



## TABLE OF CONTENTS

	Page
TITLE PAGE .....	i
APPROVAL SHEET .....	ii
PERNYATAAN BEBAS PLAGIASI .....	iii
ACKNOWLEDGMENT .....	iv
TABLE OF CONTENTS .....	v
LIST OF TABLES .....	vii
LIST OF FIGURES .....	viii
INTISARI .....	ix
ABSTRACT .....	x
CHAPTER 1 INTRODUCTION .....	1
1.1. Background .....	1
1.2. Problem Statement .....	3
1.3. Objectives .....	3
CHAPTER 2 LITERATURE REVIEW .....	4
2.1. Bread .....	4
2.2. Active Packaging .....	10
2.3. Ethanol Emitter .....	10
2.3.1. Preparation of ethanol emitter .....	13
2.4. Oxygen Scavenger .....	16
2.5. Elaboration of Oxygen Scavenger and Ethanol Sachets .....	17
2.5.1 Carrier Materials .....	17
2.5.2 Gelling Agents .....	18
2.5.3 Sachet Materials .....	21
2.5.4 External Packaging Materials .....	22
2.6. Hypotesis .....	24
CHAPTER 3 METHODOLOGY .....	25
3.1. Materials .....	25
3.2. Methods .....	25
3.2.1. Controlled Ethanol Emitter Preparation .....	26



3.2.2. Sample Preparation and Storage .....	26
3.2.3. Analysis.....	26
3.3. Data Analyses .....	29
CHAPTER 4 RESULTS AND DISCUSSION.....	30
4.1. Dynamic headspace gas O <sub>2</sub> and CO <sub>2</sub> .....	30
4.2. Microbial growth .....	32
4.3. Water activity and moisture content .....	35
4.4. Hardness change .....	35
4.5. Color change .....	37
CHAPTER 5 CONCLUSION.....	38
5.1. Conclusion .....	38
5.2. Suggestion.....	38
BIBLIOGRAPHY .....	39
APPENDIX	