# STUDY ON THE GUT BACTERIAL COMMUNITIES IN SILKWORM *Samia ricini* FED ON DIFFERENT FOOD PLANTS

**A THESIS**

**SUBMITTED TO THE BODOLAND UNIVERSITY**

**FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ZOOLOGY**

**UNDER THE FACULTY OF SCIENCE AND TECHNOLOGY**


**BY**

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## *DECLARATION*

*I, Hatarkhi Mwchahary, hereby declare that the Thesis entitled "Study on the Gut Bacterial Communities in Silkworm Samia ricini Fed on Different Food Plants" is the result of my own work, carried out at Department of Zoology, Bodoland University under the guidance of Dr. Dulur Brahma for the degree of Doctor of Philosophy and I have not submitted it earlier elsewhere for any other degree of any other University. Due acknowledgments have been made for the assistance and help taken during my work.*

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*I hereby certify that the present Thesis entitled "Study on the Gut Bacterial communities in Silkworm Samia ricini Fed on Different Food Plants" is an independent work of Ms. Hatarkhi Mwchahary submitted to Bodoland University for the award of the degree of Doctor of Philosophy (Zoology), has been carried out under my guidance at Department of Zoology, Bodoland University. Ms. Hatarkhi Mwchahary has fulfilled all the requirements laid by the university for the award of Doctor of Philosophy in Zoology under the faculty of Science and Technology.*

*To the best of my knowledge and belief, this work is original and has not been submitted so far in part or in full for the award of any degree or diploma of any University Institute.*

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***Sincerely,***
***Hatarkhi Mwchahary***

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## LIST OF ABBREVIATIONS AND SYMBOLS

| | |
|---|---|
| % | : Percentage |
| °C | : Degree Celsius |
| µg | : Microgram |
| µl | : Microliter |
| µM | : Micromolar |
| 1492R | : 1492 Reverse |
| 27F | : 27 Forward |
| 2D | : Two Dimension |
| A | : Adenosine |
| ACE | : Abundance-based Coverage Estimator |
| ADS | : Arginine Dihydrolase |
| AMP | : Antimicrobial Peptide |
| AMY | : Amygdalin |
| API | : Analytical Profile Index |
| ARA | : Arabinose |
| BLAST | : Basic Local Alignment Search Tool |
| BmCPV | : *Bombyx mori* Cytoplasmic Polyhedrosis Virus |
| BOD | : Biological Oxygen Demand |
| bp | : Base pair |
| CIT | : Citrate Utilization |
| CMC | : Carboxymethylcellulose |
| CMER&TI | : Central Muga Eri Research and Training Institute |
| D | : Days |
| $dH_2O$ | : Distilled water |
| DMSO | : Dimethyl sulfoxide |
| DNA | : Deoxyribonucleic acid |
| DNSA | : 3,5, Dinitrosalicylic acid |
| EDTA | : Ethylenediamine tetra acetic acid |
| FASTA | : Fast adaptive Shrinkage Threshold Algorithm |
| FLASH | : Fast Length Adjustment of Short reads |

g : Gram
GC : Guanosine Cytosine
GEL : Gelatinase
GLU : Glucose
h : Hour
$H_2S$ : $H_2S$ production
HCL : Hydrochloric acid
IND : Indole production
INO : Inositol
IQR : Interquartile Range
KEGG : Kyoto Encyclopedia of Genes and genomes
L : Liter
LAF : Laminar Air Flow
LDC : Lysine Decarboxylase
M : Molar
Mb : Megabyte
MEL : Melibiose
mg : Milligram
min : Minute
ml : Milliliter
mM : Millimolar
MRSA : Methicillin-Resistant *Staphylococcus aureus*
MSN : Mannitol
n : Number
NCBI : National Center for Biotechnology Information
NJM : Neighbor joining method
ng : Nanogram
nm : Nanometer
OD : Optical Density
ODC : Ornithine Decarboxylase
ONPG : Ortho Nitro Phenyl-βD- Galactopyranosidase
OTU : Operational taxonomic unit

| | |
|---|---|
| OX | : Oxidase |
| PBS | : Phosphate Buffered Saline |
| PC | : Principal Coordinate |
| PCoA | : Principal Coordinate analysis |
| PCR | : Polymerase Chain Reaction |
| PERL | : Practical Extraction and Report Language |
| PICRUSt | : Phylogenetic Investigation of Communities by Reconstruction of Unobserved States |
| pmol | : Picomole |
| pNPP | : p-nitrophenylpalmitate |
| Q | : Phred Score |
| QIIME | : Quantitative Insights into Microbial Ecology |
| RHA | : Rhamnose |
| rpm | : Rotation per minute |
| RNA | : Ribosomal Ribonucleic acid |
| S | : Svedberg |
| SAC | : Saccharose |
| SD | : standard deviation |
| SDS | : Sodium Dodecyl Sulfate |
| sec | : Second |
| SOR | : Sorbitol |
| sp. | : Species |
| STAMP | : Statistical Analysis of Metagenomics Profile |
| T | : Thymine |
| TAE | : Tris Acetate Ethylenediaminetetraacetic acid |
| TCA | : Trichloroacetic acid |
| TDA | : Tryptophane Deaminase |
| TE | : Tris EDTA |
| U | : Unit |
| UCHIME | : Ultra-fast Chimera Identification and Removal |
| UPGMA | : Unweighted Pair Group Method with Arithmetic Mean |
| URE | : Urease |

| | |
|---|---|
| UV-VIS | : Ultraviolet-Visible |
| V | : Volt |
| VP | : Voges Proskauer |
| w/v | : Weight by volume |