

TABLE OF CONTENTS

	page
TITLE PAGE	
FINAL ASSIGNMEN STATEMENT AND UPLOAD AGREEMENT	
APPROVAL BY THESIS SUPERVISORS	
APPROVAL BY THESIS EXAMINATION COMMITTEE	
ABSTRACT	v
ACKNOWLEDGMENT.....	vi
TABLE OF CONTENTS	viii
LIST OF FIGURES	x
LIST OF TABLES	xi
LIST OF APPENDICES	xii
CHAPTER I INTRODUCTION	
1.1 Background	1
1.2 Problem Statement	2
1.3 Aim of Study	
1.3.1 General Aims	2
1.3.2 Specific Aims	2
CHAPTER II LITERATURE REVIEW	
2.1 <i>Bifidobacterium</i> spp. as Probiotics.....	3
2.2 Antimicrobial Resistance	5
2.3 Antimicrobial Resistance in <i>Bifidobacterium</i> spp.....	6
2.4 Metals and Antimicrobial Resistance.....	9
2.5 The Application of Bioinformatics in Evaluating Bacterial Antibiotic Resistance.....	11
CHAPTER III MATERIALS AND METHODS	
3.1 Equipment, Materials, and Samples.....	13
3.2 Procedure	
3.2.1 Culture Maintenance	14
3.2.2 Antibiotic Susceptibility Test.....	14
3.2.3 Effect of EDTA on the Bacterial Susceptibility to Antibiotics.....	15
3.2.4 Sample Preparation for SDS-PAGE	15
3.2.5 SDS-PAGE.....	15
3.2.6 Bioinformatic Analyses.....	16
CHAPTER IV RESULTS AND DISCUSSION	
4.1 Isolate Characterization and Identification.....	19
4.2 Antibiotic Susceptibility Profile of Isolate.....	19
4.3 Effect of EDTA on the Bacterial Susceptibility of the Isolate.....	24

4.4 Whole-Genome Sequencing Assembly.....	26
4.5 Antibiotic Resistance Gene Detection	27
4.6 Identification of Putative Mobile Elements.....	39
4.7 Effect of EDTA on the expression of antibiotic resistance genes	40
CHAPTER V CONCLUSIONS AND SUGGESTIONS	
5.1 Conclusion	43
5.2 Suggestions.....	44
REFERENCES	
APPENDICES	



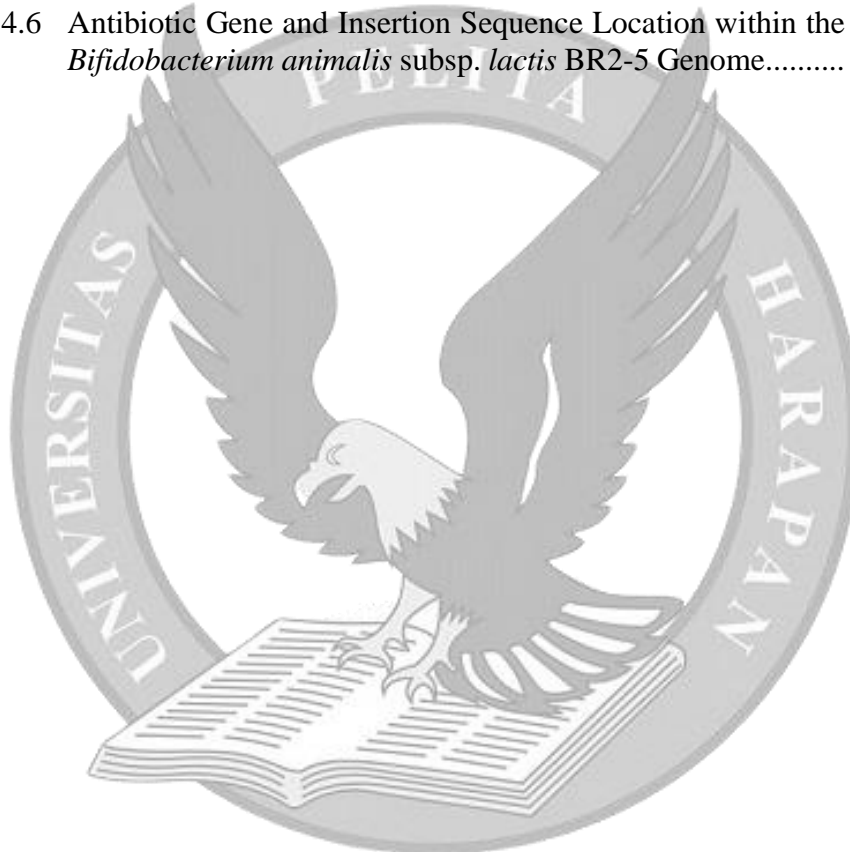
LIST OF FIGURES

	page
Figure 3.1 Research Workflow.....	14
Figure 3.2 Bioinformatic Analysis Workflow.....	17
Figure 4.1 Gram Stain Results of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5.....	17
Figure 4.2 Analysis of Protein Expression Profile <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5 Grown in Media with and without EDTA Supplementation.....	39



LIST OF TABLES

	page
Table 4.1 Antibiotic Susceptibility Profiles of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5.....	20
Table 4.2 Effect of EDTA on the Antibiotic Susceptibility Profiles of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5.....	23
Table 4.3 Post-assembly QC Results.....	25
Table 4.4 General Genome Features of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5.....	26
Table 4.5 CARD Results.....	27
Table 4.6 Antibiotic Gene and Insertion Sequence Location within the <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5 Genome.....	38



LIST OF APPENDICES

	page
Appendix A	
Antibiotic Resistance Genes based on CARD.....	61
Appendix B	
Insertion Sequence (IS) BLAST Result with ISFinder.....	63
Appendix C	
Inhibition Zone Standards for the Determination of Antibiotic Sensitivity and Resistance According to CLSI Standard as Described by Some Studies.....	69
Appendix D	
Disk-diffusion Test of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5.....	70
Appendix E	
Disk-diffusion Test of <i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BR2-5 Supplemented with EDTA.....	72
Appendix F	
Sequence Alignment of Genes with Clustal Omega.....	73

