INDEX

Chapter 1: Introduction
1.1. General Introduction 1-3
1.2. Sources of enzymes 3-5
1.3. Purification of enzymes 5-8
   a. Membrane process 8-9
   b. Hydrophobic interaction chromatography 9-10
   c. Aqueous two-phase systems 10-11
1.4. Amylases 11-14
1.5. Types of amylase 14-16
1.6. Industrial applications of amylase 16-17
1.7. Lipases 17-22
1.8. Purification of microbial lipase 22-23
1.9. Industrial applications of lipases 23-25
1.10. Objectives 26
1.11. Scope of the proposed work 26

Chapter 2: Materials and Methods
2.1. Chemicals 27
2.2. Isolation and screening Bacillus cereus MS6 27-28
2.3. Bacterial growth curve 28
2.4. Identification and characterization of bacterial isolate 28-29
2.5. Optimization of parameters for production of α-amylase 29
2.6. α and β amylase enzyme assay 30-30b
2.7. Optimization of parameters for production of lipase 31
2.8. Lipase enzyme assay 31-32
2.9. Estimation of proteins 32
2.10. Effect of temperature on activity of α-amylase and lipase 32
2.11. Effect of pH on activity of α-amylase and lipase 33
2.12. Effect of substrate concentration on activity of α-amylase and lipase 33-34
2.13. Effect of incubation time on activity of α-amylase and lipase 34
2.14. Determination of molecular weight of α-amylase and lipase by SDS-PAGE 34
2.15. Matrix-Assisted Laser Desorption/Ionization Time of Flight (MALDI-TOF)/MS 34-35
2.16. Purification of α-amylase 35-36
2.17. Immobilization of α-amylase by entrapment method 36
2.18. Activity of immobilized α-amylase 36-37
2.19. Determination of immobilized yield of α-amylase 37
2.20. Purification of lipase 37-38
2.21. Immobilization of lipase 38-39
2.22. Activity of immobilized lipase 38-39
2.23. Determination of immobilized lipase activity yield 39

Chapter 3: Results

Section A: α-amylase

3.A1. Identification and Characterization of Bacterial Isolate 40-43
3.A2. Growth Curve of bacteria 44
3.A3. Medium and optimization production of α-amylase 45
3.A4. Purification of α-amylase 45-47
3.A5. Molecular Weight of the Purified α-amylase 47-48
3.A7. Effect of temperature on the activity of α-amylase 50
3.A8 Effect pH on the activity of enzyme 51
3.A10. Immobilization of $\alpha$-amylase 52-53
3.A11. Effect of sodium alginate concentration on the activity of immobilized $\alpha$-amylase 54-55
3.A12. Effect of incubation time on immobilized activity of $\alpha$-amylase 55-56
3.A13. Effect of substrate concentration on immobilized activity of $\alpha$-amylase 56-57
3.A14. Effect of pH on immobilized activity of $\alpha$-amylase 57-58
3.A15. Effect of temperature on of immobilized activity of $\alpha$-amylase 58-59

Section B: Lipase
3.B Purification of lipase 60-61
3.B3. Effect of substrate concentration on activity of lipase 63-64
3.B4. Effect of incubation period time on activity of lipase 64-65
3.B10. Effect of pH on immobilized activity of lipase 70
3.B11. Effect of Sodium alginate concentration on immobilized activity of lipase 71-72
Chapter 4: Discussion
Section A: α-amylase 75-82
Section B: Lipase 83-88

Chapter 5: Conclusions
Section A: α-amylase 89-92
Section B: Lipase 93-96

Chapter 6: References 97-121