

## CONTENTS

	<b>Page No.</b>
Declaration	i
Certificate	ii
Acknowledgement	iii - iv
Chapter 1: Introduction	vi
Chapter 2: Review of Literature	vi - vii
Chapter 3: Materials and Method	vii - viii
Chapter 4: Results	viii - ix
Chapter 5: Discussion	ix
Chapter 6: Summary and Conclusion	ix
References	ix
Appendices	ix
Publications	ix
Certificates of Seminar Presentation	ix
Certificates of workshops attended	ix
Abbreviations	x - xiii
List of Tables	xiv - xvii
List of Figures	xviii - xx

<b>CHAPTER 1: INTRODUCTION</b>	<b>1 - 26</b>
1.1. Pigs as a domesticated animal	1 - 3
1.2. Pork production of India	3 - 5
1.3. Feed provided in smallholder pig rearing systems	5
1.4. Cultural and Economic significance of pigs in smallholder rearing systems	5 - 6
1.5. Production of pork in northeast part of India	6 - 8
1.6. Pig breeding and marketing observed in northeast India	9
1.7. Constraints/limitations of smallholder rearing systems in Assam	9 - 10
1.8. Opportunities for the development of pig farming in Assam	10 - 11
1.9. Indigenous pig breeds of India recognized by Indian Council of Agricultural Research-National Bureau of Animal Genetic Resources (ICAR-NBAGR)	12 - 13
1.10. Indigenous pig breeds of Assam recognized by ICAR-NBAGR	13 - 16
1.11. Molecular characterization of pig breeds using ‘ <i>cytochrome b</i> ’ gene as a molecular marker	16 - 18
1.12. Meat quality of crossbred and indigenous pig breeds	18 - 20
1.13. Meat quality studied in muscles and viscera	20 - 24
1.14. Research Gap	24
1.15. Objectives	24
1.16. Specific Objectives	25 - 26
<b>CHAPTER 2: REVIEW OF LITERATURE</b>	<b>27 - 57</b>
2.1. History of domestication of pigs from wild	27 - 32
2.2. Threats to domestic pigs due to crossbreeding	33 - 34
2.3. Meat quality characteristics of pork	34 - 46
2.4. Molecular marker for identification, genetic variation and phylogenetic studies	46 - 48

2.5.	Study of meat quality on different muscles	48 - 53
2.6.	Study of meat quality on different muscles in Indian pigs	53
2.7.	Study of meat quality on viscera	53 - 56
2.8.	Study of meat quality on viscera in Indian pigs	56 - 57

### **CHAPTER 3: MATERIALS AND METHODS** **58 - 77**

3.1.	Ethical approval	58
3.2.	Morphological authentication of Doom and Ghungroo pig breeds	58
3.3.	Selection of the sex of the litters	58
3.4.	Acclimatizing of the pig breeds	59
3.5.	Period of experiment	59
3.6.	Management of the experimental pigs	59
3.7.	Stages of growth observed in pigs	59 - 60
3.8.	Allocation of pigs for experimental diets	60
3.9.	Experimental diets	60 - 62
3.10.	Molecular characterization of the pig breeds	62
3.10.1.	Sample collection	63
3.10.2.	Isolation of genomic DNA	63 - 64
3.10.3.	DNA Quantification	64
3.10.4.	Amplification of PCR products	64 - 65
3.10.5.	Agarose gel electrophoresis of PCR amplified products	65
3.10.6.	DNA Sequencing	65 - 67
3.11.	Submission of nucleotide sequences to NCBI	67
3.12.	Analysis of nucleotide sequences	67
3.12.1.	Nucleotide variation sites of the sequences	67
3.12.2.	Genetic distance analysis of the sequences	68
3.12.3.	Phylogenetic analysis of the sequences	68
3.13.	Measurement of body weight and other growth parameters	68
3.14.	Slaughtering of pig breeds	68 - 69
3.14.1.	Collection of tissue samples	69
3.15.	Methods of biochemical analysis of the samples	69 - 76

3.16.	Statistical analysis	76 - 77
3.17.	Supervision of the experimental works	77
<b>CHAPTER 4: RESULTS</b>		<b>78 - 141</b>
4.1.	Morphological authentication of the pig breeds	78
4.2.	Molecular characterization of Doom and Ghungroo breeds	78 - 90
4.2.1.	DNA Quantification	78
4.2.2.	PCR Amplification and agarose gel electrophoresis	79
4.2.3.	<i>Cytochrome b</i> gene sequences of 437 bp of Doom and Ghungroo pig	79
4.2.4.	Submission of <i>cytochrome b</i> gene to NCBI	79 - 80
4.2.5.	BLAST similarity score of <i>cytochrome b</i> gene	80 - 82
4.2.6.	Nucleotide variation sites/positions	82 - 83
4.2.7.	Genetic distance analysis	84 - 85
4.2.8.	Phylogenetic analysis	86 - 87
4.3.	Body weight and other growth parameters under a control and trial diet.	87 - 89
4.4.	Biochemical analysis	89 - 93
4.5.	Meat quality of muscles and viscera of Doom and Ghungroo pigs	93 - 141
4.5.1.	pH (pH <sub>45</sub> and pH <sub>u</sub> ) in muscles	93 - 94
4.5.2.	pH (pH <sub>45</sub> and pH <sub>u</sub> ) in viscera	94 - 95
4.5.3.	Proximate composition in muscles and viscera	96 - 107
4.5.6.	Amino acid content in muscles and viscera	107 - 115
4.5.7.	Fatty acid content in muscles and viscera	115 - 123
4.5.8.	Mineral content	123 - 139
4.5.9	Correlation of minerals composition between tissues (muscles and viscera) of both the pigs with feed, drinking water and soil.	139 - 141
4.5.9.1.	Muscles of Doom and Ghungroo pig	140
4.5.9.2.	Viscera of Doom and Ghungroo pig	141

<b>CHAPTER 5: DISCUSSION</b>	<b>142 - 176</b>
5.1. Pork consumption: Nutritional, Cultural and Health Perspectives	142 - 145
5.2. Morphological authentication of the pig breeds	145 - 146
5.3. Molecular characterization of pigs breeds	146 - 148
5.4. Body weight and other growth parameters under a control and trial diet	148 - 152
5.5. Nutritional analysis of kitchen waste	152 - 154
5.6. Meat quality analysis in muscles and viscera of pig	154 - 174
5.7. Correlation of mineral content between tissues (muscles and viscera) with feed, drinking water and soil.	174 - 176
<b>CHAPTER 6: SUMMARY AND CONCLUSION</b>	<b>177 - 178</b>
<b>REFERENCES</b>	<b>179 – 229</b>
<b>APPENDICES</b>	<b>230 - 247</b>
<b>PUBLICATIONS</b>	<b>248 - 275</b>
<b>CERTIFICATES OF SEMINAR PRESENTATION</b>	<b>276 - 277</b>
<b>CERTIFICATES OF WORKSHOPS ATTENDED</b>	<b>277</b>