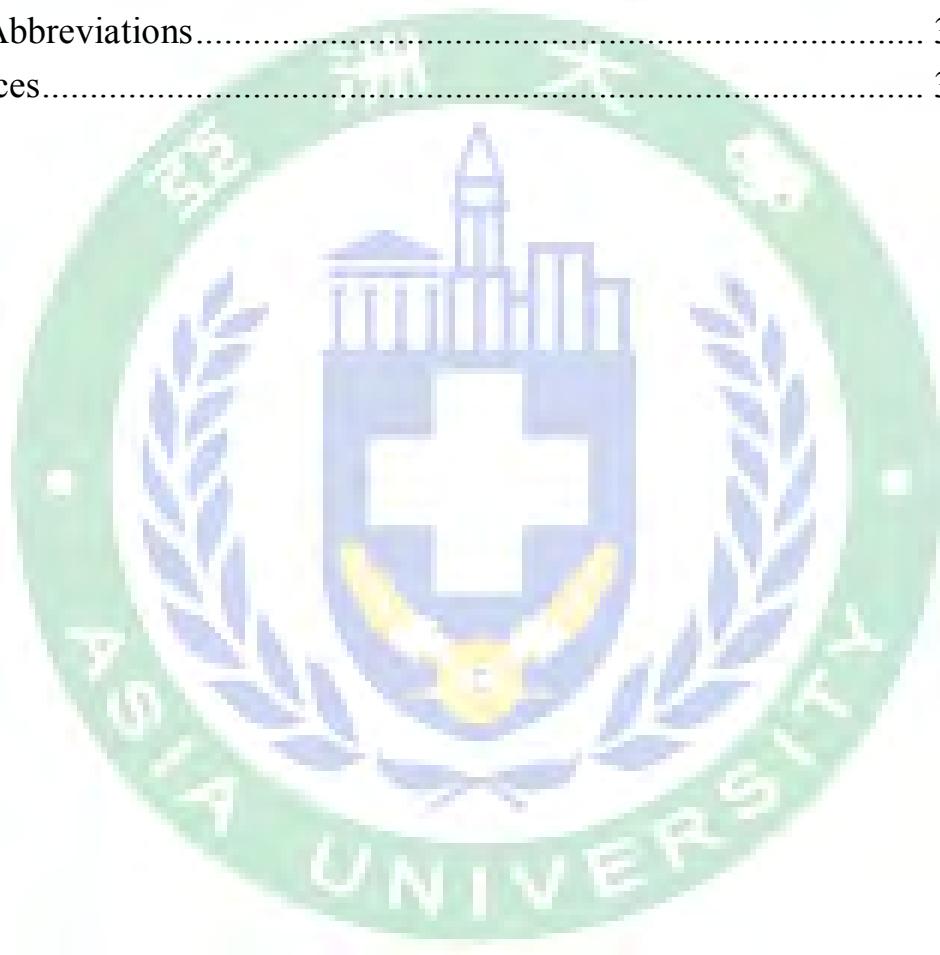


Table of Contents

摘要	I
Abstract.....	II
Acknowledgment	III
Table of contents	IV
List of figures	IV
Chapter 1 Introduction	1
1.1 Research Background.....	1
1.2 Literature Review.....	3
1.2.1 Tissue Engineering	3
1.2.2 3D Bioprinting	3
1.2.3 Bioink.....	5
1.2.4 Hydrogel	6
1.2.5 Crosslinking Mechanisms of Hydrogels	6
1.2.5.1 Physical Crosslinking	6
1.2.5.2 Chemical Crosslinking	7
1.2.6 Gelatin.....	8
1.2.7 Gelatin Methacryloyl (GelMA)	9
1.2.8 Gelatin Glycidyl Methacryloyl (GelGMA)	9
1.3 Research Motivation and Objectives	10
Chapter 2 Material and Methods	13
3.1 Synthesis of GelMA	13
3.2 Synthesis of GelGMA	13
3.3 GelMA and GelGMA hydrogels preparation	14
3.4 Physico Chemical Properties	14
3.4.1Degree of Substitution using ^1H Nuclear Magnetic Resonance....	14
3.4.2 Swelling Ratio	14
3.4.3 Degradation Rate in Collagenase.....	15
3.5 Printability Assessment	16
3.5.1 Phase Diagram of Printability	16
3.5.2 Uniformity ratio.....	16
Chapter 3 Result and Discussion.....	17

3.1 ¹ H Nuclear Magnetic Resonance	17
3.2 Swelling Ratio.....	19
3.3 Degradation Rate.....	20
3.4 Printability Assessment of GelMA and GelGMA Hydrogel	23
3.4.1 Phase Diagram of Printability	23
3.4.2 Uniformity Ratio	25
Chapter 4 Conclusion.....	30
Appendix A	31
List of Abbreviations.....	31
References.....	34



List of Figures

- Figure 1. The ^1H NMR spectra of Gelatin, GelMA and GelGMA 19
Figure 2. The swelling ratio of GelMA and GelGMA 21
Figure 3. The degradation rate of (A) GelMA and (B) GelGMA 23
Figure 4. The phase diagram of GelMA and GelGMA 25
Figure 5. The line's width of forming regular of GelMA's filament 27
Figure 6. The line's width of forming regular of GelGMA's filament 28
Figure 7. The uniformity ratio of GelMA at different printing parameters.... 29
Figure 8. The uniformity ratio of GelGMA at different printing parameters . 30

