CONTENTS

| List of Tables | vi - ix |
| List of Figures | x - xii |
| List of Contour plots | xiii |

1 INTRODUCTION 1 - 8

2 LITERATURE REVIEW 9 - 65

2.1 Liposomes 10

2.1.1 Structure of Liposomes 10
2.1.2 Composition of Liposomes 11

2.1.2.1 Phospholipids 11
2.1.2.2 Steroids 12
2.1.2.3 Antioxidants 12
2.1.2.4 Other components 13

2.1.3 Types of liposomes 13

2.1.3.1 Multilamellar vesicles 14
2.1.3.2 Small Unilamellar vesicles 15
2.1.3.3 Large Unilamellar vesicles 16

2.1.4 Physical properties of liposomes 17

2.2 Applications of liposomes 18

2.3 Liposomes as carrier for topical delivery systems 20

2.4 Studies on liposomally encapsulated drugs for topical application 21

2.5 Physico-chemical properties of liposomes 22

2.5.1 Membrane fluidity 23
2.5.2 Surface charge 24
2.5.3 Size/type of liposomes 24
2.5.4 Nature of drug 25

2.6 Mechanism of liposomal action in dermal drug delivery 25

2.6.1 Adsorption at interface 25
2.6.2 Ultra structure changes 26
3.3.1.4 Preparation of calibration curve for the estimation of Phosphatidylcholine (PC) in liposomes................. 73
3.3.1.5 Preparation of calibration curve for the estimation of Cholesterol (CHOL) in liposomes.................... 75
3.3.1.6 Separation of free and entrapped ACY, PC and CHOL for estimation.............................................. 77
3.3.1.7 Estimation of ACY in plain and liposomal gels........ 79
3.3.1.8 Estimation of ACY retention within liposomes and Liposomal gels during drug retention studies.......... 80
3.3.1.9 Estimation of ACY retention in liposomes adsorbed with cross-linked BSA and ACY retention in gel containing ACY liposomes adsorbed with cross-linked during drug retention studies.......................... 81
3.3.1.10 Determination of change in vesicle geometric mean diameter during drug retention studies........... 82
3.3.1.11 Estimation of ACY in diffusion studies of plain drug and plain drug gel and liposomal gels............... 82
3.3.1.12 Determination of ACY in skin.......................................... 82
3.3.2 Idoxuridine (IDU) liposomes........................................ 82

3.3.2.1 Preparation of calibration curve for the estimation of untrapped IDU.............................. 82
3.3.2.2 Preparation of calibration curve for the estimation of entrapped IDU in liposomes........ 84
3.3.2.3 Interference of excipients with the estimation of IDU ................................................................. 86
3.3.2.4 Separation of free and entrapped IDU, PC and CHOL for estimation........................................... 86
3.3.2.5 Estimation of IDU in plain and liposomal gels...... 87
3.3.2.6 Estimation of IDU retention in liposomes and Liposomal gels during drug retention studies...... 88
3.3.2.7 Estimation of IDU retention in liposomes adsorbed with cross-linked BSA and IDU retention in gel containing IDU liposomes adsorbed with cross-linked BSA during the drug retention studies.............................................. 89
3.3.2.8 Determination of change in vesicles geometric mean Diameter.................................................. 90
3.3.2.9 Estimation of IDU in diffusion studies of plain drug, Plain gel and liposomal gel............... 90
3.3.2.10 Determination of IDU in skin.......................................... 90

3.4 Results and Discussion .......................... 90 90

References .................................................. 95 95
4 PREPARATION, CHARACTERIZATION AND STABILITY STUDIES OF ACYCLOVIR AND IDOXURIDINE LIPOSOMES

4.1 Materials, Glassware, Equipments and Reagents

4.2 Experimental

4.2.1 Preparation of ACY Liposomes

4.2.2 Preparation of IDU Liposomes

4.3 Mathematical modelling of preparation of Liposomes

4.3.1 Mathematical modelling of preparation of ACY Liposomes by REV method

4.3.2 Mathematical modelling of preparation of IDU Liposomes by REV method

4.4 Characterization of prepared Liposomes

4.4.1 Acyclovir liposomes

4.4.2 Idoxuridine liposomes

4.5 Comparison

4.6 Stability studies of Liposomes

4.6.1 Acyclovir liposomes

4.6.1.1 Techniques of stability enhancement

4.6.2 Idoxuridine liposomes

4.6.2.1 Techniques of stability enhancement

4.7 Comparison of Stability Studies

4.8 Statistical Analysis of Data

4.9 Results and Discussion

4.9.1 Preparation of liposomes

4.9.2 Characterization of liposomes

4.9.3 Stability studies of liposomes

References