

## TABLE OF CONTENTS

<b>PREFACE</b>	<b>4</b>
<b>TABLE OF CONTENTS</b>	<b>6</b>
<b>LIST OF TABLES</b>	<b>8</b>
<b>LIST OF FIGURES</b>	<b>9</b>
<b>INTISARI</b>	<b>10</b>
<b>ABSTRACT</b>	<b>11</b>
<b>CHAPTER I</b>	<b>1</b>
1.1 Research Background	1
1.2 Research Problem	4
1.3 Research Objectives	4
1.4 Research Benefits	5
<b>CHAPTER II</b>	<b>6</b>
2.1 Definition of Variables	6
2.1.1 <i>Heimioporus</i> sp.	6
2.1.2 Antimicrobial Compounds in Pelawan Mushroom Extract	7
2.1.3 <i>Alternaria alternata</i>	13
2.1.4 <i>Staphylococcus aureus</i>	15
2.1.5 Mechanism of Antifungal Inhibition	16
2.1.6 Mechanism of Antibacterial Inhibition	18
2.1.7 Nystatin	19
2.1.8 Ciprofloxacin	20
2.1.9 Extraction Methods	21
2.1.10 Kirby-Bauer Disc Diffusion Method	22
2.1.11 Microdilution Method	23
2.2 Hypotheses	24
<b>CHAPTER III</b>	<b>25</b>
<b>RESEARCH METHODOLOGY</b>	<b>25</b>
3.1 Tools and Materials	25
3.1.1 Tools	25
3.1.2 Materials	25
3.2 Research Procedures	26
3.2.1 Preparation of Pelawan Mushroom	26
3.2.2 Pelawan Mushroom Extraction	26
3.2.3 Preparation of Medium	27
3.2.4 Dilution of Pelawan Mushroom Extract	27
3.2.5 Preparation of <i>Alternaria alternata</i> Culture	28
3.2.6 Fungal Cell Count Using a Spectrophotometer	28

3.2.7 Antifungal Activity Testing of Pelawan Mushroom Extract	29
3.2.8 Determination of Minimum Inhibitory Concentration (MIC) and Minimum Fungicidal Concentration (MFC)	29
3.2.9 Preparation of <i>Staphylococcus aureus</i> Culture	30
3.2.10 Bacterial Cell Count Using a Spectrophotometer	31
3.2.11`Antibacterial Activity Testing of Pelawan Mushroom Extract	31
3.2.12 Determination of Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC)	32
<b>CHAPTER IV</b>	<b>34</b>
<b>RESULT AND DISCUSSION</b>	<b>34</b>
4.1 Pelawan Mushroom Extraction	34
4.2 Antifungal Activity of Pelawan Mushroom Extract	35
4.3 Antibacterial Activity of Pelawan Mushroom Extract	39
4.4 Minimum Inhibitory Concentration (MIC) and Minimum Fungicidal Concentration (MFC)	42
4.5 Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC)	46
4.6 Comparative Analysis of Antifungal and Antibacterial Potency of Pelawan Mushroom Extracts	49
<b>CHAPTER V</b>	<b>53</b>
<b>CONCLUSION</b>	<b>53</b>
5.1 Conclusion	53
5.2 Recommendations	54
<b>REFERENCE</b>	<b>55</b>
<b>APPENDIX</b>	<b>68</b>

## LIST OF TABLES

<b>Table 2.1</b> Secondary metabolites present in each extract (Batubara et al., 2025).	9
<b>Table 2.2</b> Identified compounds of ethanolic extract of Pelawan mushroom	12
<b>Table 4.2.1</b> Antifungal activity of pelawan mushroom extract against <i>Alternaria alternata</i> FNCC 6023	35
<b>Table 4.2.2</b> Inhibition zone category for fungi (Rosadi et al., 2024)	36
<b>Table 4.3.1</b> Antibacterial activity of pelawan mushroom extract against <i>Staphylococcus aureus</i> ATCC 25923	39
<b>Table 4.3.2</b> Inhibition zone category for bacteria (Insyra et al., 2022)	39
<b>Table 4.4.1</b> Minimum Inhibitory Concentration (MIC) and Minimum Fungicidal Concentration (MFC) of <i>Alternaria alternata</i> FNCC 6023	42
<b>Table 4.4.2</b> Minimum Inhibitory Concentration (MIC) category for fungi (Bhaskaracharya et al., 2023)	43
<b>Table 4.5.1</b> Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of <i>Staphylococcus aureus</i> ATCC 25923	46
<b>Table 4.5.2</b> Minimum Inhibitory Concentration (MIC) category for bacteria (Busmann et al., 2010)	46
<b>Table 4.6</b> Comparative Analysis of Antifungal Potency of Pelawan Mushroom Extracts Against <i>Alternaria alternata</i> FNCC 6023	49
<b>Table 4.7</b> Comparative Analysis of Antibacterial Potency of Pelawan Mushroom Extracts Against <i>Staphylococcus aureus</i> ATCC 25923	<b>50</b>

## LIST OF FIGURES

<b>Figure 2.1</b> <i>Heimioporus</i> sp. (Pelawan Mushroom)	<b>7</b>
<b>Figure 2.2</b> Chemical structure of linoleic acid (C <sub>18</sub> H <sub>32</sub> O <sub>2</sub> )	<b>10</b>
<b>Figure 2.3</b> Chemical structure of coriolic acid	<b>11</b>
<b>Figure 2.3</b> <i>Alternaria alternata</i>	<b>15</b>
<b>Figure 2.4</b> <i>Staphylococcus aureus</i> (1000x magnification)	<b>16</b>
<b>Figure 2.5</b> Structure of fungal cell membrane	<b>17</b>
<b>Figure 2.6</b> Direct comparison of gram-positive and gram-negative bacteria peptidoglycan content	<b>19</b>
<b>Figure 2.7</b> Chemical structure of Nystatin	<b>19</b>
<b>Figure 2.8</b> Chemical structure of Ciprofloxacin	<b>21</b>
<b>Figure 3.1</b> Microplate layout for MIC	<b>33</b>
<b>Figure 3.2</b> Petri dish layout for MFC and MBC determination	<b>33</b>
<b>Figure 4.1</b> Yield of Pelawan Mushroom chart	<b>34</b>