List of Figures

,

List of Figures	
Figure 1: Immunoglobulin fragments: structure and function relationship	16
Figure 8: Cross regulation between Peripheral and Mucosal Systems	22
Figure 2: Secretory IgA	24
Figure 3: Common Mucosal system	25
Figure 4: Antigen acquired by different lymphatic tissues	28
Figure 5: Peyer's Patches	29
Figure 6: Mucosal Homeostasis	31
Figure 7: Recirculation of the lymphocytes	32
Figure 8: Clinical Manifestations of Tetanus	44
Figure 9: Structure of Tetanus Toxin (Tetanospasmin)	50
Figure 10: Tetanus toxin : Mode of action	51
Figure 11: Total tetanus global annual reported incidence and DTP3 coverage, 1980-2003	55
Figure 12: Neonatal tetanus Global annual incidence and TT2+ coverage, 1980-2003 and protection at Birth coverage for 2003 only.	56
Figure 13: Reported Neonatal Tetanus cases in year 1990 and year 2003: Impact of WHO vaccination coverage.	57
Figure 14: Corynebactrium diphtheriae bacterial colony	78
Figure 15: The Diphtheria Toxin (DT) Monomer	80
Figure 16: Uptake and activity of the diphtheria toxin in Eukaryotic cells	81
Figure 17: Diphtheria Global annual reported incidence and DTP3 coverage (1980-2003)	90
Figure 18: Immunization coverage with DTP3 vaccines in Infants, 2003	90
Figure 19: Chemical structure of N-acetyl glucosamine (A) and glucosamine (B)	97
Figure a20: Standard curve for molecular weight marker (A) HPLC profile (B) Calibration curve	142
Figure 20: Standard Curve for Tetanus Toxoid by RE	157

iv

Figure 21: Photograph of Gel showing standard curve for TT	157
Figure 22: Gel photographs of RE for additive compatibility study	161
Figure 23: Gel photographs of RE for additive compatibility study	162
Figure 24: Interaction between Chitosan (CS) and Tetanus Toxin (TT-green backbone) fragments.	164
Figure 25: Interaction between Chitosan (CS red color) and Diphtheria Toxin (DT) fragments.	165
Figure 26: Standard curve for the DC protein assay.	186
Figure 27: SDS-PAGE of TT (M- Molecular weight marker & 1 to 7- samples)	187
Figure 28 : SDS-PAGE of DT (M- Molecular weight marker & DT samples)	188
Figure 29: HPLC chromatogram of TT	189
Figure 30: HPLC chromatogram of DT	189
Figure 31: Standard curve for estimation of TT using HPLC	190
Figure 32 : Standard curve for estimation of DT using HPLC	1 91
Figure 33 : Standard curve for TT using ELISA	192
Figure 34: Standard curve for DT using ELISA	193
Figure 35: Isoelectric Focusing of TT	195
Figure 36: Isoelectric Focusing of DT	195
Figure 37: Effect of addition of STPP on pH and %T of the CS.	196
Figure 38: FTIR of Chitosan and Chitosan-STPP complex.	198
Figure 39: Effect of viscosity of reaction medium on the entrapment of TT	200
Figure 40: HPLC chromatogram of Plain Chitosan batch supernatant	205
Figure 41: HPLC chromatogram of CS and plain 40 Lf TT	205
Figure 42: Chromatogram of supernatant of CS-TT batch containing 8500Lf TT	206
Figure 43: Chromatogram of Std DT and supernatant of batches for determination of unentrapped DT	206
Figure 44: Particle size distribution curve for 26Plain, 27 TT and 28 DT	212
Figure 45: E-SEM of Batch 1W	213
	N

Figure 46: E-SEM of Batch 27TT	213
Figure 47: E-SEM of Batch 28DT	214
Figure 48: TEM of 27 TT Final formulation.	215
Figure 49: TEM of 28DT final formulation.	215
Figure 50: SDS-PAGE of processed samples of TT and DT.	216
Figure 51: HPLC chromatogram of sample of TT, processed using Emulsiflex C-5 and Silverson type homogenizer	218
Figure 52: HPLC chromatogram of sample of DT, processed using Emulsiflex C-5 and Silverson type homogenizer.	218
Figure 53: Rheological characterization of CS-TT final formulation	222
Figure 54: Sedimentation profile of Batch 26 Plain, 27TT and 28 DT.	222
Figure 55: Standard curve using Equine anti-TT IgG as standard.	224
Figure 56: Standard curve using Equine anti-DT IgG as standard.	226
Figure 57: Standard curve using anti-TT mice IgG as standard.	
Figure 58: Standard curve using anti-DT mice IgG as standard.	227
Figure 59: TT specific IgG titres on 22 nd day	228
Figure 60: DT specific IgG titres on 22nd day.	229
Figure 61: TT specific IgG titres.	232
Figure 62: DT specific IgG titres.	234
Figure 63: TT specific IgA levels in Intestinal Lavage	- 236
Figure 64: DT specific IgA levels in Intestinal Lavage.	237
Figure 65: TT specific IgA levels in Fecal Matter.	238
Figure 66: DT specific IgA levels in Fecal Matter	240
Photo 1: Symptoms of Tetanus	45
Photo 2: (a, b) Neonatal Tetanus	46
Photo 3: Clostridium tetani	48
Photo 4: Diphtheretic membrane	77