



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : Neha Maurya
Roll Number : 146106005
Programme of Study : Ph.D.
Thesis Title: : Cloning and expression of a chimeric protease and chitinase fusion protein from *Metarhizium anisopliae* into *Escherichia coli* for enhanced enzyme activity
Name of Thesis Supervisor(s) : Dr. Gurvinder Kaur Saini
Thesis Submitted to the : Biosciences and Bioengineering Department/ Center
Date of completion of Thesis Viva- 31.May.2024
Voce: Exam
Key words for description of Thesis : Entomopathogenic fungus, chitinase, chitin-binding domain, protease, virulence, Work

SHORT ABSTRACT

This thesis focuses on developing chimeric protease, chitinase, and protease-chitinase fusion proteins with increased binding affinity to insect cuticles and improved catalytic activity to enhance cuticle degradation. The research explores the insecticidal capabilities of these engineered enzymes, aiming to combat insect pests more effectively. By combining the wild-type Pr1a protease and Chi2 chitinase from *Metarhizium anisopliae* with a chitin-binding domain from *Bombyx mori*, the engineered proteins are designed to breach the insect's primary defense mechanism—the cuticle—more rapidly. Enhancing these enzymes' efficiency directly increases fungal virulence, making it a more potent pathogen.