

## TABLE OF CONTENTS

<b>CHAPTER I INTRODUCTION.....</b>	<b>1</b>
1.1. Background .....	1
1.2. Problem Statements .....	4
1.3. Research Objectives .....	4
1.4. Research Novelty .....	4
1.5. Research Outcome.....	5
<b>CHAPTER II LITERATURE REVIEW .....</b>	<b>6</b>
2.1. Inflammatory Bowel Diseases.....	6
2.2. Ulcerative Colitis (UC) .....	7
2.3. Colitis Models .....	8
2.4. Pro-inflammatory cytokines .....	9
2.5. Phenolic compound .....	11
2.6. Citrus .....	12
2.7. <i>Citrus aurantifolia</i> .....	15
2.8. Citrus peel extraction.....	16
2.9. Ultrasound-assisted extraction .....	16
2.10. Box Behnken Design (BBD) with Response Surface Methodology (RSM) 18	
2.11. Hypothesis .....	19
<b>CHAPTER III RESEARCH METHODS.....</b>	<b>20</b>
<b>3.1. Materials and Instruments .....</b>	<b>20</b>
3.1.1. Materials.....	20
3.1.2. Instruments .....	20
<b>3.2. Time and Location of Research .....</b>	<b>20</b>
<b>3.3. Methods .....</b>	<b>21</b>
3.3.1. <i>Citrus aurantifolia</i> peel extraction procedure .....	21
3.3.2. Total Phenolic Content (TPC).....	23
3.3.3. DPPH scavenging activity.....	23

3.3.4.	HPLC analysis.....	23
3.3.5.	Animal experiment.....	24
3.3.6.	Evaluation of Disease Activity Index (DAI).....	25
3.3.7.	Blood sampling .....	25
3.3.8.	Colonic Tissues Inflammatory Response Measurement .....	25
3.3.9.	Statistical Analysis .....	25
3.4.	Experiment scheme .....	26
3.5.	Experimental design .....	26
<b>CHAPTER IV RESULTS AND DISCUSSION .....</b>		<b>29</b>
4.1.	<i>Citrus aurantifolia</i> peel extraction .....	29
4.1.1.	Single factor experiment .....	29
4.1.2.	Determination of optimum values.....	34
4.1.3.	Response Surface Methodology.....	35
4.1.4.	3D Surface Plots.....	37
4.1.5.	Verification of optimum extraction conditions .....	40
4.1.6.	Identification and quantification of phenolic compounds.....	41
4.2.	<i>In vivo</i> analysis on BALB/c mice.....	42
4.2.1.	Body weight loss .....	42
4.2.2.	Food intake.....	44
4.2.3.	DAI score .....	46
4.2.4.	Hematology .....	47
4.2.5.	Colon length and weight .....	50
4.2.6.	Serology .....	53
<b>CHAPTER V CONCLUSION AND SUGGESTIONS.....</b>		<b>60</b>
5.1.	Conclusion.....	60
5.2.	Suggestions.....	60
<b>REFERENCE .....</b>		<b>61</b>
<b>APPENDICES .....</b>		<b>70</b>