Pesticide Tolerant and High Temperature Resistant Biocontrol Agents

Technology Description

1. The strain *T. chilonis* is resistant to multiple insecticides (ocl, op, sp, neonicotinoids, oxadiazine, spinosyn) with a high resistance factor of up tp 3.00 - 76.46, therefore, can be used efficiently by farmers in insecticide stressed farm conditions (i.e., mainly on vegetable and paddy based ecosystems) to efficiently control of lepidopteran pests.
2. *T. chilonis* is an egg parasitoid of lepidopteron pests. The strain is resistant to high temperature (up to 400C), therefore, can be used efficiently by farmers in high temperature regions farm conditions (i.e. on vegetable/paddy and sugarcane based ecosystems) to efficiently control of lepidopteran pests.
3. The strain of *C. zastrowi sillemi* (Multiple insecticides - ocl, op and sp) is resistant to insecticides, therefore, can be used efficiently by farmers in insecticide stressed farm

Name of institute:
National Bureau of Agriculturally Important Insects, Bangalore
Stage of development:
Ready for commercialization
Patent status: No

Scientific Experts:
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Background

Agricultural productivity in India is affected largely by insect pests and diseases, which cause losses to the tune of 10-30%. Though there has been increasing awareness in India about the hazards of indiscriminate use of insecticides in agriculture, use of biological agents for pest management has not taken off in a big way due to the susceptibility of bioagents to abiotic and insecticide-induced stresses, perceived slow action, lack of timely availability, etc. Biocontrol agents are very susceptible to insecticides and abiotic stresses, though in a totally insecticide-free environment, they have been reported to be effective to the tune of 50-60%. Hence, by developing Multiple insecticide resistant strains of T. chilonis (TcT1 Multiple insecticide resistant), ***C. zastrowi sillemi*** (PTS8) and temperature resistant

Benefits / Utility

The Multiple insecticide resistant and temperature resistant strains of ***T. chilonis*** and multiple insecticides resistant strain of ***Chrysoperla zastrowi sillemi*** can be used in insecticides and high temperature

Country

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 facility available the quantum of production may be scaled up.

Scalability

ȳ 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: No toxicological data or registration is required for its commercial use. ȳ Since these strains are multiple insecticides and high temperature resistant, these can be used field alon with farmers practice and go well with IPM. ȳ These can be used in most of the crops like rice, maize, sugarcane, cotton, several vegetable and fruit crops. Market potential: ȳ Trichogramma and Chrysoperla production is a profitable business and there is only less than 0.5-1% cropped area are covered by these bioagents ȳ Use of resistant strain has indicated that insecticsdes application can be reduced by 50-80% and yield can enhance up to 20%, because their ability to survive under stressed conditions and give higher protection as compared to similar bioagents

Potential investors to this technical innovation

Producers of commercial bio control agents.

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Financials

VALUE OF THE TECHNOLOGY: Project cost : Rs. 50 lakh for coverage of 15000 hectares per season, thus about in (including for production of Corcyra culture, egg of which are required for production these bioagents, building about 1200 sq.f area, rearing boxes and small equipments). Financial Required: (for 50 batches in a year, each with 200 kg using 100L fermentor) Non-recurring: Rs. 40 lakh, Recurring: Rs. 10.0 lakh Working thus Rs. 120 lakhs return is possible. Economic analysis The insecticide and temperature resistant strains of ***T. chilonis*** and ***C. zastrowi sillemi*** are very effective in reducing the number of harmful pests and have great impact on growth of vegetables and commercial crop production and will generate employment. The analysis done for Kharif and Rabi seasons of 2011-2012 indicated: Production of Multiple insecticide resistant / Temperature resistant strains of ***T. chilonis*** and ***C. zastrowi sillemi:*** Production of Corcyra for Chrysoperla to cover 100 acre and Trichogramma to cover 300 acre – 720 mandays. ȳ Release at fields: Chysoperla - 24 mandays for 100 acre, Trichogramma - 48 mandays for 300 acre Pesticide tolerant Trichogramma and Chrysoperla tested in 400 acres ȳ Cost of Cultivation with insecticides = 14000/acre ȳ Cost of cultivation with bioagents = Rs. 9600/acre ȳ Direct savings by farmers = Rs. 5400/acre, therefore savings for 400 acres = Rs.21.60 lakh The analysis done for Rabi seasons of 2013 indicated that insecticide application was

Target Market / Customer

ȳ Individual Farmers ȳ Contract farming companies ȳ Farmer's federations / Groups

Social impact of the technology

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

Any other relevant information

ȳ It is a green technology ȳ Unemployed youth can start small production units through NABARD support and help farming system and themselves