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APPENDIX

Appendix A

Calibration Curve

The concentration versus absorbance of propranolol hydrochloride in methanol at 289nm, in water at 289nm, in 0.1 N HCL acid at 289nm and in phosphate buffer pH 6.8 at 289nm were present in table 4 - 7 and shown linear relationship with correlation coefficient 0.9996, 0.9999, 0.9998 and 0.9999, respectively. The standard curve of propranolol hydrochloride after regression analysis was illustrated in Figure 1-4.

Table 4 Absorbance of propranolol hydrochloride in methanol at 289nm.

Concentration ($\mu\text{g/ml}$)	Absorbance
0	0
10	0.202
20	0.408
30	0.610
40	0.812
50	1.040

Coefficient of determination = 0.9996 ; $y = 0.0207x - 0.0096$

(y = absorbance ; x = concentration)

Table 5 Absorbance of propranolol hydrochloride in water at 289nm.

Concentration ($\mu\text{g/ml}$)	Absorbance
0	0
10	0.184
20	0.366
30	0.554
40	0.740
50	0.922

Coefficient of determination = 0.9999 ; $y = 0.0184x - 0.0004$

($y = \text{absorbance}$; $x = \text{concentration}$)

Table 6 Absorbance of propranolol hydrochloride in 0.1N HCL acid at 289nm

Concentration ($\mu\text{g/ml}$)	Absorbance
0	0
10	0.210
20	0.418
30	0.631
40	0.843
50	1.070

Coefficient of determination = 0.9998 ; $y = 0.0213x - 0.0043$

($y = \text{absorbance}$; $x = \text{concentration}$)

Table 7 Absorbance of propranolol hydrochloride in phosphate buffer pH 6.8 at 289nm.

Concentration ($\mu\text{g/ml}$)	Absorbance
0	0
10	0.207
20	0.410
30	0.617
40	0.821
50	1.040

Coefficient of determination = 0.9999 ; $y = 0.0207x - 0.002$

(y = absorbance ; x = concentration)

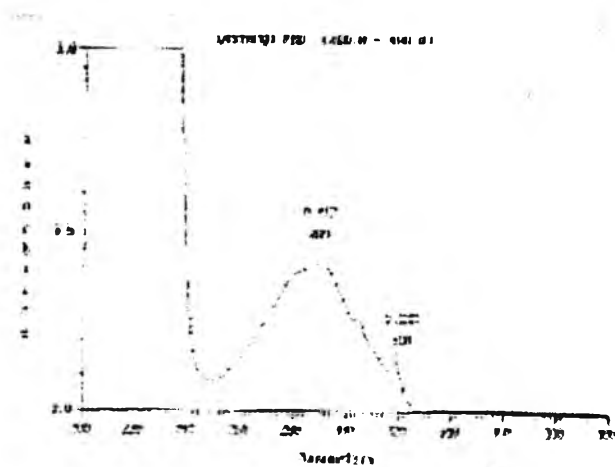


Figure 60 The representative maximum wavelength of propranolol hydrochloride in water.

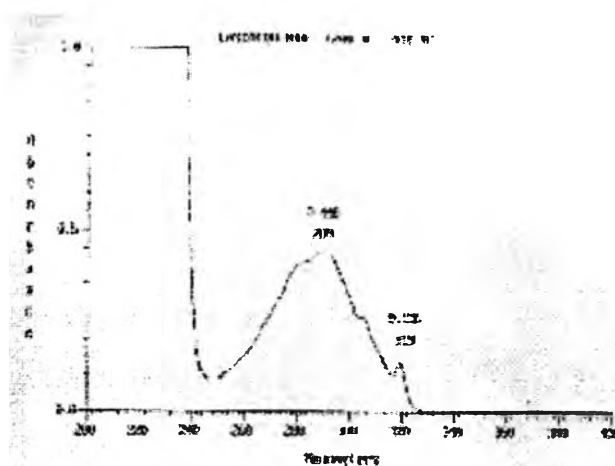


Figure 61 The representative maximum wavelength of propranolol hydrochloride in methanol.

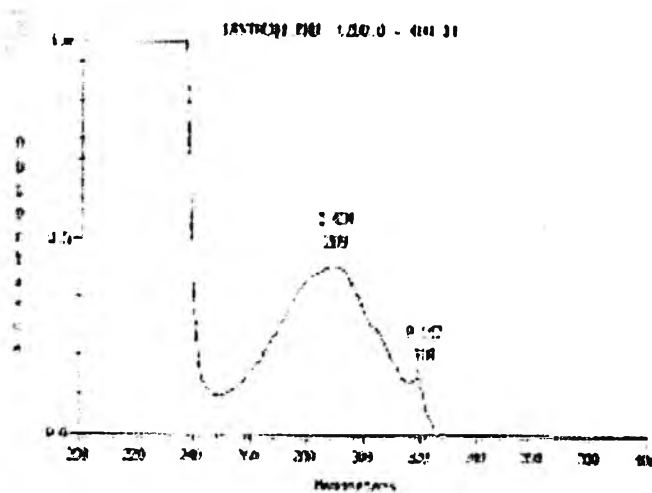


Figure 62 The representative maximum wavelength of propranolol hydrochloride in 0.1 N HCl.

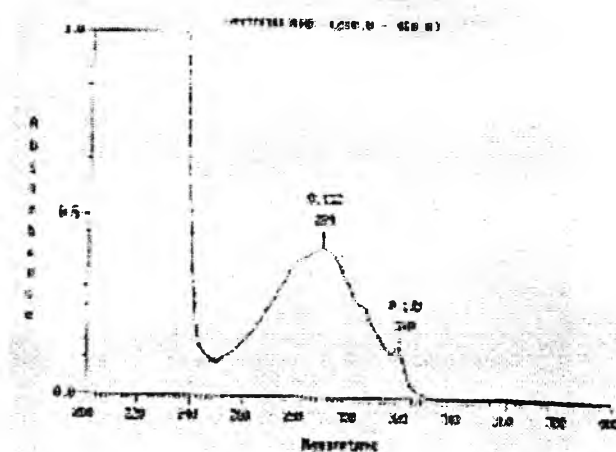


Figure 63 The representative maximum wavelength of propranolol hydrochloride in phosphate buffer pH 6.8.

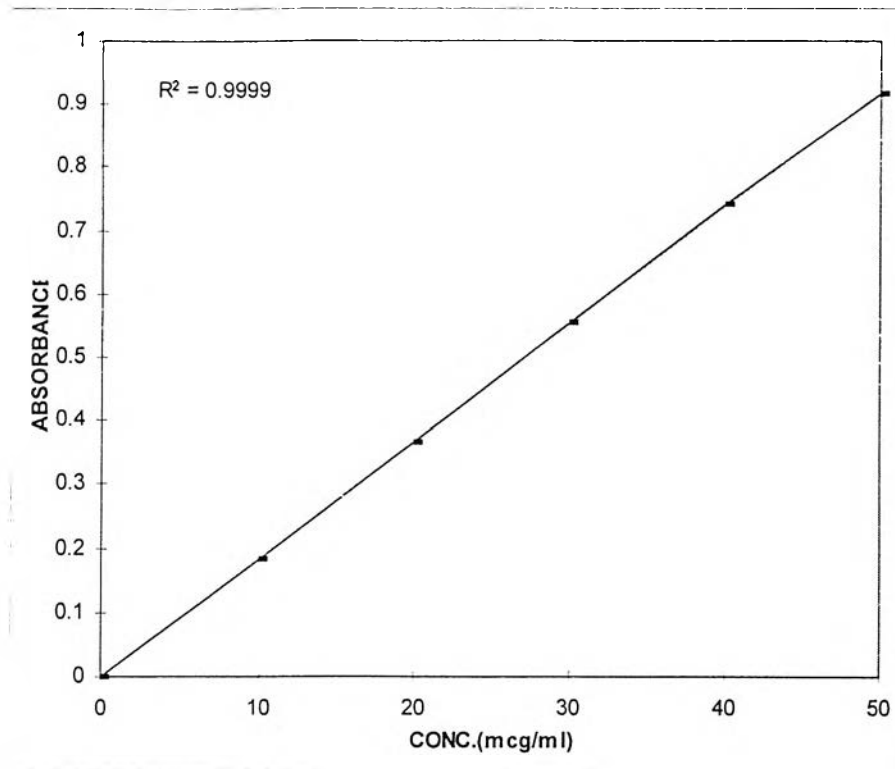


Figure 64 Calibration curve of propranolol hydrochloride in water.

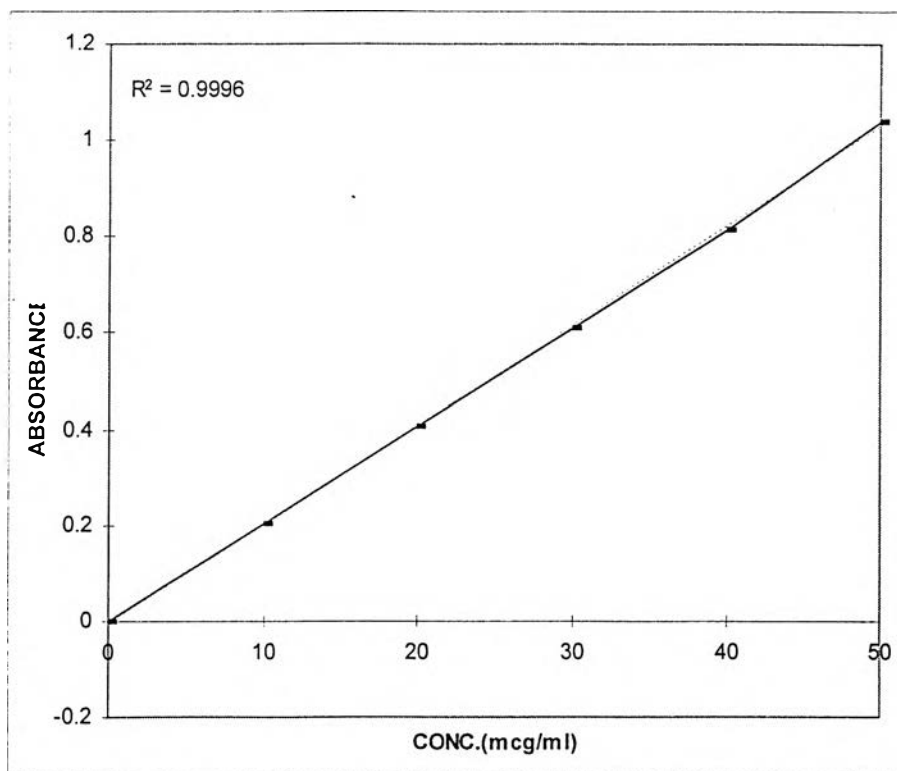


Figure 65 Calibration curve of propranolol hydrochloride in methanol.

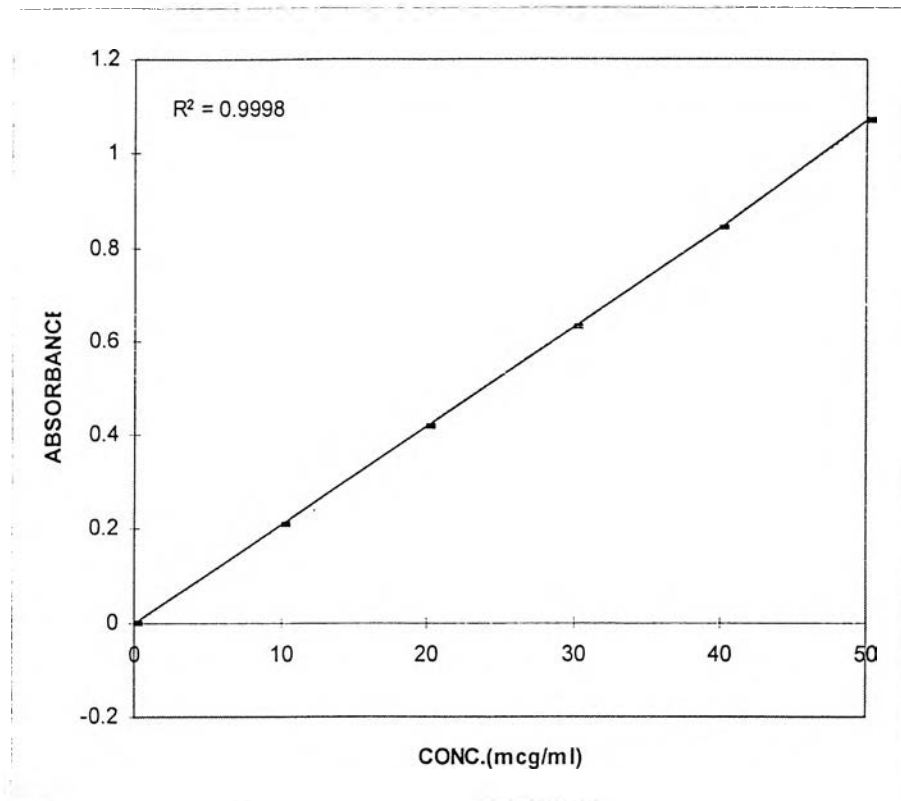


Figure 66 Calibration curve of propranolol hydrochloride in 0.1N HCl.

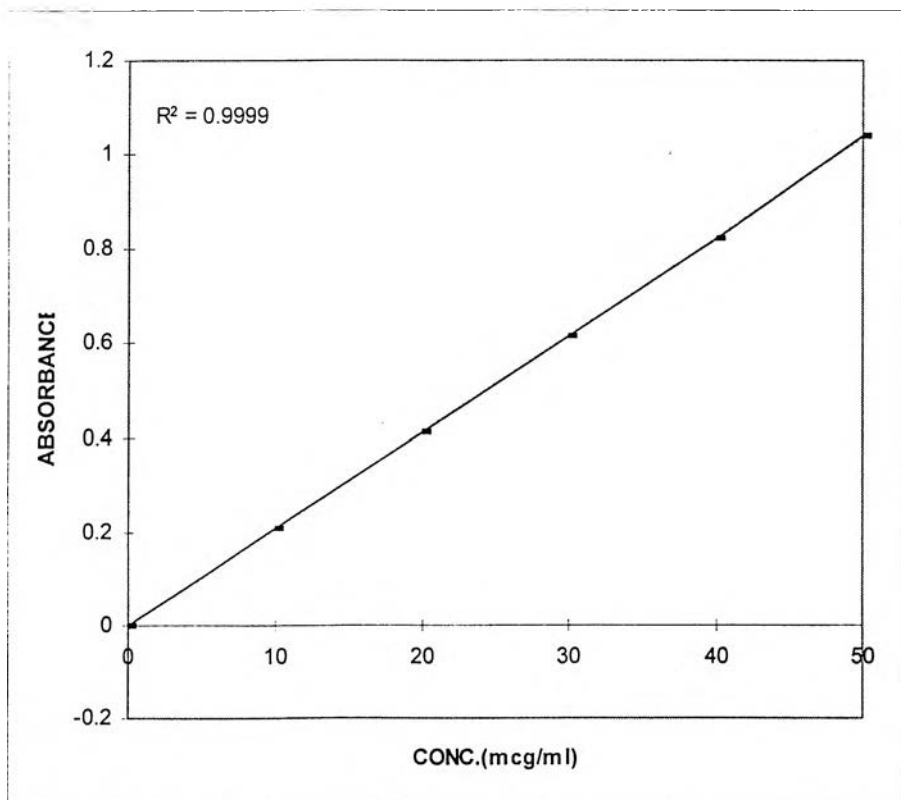


Figure 67 Calibration curve of propranolol hydrochloride in phosphate buffer pH 6.8.

Appendix B

Percentage of Drug Release

Table 8 Percent of drug released from core tablets

Time (minutes)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
15	0.36	0.31	0.35	0.34	0.025	85.20
30	0.37	0.38	0.36	0.37	0.007	92.57
45	0.37	0.37	0.36	0.37	0.006	91.90
60	0.36	0.37	0.36	0.36	0.007	91.24

Table 9 Percent of drug released from coated tablet coated with cellulose acetate(1liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.04	0.10	0.05	0.07	0.032	3.35
1	0.13	0.20	0.18	0.17	0.020	9.10
2	0.34	0.43	0.38	0.38	0.046	19.20
4	0.76	0.78	0.76	0.77	0.016	38.31
6	0.57	0.55	0.57	0.56	0.015	56.24

Table 10 Percent of drug released from coated tablet coated with cellulose acetate(2liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.02	0.01	0.02	0.00	0.75
1	0.07	0.07	0.02	0.06	0.03	2.75
2	0.32	0.38	0.22	0.31	0.08	15.30
4	0.38	0.33	0.33	0.34	0.03	17.21
6	0.57	0.59	0.56	0.57	0.02	57.21

Table 11 Percent of drug released from coated tablet coated with cellulose acetate(3liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0.02	0.02	0.02	0.02	0.001	0.75
4	0.05	0.02	0.02	0.03	0.019	1.75
6	0.05	0.02	0.03	0.03	0.017	1.55

Table 12 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 20% PEG 400(1liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.04	0.03	0.03	0.010	1.30
1	0.03	0.09	0.05	0.06	0.033	2.90
2	0.06	0.18	0.09	0.11	0.064	5.55
4	0.14	0.42	0.13	0.23	0.165	11.50
6	0.25	0.60	0.39	0.50	0.176	20.91

Table 13 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 20% PEG 400(2liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.02	0.01	0.01	0.002	0.70
1	0.03	0.01	0.02	0.02	0.007	1.00
2	0.02	0.02	0.03	0.02	0.004	1.05
4	0.02	0.03	0.03	0.02	0.006	1.23
6	0.02	0.06	0.03	0.04	0.020	1.75

Table 14 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 20% PEG 400(3liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.02	0.02	0.02	0.003	0.90
1	0.02	0.02	0.02	0.02	0.001	0.85
2	0.02	0.01	0.02	0.01	0.003	0.70
4	0.04	0.02	0.02	0.03	0.009	1.06
6	0.03	0.02	0.02	0.02	0.005	1.02

Table 15 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 40% PEG 400(1liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.16	0.08	0.11	0.12	0.037	5.75
1	0.32	0.17	0.22	0.23	0.076	11.59
2	0.65	0.45	0.49	0.53	0.105	26.46
4	0.53	0.40	0.41	0.45	0.069	44.52
6	0.70	0.56	0.61	0.62	0.072	62.45

Table 16 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 40% PEG 400(2liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.02	0.01	0.005	0.55
1	0.01	0.02	0.02	0.02	0.006	0.75
2	0.02	0.01	0.01	0.01	0.005	0.70
4	0.01	0.01	0.01	0.01	0.002	0.60
6	0.02	0.02	0.01	0.02	0.002	0.75

Table 17 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 40% PEG 400(3liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.01	0.01	0.002	0.55
1	0.01	0.02	0.01	0.01	0.002	0.75
2	0.01	0.01	0.01	0.01	0.003	0.70
4	0.02	0.01	0.01	0.02	0.005	0.60
6	0.01	0.01	0.02	0.01	0.006	0.75

Table 18 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 60% PEG 400(1liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.08	0.10	0.09	0.09	0.008	4.50
1	0.17	0.17	0.17	0.17	0.002	8.40
2	0.35	0.36	0.36	0.36	0.004	17.76
4	0.64	0.74	0.73	0.70	0.053	35.01
6	0.46	0.52	0.48	0.49	0.031	47.85

Table 19 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 60% PEG 400(2liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.03	0.02	0.009	0.75
1	0.02	0.01	0.03	0.02	0.010	1.10
2	0.02	0.02	0.04	0.03	0.011	1.09
4	0.03	0.02	0.05	0.03	0.014	1.65
6	0.02	0.02	0.04	0.03	0.012	1.35

Table 20 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 60% PEG 400(3liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.02	0.01	0.005	0.75
1	0.01	0.03	0.01	0.02	0.008	1.10
2	0.02	0.02	0.02	0.02	0.008	1.09
4	0.02	0.02	0.02	0.02	0.002	1.65
6	0.02	0.03	0.02	0.02	0.002	1.35

Table 21 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 20% DBP(2liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
4	0	0	0	0	0	0
6	0	0	0	0	0	0

Table 22 Percent of drug released from coated tablet coated with cellulose acetate plasticized with 40% DBP(2liter)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0	0	0	0	0	0
4	0	0	0	0	0	0
6	0	0	0	0	0	0

Table 23 Percent of drug released from osmotic devices coated with cellulose acetate (coating solution 3liter, film thickness 95mcm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.00	0.03	0.01	0.00	0.004	0.20
2	0.02	0.04	0.06	0.04	0.017	1.95
4	0.09	0.09	0.08	0.09	0.006	4.35
6	0.17	0.14	0.13	0.15	0.021	7.40
8	0.22	0.20	0.20	0.21	0.009	10.36
10	0.28	0.26	0.25	0.26	0.014	13.12
12	0.33	0.30	0.31	0.31	0.014	15.53
14	0.39	0.34	0.34	0.36	0.026	17.80
16	0.43	0.39	0.39	0.41	0.024	20.43
20	0.49	0.49	0.49	0.49	0.005	24.59
24	0.59	0.57	0.56	0.58	0.014	28.92

Table 24 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 (coating solution 2liter, film thickness 70mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.03	0.03	0.03	0.008	1.30
1	0.04	0.05	0.06	0.05	0.010	2.55
2	0.11	0.10	0.10	0.10	0.030	5.20
4	0.24	0.19	0.21	0.21	0.026	10.66
6	0.35	0.29	0.31	0.32	0.032	15.81
8	0.47	0.35	0.41	0.41	0.058	20.37
10	0.56	0.44	0.50	0.50	0.060	25.04
12	0.69	0.54	0.61	0.61	0.072	30.67
14	0.40	0.30	0.35	0.35	0.052	35.11
16	0.47	0.33	0.40	0.39	0.057	39.24
20	0.57	0.41	0.41	0.46	0.091	46.18
24	0.65	0.48	0.56	0.56	0.087	56.52

Table 25 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 (coating solution 3liter, film thickness 135mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.01	0.01	0.01	0.004	0.60
1	0.07	0.04	0.03	0.05	0.024	2.30
2	0.08	0.07	0.03	0.06	0.024	3.00
4	0.10	0.13	0.09	0.11	0.022	5.30
6	0.17	0.21	0.19	0.19	0.018	9.46
8	0.26	0.27	0.16	0.23	0.059	13.27
10	0.35	0.33	0.35	0.34	0.009	17.13
12	0.43	0.39	0.44	0.42	0.026	21.05
14	0.54	0.46	0.51	0.50	0.042	25.13
16	0.57	0.54	0.56	0.56	0.015	27.88
20	0.75	0.69	0.72	0.72	0.033	36.13
24	0.88	0.77	0.81	0.82	0.055	41.21

Table 26 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 40% PEG 400 (coating solution 2liter, film thickness 145mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.08	0.05	0.06	0.06	0.014	3.15
1	0.12	0.06	0.09	0.09	0.033	4.50
2	0.27	0.17	0.21	0.22	0.500	10.79
4	0.51	0.37	0.49	0.45	0.077	22.65
6	0.76	0.59	0.72	0.69	0.085	34.48
8	0.50	0.36	0.48	0.45	0.077	44.76
10	0.59	0.46	0.57	0.54	0.071	54.00
12	0.66	0.57	0.69	0.64	0.064	64.07
14	0.77	0.62	0.73	0.71	0.075	70.90
16	0.80	0.67	0.78	0.75	0.067	75.36
20	0.34	0.32	0.34	0.33	0.013	83.35
24	0.36	0.31	0.35	0.34	0.025	85.67

Table 27 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 40% PEG 400 (coating solution 3liter, film thickness 160mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.03	0.03	0.04	0.03	0.005	1.45
1	0.06	0.05	0.07	0.06	0.008	2.92
2	0.15	0.15	0.15	0.15	0.004	7.45
4	0.39	0.36	0.33	0.37	0.018	18.15
6	0.58	0.54	0.52	0.55	0.031	27.37
8	0.76	0.69	0.66	0.70	0.050	35.15
10	0.48	0.45	0.39	0.44	0.045	43.78
12	0.58	0.52	0.50	0.53	0.042	53.43
14	0.66	0.58	0.56	0.60	0.057	60.08
16	0.71	0.67	0.61	0.66	0.049	66.55
20	0.34	0.30	0.29	0.31	0.027	77.56
24	0.36	0.32	0.31	0.33	0.025	82.39

Table 28 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 (coating solution 2liter, film thickness 160mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.09	0.11	0.05	0.08	0.034	4.42
1	0.18	0.21	0.10	0.16	0.057	8.15
2	0.47	0.55	0.29	0.44	0.137	21.86
4	0.44	0.44	0.28	0.39	0.092	38.62
6	0.61	0.62	0.44	0.56	0.101	55.76
8	0.74	0.78	0.58	0.70	0.106	69.91
10	0.34	0.34	0.27	0.32	0.039	79.17
12	0.35	0.36	0.30	0.34	0.034	84.51
14	0.37	0.36	0.32	0.36	0.029	87.86
16	0.36	0.36	0.35	0.36	0.004	89.97
20	0.38	0.36	0.37	0.37	0.004	92.74
24	0.38	0.37	0.37	0.37	0.005	93.83

Table 29 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 (coating solution 3liter, film thickness 230mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.05	0.04	0.05	0.05	0.034	2.40
1	0.13	0.12	0.13	0.13	0.057	6.35
2	0.35	0.49	0.35	0.40	0.137	19.95
4	0.75	0.79	0.75	0.75	0.092	37.72
6	0.53	0.51	0.53	0.52	0.101	51.94
8	0.66	0.66	0.66	0.66	0.106	66.40
10	0.75	0.71	0.78	0.75	0.035	74.66
12	0.33	0.27	0.36	0.32	0.048	80.75
14	0.34	0.31	0.36	0.34	0.029	85.09
16	0.34	0.35	0.36	0.35	0.012	87.95
20	0.36	0.35	0.37	0.36	0.012	90.02
24	0.36	0.36	0.37	0.36	0.002	91.12

Table 30 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20%DBP

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0.01	0.01	0.02	0.01	0.006	0.60
4	0.01	0.02	0.02	0.02	0.004	0.85
6	0.02	0.02	0.02	0.02	0.006	1.00
8	0.05	0.03	0.02	0.03	0.014	2.55
10	0.08	0.04	0.02	0.05	0.027	22.30
12	0.06	0.02	0.06	0.05	0.023	2.36
14	0.08	0.01	0.08	0.06	0.038	2.91
16	0.11	0.01	0.11	0.08	0.056	3.90
20	0.14	0.03	0.15	0.11	0.066	5.31
24	0.24	0.06	0.25	0.18	0.104	9.12

Table 31 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 40%DBP

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0	0	0	0	0	0
2	0.01	0.02	0.01	0.01	0.005	0.25
4	0.01	0.01	0.01	0.01	0.002	0.40
6	0.01	0.01	0.01	0.01	0.002	0.55
8	0.01	0.02	0.02	0.02	0.003	0.80
10	0.01	0.02	0.02	0.02	0.005	0.90
12	0.03	0.03	0.04	0.03	0.008	1.65
14	0.05	0.03	0.04	0.04	0.014	2.05
16	0.08	0.04	0.06	0.06	0.022	2.96
20	0.15	0.06	0.10	0.10	0.049	5.16
24	0.39	0.09	0.21	0.23	0.152	11.46

Table 32 Percent of drug released from osmotic devices coated with cellulose acetate film containing 20% DBP and 20% PEG 4000

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.02	0.02	0.02	0.001	0.66
1	0.03	0.02	0.04	0.03	0.011	1.27
2	0.09	0.05	0.12	0.09	0.033	3.72
4	0.32	0.16	0.39	0.30	0.096	13.14
6	0.06	0.36	0.68	0.54	0.159	23.44
8	0.44	0.31	0.47	0.41	0.084	35.85
10	0.55	0.40	0.61	0.52	0.105	46.40
12	0.65	0.51	0.73	0.63	0.112	55.20
14	0.75	0.59	0.81	0.72	0.110	62.96
16	0.32	0.25	0.33	0.30	0.041	65.92
20	0.35	0.28	0.33	0.32	0.035	70.59
24	0.32	0.31	0.35	0.34	0.025	73.95

Table 33 Percent of drug released from osmotic devices coated with cellulose acetate film containing 20% DBP and 40% PEG 4000

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.06	0.07	0.07	0.07	0.006	3.02
1	0.22	0.29	0.27	0.26	0.037	11.47
2	0.66	0.80	0.74	0.73	0.074	32.10
4	0.58	0.67	0.66	0.64	0.047	55.81
6	0.27	0.33	0.33	0.31	0.038	68.41
8	0.31	0.34	0.35	0.33	0.023	73.30
10	0.32	0.35	0.36	0.34	0.021	75.35
12	0.31	0.33	0.34	0.33	0.014	71.45
14	0.30	0.32	0.34	0.32	0.018	70.20
16	0.30	0.31	0.32	0.31	0.011	70.70
20	0.30	0.31	0.32	0.31	0.010	70.70
24	0.30	0.31	0.32	0.31	0.010	70.70

Table 34 Percent of drug released from osmotic devices coated with cellulose acetate film containing 20% DBP and 60% PEG 4000

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.18	0.23	0.22	0.21	0.027	9.15
1	0.58	0.62	0.60	0.60	0.022	26.13
2	0.55	0.61	0.57	0.58	0.030	50.46
4	0.30	0.32	0.22	0.31	0.015	68.59
6	0.34	0.35	0.34	0.35	0.005	75.89
8	0.36	0.36	0.36	0.36	0.003	78.82
10	0.36	0.36	0.35	0.36	0.004	78.44
12	0.36	0.36	0.36	0.36	0.000	78.27
14	0.36	0.36	0.35	0.35	0.002	77.93
16	0.36	0.36	0.35	0.35	0.000	77.93
20	0.36	0.36	0.35	0.35	0.000	77.93
24	0.36	0.36	0.35	0.35	0.000	77.93

Table 35 Percent of drug released from osmotic devices coated with cellulose acetate film with a 700microm passageway

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.01	0.02	0.02	0.02	0.003	0.85
2	0.03	0.04	0.05	0.04	0.007	1.95
4	0.07	0.09	0.10	0.09	0.015	4.45
6	0.12	0.13	0.16	0.14	0.018	6.80
8	0.12	0.20	0.21	0.19	0.030	9.41
10	0.20	0.25	0.27	0.24	0.036	12.07
12	0.25	0.31	0.35	0.30	0.053	15.33
14	0.32	0.39	0.42	0.38	0.050	18.84
16	0.36	0.42	0.45	0.41	0.045	20.56
20	0.42	0.50	0.56	0.49	0.077	24.78
24	0.54	0.62	0.69	0.61	0.072	36.80

Table 36 Percent of drug released from osmotic devices coated with cellulose acetate film with a 1000µm passageway

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.03	0.03	0.02	0.03	0.006	1.40
2	0.07	0.06	0.04	0.05	0.014	2.70
4	0.12	0.10	0.10	0.11	0.012	5.25
6	0.13	0.17	0.17	0.16	0.026	7.81
8	0.19	0.21	0.22	0.20	0.015	10.16
10	0.22	0.28	0.25	0.25	0.032	12.47
12	0.32	0.30	0.27	0.30	0.033	15.18
14	0.38	0.36	0.30	0.35	0.040	17.35
16	0.41	0.41	0.36	0.39	0.032	19.76
20	0.42	0.51	0.44	0.49	0.042	24.63
24	0.62	0.61	0.59	0.61	0.015	30.35

Table 37 Percent of drug released from osmotic devices coated with cellulose acetate film with a 1500µm passageway

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.02	0.05	0.05	0.04	0.014	2.00
2	0.05	0.07	0.08	0.07	0.018	3.40
4	0.12	0.13	0.14	0.13	0.013	6.50
6	0.19	0.20	0.17	0.19	0.016	9.36
8	0.24	0.25	0.23	0.24	0.012	11.82
10	0.29	0.27	0.29	0.28	0.011	13.98
12	0.32	0.35	0.37	0.33	0.026	16.96
14	0.38	0.39	0.37	0.38	0.013	19.11
16	0.42	0.41	0.41	0.41	0.005	20.72
20	0.50	0.54	0.53	0.52	0.012	26.14
24	0.67	0.63	0.63	0.64	0.022	32.07

Table 38 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 700µm passageway (film thickness 70µm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.04	0.04	0.04	0.04	0.002	1.95
1	0.07	0.06	0.10	0.08	0.018	3.82
2	0.15	0.10	0.13	0.13	0.022	6.35
4	0.26	0.23	0.27	0.25	0.021	12.66
6	0.34	0.32	0.35	0.33	0.012	16.72
8	0.47	0.43	0.49	0.46	0.027	23.08
10	0.34	0.53	0.59	0.55	0.033	27.76
12	0.65	0.62	0.69	0.65	0.039	32.78
14	0.75	0.67	0.81	0.74	0.074	37.27
16	0.80	0.77	0.85	0.81	0.039	40.41
20	0.48	0.45	0.52	0.48	0.038	48.21
24	0.58	0.55	0.63	0.58	0.039	58.55

Table 39 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 1000µm passageway (film thickness 70µm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.29	0.05	0.05	0.05	0.006	1.15
1	0.06	0.10	0.12	0.11	0.007	2.64
2	0.25	0.20	0.23	0.23	0.013	5.55
4	0.41	0.28	0.35	0.35	0.026	11.25
6	0.55	0.36	0.41	0.44	0.063	17.31
8	0.65	0.47	0.55	0.56	0.101	22.13
10	0.76	0.58	0.65	0.66	0.091	27.95
12	0.46	0.33	0.37	0.39	0.090	33.13
14	0.50	0.36	0.43	0.43	0.066	38.82
16	0.60	0.43	0.50	0.51	0.085	43.06
20	0.73	0.54	0.61	0.63	0.095	50.90
24	0.65	0.48	0.56	0.56	0.087	62.85

Table 40 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 1500µm passageway (film thickness 70µm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.02	0.01	0.004	0.55
1	0.07	0.07	0.09	0.07	0.021	3.65
2	0.12	0.14	0.15	0.13	0.016	6.69
4	0.24	0.28	0.29	0.27	0.025	13.35
6	0.35	0.36	0.37	0.36	0.010	18.06
8	0.43	0.46	0.47	0.45	0.020	22.68
10	0.55	0.56	0.58	0.56	0.017	28.21
12	0.67	0.69	0.68	0.68	0.008	34.08
14	0.37	0.40	0.41	0.39	0.022	39.00
16	0.41	0.43	0.45	0.43	0.018	43.14
20	0.51	0.53	0.53	0.52	0.010	52.49
24	0.61	0.63	0.65	0.63	0.020	63.12

Table 41 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 700µm passageway (film thickness 160µm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.09	0.07	0.08	0.08	0.007	4.00
1	0.23	0.25	0.21	0.23	0.019	11.30
2	0.42	0.41	0.43	0.42	0.012	20.93
4	0.45	0.43	0.47	0.45	0.021	45.22
6	0.62	0.36	0.67	0.65	0.025	65.15
8	0.75	0.72	0.78	0.75	0.032	75.42
10	0.34	0.32	0.35	0.34	0.016	84.45
12	0.35	0.35	0.35	0.35	0.003	87.55
14	0.37	0.37	0.36	0.37	0.007	91.89
16	0.37	0.38	0.36	0.37	0.006	92.99
20	0.38	0.37	0.38	0.38	0.004	94.34
24	0.39	0.39	0.38	0.39	0.006	97.20

Table 42 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 1000µm passageway (film thickness 160µm)

Time (hours)	OD 290µm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.07	0.06	0.07	0.07	0.009	3.35
1	0.21	0.20	0.19	0.20	0.013	9.90
2	0.39	0.39	0.38	0.39	0.010	19.30
4	0.45	0.45	0.45	0.45	0.003	45.11
6	0.60	0.57	0.61	0.59	0.021	56.26
8	0.72	0.70	0.75	0.72	0.024	72.51
10	0.34	0.33	0.35	0.34	0.011	84.44
12	0.38	0.36	0.37	0.37	0.007	92.53
14	0.38	0.37	0.39	0.38	0.012	94.88
16	0.38	0.38	0.39	0.38	0.005	95.48
20	0.39	0.38	0.39	0.39	0.006	96.84
24	0.39	0.39	0.40	0.39	0.005	100.20

Table 43 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 1500µm passageway (film thickness 160µm)

Time (hours)	OD 290µm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.10	0.09	0.09	0.09	0.007	4.60
1	0.20	0.21	0.22	0.21	0.001	10.55
2	0.46	0.44	0.45	0.45	0.011	22.41
4	0.50	0.48	0.48	0.48	0.013	48.42
6	0.61	0.61	0.63	0.62	0.011	61.66
8	0.74	0.72	0.73	0.73	0.006	75.99
10	0.33	0.33	0.33	0.33	0.003	82.00
12	0.37	0.38	0.37	0.37	0.007	93.99
14	0.38	0.38	0.37	0.38	0.006	94.89
16	0.38	0.39	0.38	0.38	0.005	96.46
20	0.39	0.39	0.39	0.39	0.006	98.35
24	0.39	0.40	0.39	0.40	0.004	99.48

Table 44 Percent of drug released from osmotic devices coated with cellulose acetate with a 400µm passageway (using rotating basket apparatus at 50rpm).

Time (hours)	OD 290µm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.01	0.00	0.00	0.00	0.020	0.15
2	0.03	0.10	0.05	0.03	0.022	1.55
4	0.10	0.09	0.11	0.10	0.009	4.95
6	0.16	0.15	0.15	0.15	0.009	7.69
8	0.22	0.23	0.23	0.23	0.017	11.71
10	0.27	0.25	0.28	0.27	0.014	13.27
12	0.33	0.32	0.31	0.32	0.008	16.04
14	0.38	0.40	0.36	0.38	0.016	18.95
16	0.43	0.42	0.45	0.43	0.016	21.61
20	0.51	0.49	0.53	0.51	0.020	25.49
24	0.60	0.58	0.62	0.60	0.018	30.12

Table 45 Percent of drug released from osmotic devices coated with cellulose acetate with a 400mcm passageway (using rotating basket apparatus at 150rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.00	0.00	0.01	0.00	0.004	0.20
2	0.04	0.04	0.03	0.03	0.008	1.70
4	0.10	0.12	0.08	0.10	0.021	4.90
6	0.17	0.19	0.15	0.17	0.018	8.42
8	0.24	0.25	0.24	0.24	0.008	12.17
10	0.27	0.31	0.29	0.29	0.008	14.32
12	0.33	0.35	0.34	0.34	0.020	17.09
14	0.39	0.41	0.39	0.40	0.013	18.50
16	0.44	0.47	0.42	0.44	0.022	22.07
20	0.50	0.51	0.50	0.50	0.007	25.29
24	0.55	0.58	0.57	0.57	0.018	28.47

Table 46 Percent of drug released from osmotic devices coated with cellulose acetate with a 1500mcm passageway (using rotating basket apparatus at 50rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.00	0.00	0.00	0.00	0.001	0.15
2	0.03	0.04	0.04	0.04	0.004	1.75
4	0.08	0.10	0.08	0.09	0.011	4.25
6	0.13	0.13	0.15	0.13	0.010	6.71
8	0.22	0.23	0.24	0.23	0.014	11.56
10	0.27	0.26	0.28	0.27	0.012	13.42
12	0.34	0.30	0.34	0.33	0.024	16.34
14	0.40	0.35	0.37	0.34	0.017	17.05
16	0.43	0.40	0.42	0.42	0.018	20.82
20	0.50	0.49	0.50	0.49	0.006	24.30
24	0.58	0.59	0.59	0.59	0.006	29.47

Table 47 Percent of drug released from osmotic devices coated with cellulose acetate with a 1500mcm passageway (using rotating basket apparatus at 150rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.01	0.00	0.00	0.00	0.003	0.15
2	0.03	0.03	0.07	0.04	0.025	2.15
4	0.09	0.09	0.11	0.10	0.011	4.79
6	0.14	0.14	0.14	0.14	0.040	6.95
8	0.21	0.21	0.24	0.22	0.019	11.06
10	0.28	0.24	0.27	0.26	0.021	13.12
12	0.34	0.28	0.32	0.33	0.051	16.27
14	0.39	0.34	0.40	0.38	0.029	18.85
16	0.45	0.39	0.49	0.44	0.047	22.22
20	0.51	0.41	0.52	0.48	0.062	24.09
24	0.61	0.58	0.62	0.60	0.018	30.32

Table 48 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 400mcm passageway (using rotating basket apparatus at 50rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.01	0.04	0.02	0.016	1.05
1	0.03	0.05	0.07	0.05	0.018	2.50
2	0.11	0.10	0.11	0.11	0.006	5.25
4	0.23	0.20	0.24	0.22	0.024	11.05
6	0.37	0.29	0.31	0.32	0.039	16.06
8	0.46	0.35	0.41	0.41	0.051	20.32
10	0.57	0.44	0.50	0.50	0.069	25.19
12	0.68	0.56	0.60	0.61	0.059	30.66
14	0.39	0.30	0.37	0.35	0.047	35.39
16	0.45	0.35	0.38	0.39	0.056	39.23
20	0.58	0.39	0.41	0.46	0.103	46.06
24	0.63	0.50	0.57	0.57	0.069	56.81

Table 49 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 400mcm passageway (using rotating basket apparatus at 150rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.02	0.03	0.02	0.007	1.20
1	0.04	0.05	0.06	0.05	0.013	2.45
2	0.12	0.11	0.11	0.11	0.006	5.45
4	0.24	0.19	0.22	0.16	0.060	8.11
6	0.35	0.29	0.31	0.32	0.029	15.81
8	0.46	0.36	0.41	0.41	0.054	20.47
10	0.57	0.43	0.50	0.50	0.069	24.40
12	0.68	0.55	0.32	0.61	0.041	30.77
14	0.39	0.31	0.37	0.36	0.054	35.79
16	0.45	0.35	0.40	0.40	0.092	39.92
20	0.58	0.41	0.43	0.47	0.073	47.46
24	0.65	0.50	0.58	0.58	0.064	57.80

Table 50 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 1500mcm passageway (using rotating basket apparatus at 50rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.02	0.01	0.006	0.50
1	0.05	0.06	0.08	0.06	0.012	3.20
2	0.12	0.11	0.14	0.12	0.014	6.10
4	0.22	0.24	0.24	0.23	0.012	11.64
6	0.30	0.31	0.34	0.32	0.023	15.86
8	0.41	0.43	0.46	0.43	0.023	21.68
10	0.53	0.54	0.55	0.54	0.012	27.09
12	0.61	0.62	0.63	0.62	0.011	31.22
14	0.35	0.35	0.37	0.36	0.010	35.60
16	0.40	0.43	0.44	0.42	0.020	42.53
20	0.49	0.49	0.52	0.50	0.016	50.07
24	0.60	0.58	0.52	0.57	0.039	57.02

Table 51 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 1500µm passageway (using rotating basket apparatus at 150rpm)

Time (hours)	OD 290µm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.01	0.01	0.02	0.01	0.007	0.70
1	0.05	0.03	0.07	0.05	0.022	2.65
2	0.14	0.11	0.15	0.13	0.019	6.65
4	0.25	0.24	0.28	0.26	0.019	12.90
6	0.37	0.39	0.43	0.37	0.027	19.91
8	0.45	0.47	0.50	0.48	0.022	23.78
10	0.58	0.59	0.60	0.59	0.012	29.50
12	0.65	0.69	0.72	0.69	0.037	34.53
14	0.37	0.41	0.43	0.40	0.028	40.42
16	0.42	0.46	0.48	0.45	0.030	45.55
20	0.52	0.54	0.57	0.54	0.022	54.59
24	0.62	0.65	0.67	0.65	0.029	65.04

Table 52 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 400µm passageway (using rotating basket apparatus at 50rpm)

Time (hours)	OD 290µm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.08	0.07	0.07	0.01	0.008	3.95
1	0.22	0.17	0.16	0.14	0.033	9.10
2	0.42	0.36	0.38	0.39	0.031	19.40
4	0.43	0.40	0.38	0.41	0.025	40.61
6	0.60	0.52	0.59	0.57	0.043	56.85
8	0.73	0.68	0.73	0.72	0.031	71.61
10	0.34	0.32	0.34	0.33	0.014	82.93
12	0.36	0.35	0.37	0.36	0.010	90.77
14	0.35	0.37	0.37	0.36	0.010	90.62
16	0.36	0.38	0.37	0.37	0.009	92.72
20	0.37	0.37	0.37	0.37	0.006	92.82
24	0.38	0.39	0.39	0.39	0.005	97.76

Table 53 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 400µm passageway (using rotating basket apparatus at 150rpm)

Time (hours)	OD 290µm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.10	0.05	0.22	0.09	0.038	4.65
1	0.22	0.14	0.28	0.21	0.071	10.55
2	0.47	0.29	0.55	0.44	0.133	21.82
4	0.47	0.32	0.53	0.44	0.106	43.92
6	0.65	0.48	0.69	0.61	0.113	60.66
8	0.81	0.60	0.80	0.74	0.114	73.62
10	0.35	0.29	0.35	0.33	0.037	82.45
12	0.36	0.32	0.36	0.35	0.028	87.29
14	0.37	0.32	0.37	0.36	0.027	89.38
16	0.37	0.33	0.37	0.36	0.021	90.23
20	0.36	0.34	0.37	0.36	0.012	89.46
24	0.36	0.35	0.39	0.37	0.019	92.18

Table 54 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 1500µm passageway (using rotating basket apparatus at 50rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.10	0.04	0.08	0.09	0.009	4.45
1	0.21	0.09	0.20	0.21	0.016	10.55
2	0.44	0.23	0.41	0.40	0.046	20.16
4	0.86	0.25	0.75	0.79	0.062	39.42
6	0.69	0.76	0.55	0.62	0.069	61.65
8	0.76	0.61	0.67	0.73	0.053	73.11
10	0.34	0.76	0.31	0.33	0.020	81.94
12	0.37	0.33	0.34	0.36	0.017	90.03
14	0.36	0.37	0.35	0.36	0.014	91.13
16	0.36	0.38	0.36	0.37	0.013	92.73
20	0.37	0.38	0.36	0.38	0.019	94.83
24	0.38	0.40	0.37	0.38	0.018	96.10

Table 55 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 1500µm passageway (using rotating basket apparatus at 150rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.10	0.08	0.12	0.10	0.017	4.95
1	0.21	0.21	0.27	0.23	0.036	11.45
2	0.44	0.45	0.54	0.48	0.058	23.81
4	0.84	0.77	0.97	0.86	0.102	43.17
6	0.60	0.57	0.71	0.63	0.076	62.58
8	0.73	0.71	0.82	0.75	0.060	75.31
10	0.33	0.39	0.37	0.36	0.029	90.20
12	0.37	0.37	0.37	0.37	0.001	93.05
14	0.38	0.38	0.39	0.38	0.006	95.40
16	0.38	0.39	0.39	0.32	0.008	96.75
20	0.39	0.39	0.40	0.39	0.003	98.86
24	0.39	0.40	0.40	0.40	0.003	99.97

Table 56 Percent of drug released from osmotic devices coated with cellulose acetate with a 400 µm passageway (using rotating paddle apparatus at 100rpm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.01	0.00	0.00	0.00	0.002	0.20
2	0.03	0.02	0.02	0.02	0.005	0.95
4	0.12	0.13	0.14	0.13	0.012	6.40
6	0.18	0.22	0.21	0.21	0.022	10.26
8	0.22	0.25	0.24	0.23	0.015	11.72
10	0.28	0.31	0.35	0.31	0.032	15.72
12	0.34	0.37	0.40	0.37	0.030	18.44
14	0.40	0.40	0.41	0.40	0.008	20.16
16	0.42	0.42	0.44	0.43	0.014	21.43
20	0.49	0.51	0.57	0.52	0.045	26.25
24	0.61	0.60	0.64	0.62	0.024	31.03

Table 57 Percent of drug released from osmotic devices coated with cellulose acetate with a 1500µm passageway (using rotating paddle apparatus at 100rpm)

Time (hours)	OD 290µm			Mean	SD	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.00	0.01	0.00	0.01	0.003	0.25
2	0.03	0.02	0.01	0.01	0.008	1.00
4	0.10	0.08	0.07	0.08	0.019	4.18
6	0.18	0.19	0.15	0.16	0.017	8.20
8	0.27	0.21	0.23	0.25	0.017	12.30
10	0.31	0.27	0.27	0.28	0.023	14.17
12	0.34	0.31	0.31	0.32	0.019	16.04
14	0.41	0.38	0.38	0.39	0.019	18.06
16	0.46	0.41	0.42	0.43	0.029	21.61
20	0.52	0.50	0.51	0.51	0.011	25.49
24	0.66	0.64	0.63	0.64	0.014	32.17

Table 58 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 400µm passageway (using rotating paddle apparatus at 100rpm)

Time (hours)	OD 290µm			Mean	SD	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.04	0.03	0.03	0.03	0.007	1.65
1	0.08	0.08	0.06	0.08	0.011	3.75
2	0.15	0.13	0.15	0.14	0.011	7.15
4	0.26	0.27	0.28	0.27	0.014	13.45
6	0.36	0.37	0.34	0.35	0.012	17.72
8	0.46	0.48	0.45	0.46	0.012	23.11
10	0.49	0.53	0.55	0.52	0.029	26.08
12	0.60	0.62	0.65	0.62	0.028	31.16
14	0.71	0.77	0.80	0.76	0.043	37.98
16	0.81	0.87	0.92	0.87	0.057	43.57
20	0.48	0.51	0.52	0.50	0.021	50.16
24	0.58	0.60	0.62	0.60	0.017	60.20

Table 59 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with a 1500µm passageway (using rotating paddle apparatus at 100rpm)

Time (hours)	OD 290µm			Mean	SD	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.05	0.03	0.01	0.03	0.019	1.45
1	0.10	0.09	0.06	0.08	0.019	4.05
2	0.17	0.16	0.14	0.16	0.014	7.28
4	0.31	0.28	0.27	0.28	0.021	14.10
6	0.34	0.37	0.34	0.35	0.017	17.46
8	0.49	0.46	0.38	0.45	0.056	22.32
10	0.55	0.54	0.51	0.53	0.020	26.52
12	0.63	0.60	0.58	0.60	0.023	30.11
14	0.77	0.75	0.71	0.75	0.029	37.38
16	0.83	0.87	0.89	0.86	0.030	43.07
20	0.51	0.49	0.45	0.48	0.028	48.37
24	0.59	0.59	0.60	0.59	0.010	59.50

Table 60 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 400mcm passageway (using rotating paddle apparatus at 100rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.05	0.02	0.05	0.04	0.022	2.10
1	0.15	0.15	0.13	0.14	0.009	7.18
2	0.27	0.27	0.31	0.28	0.022	13.95
4	0.61	0.56	0.74	0.64	0.009	31.86
6	0.48	0.43	0.60	0.50	0.086	50.04
8	0.62	0.73	0.57	0.64	0.084	63.98
10	0.29	0.33	0.27	0.30	0.029	74.90
12	0.33	0.35	0.31	0.33	0.019	83.23
14	0.34	0.38	0.34	0.35	0.022	88.57
16	0.35	0.37	0.35	0.36	0.007	89.67
20	0.37	0.39	0.37	0.38	0.011	94.26
24	0.37	0.39	0.39	0.39	0.010	97.11

Table 61 Percent of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with a 1500mcm passageway (using rotating paddle apparatus at 100rpm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.07	0.07	0.07	0.07	0.003	3.45
1	0.15	0.17	0.15	0.16	0.007	7.86
2	0.33	0.37	0.34	0.35	0.020	17.32
4	0.68	0.80	0.71	0.73	0.067	36.50
6	0.50	0.56	0.53	0.53	0.031	52.90
8	0.60	0.64	0.71	0.65	0.055	65.17
10	0.31	0.31	0.32	0.31	0.004	77.50
12	0.33	0.34	0.34	0.34	0.007	84.59
14	0.35	0.36	0.35	0.35	0.005	88.19
16	0.36	0.36	0.35	0.35	0.008	91.14
20	0.38	0.36	0.38	0.37	0.009	93.99
24	0.38	0.37	0.39	0.38	0.009	94.99

Table 62 Percent of drug released from osmotic devices coated with cellulose acetate in pH-change method

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0	0	0	0	0	0
1	0.02	0.05	0.05	0.04	0.014	1.84
2	0.04	0.05	0.05	0.05	0.008	2.22
4	0.05	0.08	0.07	0.06	0.015	2.98
6	0.09	0.10	0.08	0.09	0.008	4.30
8	0.14	0.16	0.12	0.14	0.023	6.79
10	0.14	0.19	0.17	0.16	0.024	8.01
12	0.17	0.22	0.20	0.19	0.029	9.48
14	0.20	0.26	0.22	0.23	0.032	11.10
16	0.23	0.29	0.26	0.26	0.032	12.77
20	0.26	0.34	0.27	0.29	0.041	14.19
24	0.31	0.43	0.31	0.35	0.065	17.13

Table 63 Percent of drug released from osmotic devices coated with cellulose acetate 20% PEG 400 in pH-change method (film thickness 70mcm).

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.05	0.05	0.06	0.04	0.012	2.02
1	0.10	0.10	0.07	0.06	0.009	2.83
2	0.15	0.17	0.12	0.11	0.016	5.05
4	0.21	0.20	0.18	0.17	0.007	8.10
6	0.23	0.24	0.20	0.20	0.014	9.86
8	0.28	0.28	0.26	0.24	0.015	11.87
10	0.33	0.33	0.30	0.29	0.014	14.03
12	0.38	0.38	0.35	0.34	0.016	16.58
14	0.43	0.48	0.41	0.39	0.028	21.04
16	0.52	0.51	0.48	0.46	0.021	22.51
20	0.58	0.55	0.55	0.53	0.030	25.76
24	0.36	0.32	0.61	0.58	0.030	28.41

Table 64 Percent of drug released from osmotic devices coated with cellulose acetate 40% PEG 400 in pH-change method (film thickness 145mcm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.07	0.06	0.07	0.06	0.006	3.02
1	0.09	0.07	0.10	0.09	0.013	4.11
2	0.16	0.14	0.19	0.16	0.023	7.65
4	0.25	0.23	0.30	0.26	0.035	12.83
6	0.35	0.34	0.42	0.37	0.044	18.06
8	0.40	0.39	0.48	0.42	0.049	20.71
10	0.50	0.49	0.60	0.53	0.059	25.90
12	0.57	0.58	0.71	0.62	0.079	30.31
14	0.63	0.63	0.80	0.69	0.097	33.76
16	0.70	0.71	0.85	0.75	0.086	36.81
20	0.41	0.41	0.50	0.44	0.051	43.37
24	0.46	0.44	0.55	0.48	0.058	47.22

Table 65 Percent of drug released from osmotic devices coated with cellulose acetate 60% PEG 400 in pH-change method (film thickness 160mcm)

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.09	0.08	0.09	0.09	0.006	4.10
1	0.14	0.14	0.19	0.16	0.028	7.31
2	0.26	0.22	0.33	0.27	0.055	12.56
4	0.40	0.34	0.48	0.41	0.071	19.81
6	0.55	0.49	0.67	0.57	0.094	27.68
8	0.63	0.57	0.78	0.66	0.106	32.09
10	0.39	0.36	0.47	0.41	0.057	39.97
12	0.45	0.43	0.55	0.47	0.063	46.25
14	0.51	0.48	0.60	0.53	0.064	51.85
16	0.55	0.53	0.66	0.58	0.071	56.77
20	0.66	0.64	0.74	0.68	0.055	66.68
24	0.70	0.69	0.79	0.73	0.054	71.42

Table 66 Percent of drug released from drug-lactose osmotic devices coated with cellulose acetate plasticized with 20% PEG 400

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.03	0.03	0.03	0.03	0.000	1.38
1	0.04	0.04	0.03	0.04	0.003	1.65
2	0.07	0.07	0.06	0.07	0.007	2.98
4	0.16	0.17	0.16	0.16	0.009	7.29
6	0.23	0.26	0.25	0.24	0.017	10.85
8	0.31	0.35	0.30	0.32	0.029	14.19
10	0.41	0.42	0.36	0.40	0.029	17.63
12	0.49	0.48	0.44	0.47	0.036	20.65
14	0.57	0.56	0.52	0.55	0.027	24.64
16	0.61	0.65	0.61	0.62	0.024	27.73
20	0.74	0.78	0.72	0.75	0.027	33.23
24	0.93	0.98	0.86	0.92	0.061	41.13

Table 67 Percent of drug released from drug-sucrose osmotic devices coated with cellulose acetate plasticized with 20% PEG 400

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.05	0.07	0.05	0.06	0.008	2.60
1	0.06	0.08	0.08	0.08	0.009	3.48
2	0.16	0.17	0.13	0.15	0.021	7.01
4	0.32	0.32	0.29	0.31	0.019	14.34
6	0.45	0.44	0.46	0.45	0.099	20.80
8	0.56	0.59	0.58	0.58	0.011	26.72
10	0.65	0.67	0.65	0.66	0.012	30.67
12	0.76	0.77	0.74	0.76	0.017	35.12
14	0.44	0.45	0.43	0.44	0.001	40.82
16	0.48	0.49	0.46	0.48	0.015	44.43
20	0.54	0.54	0.50	0.53	0.021	49.11
24	0.60	0.61	0.57	0.59	0.023	55.28

Table 68 Percent of drug released from drug-mannitol osmotic devices coated with cellulose acetate plasticized with 20% PEG 400

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.07	0.04	0.11	0.07	0.033	3.25
1	0.12	0.11	0.11	0.12	0.005	5.27
2	0.15	0.16	0.17	0.16	0.006	7.33
4	0.36	0.34	0.35	0.35	0.008	16.89
6	0.48	0.47	0.52	0.49	0.024	22.42
8	0.65	0.67	0.61	0.65	0.032	29.58
10	0.77	0.48	0.81	0.77	0.028	35.52
12	0.46	0.46	0.43	0.45	0.016	41.24
14	0.50	0.52	0.50	0.51	0.011	46.39
16	0.55	0.56	0.56	0.56	0.006	51.20
20	0.64	0.65	0.61	0.63	0.019	58.22
24	0.74	0.77	0.70	0.74	0.042	67.79

Table 69 Percent of drug released from drug-sodium chloride osmotic devices coated with cellulose acetate plasticized with 20% PEG 400

Time (hours)	OD 290nm			Mean	SD.	% Release
	1	2	3			
0	0	0	0	0	0	0
0.5	0.02	0.02	0.01	0.01	0.008	0.62
1	0.09	0.09	0.09	0.09	0.005	3.97
2	0.32	0.31	0.30	0.31	0.011	13.49
4	0.56	0.55	0.54	0.55	0.009	24.59
6	0.46	0.47	0.47	0.47	0.007	41.71
8	0.65	0.65	0.67	0.66	0.010	58.88
10	0.33	0.33	0.29	0.32	0.021	70.63
12	0.35	0.35	0.37	0.35	0.011	78.92
14	0.37	0.37	0.39	0.38	0.009	84.67
16	0.40	0.37	0.39	0.39	0.012	86.67
20	0.41	0.41	0.39	0.40	0.013	90.10
24	0.42	0.43	0.38	0.41	0.025	92.43

Appendix C

Table 71 Physical properties of propranolol hydrochloride core tablets

Weight (gram)	Hardness (Kg.)	Diameter (mm.)	
0.208	5.23		9.57
0.204	5.32		9.57
0.213	4.87		9.57
0.211	4.95		9.56
0.199	4.67		9.57
0.209	4.85		9.57
0.185	4.59		9.56
0.211	5.23		9.56
0.204	4.71		9.56
0.205	5.21		9.57
0.206	4.88		9.57
0.211	4.9		9.57
0.212	5.26		9.57
0.207	4.87		9.56
0.209	5.24		9.56
0.205	5.11		9.56
0.199	4.28		9.56
0.206	4.85		9.57
0.207	4.99		9.57
0.211	4.78		9.57
Mean	0.206	4.94	9.57
SD.	0.0063	0.267	0.004

Table 71 Physical properties of propranolol hydrochloride-lactose core tablets

Weight (gram)	Hardness (Kg.)	Diameter (mm.)	
0.254	5.42		9.56
0.248	4.32		9.56
0.257	4.77		9.56
0.248	4.98		9.57
0.247	5.41		9.57
0.241	6.32		9.56
0.263	6.74		9.56
0.254	4.85		9.56
0.261	4.56		9.57
0.258	4.23		9.57
0.249	5.98		9.57
0.247	6.74		9.57
0.254	6.78		9.57
0.251	5.64		9.56
0.264	5.21		9.56
0.271	5.3		9.56
0.251	4.7		9.56
0.255	4.97		9.56
0.243	4.75		9.56
0.258	4.85		9.56
Mean	0.254	5.33	9.56
SD.	0.0062	0.801	0.005

Table 72 Physical properties of propranolol hydrochloride- mannitol core tablets

Weight (gram)	Hardness (Kg.)	Diameter (mm.)	
0.258	5.64		9.56
0.259	4.34		9.57
0.248	4.78		9.57
0.271	5.43		9.56
0.256	4.96		9.57
0.284	5.69		9.56
0.265	7.21		9.56
0.244	6.23		9.56
0.287	5.41		9.56
0.265	7.23		9.57
0.241	5.98		9.57
0.259	5.84		9.57
0.263	5.63		9.57
0.254	6.21		9.57
0.265	5.33		9.57
0.254	5.23		9.56
0.264	4.79		9.56
0.263	4.52		9.56
0.275	4.68		9.56
0.265	4.77		9.57
Mean	0.262	5.5	9.57
SD.	0.011	0.791	0.006

Table 73 Physical properties of propranolol hydrochloride- sucrose core tablets

Weight (gram)	Hardness (Kg.)	Diameter (mm.)	
0.268	5.23		9.56
0.279	5.63		9.56
0.263	6.41		9.57
0.287	5.46		9.56
0.263	4.23		9.57
0.254	4.98		9.56
0.298	5.87		9.56
0.287	6.14		9.56
0.241	6.21		9.57
0.265	5.46		9.58
0.284	5.87		9.56
0.274	5.21		9.57
0.261	5.63		9.57
0.235	4.56		9.56
0.277	4.78		9.58
0.284	6.51		9.56
0.256	4.57		9.56
0.254	4.98		9.57
0.291	4.77		9.57
0.251	5.6		9.56
Mean	0.268	5.41	9.56
SD.	0.017	0.649	0.006

Table 74 Physical properties of propranolol hydrochloride-sodium chloride core tablets

Weight (gram)	Hardness (Kg.)	Diameter (mm.)	
0.256	5.23	9.56	
0.278	5.62	9.56	
0.261	4.25	9.56	
0.274	4.21	9.57	
0.256	5.24	9.57	
0.243	5.15	9.56	
0.281	5.78	9.56	
0.264	5.23	9.56	
0.259	4.56	9.57	
0.234	6.24	9.57	
0.264	6.15	9.57	
0.274	6.32	9.57	
0.254	4.36	9.57	
0.264	4.56	9.56	
0.268	5.23	9.56	
0.262	5.96	9.56	
0.257	5.87	9.56	
0.258	6.78	9.56	
0.274	6.55	9.56	
0.256	4.95	9.56	
Mean	0.262	5.41	9.57
SD	0.011	0.783	0.007

Table 75 film thickness of core tablets coated with cellulose acetate

core tablet	solution 1 liter	solution 2 liter	solution 3 liter	
9.57	9.61	9.69	9.73	
9.56	9.62	9.71	9.76	
9.56	9.66	9.69	9.73	
9.56	9.6	9.69	9.75	
9.57	9.59	9.69	9.76	
9.56	9.59	9.69	9.76	
9.56	9.6	9.7	9.76	
9.57	9.59	9.7	9.76	
9.57	9.61	9.69	9.74	
9.56	9.61	9.71	9.76	
9.57	9.58	9.75	9.75	
9.56	9.6	9.68	9.81	
9.56	9.59	9.69	9.75	
9.57	9.58	9.76	9.74	
9.57	9.61	9.71	9.76	
9.59	9.61	9.72	9.77	
9.56	9.67	9.73	9.75	
9.57	9.6	9.69	9.76	
9.56	9.62	9.71	9.76	
9.57	9.59	9.68	9.77	
Mean	9.57	9.61	9.7	9.76
SD	0.01	0.02	0.02	0.019
THICKNESS	20micrometer	65micrometer	95micrometer	

Table 76 film thickness of core tablets coated with cellulose acetate plasticized with 20 % PEG 400

core tablet	solution 1 liter	solution 2liter	solution 3 liter	
9.57	9.64	9.7	9.85	
9.56	9.62	9.69	9.81	
9.56	9.63	9.71	9.87	
9.56	9.65	9.72	9.85	
9.57	9.66	9.69	9.9	
9.56	9.63	9.7	9.76	
9.56	9.65	9.69	9.8	
9.57	9.7	9.72	9.84	
9.57	9.68	9.69	9.83	
9.56	9.68	9.72	9.84	
9.57	9.63	9.68	9.81	
9.56	9.68	9.71	9.81	
9.56	9.69	9.71	9.86	
9.57	9.66	9.68	9.84	
9.57	9.69	9.71	9.82	
9.59	9.69	9.73	9.84	
9.56	9.66	9.71	9.83	
9.57	9.7	9.72	9.86	
9.56	9.65	9.72	9.82	
9.57	9.66	9.72	9.84	
Mean	9.57	9.66	9.71	9.84
SD.	0.01	0.03	0.02	0.03
THICKNESS		45micrometer	70micrometer	135micrometer

Table 77 film thickness of core tablets coated with cellulose acetate plasticized with 40 % PEG 400

core tablet	solution 1 liter	solution 2liter	solution 3 liter	
9.57	9.71	9.69	9.96	
9.56	9.7	9.82	10.06	
9.56	9.73	9.87	9.9	
9.56	9.74	9.86	10	
9.57	9.73	9.83	9.88	
9.56	9.74	9.87	9.84	
9.56	9.72	9.87	9.9	
9.57	9.69	9.86	9.82	
9.57	9.71	9.87	9.91	
9.56	9.7	9.82	9.86	
9.57	9.76	9.88	9.89	
9.56	9.73	9.91	9.87	
9.56	9.69	9.89	9.88	
9.57	9.76	9.86	9.91	
9.57	9.73	9.86	9.96	
9.59	9.72	9.87	9.83	
9.56	9.77	9.86	9.88	
9.57	9.78	9.91	9.81	
9.56	9.74	9.85	9.81	
9.57	9.68	9.86	9.83	
Mean	9.57	9.73	9.86	9.89
SD.	0.01	0.03	0.027	0.061
THICKNESS		80micrometer	145micrometer	160micrometer

Table 78 film thickness of core tablets coated with cellulose acetate plasticized with 60% PEG 400

core tablet	solution 1 liter	solution 2 liter	solution 3 liter
9.57	9.73	9.88	9.98
9.56	9.74	9.74	10.02
9.56	9.72	9.89	10.01
9.56	9.7	9.93	10.04
9.57	9.74	9.88	9.98
9.56	9.76	9.87	10.18
9.56	9.73	9.98	10.04
9.57	9.76	9.86	10.03
9.57	9.73	9.98	10.07
9.56	9.73	9.95	9.95
9.57	9.67	9.88	10.07
9.56	9.75	9.86	9.95
9.56	9.7	9.86	10.07
9.57	9.75	9.98	10
9.57	9.73	9.88	10
9.59	9.71	9.86	10.05
9.56	9.74	9.84	10.04
9.57	9.7	9.88	10.15
9.56	9.72	9.86	9.99
9.57	9.71	9.86	10.01
Mean	9.57 9.73	9.89	10.03
SD	0.01	0.02	0.057
THICKNESS	80micrometer	160micrometer	230micrometer

Table 79 film thickness of core tablets coated with cellulose acetate plasticized with 20% DBP

core tablet	solution 2 liter
9.57	9.78
9.56	9.81
9.56	9.83
9.56	9.82
9.57	9.8
9.56	9.83
9.56	9.8
9.57	9.81
9.57	9.8
9.56	9.85
9.57	9.79
9.56	9.82
9.56	9.83
9.57	9.83
9.57	9.84
9.59	9.84
9.56	9.83
9.57	9.86
9.56	9.81
9.57	9.83
Mean	9.57 9.82
SD	0.01 0.02
THICKNESS	65micrometer

Table 80 film thickness of core tablets coated with cellulose acetate plasticized with 40% DBP

core tablet	solution 2 liter
9.57	9.87
9.56	9.82
9.56	9.81
9.56	9.85
9.57	9.84
9.56	9.83
9.56	9.85
9.57	9.84
9.57	9.88
9.56	9.88
9.57	9.82
9.56	9.9
9.56	9.82
9.57	9.86
9.57	9.85
9.59	9.87
9.56	9.8
9.57	9.89
9.56	9.85
9.57	9.85
Mean	9.57 9.85
SD	0.01 0.03
THICKNESS	65micrometer

Table 81 film thickness of core tablets coated with cellulose acetate plasticized with 20% DBP and 20 % PEG 4000

core tablet	solution 2 liter
9.57	9.84
9.56	9.84
9.56	9.87
9.56	9.86
9.57	9.82
9.56	9.88
9.56	9.85
9.57	9.8
9.57	9.86
9.56	9.83
9.57	9.83
9.56	9.88
9.56	9.84
9.57	9.84
9.57	9.86
9.59	9.82
9.56	9.83
9.57	9.84
9.56	9.86
9.57	9.88
Mean 9.57	9.85
SD 0.01	0.02
THICKNESS	80micrometer

Table 82 film thickness of core tablets coated with cellulose acetate plasticized with 20% DBP and 40 % PEG 4000

core tablet	solution 2 liter
9.57	9.97
9.56	9.97
9.56	9.9
9.56	9.95
9.57	9.91
9.56	9.94
9.56	9.92
9.57	9.92
9.57	9.9
9.56	9.94
9.57	9.91
9.56	9.97
9.56	9.96
9.57	9.88
9.57	10.01
9.59	9.91
9.56	9.94
9.57	9.87
9.56	9.92
9.57	9.88
Mean 9.57	9.93
SD 0.01	0.036
THICKNESS	120micrometer

Table 83 film thickness of core tablets coated with cellulose acetate plasticized with 20% DBP and 60 % PEG 4000

core tablet	solution 2 liter
9.57	10.07
9.56	10.01
9.56	10.12
9.56	9.93
9.57	9.99
9.56	9.96
9.56	10.05
9.57	9.97
9.57	10.05
9.56	10.03
9.57	10.03
9.56	10.02
9.56	10.06
9.57	10.00
9.57	9.96
9.59	10.01
9.56	10.02
9.57	9.96
9.56	10.03
9.57	10.06
Mean 9.57	10.02
SD 0.01	0.046
THICKNESS	165micrometer

Appendix D

Osmotic pressure calculation method

Osmotic pressure of lactose

The average value of osmolarity (C) was 0.003 mosmol/kg. The dilution factor is 100. R is the gas constant equal to 0.082 liter.atm/mole.degree. The absolute temperature is 310K.

$$\pi = CRT$$

$$\pi = (0.003*100)*0.082*310$$

$$\pi = 7.626\text{atm}$$

Osmotic pressure of sucrose

The average value of osmolarity (C) was 0.012 mosmol/kg. The dilution factor is 100. R is the gas constant equal to 0.082 liter.atm/mole.degree. The absolute temperature is 310K.

$$\pi = CRT$$

$$\pi = (0.012*100)*0.082*310$$

$$\pi = 30.504\text{atm}$$

Osmotic pressure of mannitol

The average value of osmolarity (C) was 0.013 mosmol/kg. The dilution factor is 100. R is the gas constant equal to 0.082 liter.atm/mole.degree. The absolute temperature is 310K.

$$\pi = CRT$$

$$\pi = (0.013*100)*0.082*310$$

$$\pi = 33.046\text{atm}$$

Osmotic pressure of sodium chloride

The average value of osmolarity (C) was 0.096 mosmol/kg. The dilution factor is 100. R is the gas constant equal to 0.082 litre.atm/mole degree. The absolute temperature is 310K.

$$\pi = CRT$$

$$\pi = (0.096*100)*0.082*310$$

$$\pi = 251.658\text{atm}$$

Osmotic pressure of 0.1N HCl

The average value of osmolarity (C) was 0.218 mosmol/kg. The dilution factor is 1. R is the gas constant equal to 0.082 liter.atm/mole.degree. The absolute temperature is 310K.

$$\pi = CRT$$

$$\pi = (0.218*1)*0.082*310$$

$$\pi = 5.542\text{atm}$$

Osmotic pressure of phosphate buffer pH 6.8

The average value of osmolarity (C) was 0.325 mosmol/kg. The dilution factor is 100. R is the gas constant equal to 0.082 liter.atm/mole.degree. The absolute temperature is 310K.

$$\pi = CRT$$

$$\pi = (0.325*1)*0.082*310$$

$$\pi = 8.262\text{atm.}$$

Appendix E

Data in statistical processes

Table 84 The Anova analysis of percentage of drug released from osmotic devices coated with various levels of PEG 400 in coating film.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	29569.372	12	2464.114	6.205	S*
Within Groups	10325.792	26	397.146		
Total	39895.163	38			

If $\alpha = 0.05$ and degree of freedom = 12 and 26 then critical of F more than 2.15

S* = significant, NS* = non-significant

Table 85 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate with varying size of passageway.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.716	3	4.572	.043	NS*
Within Groups	5072.898	48	105.685		
Total	5086.614	51			

If $\alpha = 0.05$ and degree of freedom = 12 and 38 then critical of F more than 2.05

S* = significant, NS* = non-significant

Table 86 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with varying size of passageway.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55.939	3	18.646	.049	NS*
Within Groups	18399.836	48	383.330		
Total	18455.775	51			

If $\alpha = 0.05$ and degree of freedom = 3 and 48 then critical of F more than 2.80

S* = significant, NS* = non-significant

Table 87 The f-value of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with varying size of passageway.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	400 μ m - 700 μ m	-1.6084	.8177	.2268	-2.1025	-1.1142	-7.092	12	S*
Pair 2	1000 μ m - 400 μ m	2.1610	2.0486	.5682	.9230	3.3990	3.803	12	NS*
Pair 3	1500 μ m - 400 μ m	2.7980	2.1458	.5951	1.5013	4.0947	4.702	12	NS*
Pair 4	1000 μ m - 700 μ m	.5526	1.7616	.4886	-.5119	1.6172	1.131	12	NS*
Pair 5	1500 μ m - 700 μ m	1.1896	1.7718	.4914	.1189	2.2603	2.421	12	NS*
Pair 6	1000 μ m - 1500 μ m	-.6370	.7239	.2008	-1.0745	-.1995	-3.173	12	NS*

S* = significant, NS* = non-significant

Table 88 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 60 % PEG 400 with varying size of passageway.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	370.963	3	123.654	.087	NS* NS*
Within Groups	68098.146	48	1418.711		
Total	68469.110	51			

If $\alpha = 0.05$ and degree of freedom = 3 and 48 then critical of F more than 2.80

S* = significant, NS* = non-significant

Table 89 The f-value of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 60 % PEG 400 with varying size of passageway.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	400 μ m - 700 μ m	-3.3569	2.9291	.8124	-5.1270	-1.5869	-4.132	12	NS*
Pair 2	1000 μ m - 400 μ m	3.3845	3.4168	.9477	1.3197	5.4492	3.571	12	NS*
Pair 3	1500 μ m - 400 μ m	4.5385	3.2375	.8979	2.5821	6.4949	8.054	12	S*
Pair 4	1000 μ m - 700 μ m	2.754E-02	3.5088	.9732	-2.0928	2.1479	.028	12	NS*
Pair 5	1500 μ m - 700 μ m	1.1815	2.7158	.7532	-.4596	2.8227	1.569	12	NS*
Pair 6	μ m 1000 - 1500 μ m	-1.1540	2.3692	.6571	-2.5857	.2777	-1.756	12	NS*

S* = significant, NS* = non-significant

Table 90 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate with varying rotating speed.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15.033	5	3.007	.029	NS*
Within Groups	7357.304	72	102.185		
Total	7372.337	77			

If $\alpha = 0.05$ and degree of freedom = 5 and 72 then critical of F more than 2.71

S* = significant, NS* = non-significant

Table 91 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with varying rotating speed.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55.348	3	18.449	.049	NS*
Within Groups	17996.442	48	374.926		
Total	18051.790	51			

If $\alpha = 0.05$ and degree of freedom = 3 and 48 then critical of F more than 2.80

S* = significant, NS* = non-significant

Table 92 The f-value of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with varying rotating speed.

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
400 μ m	50rpm - 100rpm	7.069E-02	.1868	5.180E-02	-4.22E-02	.1835	0.005	12	NS*
	50rpm - 150rpm	-4.46E-03	1.0423	.2891	-.6343	.6254	-.015	12	NS*
	100rpm- 150rpm	-7.52E-02	.9647	.2676	-.6581	.5078	-.281	12	NS*
1500 μ m	50rpm - 100rpm	-1.7318	1.7020	.4721	-2.7604	-.7033	-2.669	12	NS*
	50rpm- 150rpm	-2.5932	2.4065	.6675	-4.0474	-1.1389	-3.885	12	NS*
	100rpm - 150rpm	-.8613	1.0802	.2996	-1.5141	-.2085	-1.275	12	NS*

S* = Significance , NS* = Non-significance

Table 93 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with varying rotating speed.

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	345.877	3	115.292	.081	NS*
Within Groups	67910.309	48	1414.798		
Total	68256.186	51			

If $\alpha = 0.05$ and degree of freedom = 5 and 72 then critical of F more than 2.20

S* = Significance , NS* = Non-significance

Table 94 The f-value of percentage drug release from core tablets coated with cellulose acetate plasticized with 60 % PEG 400 with varying rotating apparatus.

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
400 μ m	50rpm - 100rpm	1.7186	2.2505	.6242	.3587	3.0786	2.753	12	NS*
	50rpm - 150rpm	.2255	2.8838	.7998	-1.5172	1.9682	.282	12	NS*
	100rpm - 150rpm	-1.4931	2.5338	.7028	-3.0243	3.810E-02	-2.125	12	NS*
1500 μ m	50rpm - 100rpm	-2.5155	2.5767	.7146	-4.0725	-.9584	-3.520	12	NS*
	50rpm - 150rpm	-3.0308	2.1927	.6082	-4.3558	-1.7057	-4.984	12	S*
	100rpm - 150rpm	-.5153	2.8472	.7897	-2.2359	1.2052	-.653	12	NS*

S* = Significance , NS* = Non-significance

Table 95 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate with varying rotating type.

ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.504	3	5.501	.051	NS*
Within Groups	5135.821	48	106.996		
Total	5152.326	51			

If $\alpha = 0.05$ and degree of freedom = 3 and 48 then critical of F more than 2.80

S* = significant, NS* = non-significant

Table 96 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 20 % PEG 400 with varying the rotating speed.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55.348	3	18.449	.049	NS*
Within Groups	17996.442	48	374.926		
Total	18051.790	51			

If $\alpha = 0.05$ and degree of freedom = 3 and 48 then critical of F more than 2.80

S* = significant, NS* = non-significant

Table 97 The f-value of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 20% PEG 400 with varying rotating speed.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
400 μ m	Basket-Paddle	-2.1025	1.4299	.3966	-2.9665	-1.2384	-5.301	12	S*
1500 μ m	Basket-Paddle	1.0315	1.8226	.5055	-6.98E-02	2.1329	2.041	12	NS*

S* = Significance , NS* = Non-significance

Table 98 The Anova analysis of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 60 % PEG 400 with varying the rotating speed.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	345.877	3	115.292	.081	NS*
Within Groups	67910.309	48	1414.798		
Total	68256.186	51			

If $\alpha = 0.05$ and degree of freedom = 3 and 48 then critical of F more than 2.80

S* = significant, NS* = non-significant

Table 99 The f-value of percentage of drug released from osmotic devices coated with cellulose acetate plasticized with 60% PEG 400 with varying rotating speed.

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
400 μ m Basket-Paddle	2.2963	3.5134	.9744	.1732	4.4194	2.357	12	NS*
1500 μ m Basket-Paddle	5.7824	3.6080	1.0007	3.6021	7.9627	8.779	12	S*

S* = Significance , NS* = Non-significance

VITAE

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