in disease control but also induces the salinity resistance to crop plants with increased seed germination and growth. These ***T. harzianum*** isolates are resistant to 2M concentration of NaCl and pH 8.5 and have good bio-control potential. ÿ Bio-formulation of carbendazim resistant ***Trichoderma harzianum*** isolate (NBAII-GJ16B) has biocontrol efficiency against major plant pathogens besides resistance to fungicide - carbendazim (500 ppm). Bio-formulation of ***T. harzianum*** with carbendazim resistance 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. ÿ The bioformulation is developed with an efficient abiotic stress resistant agent. The bacterium survived in high temperature; 50ºC, 1.5M NaCl salinity and drought resistance up to -10.28 Mpa. The isolate produced plant growth promoting enzymes like phosphatases, proteases, chitinase, cellulase and ACC deaminase. They produced secondary metabolites like HCN which is involved in disease management. The isolate helps in plant growth promotion besides disease suppression. They produced proline which stabilized plant growth under stressed condition. Additionally it also proved its excellent rhizosphere

Name of institute: National Bureau of Agriculturally Important Insects, Bangalore, Karnataka

Stage of development:
Ready for commercialization
Patent status: Filed

Scientific Experts:
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Background

The formulations of ***Trichoderma*** or ***Pseudomonas*** available in the market are for general conditions. However we need bioagents that have tolerance to abiotic stress. At NBAII stress tolerant isolates of ***Trichoderma*** and ***Pseudomonas fluorescens*** were developed. ***T. harzianum*** formulations tolerant to salinity upto 2M NaCl concentration or pH of 8.5 was developed. Similarly another formulation of ***T. harzianum*** with an isolate tolerant to Carbendazim upto 500 ppm was developed. The bioefficacy of these formulations have been field tested against the soil and seed borne diseases of ground nut. Another formulation of Pseudomonas that has capapcity to produce more high di acetyl phluro glucinol that was

Benefits / Utility

The bio-formulations of these stress tolerant isolates (HAR 4B, GJ 16B and NBAII PFDWD) will be very useful in chemical free management of plant pathogens under saline soil conditions. Farmers can use these formulations so that the cost of plant protection will be lower compared to chemical control. This will result in better cost: benefit ratio. It is easy to mass produce these bio-formulations and can be procured whenever needed from the mass producing units. For the ***Trichoderma*** formulations toxicological data required for registration with CIB-RC has been developed and hence registration

Country Context

India Already biocontrol agent manufacturers are having the scaled up technology. The intervention in this technology is the new stress tolerant isolates being introduced. Based on the fermentation

Scalability

Scale of production is 5 kg per batch which may be increased even up to 30 kg per batch

Business and Commercial Potential

Business Potential: Toxicological data required for complete registration has been developed. Bioefficacy data for temporary registration available
Further field trials to facilitate permanent registration are going on. More field data from ongoing field trials Many of the temporary registrants looking for permanent registration Market potential: Trichoderma production is a profitable business and there is only less than 2-3% cropped area are covered by bioagents In seed treatment

Potential investors to this technical innovation

Producers of commercial bio control agents. Producers of Plant protection chemicals.

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Financials

VALUE OF THE TECHNOLOGY: Project cost : Rs. 81 lakh (including all the three formulations) Tech commercialization fee to be charged from one licensee= Rs. 1 lakh for temporary registration and Rs. 1.5 lakh for complete registration. Combo offer: 1.6 lakh for temporary registration and 2.5 lakh for complete registration if two technologies are transferred together. Financial Required: (for 50 batches in a year, each with 200 kg using 100L fermentor) Non-recurring: Rs. 25 lakh, Recurring: Rs. 2.5 lakh Working cost per year (@10% on depreciation for NR and 15% on interest on capital): Rs. 8.75 lakh Profit: Rs. 6.25 and

Target Market / Customer

ÿ Individual Farmers ÿ Contract farming companies ÿ Farmer's federations / Groups.

Social impact of the technology

ÿ It will reduce the cost of production by reducing cost on chemical fungicides ÿ Cost-benefit ration will be improved ÿ Environment production by less use of chemical fungicides ÿ Enhanced soil health ÿ The technology is a viable one and being taken up by many manufacturers and there is no problem in large scale commercialization ÿ If solid state fermentation is followed it will give further enhanced shelf life. However large scale bioreactors for mass

Any other relevant information

ÿ It is a green technology ÿUnemployed youth can start small production units through NABARD support and help farming system