

## CONTENTS

<i>Title</i>	<i>Pages</i>
Acknowledgment	v
Abstract	vii
List of Tables	ix
List of Figures	x
List of Appendices	xi
<b>CHAPTER-I      Introduction</b>	<b>1-4</b>
1.1 Introduction	1
1.2 Necessity of the research	3
1.3 Research problem	4
1.4 Objectives	4
<b>CHAPTER- II      Literature Review</b>	<b>5-10</b>
2.1 Survey review	5
2.2 Plant phytochemicals and antioxidant review	6
2.3 Hepatoprotective review	7
2.4 GC-MS analysis review	9
2.5 Docking review	9
<b>CHAPTER- III      Description of Plants</b>	<b>11-12</b>
3.1 Sample selection	11
3.2 <i>Morus indica</i> L.	11
3.3 <i>Averrhoa carambola</i> L.	11
3.4 <i>Phlogacanthus thyrsiflorus</i> Nees.	12
<b>CHAPTER- IV      Materials and Methods</b>	<b>13-24</b>
4.1 Area of study	13
4.2 Topography	13
4.3 Collection and Identification	13

4.4 Extract preparation of sample	14
4.5 Phytochemical screening	14
4.6 <i>In-vitro</i> antioxidant tests	16
4.6.1 Total phenolic contents	16
4.6.2 Total flavonoid contents	16
4.6.3 Total reducing power assay	16
4.6.4 Total antioxidant capacity	16
4.6.5 DPPH radical scavenging assay	17
4.6.6 ABTS radical cation scavenging assay	17
4.6.7 Iron chelating capacity	17
4.6.8 H <sub>2</sub> O <sub>2</sub> radical scavenging assay	18
4.6.9 Ferric reducing antioxidant assay	18
4.7 Gas chromatography coupled with mass-spectrometry analysis	18
4.8 <i>In-vivo</i> animal model experiment	19
4.8.1 Experimental animal	19
4.8.2 Acute toxicity study	19
4.8.3 Experimental design	19
4.8.4 Assessment of serum biochemical assays	20
4.8.5 Assessment of levels of antioxidant enzymes	20
4.8.5.1 Superoxide dismutase (SOD) assay	21
4.8.5.2 Catalase assay	21
4.8.5.3 Gluthathione peroxidase	21
4.8.5.4 Gluthathione assay	21
4.8.5.5 Lipid-peroxidation	22
4.8.5.6 Total protein assay	22
4.9 Histopathological study	22

4.10 Molecular docking with hepatoprotective bio-target	22
4.10.1 Ligand selection	22
4.10.2 Selection of target protein	23
4.10.3 Ligand molecules	23
4.10.4 Ligand preparation	23
4.10.5 Preparation of receptor	23
4.10.6 Molecular docking	24
4.10.7 $\Delta G$ binding affinity	24
4.10.8 ADME property of ligands	24
4.10.9 Statistical analysis	24
<b>CHAPTER- V        Results</b>	<b>25-59</b>
5.1 Hepatoprotective medicinal plants	25
5.2 Some herbal formulation	29
5.3 Extract yield	30
5.4 Phytochemical screening	30
5.5 Total phenolic & flavonoid content	31
5.6 Total reducing power assay	33
5.7 Total antioxidant capacity	34
5.8 DPPH radical scavenging assay	35
5.9 ABTS radical scavenging assay	37
5.10 Iron chelating capacity	38
5.11 $H_2O_2$ radical scavenging activity	40
5.12 Ferric reducing antioxidant property	41
5.13 GC-MS analysis	42

5.14 <i>In-vivo</i> hepatoprotective study	45
5.14.1 Acute toxicity study	45
5.14.2 Effect of RoMi interventions on biochemical parameters	45
5.14.3 Effect of RoMi on parameters of oxidative stress in liver	47
5.15 Effect of interventions on histopathological changes in liver	50
5.16 Effect of interventions on histopathological changes in kidney	52
5.17 Docking analysis of NFκB protein	53
5.17.1 Receptor sitemap & site score	53
5.17.2 Ligand docking	54
5.18 Docking analysis of COX-2 protein	56
5.19 ADME property of ligands	58
<b>CHAPTER- VI</b> <b>Discussion</b>	<b>60-72</b>
<b>CHAPTER-VII</b> <b>Conclusion</b>	<b>73-74</b>
<b>CHAPTER- VIII</b> <b>Summary</b>	<b>75-77</b>
<b>CHAPTER- IX</b> <b>Salient Features of the Study</b>	<b>78</b>
<b>CHAPTER- X</b> <b>Bibliography</b>	<b>79-97</b>
<b>Appendix-A</b> Questionnaires used	98-99
<b>Appendix-B</b> GC-MS chromatogram	100-101
<b>Appendix-C</b> Chemicals used	102-103
<b>Appendix-D</b> Instruments used	104
<b>Appendix-E</b> Paper publication	105
<b>Appendix-F</b> Seminar presentation	106
<b>Appendix-G</b> Photos of medicinal plants	107-113
<b>Appendix-H</b> Abbreviations used	114-115