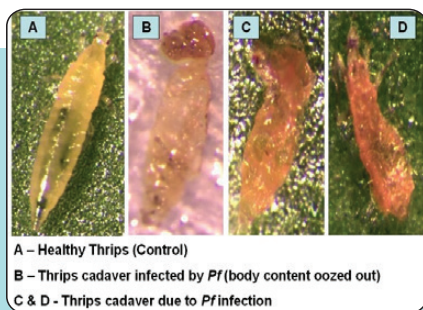


Powder based formulation of *Pseudomonas fluorescens* (NBAIR-PFDWD), an antimicrobial 2, 4-diacetylphloroglucinol (DAPG) producing biotic and abiotic stress tolerant strain for Thrips species management



Technology Description

The bioformulation is developed with an efficient plant growth promoting and abiotic stress tolerant biocontrol agent. The bacterium survived in high temperature (50 °C), salinity (1.5M NaCl) and drought tolerance (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 pests and disease management. The isolate effectively controls *Thrips* species under field conditions and also inhibited *Sclerotium rolfsii*, *Rhizoctonia solani* and *Fusarium oxysporum*. They produced proline which stabilized plant growth under stressed condition. Additionally, it also proved its excellent rhizosphere competence by establishing well in soils (log 8.7 cfu/gm). They proved to be an effective plant growth promoter under saline and water limiting conditions.

Background

Presence of fluorescent pseudomonads is ubiquitous and some reports are available on their occurrence in stressed environment like saline, sodic and semi arid soils. Hence we undertook a research under NAIP project “Effect of abiotic stresses on the natural enemies of crop pests: *Trichogramma*, *Chrysoperla*, *Trichoderma* and *Pseudomonas*, and mechanism of tolerance to these stresses” to study the diversity of fluorescent pseudomonads that occurs in such soils and also to see their level of tolerance to high temperature, salinity and drought. We also wanted to ascertain their biochemical / antibiotic producing properties so as to ascertain whether they could be useful in plant protection under stressful conditions. *Pseudomonas fluorescens* (NBAIL PFDWD) was originally isolated by us from ground nut rhizosphere of North India.

Benefits /Utility

P. fluorescens is a well-known PGPR. *Pseudomonas fluorescens* (NBAIL PFDWD) is proved to be a plant growth promoter additionally having abiotic stress tolerance. They also produce DAPG which makes it effective against major plant fungal pathogens. The formulations of this isolate can be used in pests and disease management of pulses, rice, legumes and vegetables grown in rain fed and stressed soils.

Scalability

The technology is scalable. The current scale of operation in 5L and this can be scaled up to 10-1000L based on the equipment and energy availability. The technology can be scaled up to 100L in small scale level. In case of large production sufficient funds, skilled man power and large-scale production units are necessary.

Business and commercial potential

This technology has a wide scope of commercialization and there is a high demand for biocontrol agents for management of *Thrips* species and diseases like Fusarium species. At present, very small quantities of microbial BCAs are produced in the country against very high demand. There is scope for label expansion of this technology for management of other lepidopteran pests like *Spodoptera* species in other crops.

Financial requirement

The cost of production of this product may around 100/- per kg and it can be sold at 200-250/kg. An investment of 15-20 lakhs for equipment, other infrastructure etc. is required to produce 100 tonnes/ annum.

Target Market/Customer

Biocontrol and Biopesticide industries, Farmers, State Agriculture departments, KVK's. This technology already commercialized to three firms.





Talc formulation and nucleus culture of *P. fluorescens* NBAIR-PFDWD



Representative image of *P. fluorescens* NBAIR-PFDWD increased yield of Capsicum compared to control

Social impact of the technology

- The technology development needs large production units and man power. Hence, the proposal will generate employment and economic profits.

Toxicological data

- Toxicology data for primary culture and wettable powder formulation of *Pseudomonas fluorescens* NBAIR PFDWD has been generated as per CIBRC guidelines.