**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI**
**SHORT ABSTRACT OF THESIS**

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| Name of the Student | : | Biju Bharali |
| Roll Number | : | 176152007 |
| Programme of Study | : | Ph.D. |

Thesis Title:
Analyzing the Gut Microbiome of *Samia cynthia ricini*

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| Name of Thesis Supervisor(s) | : | Prof. Utpal Bora, Prof. Karuna Kalita |
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## SHORT ABSTRACT

This comprehensive research project delves into the intricate world of the gut microbiota of *Samia cynthia ricini* (a domesticated native silkworm), shedding light on the profound impact of microbial communities on its growth, health, and phenotypic characteristics. By employing state-of-the-art metagenomic and metabolomic techniques, the study addresses critical objectives. First, it elucidates the composition and dynamics of the gut microbiota under varying dietary conditions and throughout different growth stages. Secondly, it employs shotgun metagenome analysis to uncover the genetic diversity and functional potential of the gut microbiome in the 5$^{th}$ instar larva. Thirdly, it conducts a comparative analysis of the microbiomes of *S. cynthia ricini* and other lepidopteran species, seeking common patterns and significant differences in taxonomic and functional abundances based on ecological adaptations. Lastly, the study investigates the metabolomic profiles of the silkworm's gut under different dietary regimens and the associated microbiota's role in shaping these profiles.

The research fills critical knowledge gaps surrounding *S. cynthia ricini* and its importance in the ecological and economic landscape of Assam and Northeast India. By gaining a deeper understanding of the complex interactions between the host organism, its environment, and its microbiota, this study holds promise for enhancing silkworm-rearing practices, disease management, and boosting the rural sericulture economy. Furthermore, it exemplifies the significance of integrative analyses in elucidating host-microbiome relationships, providing a more nuanced view of the metaorganism's dynamics. Overall, this research contributes to the conservation of the species and offers valuable insights for sustainable sericulture and ecosystem preservation.