## List of Figures

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Figure No</th>
<th>Title</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1</td>
<td>Variation in drug plasmatic concentration with time following conventional administration and controlled release devices.</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>1.2</td>
<td>Schematic representation of membrane release systems.</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>1.3</td>
<td>Schematic representation of matrix release systems.</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>1.4</td>
<td>Schematic representation of degradable matrix systems.</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>Schematic representation of bioerodible crosslinked matrix.</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>1.6</td>
<td>Schematic representation of water insoluble/soluble matrix.</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>1.7</td>
<td>Schematic representation of bioerodible/biodegradable matrix.</td>
<td>17</td>
</tr>
<tr>
<td>8</td>
<td>1.8</td>
<td>Schematic representation of unilamellar liposomes.</td>
<td>21</td>
</tr>
<tr>
<td>9</td>
<td>1.9</td>
<td>Comparison of the structure of nanospheres and nanocapsules.</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>1.10</td>
<td>Schematic representation of dialysis procedure.</td>
<td>36</td>
</tr>
<tr>
<td>11</td>
<td>1.11</td>
<td>Schematic representation of diblock copolymer self assembly.</td>
<td>37</td>
</tr>
</tbody>
</table>
2.1 FTIR spectra of (A) lamotrigine (B) copolymeric nanoparticles and (C) lamotrigine loaded copolymeric nanoparticles.

2.2 Representative $^1$H NMR spectra of (A) EMA homopolymer and (B) EMA: HEMA (70:30) copolymer.

2.3 Fineman-Ross method.

2.4 Inverted Fineman-Ross method.

2.5 Kelan–Tudos method.

2.6 Tidwell-Mortimer nonlinear least square method.

2.7 Effect of copolymer composition on molecular weight distribution by GPC.

2.8 Particle size distribution of poly (EMA: HEMA) copolymeric nanoparticles by dynamic light scattering. (A) 90:10, (B) 80:20, (C) 70:30, (D) 60:40, and (E) 50:50 EMA: HEMA.

2.9 TEM images of copolymeric nanoparticles (A) 90:10 poly (EMA: HEMA), (B) 50:50 poly (EMA: HEMA) and (C) lamotrigine loaded 90:10 poly (EMA: HEMA)

2.10 UV spectra of (a) lamotrigine, (b) copolymeric nanoparticles and (c) lamotrigine loaded copolymeric
Equilibrium swelling study of copolymeric nanoparticles in 0.1 N HCl.
(O) 90:10 (EMA: HEMA), (□) 80:20 (EMA: HEMA),
(Δ) 70:30 (EMA: HEMA), (●) 60:40 (EMA: HEMA),
and (■) 50:50 (EMA: HEMA).

Percentage cumulative release pattern of lamotrigine through copolymer nanoparticles.
(O) 90:10 (EMA: HEMA), (□) 80:20 (EMA: HEMA),
(Δ) 70:30 (EMA: HEMA), (●) 60:40 (EMA: HEMA),
and (■) 50:50 (EMA: HEMA).

Percentage drug retention at (A) 2-8 °C and (B) 30 °C from copolymeric nanoparticles with time.
(O) 90:10 (EMA: HEMA), (□) 80:20 (EMA: HEMA),
(Δ) 70:30 (EMA: HEMA), (●) 60:40 (EMA: HEMA),
and (■) 50:50 (EMA: HEMA).

FTIR spectra of (A) poly (MMA-VCL) copolymer, (B) etoposide and (C) etoposide loaded copolymeric nanoparticles.

¹H NMR spectra of PMMA and poly (MMA-VCL) copolymer.

Fineman-Ross method.
3.4 Inverted Fineman-Ross method.

3.5 Tidwell-Mortimer nonlinear least square method.

3.6 Effect of copolymer composition on molecular weight distribution by GPC.

3.7 Effect of etoposide on molecular weight distribution of copolymer by GPC.

3.8 Percentage transmittance at 500 nm of aqueous solution containing a 0.1 mg/mL poly (MMA-co-VCL) solution at different temperatures. 
(o) 80:20 (MMA: VCL), (□) 60:40 (MMA: VCL),
(A) 40:60 (MMA: VCL).

3.9 DSC thermograms of (A) etoposide (B) lyophilized copolymeric nanoparticles, (C) physical mixture of etoposide and copolymeric nanoparticles and (D) etoposide loaded copolymeric nanoparticles.

3.10 X-ray diffraction patterns of (A) etoposide, (B) copolymer nanoparticles and (C) etoposide loaded copolymeric nanoparticles.

3.11 Representative DLS histogram of poly (MMA-co-VCL) copolymer systems (A) (90:10) MMA-co-VCL, (B) (80:20) MMA-co-VCL, (C) (70:30) MMA-co-VCL, (D) (60:40) MMA-co-VCL, (E) (50:50) MMA-co-VCL, (F) (40:60) MMA-co-VCL.
36 3.12 Representative DLS histogram of etoposide loaded copolymeric nanoparticles (A) PMMA, (B) 75:25 poly (MMA-co-VCL), (C) 50:50 poly (MMA-co-VCL) and (D) 25:75 poly (MMA-co-VCL).

37 3.13 TEM images of (A) (50:50) poly (MMA-co-VCL) and (B) etoposide loaded (50:50) poly (MMA-co-VCL) copolymer system.

38 3.14 UV spectra of (A) etoposide (B) copolymeric nanoparticles and (C1,4) etoposide loaded copolymeric nanoparticles.


40 3.16 Cytotoxicity profile of poly (MMA-co-VCL) nanoparticles of different compositions and SDS as a control, tested in B16F10 cell lines.

41 3.17 Cytotoxicity profile of etoposide loaded poly (MMA-co-VCL) nanoparticles of different compositions and etoposide as a control, tested in B16F10 cell lines.

42 4.1 Molecular structure of (A) venlafaxine hydrochloride, (B) sodium tripolyphosphate and (C) chitosan.
4.2 Effect of chitosan concentration on (■) particle size and (□) zeta potential at CS/TPP mass ratio 5:1 and pH = 5.

4.3 Effect of CS/TPP mass ratio on (■) particle size and (□) zeta potential at CS concentration = 1.5 mg/mL, TPP concentration = 0.5 mg/mL.

4.4 Effect of venlafaxine hydrochloride concentration on encapsulation efficiency (CS/TPP mass ratio 5:1, pH = 5).

4.5 Effect of venlafaxine hydrochloride concentration on (■) particle size and (□) zeta potential. (CS/TPP mass ratio 5:1, pH = 5).

4.6 Effect of chitosan concentration on encapsulation efficiency at CS/TPP mass ratio 5:1 and pH = 5.

4.7 Effect of CS/TPP mass ratio on encapsulation efficiency at chitosan and drug concentration 1.5 mg/mL and 0.6 mg/mL respectively at pH = 5.

4.8 Effect of PEG concentrations on (■) particle size and (□) zeta potential. (CS/TPP mass ratio = 5:1, venlafaxine hydrochloride concentration = 0.6 mg/mL at pH = 5).

4.9 Effect of PEG concentration on encapsulation efficiency of venlafaxine hydrochloride in CS/TPP nanoparticles. (CS/TPP mass ratio = 5:1, venlafaxine hydrochloride concentration = 0.6 mg/mL and pH = 5).
FTIR spectra of (A) CS/TPP nanoparticles, (B) chitosan, (C) venlafaxine hydrochloride loaded CS/TPP nanoparticles, (D) venlafaxine hydrochloride and (E) PEG coated CS/TPP nanoparticles.

DSC thermograms of (A) CS/TPP nanoparticles, (B) venlafaxine hydrochloride, (C) venlafaxine hydrochloride loaded CS/TPP nanoparticles, (D) physical mixture of venlafaxine hydrochloride and CS/TPP nanoparticles and (E) placebo PEG coated CS/TPP nanoparticles.

XRD patterns of (A) venlafaxine hydrochloride, (B) chitosan, (C) CS/TPP nanoparticles and (D) venlafaxine hydrochloride loaded CS/TPP nanoparticles.

XRD patterns of chitosan, PEG and PEG coated CS/TPP nanoparticles.

TEM images of (A) CS/TPP nanoparticles, (B) venlafaxine hydrochloride loaded CS/TPP nanoparticles and (C, D) PEG coated CS/TPP nanoparticles synthesized at CS/TPP mass ratio = 5:1, venlafaxine hydrochloride = 0.6 mg/ml, PEG = 30 mg/ml at pH = 5.

XPS analysis of CS, PEG, CS/TPP and PEG coated CS/TPP nanoparticles. (A) High resolution C (1S) photoelectron line showing carbon functionalities and...
relative composition in CS, PEG and PEG coated CS nanoparticles, (B) XPS Survey scan of CS/TPP nanoparticles and PEG coated CS/TPP nanoparticles.

4.16 In-vitro release profile of venlafaxine hydrochloride from CS/TPP nanoparticles.