CONTENTS

Acknowledgement i-ii

Preface iii

List of tables iv

List of appendices iv

List of figures v-vi

List of abbreviations vii-x

General Introduction 1-10

Review of Literature 11-36

Aims and objectives of the present study

Chapter 1: Study of seasonal diversity and ethnomedicinal uses of mushrooms in Gurguripal Ecoforest 37-84

1.1. Introduction

1.2. Materials and Methods

1.2.1. Study area

1.2.2. Collection, identification and preservation of specimens

1.2.3. Statistical analysis of mushroom diversity

1.2.4. Ethnomycological survey

1.3. Results and Discussions

1.3.1. Distribution frequency

1.3.2. Diversity index

1.3.3. Ethnomycology

1.4. Conclusion

Chapter 2: Nutritional and bioactive potentials of selected mushrooms in Gurguripal Ecoforest 85-107

2.1. Introduction

2.2. Materials and Methods

2.2.1. Analysis of nutrients

2.2.2. Analysis of major phenolic compounds

2.2.3. Antioxidant assay

2.2.4. Fatty acid analysis

2.2.5. EDAX analysis

2.3. Results and Discussions

2.3.1. Nutrient content

2.3.2. Phenolic compounds

2.3.3. Antioxidant assay

2.3.4. Fatty acids

2.3.5. Elemental constituents

2.4. Conclusion

Chapter 3: Study of antibacterial potential, characterisation and efficacy enhancement of mushroom extract 108-132

3.1. Introduction

3.2. Materials and Methods

3.2.1. Preparation of mushroom extracts

3.2.2. Antibacterial activity of Mushroom Extracts

3.2.3. Biosynthesis and Characterization of Silver Nanoparticles

3.2.4. Antibacterial efficacy by silver nanoparticles

3.2.5. Partial purification by Column chromatography and Fraction collection

3.2.6. HPLC analysis

3.2.7. Isolation and purification of polysaccharide from *T. heimii*

3.2.8. Characterization of THP-I through LC-MS and NMR study

3.2.9. Determination of MIC and MBC

3.2.10. In vitro cytotoxicity assay

3.3. Results and Discussions

3.3.1. Antibacterial potential of mushroom

3.3.2. Antibacterial efficacy enhancement of mushroom extract through AgNps

3.3.3. Study of active constituents in *T. heimii*

3.3.4. Isolation, purification and antibacterial activity of crude polysaccharide

3.3.5. Spectroscopical analysis

3.3.6. MIC and MBC study of *T. heimii* extract

3.3.7. Cytotoxicity study of T. heimii extract

3.4. Conclusion

Chapter 4: Bactericidal mechanism of *p*-coumaric acid, a principal compound of *Termitomyces heimii*: A bioinformatics insight 133-174

4.1. Introduction

4.2. Materials and Methods

4.2.1. Study of Minimum Inhibitory Concentration (MIC) of p-CA against two human pathogenic bacteria

4.2.2. Sequence retrieval

4.2.3. Sequence selection

4.2.4. Tertiary structures prediction

4.2.5. Quality assessment of predicted structures

4.2.6. Ligand structure retrieval

4.2.7. Molecular Docking

4.2.8. Phylogenetic tree construction

4.3. Results and Discussions

4.3.1. Minimum Inhibitory Concentration (MIC) of *p*-CA

4.3.2. Analysis of Retrieved Trans-membrane Proteins

4.3.3. Tertiary Structure Prediction and Quality Assessment

4.3.4. Molecular Docking Analysis with *p*-CA

4.3.5. Sequential Comparison between trans-membrane proteins of *S. aureus* and *E. coli* through Phylogenetic Tree

4.4. Conclusion

Summary and Conclusion 175-181

References 182-224

Publications