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### Microorganisms for sustainable Tea cultivation in the north east India: Recent advances

Sustainable tea cultivation rely more on adopting alternative control strategies for effective pest management in an environment-friendly way which could replace some insecticides and thereby reduce the amount of pesticide residues in made tea. Hence, entomopathogens can play a vital role by providing effective control of target pests, conservation of natural enemies and biodiversity in tea ecosystem, an attempt has been made to isolate *Beauveria* spp and *Metarhizium* spp from Darjeeling and Dooars tea plantations and identified two potential isolates namely (BKN 1/14 as *Beauveria bassiana* and (MET 5/1) as *Metarhizium anisoplae*. Stock suspension was prepared at concentration  $1 \times 10^8$  CFU/ml, further diluted to 0.25%, 0.5%, 0.75% and 1% using distilled water were sprayed on different life stages of tea mosquito, as well as red spider mite. A Baculovirus, belonging to the group Nucleopolyhedrosis Virus (NPV) which infects the *Hyposidra talaca* larvae has been isolated, identified, and characterized. Based on the findings of the laboratory studies, these beneficial microbial were developed in to a 5% AS formulations by the industry partner, following standard protocol. The developed 5% AS formulations were evaluated their field bio-efficacy under *in vivo* conditions following the Standard Operational Procedure (SOP) in three different locations against tea mosquito, red spider mite and lopper with encouraging results in comparison to commercial samples. All the three formulations were found to be non-phytotoxic to the tea plants, safer to the insect natural enemies, there is no tainting effect on made tea and were found to have a longer shelf life at room temperature without any change in their bio-efficacy. These strains could be commercialized after fulfilling the requirements for its registration and label claim on tea for the benefit of the tea industry.

### Biography

Dr Azariah Babu, has completed Ph.D under the guidance of Prof. Dr. T. N. Ananthkrishnan and done Post Doctoral Research under the guidance of Professor (Mrs) Silvia Dorn at the SWISS Federal Institute of Technology Zurich (ETH) in the Institute of Plant Sciences, Applied Entomology Zurich, Switzerland. Have more 23 years of research experience in basic and applied aspects of Entomology and Plant protection. Also have the experience in advising tea growers on different aspects of tea pest management, Good Agricultural Practices (GAP) including the safe use of pesticides and organic certification. Completed several research projects in the capacity as Principal Investigator funded by Govt. of India & abroad

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