



**APPLICATION OF MODIFIED ATMOSPHERE
PACKAGING TO EXTEND SHELF LIFE OF MILKFISH
(*Chanos chanos*)
STORED AT 2±1°C; A BIOCHEMICAL,
MICROBIOLOGICAL AND SENSORY EVALUATION**

THESIS


**Submitted to the Faculty of Agricultural Technology
in partial fulfillment of the requirements for obtaining the degree of sarjana**

Bachelor of Science

**By : AUDIE LEILANI SETIAWAN
NIM : 99.70.0216**



2003

PERPUSTAKAAN		No. INV.	089 / s / TR / c1
		Th. ANGG.	0811
PARAP.		 TGL. 19-01-04	

**DEPARTMENT OF FOOD TECHNOLOGY
FACULTY OF AGRICULTURAL TECHNOLOGY
SOEGIJAPRANATA CATHOLIC UNIVERSITY
SEMARANG**

**APPLICATION OF MODIFIED ATMOSPHERE
PACKAGING TO EXTEND SHELF LIFE OF MILKFISH
(*Chanos chanos*)
STORED AT 2±1°C; A BIOCHEMICAL,
MICROBIOLOGICAL AND SENSORY EVALUATION**

By :

AUDIE LEILANI SETIAWAN


NIM : 99.70.0216

This thesis has been approved and defended
in front of the examination committee on : July 4, 2003

Semarang, 2003

Faculty of Agricultural Technology
Soegijapranata Catholic University

Supervisor I

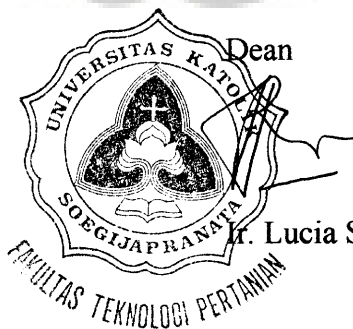


Dr. Stefan Persijn.

Supervisor II



Ir. Lucia Sri Lestari, MSc.

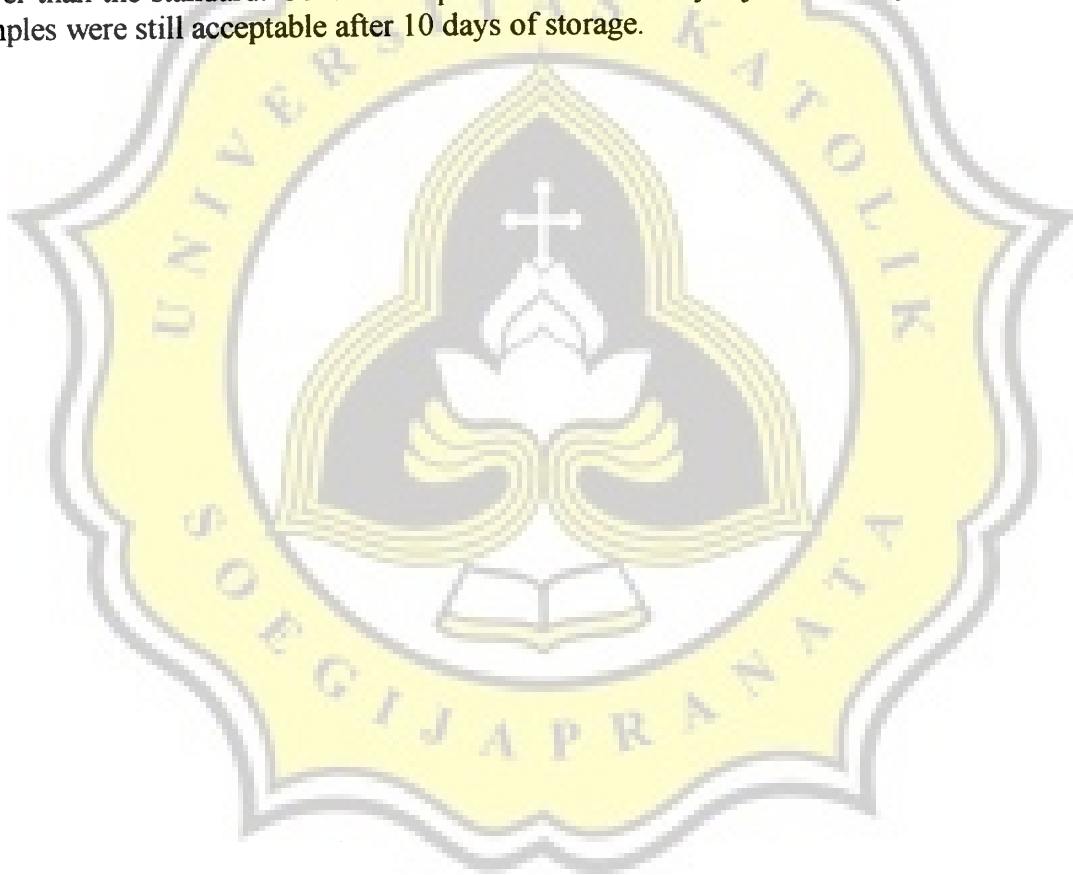


Dean

Ir. Lucia Sri Lestari, MSc.

SUMMARY

Milkfish (*Chanos chanos*) is the most popular fish in Semarang. In order to extend its shelf life, the fish was stored in the ice state ($2\pm 1^{\circ}\text{C}$) under Modified Atmosphere Packaging (MAP). The objective of this study was to evaluate the effect of 3 gas mixtures (1) 40% CO_2 , 50 % N_2 , 10% O_2 ; (2) 100% CO_2 and (3) air (control) to extend the shelf life of milkfish (*Chanos chanos*) stored at ($2\pm 1^{\circ}\text{C}$). Quality of the fish was evaluated in terms of total volatile bases (TVB), trimethylamine (TMA), pH, drip loss, total plate count and sensory analysis. The shelf life of fish can be extended to 10 days of storage period in MAP while for control it was only 4-7 days. MAP inhibited bacterial growth, increase in TVB, TMA, pH were reduced during the storage. In MAP the value of TVB, TMA and TPC increased during the storage, but the final value was lower than the standard. Control samples were sensorially rejected at day 7 while MAP samples were still acceptable after 10 days of storage.



PREFACE

Firstly, I would like to thank God for HIS blessing, therefore this report could be finished successfully. Special thanks are also given to Dr. Stefan Persijn as the first supervisor and Ir. Lucia Sri Lestari, MSc. as the second supervisor, also to Mr. Mulyadi Ferdinandus (PT. Avista) for his support. Thank also to Dad, Mom, Grandma, Peggy and my Uncle Sonny who supported me to finish this report. For Mr. Soleh, Ms. Wiwik and Mr. Supriyana, thanks for your assistance during the laboratory work and companion during the study. For Heru, Fay, Siany, Joshua, Marcel, Uke, Wulan, Joenaidi, Santie, Diana and Lena, thanks for your untiring supports during my experiment.

Finally, I also thank all other parties who helped me with this work and who I cannot mention here.

Semarang, June 2003

Audie L. Setiawan

TABLE OF CONTENT

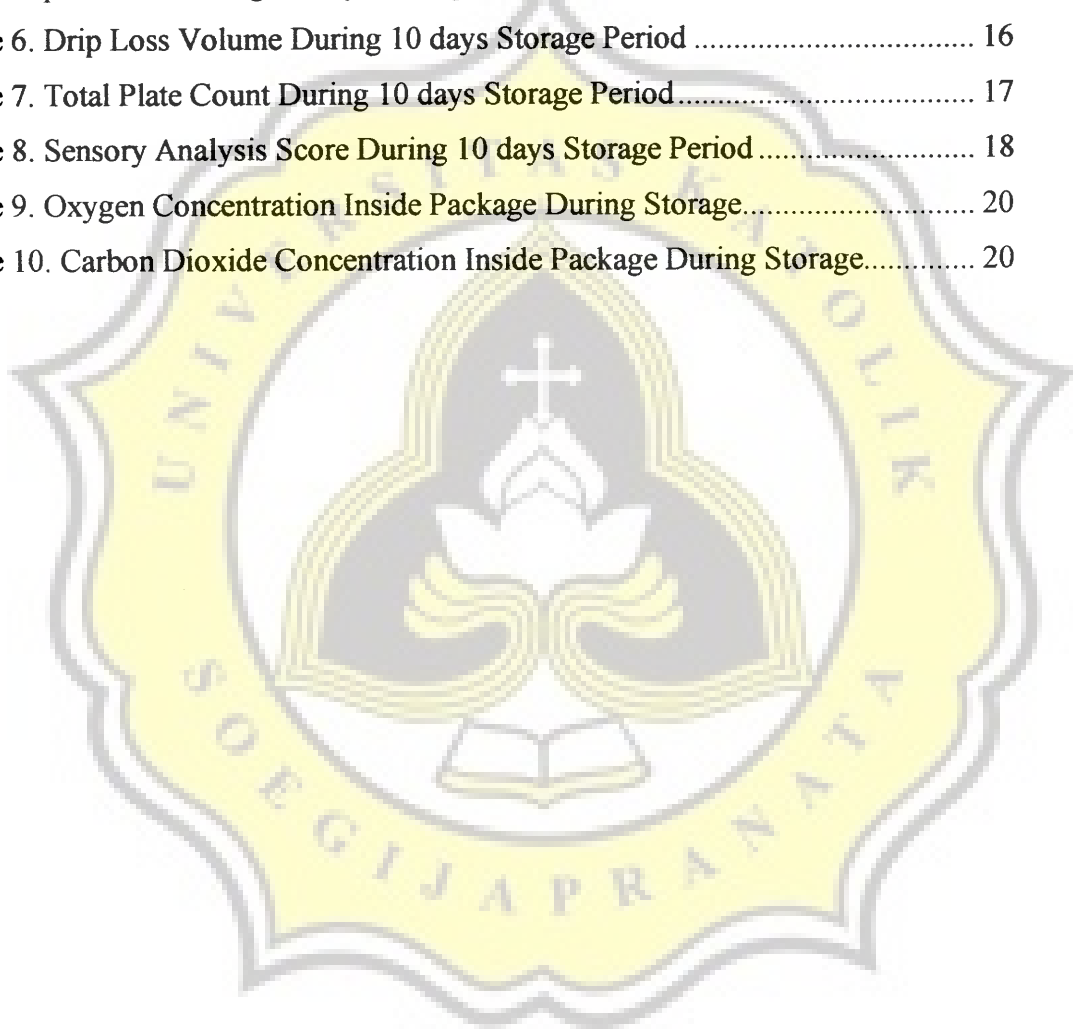
SUMMARY	i
PREFACE	ii
TABLE OF CONTENT	iii
LIST OF TABLES	v
LIST OF PICTURES	vi
LIST OF FIGURES	vii
LIST OF APPENDIX	viii
1. INTRODUCTION	1
2. MATERIALS AND METHODS	9
2.1 Sample Preparation	9
2.2 Non-sensory Analyses	10
2.2.1 Gas Measurement	10
2.2.2 Drip Loss Measurement	10
2.2.3 pH Measurement	10
2.2.4 Total Volatile Base (TVB) and Trimethylamine (TMA) Analysis	10
2.2.5 Microbiological Analysis	11
2.3 Sensory Analysis	11
2.4 Data Analysis	11
3. RESULTS	12
3.1 Total Volatile Base Content (TVB)	12
3.2 Trimethylamine Content (TMA)	13
3.3 Trimethylamine (TMA) versus Total Volatile Base (TVB)	14
3.4 pH Value	14
3.5 Drip Loss Volume	15
3.6 Total Plate Count	16
3.7 Sensory Analysis	17
3.8 Measurement Gas Conditions Inside Package During Storage	18
4. DISCUSSION	21
5. CONCLUSIONS	27

REFERENCES..... 27
APPENDIX..... 30



LIST OF TABLES

Table 1. Chemical Composition of Several Fish Species	1
Table 2. Minimum Growth Temperature of Various Microorganisms.....	4
Table 3. Total Volatile Base (TVB) Value During 10 days Storage Period.....	12
Table 4. Trimethylamine (TMA) Value During 10 days Storage Period	13
Table 5. pH Value During 10 days Storage Period.....	15
Table 6. Drip Loss Volume During 10 days Storage Period	16
Table 7. Total Plate Count During 10 days Storage Period.....	17
Table 8. Sensory Analysis Score During 10 days Storage Period	18
Table 9. Oxygen Concentration Inside Package During Storage.....	20
Table 10. Carbon Dioxide Concentration Inside Package During Storage.....	20



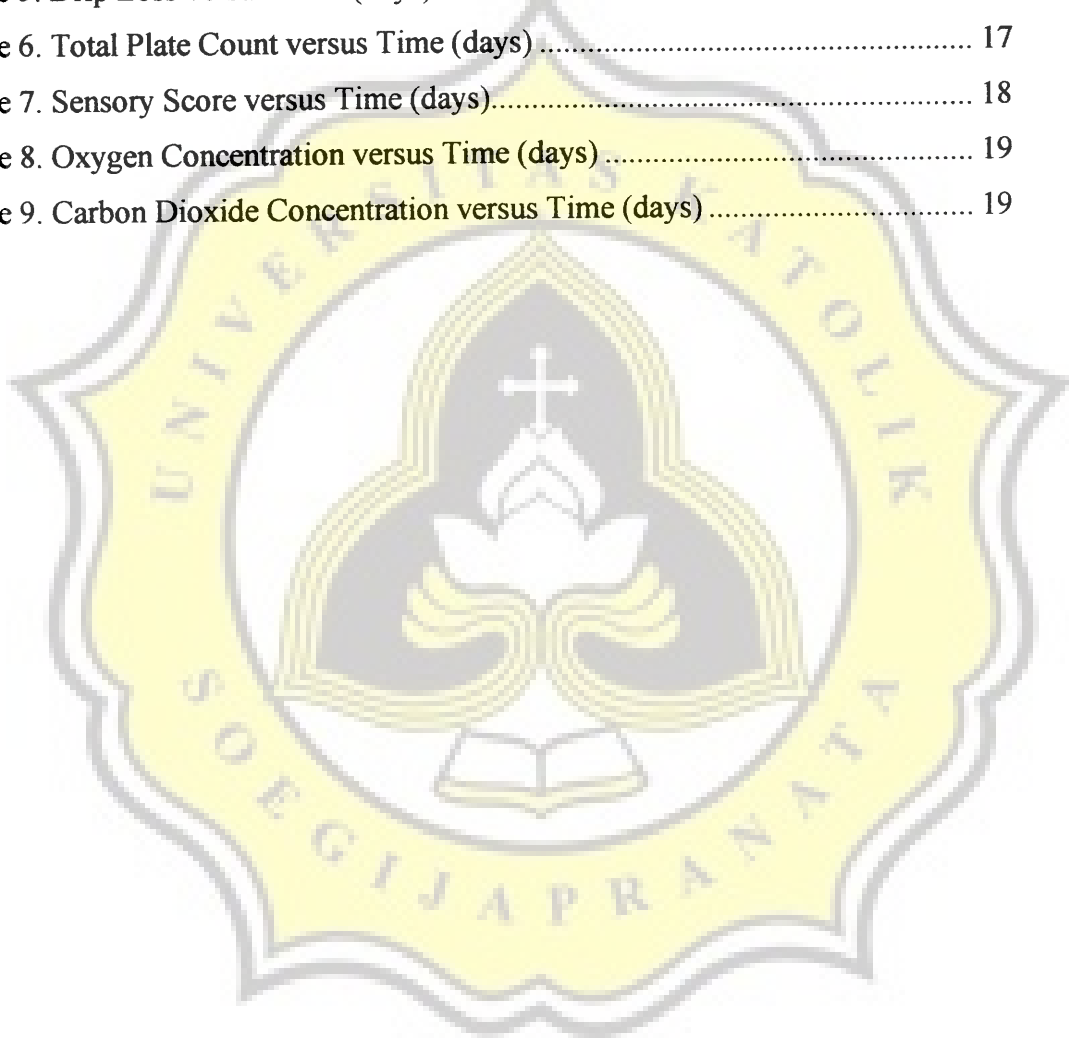
LIST OF PICTURES

Picture 1. Milkfish (*Chanos chanos*) Packed Under Modified Atmosphere Packaging ..9



LIST OF FIGURES

Figure 1. Total Volatile Base (TVB) versus Time (days).....	12
Figure 2. Trimethylamine (TMA) versus Time (days).....	13
Figure 3. Trimethylamine (TMA) versus Total Volatile Base (TVB).....	14
Figure 4. pH Value versus Time (days).....	15
Figure 5. Drip Loss versus Time (days).....	16
Figure 6. Total Plate Count versus Time (days).....	17
Figure 7. Sensory Score versus Time (days).....	18
Figure 8. Oxygen Concentration versus Time (days).....	19
Figure 9. Carbon Dioxide Concentration versus Time (days).....	19



APPENDIX

Appendix 1. Calculations of Total Volatile Base and Trimethylamine.....	30
Appendix 2. Score Sheet for Fresh Fish Sensory Evaluation	31
Appendix 3. Standar Nasional Indonesia (SNI) Ikan Segar (SNI 01-2729-1992)...	34
Appendix 4. Statistical Analysis for TVB, TMA, pH and Drip Loss per Day	35
Appendix 5. Statistical Analysis for TVB, TMA, pH and Drip Loss in Treatment	42
Appendix 6. Raw Data for Total Volatile Base and Trimethylamine	48
Appendix 7. Raw Data for pH	49
Appendix 8. Raw Data for Drip Loss	50
Appendix 9. Raw Data for Total Plate Count (TPC).....	51
Appendix 10. Raw Data for Sensory Evaluation.....	52
Appendix 11. Raw Data for Gas Measurement	54

