

CONTENTS

TITLE	PAGE NO.
LIST OF TABLES	
LIST OF FIGURES	
LIST OF PLATES	
LIST OF APPENDICES	
1 INTRODUCTION	1
2 REVIEW OF LITERATURE	8
2.1 Healthcare Textiles	9
2.1.1. Materials Used for Healthcare Textiles	10
2.1.2. Types of Healthcare Textile Products	11
2.1.3. Structure of Textile Materials	12
2.1.4. Advantage of Healthcare Textiles	14
2.2 Microbes	15
2.2.1 Types of Microbes	15
2.2.1.1. <i>Staphylococcus saprophyticus</i>	16
2.2.1.2 <i>Aeromonas hydrophila</i>	16
2.2.1.3 <i>Escherichia coli</i>	17
2.2.1.4 <i>Pseudomonas aeruginosa</i>	18
2.2.1.5 <i>Candida albicans</i>	19
2.2.2. Human Skin and Skin Wound	19
2.2.3 Factors Influencing the Growth of Microbes in Fabrics	20
2.3. Use of Herbs in Textile Finishing	22
2.3.1. Plant Authentication	24
2.3.2 Textile Material Used for Wound Dressing	25
2.3.3 Phytochemical Screening	27
2.4. Antimicrobial Finishing on Textiles	30
2.4.1 The need for Antimicrobial Textiles	31
2.4.2 Application of Antimicrobial Agents	33
2.4.3 Antimicrobial Finishing	33
2.4.4 Antimicrobial Finishing Methods	34

TITLE	PAGE NO.
2.4.4.1 Dip and Dry method	34
2.4.4.2 Exhaust Method	35
2.4.4.3 Microencapsulation	35
2.4.4.4 Nanoencapsulation	37
2.5. Antimicrobial Assessment	40
2.5.1 Agar Well Diffusion Assay	40
2.5.2 AATTC 147-2004	41
2.5.3 Wound Scratch Assay	42
2.5.4 Fourier Transform Infrared Spectroscopy (FTIR)	44
2.5.5 SEM Analysis	45
3 EXPERIMENTAL PROCEDURE	47
Phase I	55
3.1 Literature Survey	55
3.1.1 Collection of Information for the Properties of Wound Dressing Band-aids	55
3.1.1.1 Selection of Method of Data Collection	55
3.1.1.2 Preparation of Interview Schedule	56
3.1.1.3 Pilot Study	56
3.1.1.4 Actual Interview	56
3.2 Selection of Yarn and Testing of Physical Property of Cotton Yarn	56
3.2.1 Yarn Count CV%	57
3.2.2 Evenness Percentage of Yarn	57
3.2.3 Yarn Tenacity	59
3.2.4 Yarn Hairiness	60
3.2.5 Moisture Content	60
3.2.6 Yarn Thickness	61
3.2.7 Yarn Twist Per Inch	61
3.2.8 Physical Properties of Cotton Yarn	62
3.3 Fabric Formation and Pretreatment of Fabric	63
3.3.1 Warp Winding	63

TITLE	PAGE NO.
3.3.2 Weaving	64
3.3.3 Pretreatment	65
3.3.3.1 Desizing	66
3.3.3.2 Scouring	66
3.3.3.3 Bleaching	67
3.4 Selection of Herbs	69
3.4.1 Taxonomy of Plants	69
3.4.2 Plant Authentication	69
3.5 Processing of Herbs	71
3.5.1 Drying	71
3.5.2 Garbling	71
3.5.3 Grinding	71
Phase II	73
3.6 Herbal Extraction	73
3.6.1 Extraction by Soxhlet	73
3.6.2. Optimisation of Herbal Extracts	73
3.6.3 Qualitative Phytochemical Analysis of Herbal Extracts	74
3.6.3.1 Test for Carbohydrates	74
3.6.3.2 Test for Tannins	74
3.6.3.3 Test for Saponins	74
3.6.3.4 Test for Flavanoids	74
3.6.3.5 Test for Alkaloids	75
3.6.3.6 Test for Quinones	75
3.6.3.7 Test for Glycosides	75
3.6.3.8 Test for Cardiac Glycosides	75
3.6.3.9 Test for Terpenoids	75
3.6.3.10 Test for Phenols	75
3.6.3.11 Test for Coumarins	76
3.6.3.12 Test for Steroids and Phytosteroids	76
3.6.3.13 Test for Phlobatannins	76
3.6.3.14 Test for Anthroquinones	76

TITLE	PAGE NO.
Phase III	85
3.7 Antimicrobial Testing	85
3.7.1 Selection of Microbial Cultures	85
3.8 Determination of Minimum Inhibitory Concentration (MIC)	86
3.8.1 Antibacterial Activity of Herbal Extract by Agar Well Diffusion Method	91
3.8.2 Polyherbal Formulation	91
3.8.3 Antibacterial Activity of Polyherbal Extract by Agar Well Diffusion Method	93
3.8.4 Wound Scratch Assay of Polyherbal Extract	94
Phase IV	95
3.9 Application of Polyherbal Extracts on Cotton Fabrics	95
3.9.1 Dip and Dry Method	96
3.9.2 Exhaust Method	96
3.9.2.1 Preparation of Polyherbal Microencapsules by Ionic Gelation Process	96
3.9.2.2 Preparation of Polyherbal Nanoencapsules	97
3.10 Antimicrobial Activity by AATCC 147	98
3.11 Fourier Transform Infrared (FTIR) Spectroscopic Analysis	99
3.12 Scanning Electron Microscopic (SEM) Analysis	100
3.13 Testing of Physical Properties of Polyherbal Pretreated Woven Fabric	100
3.13.1 Fabric Weight	100
3.13.2 Tensile Strength and Elongation	100
3.13.3 Air Permeability	101
3.13.4 Water Absorbency	102
3.13.5 Vertical Wicking	102
3.13.6 Sinking	103
3.13.7 Water Holding Capacity	103
3.14 Product Development and Evaluation	105
3.14.1 Microbial Filtration Test	105
3.14.2 Band-aids Toxicity Test	106
3.15 Statistical Analysis	107

TITLE	PAGE NO.
4 RESULTS AND DISCUSSION	108
4.1 Properties of Commercially Available Wound Dressing Band aids	109
4.1.1 Interview Schedule	109
4.1.2 Properties Best Suitable For Wound Dressing Bandages Used for Acute Wound	111
4.2 The Yield % Obtained from Each Plant Extract	112
4.3 Determination of Minimum Inhibitory Concentration (MIC)	113
4.4 Antimicrobial Activity of the Herbal Extract	114
4.5 Antimicrobial Analysis for Poly Herbal Extract	116
4.6 Wound Scratch Cell Line Assay	118
4.7 Antimicrobial Assessment of Polyherbal Finished Fabric	119
4.8 SEM analysis of Polyherbal Finished Fabric	121
4.9 Assessment of Finished Fabric Using Fourier Transformer Infrared Spectroscopy	123
4.10 Physical Properties of Polyherbal Finished Fabric	125
4.10.1 Physical Properties of the Commercial Band aids and Control Fabric	125
4.10.2 Fabric Weight of Polyherbal Finished Fabric	126
4.10.3 Tensile Strength of Polyherbal Finished Fabric	128
4.10.4 Sinking Test of Polyherbal Finished Fabrics	130
4.10.5 Water Holding Capacity of Polyherbal Finished Fabric	131
4.10.6 Air permeability of Polyherbal Finished Fabric	133
4.10.7 Absorbency of Polyherbal Finished Fabric	134
4.10.8 Vertical Wicking of Polyherbal Finished Fabric	136
4.11 Microbial Filtration Test	137
4.11.1 Bacterial Filtration Test	137
4.11.2 Fungal Filtration Test	146
4.12 Band aid toxicity test	150
5 SUMMARY AND CONCLUSION	151
BIBLIOGRAPHY	161
APPENDICES	183
PAPERS PUBLISHED	190
