

A novel *Bacillus albus* strain NBAIR-BATP with excellent insecticidal, antagonistic and growth promotion properties for the management of pests and diseases



Talc formulation and nucleus culture of *Bacillus albus* NBAIR-BATP

Technology Description

At ICAR-NBAIR, research has succeeded in identifying a novel *Bacillus albus* NBAIR-BATP strain, and further developing it into a formulation for management of fall armyworm (*Spodoptera frugiperda*), tomato pinworm (*Tuta absoluta*) and Thrips species. This *B. albus* NBAIR-BATP is very effective in management of Fusarium wilt under field conditions. This isolate has been submitted

to GenBank as MT226753.1. Talc based formulation of *Bacillus albus* strain NBAIR-BATP was developed and dose was standardized for effective management of the Maize Fall armyworm (*Spodoptera frugiperda*), tomato pin worm (*Tuta absoluta*), Thrips species and *Fusarium* wilt of cucumber. Results of field trials indicated more than 80-85% reduction in the maize plant damage caused by fall armyworm during 2018-19 and 2019-2020. In both trials yield of the maize, capsicum and tomato increased compared to insecticide treatment and untreated control. Similar results obtained for the management of Tomato pin worm (*Tuta absoluta*) and Thrips species in *Capsicum annum*. This bacterial strain NBAIR-BATP is also effectively control *Fusarium* wilt of cucumber (*Fusarium oxysporum* f.sp. *cucumerinum*).

Background

Bacillus albus strain NBAIR-BATP effectively produces siderophores, chitinase, proteases, cellulases, lipases, indole acetic acid (IAA), ammonia, with the ability to suppress the plant diseases caused by soil borne pathogens and insect pests under field conditions. The *Bacillus albus* strain NBAIR-BATP was identified and submitted to GenBank MT226753.1. and this culture was also certified by ICAR-NBAIM, Mau.

Benefits /Utility

Field tests have shown 60-85% reduction in pests like fall armyworm (*Spodoptera*

frugiperda), tomato pinworm (*Tuta absoluta*) and Thrips species and soil borne diseases like *Fusarium* wilt of cucumber and 30-45% increase in yield of the crops.

Scalability

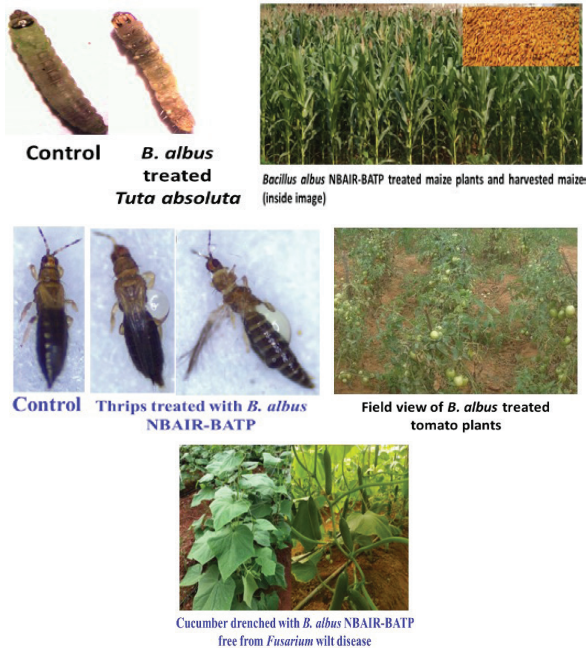
It can be scaled up to large quantities using large-scale fermenter of 500-1000 litres capacity depending on the need.

Business and commercial potential

This technology has a wide scope of commercialization and there is a high demand for biocontrol agents for management of pests like fall armyworm (*Spodoptera frugiperda*), tomato pinworm (*Tuta absoluta*) and Thrips species and soil borne diseases like *Fusarium* wilt of cucumber. 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 pests and soil borne diseases in other crops.

Financial requirement

The cost of production of this product may around Rs. 80-100/- per talc formulation and it can be sold at Rs. 200-250/kg of talc formulation. An investment of 15-20 lakhs for equipment, other infrastructure etc. is required to produce 1000 tonnes/ annum.



Target Market/Customer

Though maize, tomato, capsicum and cucumber crop are important crops in India, the productivity is much lower than the world average. The fall armyworm and Thrips species, a polyphagous insect, is an invasive pest of maize and vegetables posing a serious threat to maize and vegetables cultivation in India. Similarly, the tomato pinworm is an invasive pest of tomato and severe threat to tomato crop and soil borne disease like Fusarium wilt of cucumber can cause up to 60-90% yield loss. This technology will be highly useful to all the farmers throughout the country.

Social Impact of the Technology

- This ICAR-NBAIR technology is an ecofriendly strategy for obtaining healthy and robust maize, tomato, capsicum and cucumber crop resulting in the reduced usage of chemical insecticides and fungicides against fall armyworm (*Spodoptera frugiperda*), tomato pinworm (*Tuta absoluta*) and Thrips species and soil borne diseases like *Fusarium* wilt of cucumber and thereby minimize the risks associated with insecticides/fungicides on environment and non-target organisms including human beings.

Toxicology data

- Toxicology data for primary culture and talc formulation of *Bacillus albus* strain NBAIR-BATP is proposed generated as per CIBRC guidelines in future.