TABLE OF CONTENTS

Page

COVER i
ENDORSEMENT FORM ii
DECLARATION iii
IDENTITY iv
SUMMARY vi
ABSTRACT viii
ACKNOWLEDGEMENT ix
TABLE OF CONTENTS xii
LIST OF TABLES xiv
LIST OF FIGURES xv
LIST OF APPENDICES xvi
ABBREVIATION AND SYMBOLS xvii

CHAPTER 1 INTRODUCTION 1
1.1 Research Background 1
1.2 Problem Statement 3
1.3 Research Purpose 4
1.4 Research Benefit 4
1.4.1 Theoretical benefit 4
1.4.2 Practical benefit 4
1.5 Theoretical Base 4
1.6 Hypothesis 6

CHAPTER 2 LITERATURE REVIEW 7
2.1 Holy basil (*Ocimum sanctum*) 7
2.1.1 Characteristic of holy basil (*Ocimum sanctum*) 7
2.1.2 Taxonomy of holy basil (*Ocimum sanctum*) 7
2.1.3 Morphology of holy basil (*Ocimum sanctum*) 8
2.1.4 Content of holy basil (*Ocimum sanctum*) 8
2.1.5 Holy basil (*Ocimum sanctum*) as antioxidant 9
2.1.6 Efficacy of holy basil (*Ocimum sanctum*) 11
2.2 Lead (Pb) 12
2.2.1 Lead dangerous 12
2.2.2 Mechanism of lead toxicity on oxidative stress 13
2.2.3 Mechanism of lead toxicity on lipid peroxidation 15
2.2.4 Effect of lead on liver damage 16
2.3 Liver 17
2.3.1 Anatomy of liver 17
2.3.2 Physiology of liver 19
2.4 Aminotransferase Enzyme 20
2.4.1 Serum Glutamic Oxaloacetic Transaminase (SGOT) 20

2.4.2 Serum Glutamic Pyruvic Transaminase (SGPT) 22
2.5 Mice (*Mus musculus*) 23
2.5.1 Taxonomy of mice (*Mus musculus*) 24

CHAPTER 3 MATERIALS AND METHODS 25
3.1 Experimental Design 25
3.2 Number of Sample 25
3.3 Research Variable 26
3.3.1 Independent variable 26
3.3.2 Dependent variable 26
3.3.3 Control variable 26
3.4 Operational Definition of Variable 26
3.5 Research Location and Time 27
3.6 Research Materials and Equipment 28
3.6.1 Experimental animal 28
3.6.2 Research materials 28
3.6.3 Research equipments 28
3.7 Research Procedure 29
3.7.1 Ethical clearance 29
3.7.2 Holy basil (*Ocimum sanctum*) leaf extraction 29
3.7.3 Suspension preparation 29
3.7.4 Mice maintenance 30
3.7.5 Dosage 30
3.7.6 Treatment 31
3.7.7 Sampling method 32
3.7.8 SGOT and SGPT measurement 32
3.8 Data Analysis 33
3.9 Reseach Flowchart 34

CHAPTER 4 RESEARCH RESULT 35
4.1 SGOT Test Result 35
4.2 SGPT Test Result 37

CHAPTER 5 DISCUSSION 39
5.1 Effect of *Ocimum sanctum* Leaf Extract on SGOT Levels of Serum Mice Exposed by Lead Acetate 39
5.2 Effect of *Ocimum sanctum* Leaf Extract on SGPT Levels of Serum Mice Exposed by Lead Acetate 43

CHAPTER 6 CONCLUSION AND SUGGESTION 48
6.1 Conclusion 48
6.2 Suggestion 48

REFERENCES 49
APPENDICES 56

LIST OF TABLES

Table **Page**

4.1 Average and standard deviation of SGOT level in mice (U/L) from control group and treatment groups which given *Ocimum sanctum* leaf extract and lead acetate 36

4.1 Average and standard deviation of SGPT level in mice (U/L) from control group and treatment groups which given *Ocimum sanctum* leaf extract and lead acetate 38

LIST OF FIGURES

Figure **Page**

2.1 *Ocimum sanctum* 8

2.2 Ascorbic acid 10

2.3 The mechanism of lead toxicity 14

2.4 Anatomy of liver 18

2.5 Mice (*Mus musculus*) 24

4.1 Diagram of average SGOT and SGPT levels in mice (*Mus musculus*) from control groups and treatment groups which given *Ocimum sanctum* leaf extract and lead acetate 38

LIST OF APPENDICES

Appendix **Page**

1. Ethical clearance 56
2. *Ocimum sanctum* identification 57
3. Dosage conversion from rat to mice 58
4. Dosage calculation for *Ocimum sanctum* leaf extract 60
5. Dosage calculation for lead acetate 61
6. Procedure of SGOT measurement 62
7. Procedure of SGPT measurement 64
8. SGOT and SGPT test result 66
9. Statistical analysis of SGOT level 67
10. Statistical analysis of SGPT level 71
11. Research documentations 75

ABBREVIATION AND SYMBOLS

ALAD	: δ-Amino Levulinic Acid Dehydratase
ALT	: Alanine Aminotransferase
ANOVA	: Analysis of Variance
AST	: Aspartate Aminotransferase
BW	: Body Weight
CAT	: Catalase
cm	: Centimeter
CRD	: Completely Randomized Design
DMRT	: Duncan's Multiple Range Test
DNA	: Deoxyribonucleic Acid
et al.	: *et alia, et alii, et aliae*
Fe^{2+}	: Iron
GPx	: Glutathione Peroxidase
GR	: Glutathione Reductase
GSH	: Glutathione
GSSG	: Glutathione Disulfide
$HO^{\bullet}$	: Hydroxyl Radical
$HO^{\bullet}_2$	: Hydroperoxyl
IQ	: Intelligence Quotient
kg	: Kilogram
$L^{\bullet}$	: Lipid Radical
LDH	: Lactate Dehydrogenase
$LOO^{\bullet}$	: Lipid Peroxyl Radical
LOOH	: Lipid Hydroperoxide
O_2^-	: Superoxide Ions
$^{\bullet}OH$	: Hydroxyl Radical
MDH	: Malate Dehydrogenase

mg	: Milligram
ml	: Mililiter
NADH	: Nicotinamide Adenine Dinucleotide Hydrogen
nm	: Nanometer
NO	: Nitric Oxide
Pb	: Plumbum
$PbCO_3$	: Cerussite
PbS	: Mineral Galena
$PbSO_4$	: Anglesite
PUFA	: Poly Unsaturated Fatty Acids
PUSVETMA	: Pusat Veteriner Farma
ROS	: Reactive Oxygen Species
rpm	: Rotations per minute
SOD	: Superoxide Dismutase
SGOT	: Serum Glutamic Oxaloacetic Transaminase
SGPT	: Serum Glutamic Pyruvic Transaminase
SPSS	: Statistical Program for Social Science
U/L	: Units per liter
WHO	: World Health Organization