

CHITOSAN MICROSPHERES AND ULTRAFLEXIBLE LIPOSOMES AS INTRANASAL DELIVERY SYSTEMS OF VERAPAMIL HYDROCHLORIDE

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

" وَأَنْزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ
وَالْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُنْ
تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ
عَظِيمًا "

صدق الله العظيم

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Dedication

**I dedicate this thesis to my great
lovely Mother, Sisters, wife and
to the soul of my father.**

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List of Abbreviations

AUC	Area under the concentration– time curves
C.V.%	Percent coefficient of variation
C _{max}	Maximum serum drug concentration
DSC	Differential scanning calorimetry
EE%	Entrapment efficiency
F _{abs}	Absolute bioavailability
HLB	Hydrophilic-lipophilic balance
HPLC	High performance liquid chromatography
K	Elimination rate constant
K _a	Absorption rate constant
LC%	Loading capacity
MAT	Mean absorption time
MCC	Mucociliary Clearance
Nasal-MPs	Nasal VRP-loaded chitosan microspheres
NS	Intranasal solution
OS	Oral solution
PBS	Phosphate buffer saline
PC	Soybean Phosphatidylcholine
PEVs	Penetration enhancer vesicles
R ²	Coefficient of determination
S.D.	Standard deviation