

CONTENTS

	Page
1. INTRODUCTION	1
2. REVIEW of Literature	4
2.1. Physical pretreatment	7
2.2. Chemical pretreatment.....	8
2.3. Enzymatic hydrolysis of cellulose	17
2.4. Optimal conditions for enzymatic hydrolysis of lignocellulosic materials	28
2.5. Kinetics of enzymes	43
2.6. Immobilization of β -glucosidase enzyme	50
2.7. Isomerization process	60
3. MATERIALS AND METHODS	66
3.1. Source of raw materials	66
3.2. Enzymes (cellulase, β -glucosidase, xylanase and glucose isomerase)	66
3.3. Simple sugars	68
3.4. Extraction and purification of cellulose and hemicellulose from lignocellulosic raw materials	68
3.5. Chemical analyses	69
3.6. Enzymes assays	76
3.7. Evaluation of different enzyme activities	78
3.8. Saccharification process.....	84
3.9. Immobilization of β -glucosidase (Novozym 188) enzyme	85
3.10. Isomerization in process	91

4. RESULTS AND DISCUSSION	92
4.1. Pretreatment of agricultural residues	93
4.2. The chemical composition of crude and extracted lignocellulosic compounds	97
4.3. Effect of different parameters on the activity of enzymes	98
4.4. Immobilization of β -glucosidase (Novozym 188) enzyme .	151
4.5. Kinetic studies of the immobilized enzyme with different supports	156
4.6. Enzymatic saccharification of different pretreatment extracted cellulose	167
4.7. Monomerization and isomerization of saccharified lignocellulosic materials	171
5. SUMMARY	179
6. REFERENCES	185
ARABIC SUMMARY	
