



TABLE OF CONTENTS

UNDERGRADUATE THESIS	i
RATIFICATION PAGE	ii
STATEMENT OF ORIGINALITY	iii
PREFACE	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF APPENDICES	ix
ABSTRACT	x
INTISARI	xi
CHAPTER I INTRODUCTION	1
I.1 Background	1
I.2 Research Objectives	3
I.3 Research Benefits	3
CHAPTER II LITERATURE REVIEW AND HYPOTHESIS FORMULATION	4
II.1 Literature Review	4
II.1.1 Goat's milk-based α -amylase inhibitor peptide	4
II.1.2 In silico molecular docking	6
II.1.3 Antidiabetic activity testing	9
II.2 Hypothesis Formulation and Research Design	10
II.2.1 Hypothesis 1 formulation	10
II.2.2 Hypothesis 2 formulation	11
II.2.3 Hypothesis 3 formulation	12
II.2.4 Research design	12
CHAPTER III RESEARCH METHODS	14
III.1 Materials	14
III.2 Equipment	14
III.3 Procedures	15
III.3.1 Molecular docking of original peptide inhibitors against α -amylase	15
III.3.2 Optimization and modification of α -amylase inhibitory peptides	16
III.3.3 Synthesis of bioactive α -amylase inhibitory peptides	17
III.3.4 Evaluation of α -amylase inhibitory activity	17
III.3.5 Determination of IC ₅₀ value of bioactive peptides	18
III.3.6 Kinetic study of α -amylase inhibition by peptide	19
CHAPTER IV RESULTS AND DISCUSSION	21
IV.1 Identification and Characterization of Original Peptides	21
IV.2 Molecular Docking Analysis of Candidate Peptides with α -Amylase	23
IV.3 Peptide Sequence Modification and Optimization	31



IV.4 Synthesis of Selected Modified Peptides	42
IV.5 In Vitro α -Amylase Inhibition Assay and IC ₅₀ Determination	43
IV.6 Kinetic Analysis of Peptide-Enzyme Interactions	46
CHAPTER V CONCLUSIONS AND RECOMMENDATIONS	49
V.1 Conclusions	49
V.2 Recommendations	49
REFERENCES	51
APPENDICES	57