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Cloning, characterization and expression of an insecticidal crystal protein gene from Bacillus thuringiensis isolates of Andaman and Nicobar Islands

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B iocontrol of pests via Bacillus thuringiensis (Bt) δ-endotoxins represents the most successful use of a biological control agent to date. The six isolates of Bacillus thuringiensis from Andaman and Nicobar Islands which were previously characterized by PCR analysis for the presence of Coleopteran active cry genes were used for Cry1I full length gene amplification. A 2.16-kb DNA fragment of Cry1I gene was PCR amplified, cloned in expression vector pQE 80 L, and then used for transformation of E. coli M15 cells. The optimum expression was obtained with 1 mM IPTG at 37°C for 3 h. The sequence of the cloned crystal protein gene showed almost complete homology with a Cry1I toxin gene from Bacillus thuringiensis var. kurstaki, with scattered mutations in the toxic region. The deduced sequence of the protein has homologies of 91.0% with Cry1I and Cry1Ia, and 98.0% with Cry1Ib.Cloning of this gene may help to overcome the increasing resistance of pests to currently used insecticides. Based on the results obtained, the PCR method may be a valuable and reliable tool for specific detection and identification of cry1I genes. The toxicity of Bt recombinant protein was determined against first instar larvae of Myllocerus undecimpustulatus undatus Marshall (Coleoptera: Curculionidae) and Adults; Helicoverpa armigera Hübner (Noctuidae: Lepidoptera) at 310µg/mL and 15.5µg/mL respectively. The novel cry1I gene will be an important resource in constructing genetically engineered bacteria and transgenic plants for biocontrol of insect pests and Bt based biopesticidal formulations, aiming to reduce the use of chemical insecticides.

Biography

H.M.Mahadeva Swamy has completed his M.Sc. (Agri.) PLANT BIOTECHNOLOGY at the age of 26 years from University of Agricultural Sciences (UAS), Bangalore and pursuing Doctoral degree from Kuvempu University, Shimoga. Main research area work includes CLONING AND CHARACTERIZATION OF INSECTICIDAL CRYSTAL PROTEIN GENES FROM LOCAL ISOLATES OF BACILLUS THRUNGIENSI & POTENTIAL OF RNAi IN INSECT PEST MANAGAMENT. He has published more than 5 papers in reputed international journals. Participated at Illumina Agriculture Seminar. Presented paper at National Seminar on "Current Trends in Biotechnological Strategies for Eco-friendly Crop Protection"Delivered a Lecture at winter school on "Molecular mechanisms involved in conferring abiotic stress tolerance to the biological control agents Chrysoperla, Trichogramma, Trichoderma and Pseudomonas"Awarded UNIVERSITY OF AGRICULTUREAL SCIENCES GOLD MEDAL for securing the HIGHEST OVERALL GRADE POINT AVERAGE among the B.Sc. (SERICULTURE) graduates during the year 2001-2004. Awarded JAWAHARLAL NEHARU MEMORIAL FUND for meritorious student of the year 2004-2004. Nominee for youngest scientist award and International student award.

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