# TABLE OF CONTENTS

## 1. INTRODUCTION

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Phytochemistry and medicinal plants</td>
<td>1</td>
</tr>
<tr>
<td>1.1.1 Traditional Medicine and Drug discovery</td>
<td>1</td>
</tr>
<tr>
<td>1.1.2 Approved Natural Product-Based Drugs</td>
<td>3</td>
</tr>
<tr>
<td>1.1.3 Phytochemicals and their Medicinal Uses</td>
<td>4</td>
</tr>
<tr>
<td>1.2 Acute toxicity study</td>
<td>8</td>
</tr>
<tr>
<td>1.3 The Liver</td>
<td>9</td>
</tr>
<tr>
<td>1.3.1 The major functions of liver</td>
<td>10</td>
</tr>
<tr>
<td>1.3.2 Liver disease</td>
<td>11</td>
</tr>
<tr>
<td>1.3.3 Hepatotoxicity Inducing Agent</td>
<td>15</td>
</tr>
<tr>
<td>1.3.4 Mechanism of Carbon Tetrachloride-Induced Hepatotoxicity</td>
<td>16</td>
</tr>
<tr>
<td>1.3.5 Liver function tests</td>
<td>17</td>
</tr>
<tr>
<td>1.4 The kidney</td>
<td>17</td>
</tr>
<tr>
<td>1.4.1 Functions of the kidney</td>
<td>18</td>
</tr>
<tr>
<td>1.4.2 Kidney Diseases</td>
<td>19</td>
</tr>
<tr>
<td>1.4.3 Nephrotoxic Agents</td>
<td>22</td>
</tr>
<tr>
<td>1.4.4 Mechanisms of APAP induced renal toxicity</td>
<td>22</td>
</tr>
<tr>
<td>1.4.5 Kidney function Test</td>
<td>23</td>
</tr>
<tr>
<td>1.5 Oxidative stress assessment</td>
<td>24</td>
</tr>
</tbody>
</table>

## 2. REVIEW OF LITERATURE

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Plants as Hepatoprotective</td>
<td>30</td>
</tr>
<tr>
<td>2.2 Plants as Nephroprotective</td>
<td>31</td>
</tr>
</tbody>
</table>
2.3 Plant Profile of *Combretum albidum* 37

2.4 Plant profile of *Salacia fruticosa* 41

### 3. MATERIAL AND METHODS

3.1 Plant material 45

3.2 Extraction of plants materials 45

3.3 Chemicals, reagents and drugs 46

3.4 Phytochemical analysis 46

3.4.1 Preliminary Qualitative phytochemical screening 46

3.4.2 GC-MS/MS analysis of Phytochemicals 51

3.5 Animals 52

3.6 ACUTE TOXICITY STUDY 52

3.7 IN VIVO HEPATOPROTECTIVE STUDY 53

3.7.1 Experimental design 53

3.7.2 Estimation of biochemical parameters 54

3.7.2.1 Estimation of Aspartate transaminase and Alanine transaminase 54

3.7.2.2 Estimation of serum alkaline phosphatase 56

3.7.2.3 Estimation of serum bilirubin 57

3.7.2.4 Estimation of protein 58

3.7.3 Preparation of liver tissue homogenate 59

3.7.4 Lipid peroxidation and antioxidant Study 59

3.7.4.1 Estimation of thiobarbituric acid reactive substance 59

3.7.4.2 Estimation of Reduced glutathione 60

3.7.4.3 Estimation of Super oxide dismutase 60

3.7.4.4 Estimation of Catalase 60

3.7.4.5 Estimation of Glutathione S-transferase (GST) 62
3.7.4.6 Estimation of glutathione peroxidase (GPx) 62

3.8 INVIVO NEPHROPROTECTIVE STUDY 63

3.8.1 Experimental design 63

3.8.2 Biochemical parameters assessed for renal function 63

3.8.2.1 Estimation of urea 64

3.8.2.2 Estimation of creatinine 64

3.8.2.3 Estimation of Uric acid 65

3.8.3 Hematological study 66

3.8.4 Preparation of Renal tissue homogenate 67

3.8.4.1 Estimation of MDA 67

3.8.4.2 Estimation of Reduced glutathione 68

3.8.4.3 Estimation of Super oxide dismutase 68

3.8.4.4 Estimation of Catalase 68

3.8.4.5 Estimation of glutathione peroxidase 68

3.9 Histopathological studies 69

3.9.1 Histopathology of CCl₄ induced liver injury 69

3.9.2 Histopathology of APAP induced Kidney damage 70

3.10 Statistical data analysis 70

4. RESULTS 71

4.1 PHYTOCHEMICAL ANALYSIS 71

4.1.1 Qualitative phytochemical screening 71

4.1.2 Phytochemicals characterization of CA through GC-MS/MS studies 72

4.1.3 Phytochemicals characterization of SF through GC-MS/MS studies 80

4.2 Acute toxicity 104

4.3 INVIVO HEPATOPROTective STUDIES 104
4.3.1 Effect of ethanolic extract of CA and SF on Biochemical parameters 104
4.3.2 Effect of ethanolic extract of CA and SF on biochemical oxidative stress 107
4.3.3 Histopathological studies of liver 109
4.4 INVIVO NEPHROPROTECTIVE STUDIES 112
  4.4.1 Effect of EECA and EESF on biochemical parameter 112
  4.4.2 Effect of EECA and EESF on hematological parameters 113
  4.4.3 Effect of EECA and EESF on biochemical oxidative stress 120
  4.4.4 Histopathological examination of kidney 123

5. DISCUSSION 126
  5.1 Phytochemical analysis 126
  5.2 Acute toxicity studies 128
  5.3 Invivo hepatoprotective studies 129
  5.4 Invivo nephroprotective studies 133

6. SUMMARY AND CONCLUSION 137

BIBLIOGRAPHY 142

LIST OF PUBLICATIONS