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## APPENDIX A

### Analysis of Propranolol Hydrochloride

#### 1. The UV-visible spectrophotometric

##### 1.1 Calibration curve

The UV-visible spectrophotometric method was used to determine the amount of drug release in dissolution test. The relationships between concentrations versus absorbances of propranolol HCl in various media are presented in Table 1A-10A. The calibration curve of propranolol HCl and a linear relationship with the correlation of determination are also illustrated in Figure 1A-10A.

Table 1A : Absorbance of propranolol HCl in deionized water at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.1962	0.1948	0.1873	0.1928	0.0048
20	0.3915	0.3878	0.3903	0.3899	0.0019
30	0.5850	0.5783	0.5895	0.5843	0.0056
40	0.7709	0.7804	0.7741	0.7751	0.0048
50	0.9895	0.9608	0.9585	0.9696	0.0173

Table 2A : Absorbance of propranolol HCl in methanol at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.2223	0.2247	0.1938	0.2136	0.0172
20	0.4210	0.4052	0.3896	0.4053	0.0157
30	0.6305	0.6244	0.5935	0.6161	0.0198
40	0.8354	0.8096	0.7930	0.8127	0.0214
50	1.0337	1.0133	0.9992	1.0154	0.0173

Table 3A : Absorbance of propranolol HCl in 0.1588 M KCl solution at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.2029	0.2170	0.2022	0.2074	0.0084
20	0.4043	0.4070	0.3924	0.4012	0.0078
30	0.5989	0.6122	0.5938	0.6016	0.0095
40	0.8004	0.8092	0.7910	0.8002	0.0091
50	0.9990	1.0075	0.9916	0.9994	0.0080

Table 4A : Absorbance of propranolol HCl in 0.5 M KCl solution at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.2181	0.1987	0.2062	0.2077	0.0098
20	0.4104	0.3876	0.3939	0.3973	0.0118
30	0.6094	0.5856	0.586	0.5937	0.0136
40	0.8155	0.7792	0.7848	0.7932	0.0195
50	1.0040	0.9664	0.9765	0.9823	0.0195

Table 5A : Absorbance of propranolol HCl in 1 M KCl solution at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.2058	0.2042	0.2090	0.2063	0.0024
20	0.4038	0.3982	0.4030	0.4017	0.0030
30	0.6034	0.6023	0.5919	0.5992	0.0063
40	0.7964	0.7946	0.7952	0.7954	0.0009
50	0.9849	0.9907	0.9914	0.9890	0.0036

Table 6A : Absorbance of propranolol HCl in 2 M KCl solution at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.1979	0.2000	0.2078	0.2019	0.0052
20	0.3909	0.3901	0.3947	0.3919	0.0025
30	0.5915	0.5915	0.5866	0.5899	0.0028
40	0.7819	0.7846	0.7934	0.7866	0.0060
50	0.9760	0.9805	0.9798	0.9788	0.0024



Table 7A : Absorbance of propranolol HCl in isotonic buffer solution pH1.2 at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.1993	0.1973	0.2077	0.2014	0.0055
20	0.3839	0.3908	0.3938	0.3895	0.0051
30	0.5776	0.5816	0.5963	0.5852	0.0098
40	0.7700	0.7784	0.7829	0.7771	0.0065
50	0.9529	0.9652	0.9565	0.9582	0.0063

Table 8A : Absorbance of propranolol HCl in isotonic buffer solution pH6.8 at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.2029	0.1997	0.2002	0.2009	0.0017
20	0.3984	0.3851	0.3900	0.3912	0.0067
30	0.5866	0.5856	0.5859	0.5860	0.0005
40	0.7899	0.7849	0.7905	0.7884	0.0031
50	0.9751	0.9794	0.9873	0.9806	0.0062

Table 9A : Absorbance of propranolol HCl in buffer solution pH1.2 at 287 . nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.1936	0.2059	0.2037	0.2011	0.0066
20	0.3935	0.4032	0.3989	0.3985	0.0049
30	0.6045	0.5935	0.5847	0.5942	0.0099
40	0.8113	0.7888	0.7903	0.7968	0.0126
50	1.0086	0.9916	0.9734	0.9912	0.0176

Table 10A : Absorbance of propranolol HCl in buffer solution pH6.8 at 287 nm.

CONC.(mcg/ml.)	1	2	3	AVG	SD
10	0.2128	0.1998	0.2015	0.2047	0.0071
20	0.4101	0.3920	0.3952	0.3991	0.0097
30	0.6058	0.5940	0.5904	0.5967	0.0081
40	0.7986	0.7765	0.7878	0.7876	0.0111
50	0.9985	0.9758	0.9884	0.9876	0.0114



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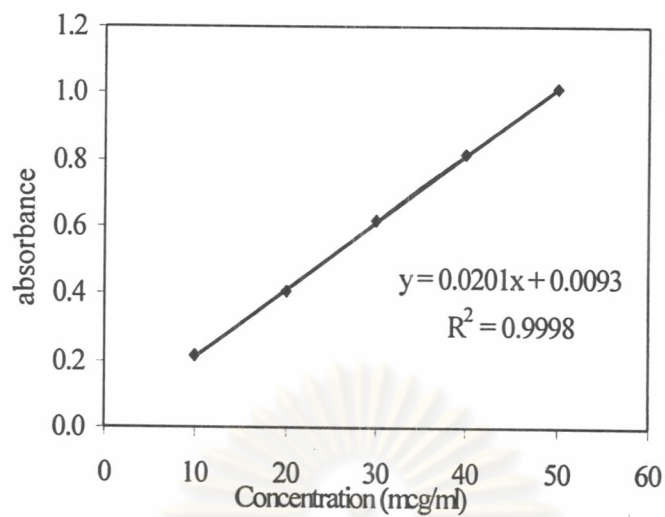


Figure 1A : Calibration curve of propranolol HCl in deionized water at 287 nm.

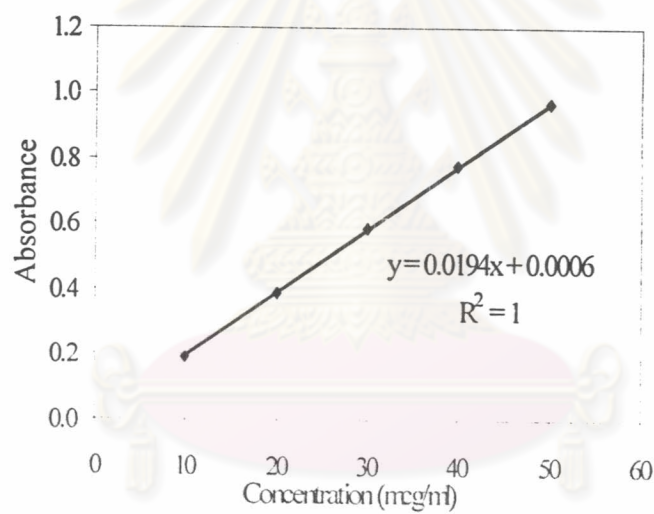


Figure 2A : Calibration curve of propranolol HCl in methanol at 287 nm.

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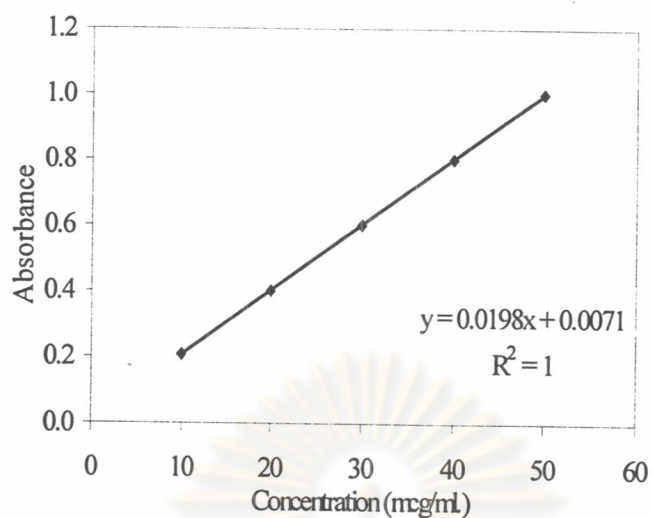


Figure 3A : Calibration curve of propranolol HCl in 0.1588M KCl solution at 287 nm.

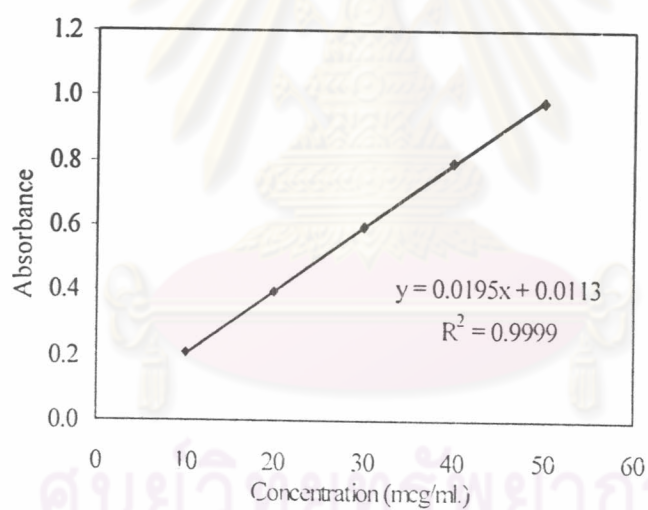


Figure 4A : Calibration curve of propranolol HCl in 0.5M KCl solution at 287 nm.

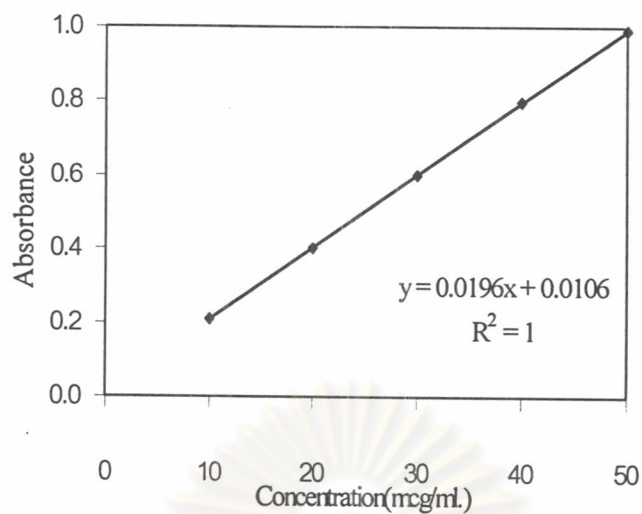


Figure 5A : Calibration curve of propranolol HCl in 1 M KCl solution at 287 nm.

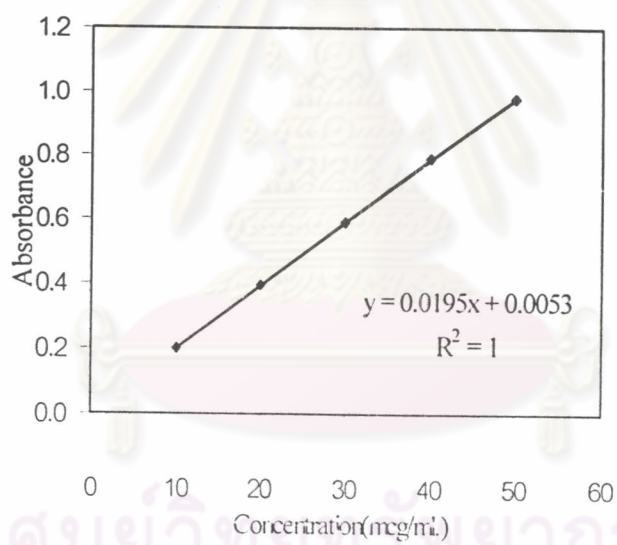


Figure 6A : Calibration curve of propranolol HCl in 2 M KCl solution at 287 nm.

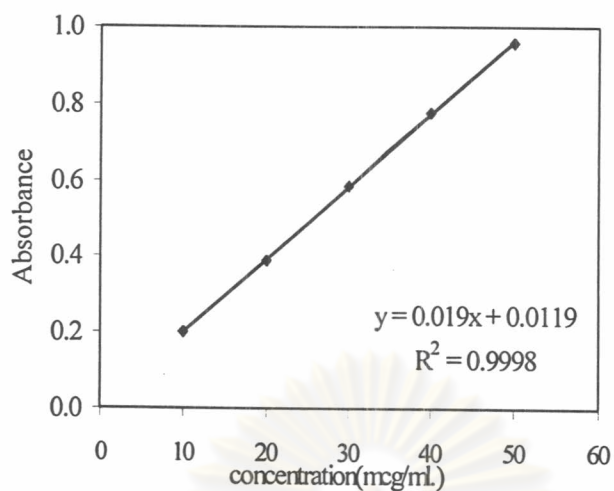


Figure 7A : Calibration curve of propranolol HCl in isotonic buffer solution pH 1.2 solution at 287 nm.

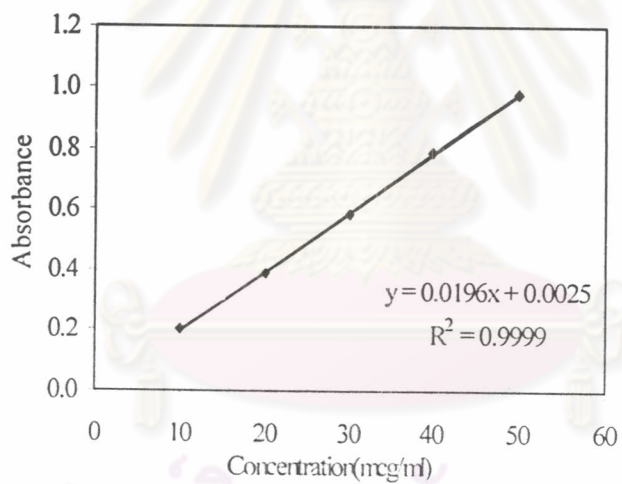


Figure 8A : Calibration curve of propranolol HCl in isotonic buffer solution PH6.8 solution at 287 nm.

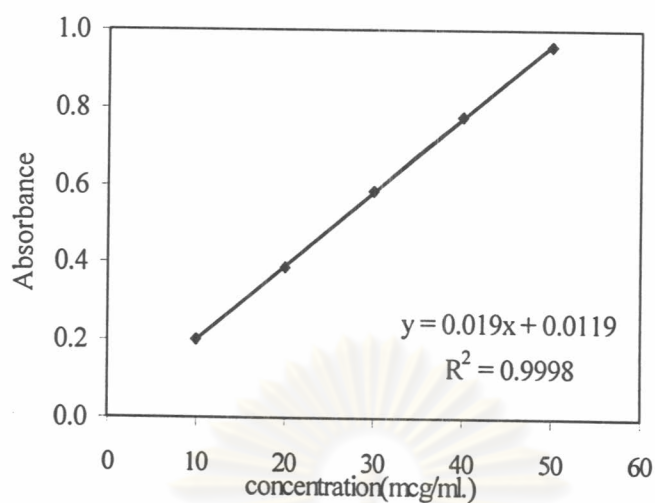


Figure 9A : Calibration curve of propranolol HCl in buffer solution PH1.2 solution at 287 nm.

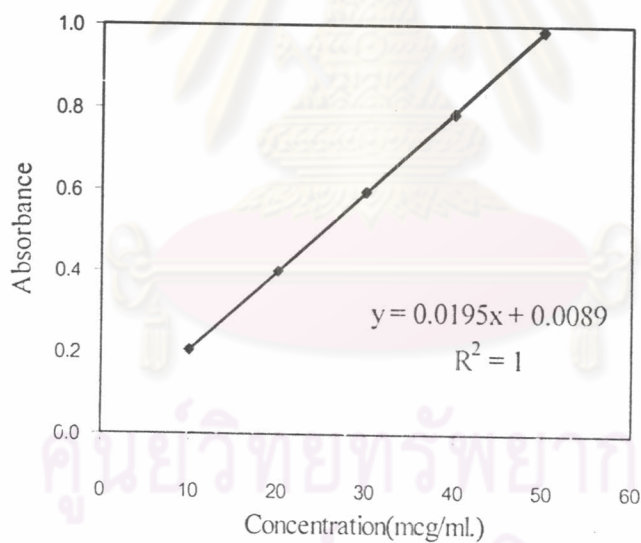


Figure 10A : Calibration curve of propranolol HCl in buffer solution PH6.8 solution at 287 nm.

## APPENDIX B

### Evaluation of Capsules

Table 1B : Weight of propranolol HCl matrices of capsule containing various amount of osmotic agent.

No.	Weight(g.)				
	C11a	C11	C21	C22	C23
1	0.3472	0.3242	0.2748	0.2654	0.2798
2	0.3376	0.3470	0.2663	0.2570	0.2656
3	0.3519	0.3510	0.2660	0.2621	0.2646
4	0.3498	0.3410	0.2764	0.2666	0.2446
5	0.3419	0.3540	0.2889	0.2604	0.2657
6	0.3391	0.3438	0.2674	0.2719	0.2574
7	0.3474	0.3546	0.2706	0.2631	0.2551
8	0.3514	0.3465	0.2633	0.2634	0.2686
9	0.3496	0.3345	0.2730	0.2633	0.2582
10	0.3387	0.3421	0.2730	0.2629	0.2598
11	0.3341	0.3454	0.2799	0.2718	0.2582
12	0.3291	0.3387	0.2700	0.2638	0.2819
13	0.3312	0.3486	0.2708	0.2725	0.2766
14	0.3487	0.3542	0.2800	0.2713	0.2616
15	0.3349	0.3431	0.2699	0.2609	0.2788
16	0.3298	0.3510	0.2731	0.2646	0.2679
17	0.3498	0.3261	0.2708	0.2620	0.2737
18	0.3501	0.3345	0.2623	0.2632	0.2757
19	0.3348	0.3451	0.2636	0.2848	0.2697
20	0.3542	0.3467	0.2717	0.2709	0.2556
AVG	0.3426	0.3436	0.2716	0.2661	0.2660
SD	0.0083	0.0086	0.0064	0.0062	0.0098
%CV	2.4241	2.4916	2.3628	2.3343	3.6976



No.	Weight(g.)				
	C24	C25	C26	C27	C28
1	0.2614	0.2754	0.2751	0.2642	0.2621
2	0.2751	0.2814	0.2764	0.2724	0.2734
3	0.2642	0.2648	0.2813	0.2813	0.2810
4	0.2843	0.2745	0.2810	0.2716	0.2715
5	0.2591	0.2648	0.2645	0.2830	0.2654
6	0.2751	0.2826	0.2649	0.2649	0.2725
7	0.2813	0.2764	0.2751	0.2599	0.2831
8	0.2648	0.2816	0.2813	0.2764	0.2818
9	0.2618	0.2754	0.2648	0.2821	0.2817
10	0.2649	0.2764	0.2648	0.2761	0.2824
11	0.2753	0.2801	0.2686	0.2831	0.2648
12	0.2811	0.2754	0.2649	0.2754	0.2761
13	0.2761	0.2648	0.2715	0.2801	0.2813
14	0.2648	0.2659	0.2814	0.2731	0.2814
15	0.2694	0.2754	0.2618	0.2642	0.2761
16	0.2768	0.2648	0.2761	0.2595	0.2648
17	0.2786	0.2813	0.2764	0.2648	0.2761
18	0.2786	0.2754	0.2648	0.2763	0.2813
19	0.2810	0.2648	0.2813	0.2713	0.27618
20	0.2751	0.2766	0.2801	0.2643	0.2648
AVG	0.2724	0.2739	0.2728	0.2722	0.2749
SD	0.0078	0.0065	0.0072	0.0078	0.0071
%CV	2.8790	2.3601	2.6389	2.8602	2.5917

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Table 2B : Thicknesses of cellulose acetate film with various amounts of cellulose acetate solution were determined by scanning electron microscopic photomicrograph.

Amount of cellulose acetate solution.	Thickness of each side of sample I	Thickness of each side of sample II	Average thickness. (n = 2)
286 ml	33.33	36.67	
	33.33	26.67	
	33.33	26.67	
	33.33	33.33	
	33.33	26.67	
	33.33	28.67	
Average >	33.33	29.78	31.56±3.41
572 ml	53.33	85.33	
	53.33	86.67	
	86.67	82.00	
	100.00	70.00	
	80.00	93.33	
	100.00	90.00	
Average >	78.89	84.56	81.72±15.63
858 ml	93.33	113.33	
	126.67	100.00	
	116.67	120.00	
	100.00	100.00	
	106.67	126.67	
	96.67	120.00	
Average >	106.67	113.33	110.00±11.98



Table 3B : Assay content of propranolol HCl matrices from capsule containing various amount of osmotic agent.

Formula	% Drug content					
	No.1	No.2	No.3	AVG	SD	%CV
C11a	104.9515	102.4407	103.6339	103.6754	1.2559	1.2114
C11	98.6967	100.7941	100.3246	99.9385	1.1007	1.1014
C21	90.0110	93.8891	95.5298	93.1433	2.8340	3.0426
C22	104.0566	103.7582	102.7141	103.5096	0.7383	0.7133
C23	103.5594	103.5345	104.5537	103.8825	0.5814	0.5597
C24	104.4543	103.0870	101.0734	102.8716	1.7007	1.6532
C25	101.7446	97.2202	105.6973	101.5540	4.2417	4.1768
C26	103.4599	102.1175	101.9932	102.5236	0.8133	0.7933
C27	100.9740	102.5153	102.0181	101.8358	0.7866	0.7725
C28	100.1536	102.0429	102.4407	101.5458	1.2219	1.2033

C11a = HPMC capsule.

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Table 4B : Weight of capsules before and after coating with HPMC and CA  
(n=20)

C26+CA1(*)				C23+CA1(*)			
Weight before coating .(g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3253	0.3450	0.3569		0.3242	0.3447	0.3658	
0.3238	0.3361	0.3723		0.3312	0.3397	0.3754	
0.3166	0.3348	0.3487		0.3268	0.3378	0.3759	
0.3293	0.3464	0.3725		0.3214	0.3415	0.3459	
0.3416	0.3446	0.3590		0.3209	0.3480	0.3549	
0.3172	0.3530	0.3533		0.3245	0.3486	0.3748	
0.3283	0.3372	0.3572		0.3314	0.3510	0.3576	
0.3280	0.3526	0.3573		0.3214	0.3318	0.3712	
0.3336	0.3435	0.3713		0.3256	0.3450	0.3549	
0.3231	0.342	0.3787		0.331	0.3348	0.3576	
0.3218	0.3454	0.3788		0.3264	0.3611	0.3594	
0.3272	0.3604	0.3560		0.3318	0.3451	0.3687	
0.3263	0.3482	0.3496		0.3214	0.3412	0.3749	
0.3282	0.3626	0.3588		0.3218	0.3368	0.3754	
0.3286	0.3569	0.3698		0.3242	0.3310	0.3576	
0.3410	0.3518	0.3525		0.3214	0.3486	0.3486	
0.3225	0.3394	0.3788		0.3314	0.3424	0.3586	
0.3256	0.3542	0.3519		0.3286	0.3612	0.3594	
0.3366	0.3446	0.3650		0.3289	0.3510	0.3594	
0.3280	0.3477	0.3558		0.3296	0.3498	0.3549	
0.3276	0.3473	0.3628	<mean	0.3262	0.3446	0.3625	<mean
0.0066	0.0077	0.0102	<SD	0.0040	0.0083	0.0095	<SD

C25+CA1(*)				C27+CA1(*)			
Weight before coating .(g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3414	0.3348	0.3500		0.3201	0.3320	0.3684	
0.3254	0.3463	0.3526		0.3413	0.3480	0.3474	
0.3237	0.3346	0.3536		0.3316	0.3522	0.3542	
0.3376	0.3363	0.3592		0.3203	0.3422	0.3562	
0.3203	0.3627	0.3541		0.3346	0.3600	0.3550	
0.3433	0.3439	0.3667		0.3289	0.3601	0.3588	
0.3187	0.3565	0.3672		0.3242	0.3352	0.3480	
0.3187	0.3441	0.3496		0.3297	0.3345	0.3607	
0.3344	0.3474	0.3624		0.3248	0.3477	0.3559	
0.3235	0.3450	0.3554		0.3301	0.3449	0.3630	
0.3254	0.3477	0.3501		0.3358	0.3334	0.3697	
0.3182	0.3457	0.3563		0.3248	0.3395	0.3469	
0.3190	0.3460	0.3773		0.3238	0.3347	0.3733	
0.3363	0.3527	0.3704		0.3334	0.3481	0.3560	
0.3366	0.3457	0.3620		0.3311	0.3480	0.3635	
0.3414	0.3395	0.3520		0.324	0.3435	0.3690	
0.3239	0.3368	0.3769		0.3224	0.3550	0.3702	
0.3279	0.3351	0.3629		0.3391	0.3468	0.3663	
0.3359	0.3480	0.3505		0.3225	0.3471	0.3575	
0.3289	0.3528	0.3673		0.3357	0.3341	0.3548	
0.3290	0.3451	0.3598	<mean	0.3289	0.3444	0.3597	<mean
0.0086	0.0075	0.0088	<SD	0.0063	0.0086	0.0080	<SD

C28+CA1(*)				C23+CA2(*)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3299	0.3506	0.3610		0.3458	0.3555	0.3374	
0.3364	0.3503	0.3617		0.3359	0.3435	0.3647	
0.3358	0.3506	0.3692		0.3294	0.3537	0.3606	
0.3386	0.3551	0.3706		0.3195	0.3407	0.3511	
0.3358	0.3519	0.3566		0.3218	0.3584	0.3421	
0.3306	0.3582	0.3597		0.3383	0.3541	0.3748	
0.3351	0.3467	0.3697		0.3489	0.3348	0.3771	
0.3293	0.3534	0.3705		0.3344	0.3614	0.3694	
0.3337	0.3521	0.3730		0.3223	0.3337	0.3558	
0.3352	0.3478	0.3679		0.3178	0.3634	0.3645	
0.3269	0.3541	0.3640		0.3115	0.3537	0.3685	
0.3328	0.3465	0.3671		0.3402	0.3288	0.3697	
0.3332	0.3561	0.3622		0.3309	0.3422	0.3374	
0.3356	0.3501	0.3586		0.3394	0.3230	0.3789	
0.3310	0.3509	0.3598		0.3486	0.3627	0.3720	
0.3336	0.3483	0.3645		0.3416	0.3592	0.3689	
0.3379	0.3551	0.3618		0.3398	0.3470	0.3475	
0.3376	0.3464	0.3678		0.3283	0.3264	0.3434	
0.3388	0.3583	0.3623		0.3375	0.3534	0.3650	
0.3307	0.3502	0.3641		0.3308	0.3513	0.3473	
0.3339	0.3516	0.3646	<mean	0.3331	0.3473	0.3598	<mean
0.0033	0.0037	0.0046	<SD	0.0105	0.0126	0.0135	<SD

C23+CA3(*)				C23+CA3(**)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3402	0.3428	0.3715		0.3405	0.3241	0.3939	
0.3358	0.3226	0.3440		0.3282	0.3317	0.3995	
0.3279	0.3413	0.3341		0.3098	0.3612	0.3627	
0.3319	0.356	0.3352		0.3372	0.3486	0.3870	
0.3186	0.3382	0.3634		0.3290	0.3527	0.3891	
0.3234	0.3495	0.3546		0.3190	0.3459	0.3803	
0.3417	0.3575	0.3707		0.3235	0.3352	0.3783	
0.3184	0.3492	0.3508		0.3431	0.3626	0.3921	
0.3304	0.3509	0.3444		0.3248	0.3456	0.3645	
0.3121	0.3493	0.3580		0.3432	0.3436	0.3619	
0.3403	0.3321	0.3653		0.3132	0.3461	0.3815	
0.3345	0.339	0.3549		0.3248	0.3590	0.3740	
0.3238	0.3457	0.3606		0.3126	0.3394	0.3788	
0.3477	0.3485	0.3368		0.3162	0.3363	0.3980	
0.3215	0.3327	0.3416		0.3230	0.3557	0.3884	
0.3392	0.3283	0.3604		0.3229	0.3289	0.3885	
0.3303	0.3399	0.3454		0.3406	0.3437	0.3979	
0.3391	0.3357	0.3464		0.3250	0.3573	0.3841	
0.3374	0.3372	0.3629		0.3405	0.3309	0.3699	
0.3479	0.3508	0.3567		0.3257	0.3311	0.3793	
0.3321	0.3424	0.3529	<mean	0.3271	0.3440	0.3825	<mean
0.0100	0.0093	0.0115	<SD	0.0106	0.0113	0.0113	<SD

C23+CA3(***)				C26+CA3(***)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3212	0.3599	0.4192		0.3210	0.3451	0.4124	
0.3368	0.3507	0.3997		0.3245	0.3510	0.4015	
0.3296	0.3444	0.4090		0.3342	0.3412	0.4125	
0.3261	0.3557	0.4245		0.3214	0.3411	0.4015	
0.3217	0.3420	0.3982		0.3341	0.3511	0.4112	
0.3246	0.3623	0.4032		0.3309	0.3421	0.4031	
0.3339	0.3479	0.4114		0.3311	0.3416	0.4157	
0.3366	0.3441	0.4118		0.3214	0.3390	0.4048	
0.3361	0.3579	0.4233		0.3245	0.3554	0.4167	
0.3285	0.3402	0.3984		0.3314	0.3445	0.4195	
0.3377	0.3585	0.4215		0.3245	0.3565	0.4015	
0.3313	0.3534	0.4099		0.3348	0.3564	0.4256	
0.3297	0.3592	0.4112		0.3310	0.3594	0.4112	
0.3328	0.3418	0.4224		0.3214	0.3442	0.4214	
0.3254	0.3371	0.3950		0.3245	0.3610	0.4012	
0.3126	0.3504	0.4164		0.3315	0.3445	0.4165	
0.3312	0.3450	0.4012		0.3245	0.3520	0.4028	
0.3325	0.3379	0.3979		0.3315	0.3412	0.4210	
0.3406	0.3434	0.4163		0.3215	0.3510	0.4012	
0.3246	0.3529	0.4167		0.3251	0.3510	0.412	
0.3297	0.3492	0.4104	<mean	0.3272	0.3485	0.4107	<mean
0.0066	0.0077	0.0094	<SD	0.0051	0.0070	0.0082	<SD



C24+CA3(***)				C25+CA3(***)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3334	0.3458	0.4089		0.3261	0.3527	0.3896	
0.3254	0.3498	0.4094		0.3261	0.3517	0.3911	
0.3203	0.3556	0.4098		0.338	0.3435	0.3786	
0.3274	0.3415	0.3986		0.3342	0.3432	0.3885	
0.3297	0.3411	0.4039		0.3207	0.3390	0.4005	
0.3385	0.3513	0.4036		0.3348	0.3482	0.3945	
0.3348	0.3511	0.3991		0.3263	0.3388	0.4025	
0.3305	0.3382	0.3988		0.3196	0.3549	0.3975	
0.3364	0.3354	0.4115		0.3384	0.3482	0.3913	
0.3234	0.3401	0.4097		0.3365	0.3509	0.4137	
0.3256	0.3546	0.3936		0.3353	0.3549	0.4000	
0.3312	0.3414	0.3938		0.3279	0.3500	0.3984	
0.3206	0.3525	0.4053		0.3311	0.3359	0.4007	
0.3234	0.3426	0.4047		0.3232	0.3384	0.3930	
0.3305	0.3423	0.4172		0.3371	0.3466	0.4084	
0.3264	0.3438	0.3932		0.3365	0.3457	0.3948	
0.3201	0.3497	0.4114		0.3268	0.335	0.3893	
0.3340	0.3377	0.4080		0.3285	0.3504	0.3951	
0.3372	0.3372	0.4110		0.3323	0.3477	0.4035	
0.3321	0.3503	0.4002		0.3229	0.3336	0.3941	
0.3290	0.3451	0.4046	<mean	0.3301	0.3455	0.3963	<mean
0.0058	0.0063	0.0068	<SD	0.0061	0.0067	0.0077	<SD

C26+CA4(*)				C21+CA4(*)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3261	0.3527	0.3896		0.3367	0.3450	0.3848	
0.3261	0.3517	0.3911		0.3382	0.3551	0.3609	
0.3380	0.3435	0.3786		0.3211	0.3403	0.3596	
0.3342	0.3432	0.3885		0.3236	0.3539	0.3827	
0.3207	0.3390	0.4005		0.3276	0.3462	0.3564	
0.3348	0.3482	0.3945		0.3411	0.3476	0.3647	
0.3263	0.3388	0.4025		0.3214	0.3624	0.3862	
0.3196	0.3549	0.3975		0.3185	0.3519	0.3757	
0.3384	0.3482	0.3913		0.3193	0.3478	0.3822	
0.3365	0.3509	0.4137		0.3215	0.3442	0.3694	
0.3353	0.3549	0.4000		0.3301	0.3433	0.3667	
0.3279	0.3500	0.3984		0.3294	0.3374	0.3608	
0.3311	0.3359	0.4007		0.3211	0.3372	0.3823	
0.3232	0.3384	0.3930		0.3420	0.3441	0.3848	
0.3371	0.3466	0.4084		0.3265	0.3591	0.3871	
0.3365	0.3457	0.3948		0.3214	0.3491	0.3239	
0.3268	0.335	0.3893		0.3210	0.3583	0.3740	
0.3285	0.3504	0.3951		0.3336	0.3414	0.3784	
0.3323	0.3477	0.4035		0.3198	0.3365	0.3702	
0.3229	0.3336	0.3941		0.3259	0.3389	0.3618	
0.3301	0.3455	0.3963	<mean	0.3270	0.3470	0.3706	<mean
0.0061	0.0067	0.0077	<SD	0.0076	0.0077	0.0150	<SD

C22+CA4(*)				C23+CA4(*)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3410	0.3581	0.3613		0.3310	0.3463	0.3436	
0.3216	0.3532	0.3833		0.3364	0.3431	0.3621	
0.3253	0.3425	0.3706		0.3123	0.3372	0.3561	
0.3359	0.3375	0.3828		0.3156	0.3304	0.3432	
0.3266	0.3553	0.3613		0.3479	0.3235	0.3512	
0.3263	0.3495	0.3694		0.3395	0.3351	0.3634	
0.3231	0.3553	0.3649		0.3344	0.3399	0.3382	
0.3281	0.3371	0.3751		0.3442	0.3193	0.3325	
0.3317	0.3495	0.3575		0.3334	0.3514	0.3555	
0.3260	0.3621	0.3751		0.3184	0.3313	0.3394	
0.3210	0.3536	0.3697		0.3221	0.3338	0.3390	
0.3291	0.3442	0.3867		0.3321	0.3436	0.3590	
0.3374	0.3462	0.3588		0.3167	0.3400	0.3386	
0.3423	0.3480	0.3675		0.3305	0.3314	0.3354	
0.3312	0.3621	0.3675		0.3413	0.3214	0.3353	
0.3306	0.3425	0.3587		0.3270	0.3345	0.3622	
0.3236	0.3437	0.3681		0.3287	0.3287	0.3572	
0.3221	0.3486	0.3656		0.3317	0.3488	0.3586	
0.3399	0.3415	0.3690		0.3137	0.3183	0.3607	
0.3253	0.3567	0.3862		0.3403	0.3261	0.3633	
0.3294	0.3494	0.3700	<mean	0.3299	0.3342	0.3497	<mean
0.0067	0.0075	0.0091	<SD	0.0105	0.0097	0.0112	<SD

C23+CA4(**)				C23+CA4(***)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3266	0.3623	0.4044		0.3214	0.3394	0.4187	
0.3384	0.3553	0.3904		0.3351	0.3446	0.4175	
0.3168	0.3450	0.4001		0.3349	0.3356	0.4110	
0.3424	0.3454	0.4108		0.3226	0.3357	0.4034	
0.3379	0.3386	0.4075		0.3308	0.3550	0.4264	
0.3220	0.3351	0.3845		0.3175	0.3528	0.4259	
0.3210	0.3446	0.3895		0.3222	0.3352	0.4038	
0.3262	0.3421	0.3972		0.3200	0.3393	0.4209	
0.3234	0.3537	0.3888		0.3302	0.3423	0.4041	
0.3400	0.3570	0.3945		0.3265	0.3407	0.4249	
0.3200	0.3514	0.4028		0.3412	0.3390	0.4304	
0.3221	0.3466	0.3984		0.3380	0.3466	0.4348	
0.3283	0.3404	0.3865		0.3295	0.3524	0.4388	
0.3362	0.3516	0.3967		0.3250	0.3410	0.4285	
0.3342	0.3534	0.3896		0.3416	0.3615	0.4044	
0.3225	0.3544	0.4105		0.3365	0.3502	0.4058	
0.3387	0.3430	0.3855		0.3432	0.3485	0.4232	
0.3309	0.3601	0.3839		0.3380	0.3420	0.4163	
0.3373	0.3400	0.3952		0.3309	0.3455	0.4119	
0.3428	0.3482	0.3817		0.3194	0.3393	0.4130	
0.3304	0.3484	0.3949	<mean	0.3302	0.3443	0.4182	<mean
0.0084	0.0075	0.0090	<SD	0.0081	0.0072	0.0109	<SD

C26+CA1(*)				C23+CA1(*)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3253	0.3450	0.3569		0.3242	0.3447	0.3658	
0.3238	0.3361	0.3723		0.3312	0.3397	0.3754	
0.3166	0.3348	0.3487		0.3268	0.3378	0.3759	
0.3293	0.3464	0.3725		0.3214	0.3415	0.3459	
0.3416	0.3446	0.3590		0.3209	0.3480	0.3549	
0.3172	0.3530	0.3533		0.3245	0.3486	0.3748	
0.3283	0.3372	0.3572		0.3314	0.3510	0.3576	
0.3280	0.3526	0.3573		0.3214	0.3318	0.3712	
0.3336	0.3435	0.3713		0.3256	0.3450	0.3549	
0.3231	0.342	0.3787		0.3310	0.3348	0.3576	
0.3218	0.3454	0.3788		0.3264	0.3611	0.3594	
0.3272	0.3604	0.3560		0.3318	0.3451	0.3687	
0.3263	0.3482	0.3496		0.3214	0.3412	0.3749	
0.3282	0.3626	0.3588		0.3218	0.3368	0.3754	
0.3286	0.3569	0.3698		0.3242	0.3310	0.3576	
0.3410	0.3518	0.3525		0.3214	0.3486	0.3486	
0.3225	0.3394	0.3788		0.3314	0.3424	0.3586	
0.3256	0.3542	0.3519		0.3286	0.3612	0.3594	
0.3366	0.3446	0.3650		0.3289	0.3510	0.3594	
0.3280	0.3477	0.3558		0.3296	0.3498	0.3549	
0.3276	0.3473	0.3628	<mean	0.3262	0.3446	0.3625	<mean
0.0066	0.0077	0.0102	<SD	0.0040	0.0083	0.0095	<SD

C25+CA1(*)				C27+CA1(*)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3414	0.3348	0.3500		0.3201	0.3320	0.3684	
0.3254	0.3463	0.3526		0.3413	0.3480	0.3474	
0.3237	0.3346	0.3536		0.3316	0.3522	0.3542	
0.3376	0.3363	0.3592		0.3203	0.3422	0.3562	
0.3203	0.3627	0.3541		0.3346	0.3600	0.3550	
0.3433	0.3439	0.3667		0.3289	0.3601	0.3588	
0.3187	0.3565	0.3672		0.3242	0.3352	0.3480	
0.3187	0.3441	0.3496		0.3297	0.3345	0.3607	
0.3344	0.3474	0.3624		0.3248	0.3477	0.3559	
0.3235	0.3450	0.3554		0.3301	0.3449	0.3630	
0.3254	0.3477	0.3501		0.3358	0.3334	0.3697	
0.3182	0.3457	0.3563		0.3248	0.3395	0.3469	
0.3190	0.3460	0.3773		0.3238	0.3347	0.3733	
0.3363	0.3527	0.3704		0.3334	0.3481	0.3560	
0.3366	0.3457	0.3620		0.3311	0.3480	0.3635	
0.3414	0.3395	0.3520		0.3240	0.3435	0.3690	
0.3239	0.3368	0.3769		0.3224	0.3550	0.3702	
0.3279	0.3351	0.3629		0.3391	0.3468	0.3663	
0.3359	0.3480	0.3505		0.3225	0.3471	0.3575	
0.3289	0.3528	0.3673		0.3357	0.3341	0.3548	
0.3290	0.3451	0.3598	<mean	0.3289	0.3444	0.3597	<mean
0.0086	0.0075	0.0088	<SD	0.0063	0.0086	0.0080	<SD

C28+CA1(*)				C23+CA2(*)			
Weight before coating (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3299	0.3506	0.3610		0.3458	0.3555	0.3374	
0.3364	0.3503	0.3617		0.3359	0.3435	0.3647	
0.3358	0.3506	0.3692		0.3294	0.3537	0.3606	
0.3386	0.3551	0.3706		0.3195	0.3407	0.3511	
0.3358	0.3519	0.3566		0.3218	0.3584	0.3421	
0.3306	0.3582	0.3597		0.3383	0.3541	0.3748	
0.3351	0.3467	0.3697		0.3489	0.3348	0.3771	
0.3293	0.3534	0.3705		0.3344	0.3614	0.3694	
0.3337	0.3521	0.3730		0.3223	0.3337	0.3558	
0.3352	0.3478	0.3679		0.3178	0.3634	0.3645	
0.3269	0.3541	0.3640		0.3115	0.3537	0.3685	
0.3328	0.3465	0.3671		0.3402	0.3288	0.3697	
0.3332	0.3561	0.3622		0.3309	0.3422	0.3374	
0.3356	0.3501	0.3586		0.3394	0.3230	0.3789	
0.3310	0.3509	0.3598		0.3486	0.3627	0.3720	
0.3336	0.3483	0.3645		0.3416	0.3592	0.3689	
0.3379	0.3551	0.3618		0.3398	0.3470	0.3475	
0.3376	0.3464	0.3678		0.3283	0.3264	0.3434	
0.3388	0.3583	0.3623		0.3375	0.3534	0.3650	
0.3307	0.3502	0.3641		0.3308	0.3513	0.3473	
0.3339	0.3516	0.3646	<mean	0.3331	0.3473	0.3598	<mean
0.0033	0.0037	0.0046	<SD	0.0105	0.0126	0.0135	<SD

C23+CA3(*)				C23+CA3(**)			
Weight before coating .(g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3402	0.3428	0.3715		0.3405	0.3241	0.3939	
0.3358	0.3226	0.3440		0.3282	0.3317	0.3995	
0.3279	0.3413	0.3341		0.3098	0.3612	0.3627	
0.3319	0.3560	0.3352		0.3372	0.3486	0.3870	
0.3186	0.3382	0.3634		0.3290	0.3527	0.3891	
0.3234	0.3495	0.3546		0.3190	0.3459	0.3803	
0.3417	0.3575	0.3707		0.3235	0.3352	0.3783	
0.3184	0.3492	0.3508		0.3431	0.3626	0.3921	
0.3304	0.3509	0.3444		0.3248	0.3456	0.3645	
0.3121	0.3493	0.3580		0.3432	0.3436	0.3619	
0.3403	0.3321	0.3653		0.3132	0.3461	0.3815	
0.3345	0.3390	0.3549		0.3248	0.3590	0.3740	
0.3238	0.3457	0.3606		0.3126	0.3394	0.3788	
0.3477	0.3485	0.3368		0.3162	0.3363	0.3980	
0.3215	0.3327	0.3416		0.3230	0.3557	0.3884	
0.3392	0.3283	0.3604		0.3229	0.3289	0.3885	
0.3303	0.3399	0.3454		0.3406	0.3437	0.3979	
0.3391	0.3357	0.3464		0.3250	0.3573	0.3841	
0.3374	0.3372	0.3629		0.3405	0.3309	0.3699	
0.3479	0.3508	0.3567		0.3257	0.3311	0.3793	
0.3321	0.3424	0.3529	<mean	0.3271	0.3440	0.3825	<mean
0.0100	0.0093	0.0115	<SD	0.0106	0.0113	0.0113	<SD



C23+CA3(***)				C26+CA3(***)			
Weight before coating .(g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3212	0.3599	0.4192		0.3210	0.3451	0.4124	
0.3368	0.3507	0.3997		0.3245	0.3510	0.4015	
0.3296	0.3444	0.4090		0.3342	0.3412	0.4125	
0.3261	0.3557	0.4245		0.3214	0.3411	0.4015	
0.3217	0.3420	0.3982		0.3341	0.3511	0.4112	
0.3246	0.3623	0.4032		0.3309	0.3421	0.4031	
0.3339	0.3479	0.4114		0.3311	0.3416	0.4157	
0.3366	0.3441	0.4118		0.3214	0.3390	0.4048	
0.3361	0.3579	0.4233		0.3245	0.3554	0.4167	
0.3285	0.3402	0.3984		0.3314	0.3445	0.4195	
0.3377	0.3585	0.4215		0.3245	0.3565	0.4015	
0.3313	0.3534	0.4099		0.3348	0.3564	0.4256	
0.3297	0.3592	0.4112		0.3310	0.3594	0.4112	
0.3328	0.3418	0.4224		0.3214	0.3442	0.4214	
0.3254	0.3371	0.3950		0.3245	0.3610	0.4012	
0.3126	0.3504	0.4164		0.3315	0.3445	0.4165	
0.3312	0.3450	0.4012		0.3245	0.3520	0.4028	
0.3325	0.3379	0.3979		0.3315	0.3412	0.4210	
0.3406	0.3434	0.4163		0.3215	0.3510	0.4012	
0.3246	0.3529	0.4167		0.3251	0.3510	0.4120	
0.3297	0.3492	0.4104	<mean	0.3274	0.3483	0.4106	<mean
0.0066	0.0077	0.0094	<SD	0.0051	0.0070	0.0082	<SD

C24+CA3(***)				C25+CA3(***)			
Weight before coating (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3334	0.3458	0.4089		0.3261	0.3527	0.3896	
0.3254	0.3498	0.4094		0.3261	0.3517	0.3911	
0.3203	0.3556	0.4098		0.3380	0.3435	0.3786	
0.3274	0.3415	0.3986		0.3342	0.3432	0.3885	
0.3297	0.3411	0.4039		0.3207	0.3390	0.4005	
0.3385	0.3513	0.4036		0.3348	0.3482	0.3945	
0.3348	0.3511	0.3991		0.3263	0.3388	0.4025	
0.3305	0.3382	0.3988		0.3196	0.3549	0.3975	
0.3364	0.3354	0.4115		0.3384	0.3482	0.3913	
0.3234	0.3401	0.4097		0.3365	0.3509	0.4137	
0.3256	0.3546	0.3936		0.3353	0.3549	0.4000	
0.3312	0.3414	0.3938		0.3279	0.3500	0.3984	
0.3206	0.3525	0.4053		0.3311	0.3359	0.4007	
0.3234	0.3426	0.4047		0.3232	0.3384	0.3930	
0.3305	0.3423	0.4172		0.3371	0.3466	0.4084	
0.3264	0.3438	0.3932		0.3365	0.3457	0.3948	
0.3201	0.3497	0.4114		0.3268	0.3350	0.3893	
0.3340	0.3377	0.4080		0.3285	0.3504	0.3951	
0.3372	0.3372	0.4110		0.3323	0.3477	0.4035	
0.3321	0.3503	0.4002		0.3229	0.3336	0.3941	
0.3290	0.3451	0.4046	<mean	0.3301	0.3455	0.3963	<mean
0.0058	0.0063	0.0068	<SD	0.0061	0.0067	0.0077	<SD

C26+CA4(*)				C21+CA4(*)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3229	0.3531	0.3785		0.3367	0.3450	0.3848	
0.3287	0.3487	0.3750		0.3382	0.3551	0.3609	
0.3254	0.3535	0.3641		0.3211	0.3403	0.3596	
0.3320	0.3637	0.3821		0.3236	0.3539	0.3827	
0.3295	0.3457	0.3728		0.3276	0.3462	0.3564	
0.3324	0.3424	0.3683		0.3411	0.3476	0.3647	
0.3278	0.3564	0.3645		0.3214	0.3624	0.3862	
0.3244	0.3550	0.3832		0.3185	0.3519	0.3757	
0.3400	0.3401	0.3697		0.3193	0.3478	0.3822	
0.3211	0.3477	0.3680		0.3215	0.3442	0.3694	
0.3281	0.3468	0.3748		0.3301	0.3433	0.3667	
0.3375	0.3413	0.3594		0.3294	0.3374	0.3608	
0.3203	0.3364	0.3799		0.3211	0.3372	0.3823	
0.3309	0.3485	0.3767		0.3420	0.3441	0.3848	
0.3261	0.3452	0.3788		0.3265	0.3591	0.3871	
0.3276	0.3511	0.3741		0.3214	0.3491	0.3239	
0.3277	0.3615	0.3778		0.3210	0.3583	0.3740	
0.3376	0.3511	0.3775		0.3336	0.3414	0.3784	
0.3353	0.3492	0.3741		0.3198	0.3365	0.3702	
0.3341	0.3628	0.3698		0.3259	0.3389	0.3618	
0.3295	0.3500	0.3735	<mean	0.3270	0.3470	0.3706	<mean
0.0055	0.0074	0.0063	<SD	0.0076	0.0077	0.0150	<SD

C22+CA4(*)				C23+CA4(*)			
Weight before coating .(g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)		Weight before coating. (g)	Weight after HPMC coating. (g)	Weight after CA coating. (g)	
0.3410	0.3581	0.3613		0.3310	0.3463	0.3436	
0.3216	0.3532	0.3833		0.3364	0.3431	0.3621	
0.3253	0.3425	0.3706		0.3123	0.3372	0.3561	
0.3359	0.3375	0.3828		0.3156	0.3304	0.3432	
0.3266	0.3553	0.3613		0.3479	0.3235	0.3512	
0.3263	0.3495	0.3694		0.3395	0.3351	0.3634	
0.3231	0.3553	0.3649		0.3344	0.3399	0.3382	
0.3281	0.3371	0.3751		0.3442	0.3193	0.3325	
0.3317	0.3495	0.3575		0.3334	0.3514	0.3555	
0.3260	0.3621	0.3751		0.3184	0.3313	0.3394	
0.3210	0.3536	0.3697		0.3221	0.3338	0.3390	
0.3291	0.3442	0.3867		0.3321	0.3436	0.3590	
0.3374	0.3462	0.3588		0.3167	0.3400	0.3386	
0.3423	0.3480	0.3675		0.3305	0.3314	0.3354	
0.3312	0.3621	0.3675		0.3413	0.3214	0.3353	
0.3306	0.3425	0.3587		0.3270	0.3345	0.3622	
0.3236	0.3437	0.3681		0.3287	0.3287	0.3572	
0.3221	0.3486	0.3656		0.3317	0.3488	0.3586	
0.3399	0.3415	0.3690		0.3137	0.3183	0.3607	
0.3253	0.3567	0.3862		0.3403	0.3261	0.3633	
0.3294	0.3494	0.3700	<mean	0.3299	0.3342	0.3497	<mean
0.0067	0.0075	0.0091	<SD	0.0105	0.0097	0.0112	<SD

C23+CA4(**)				C23+CA4(***)			
Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)		Weight before coating (g)	Weight after HPMC coating (g)	Weight after CA coating (g)	
0.3266	0.3623	0.4044		0.3266	0.3623	0.4044	
0.3384	0.3553	0.3904		0.3384	0.3553	0.3904	
0.3168	0.3450	0.4001		0.3168	0.3450	0.4001	
0.3424	0.3454	0.4108		0.3424	0.3454	0.4108	
0.3379	0.3386	0.4075		0.3379	0.3386	0.4075	
0.3220	0.3351	0.3845		0.3220	0.3351	0.3845	
0.3210	0.3446	0.3895		0.3210	0.3446	0.3895	
0.3262	0.3421	0.3972		0.3262	0.3421	0.3972	
0.3234	0.3537	0.3888		0.3234	0.3537	0.3888	
0.3400	0.3570	0.3945		0.3400	0.3570	0.3945	
0.3200	0.3514	0.4028		0.3200	0.3514	0.4028	
0.3221	0.3466	0.3984		0.3221	0.3466	0.3984	
0.3283	0.3404	0.3865		0.3283	0.3404	0.3865	
0.3362	0.3516	0.3967		0.3362	0.3516	0.3967	
0.3342	0.3534	0.3896		0.3342	0.3534	0.3896	
0.3225	0.3544	0.4105		0.3225	0.3544	0.4105	
0.3387	0.3430	0.3855		0.3387	0.3430	0.3855	
0.3309	0.3601	0.3839		0.3309	0.3601	0.3839	
0.3373	0.3400	0.3952		0.3373	0.3400	0.3952	
0.3428	0.3482	0.3817		0.3428	0.3482	0.3817	
0.3304	0.3484	0.3949	<mean	0.3304	0.3484	0.3949	<mean
0.0084	0.0075	0.0090	<SD	0.0084	0.0075	0.0090	<SD

Table 5B : Weight of CA film after dissolution test 12 hours.

Formula	No.1	No.2	No.3	No.4	No.5	No.6	AVG	SD	%CV
C23+CA1(*)+0 mm.	0.0076	0.0074	0.0077	0.0079	0.0075	0.0080	0.0077	0.0002	2.5974
C23+CA1(*)+0 .4mm.	0.0076	0.0077	0.0082	0.0075	0.0080	0.0078	0.0078	0.0003	3.8462
C23+CA1(*)+0 .8mm	0.0075	0.0071	0.0073	0.0077	0.0076	0.0080	0.0075	0.0003	4.0000
C23+CA1(*)+1 mm	0.0076	0.0079	0.0076	0.0078	0.0071	0.0079	0.0077	0.0003	3.8961
C25+CA1(*)+0 mm.	0.0118	0.0117	0.0116	0.0117	0.0120	0.0115	0.0117	0.0002	1.7094
C25+CA1(*)+0 .8 mm.	0.0117	0.0114	0.0118	0.0121	0.0120	0.0119	0.0118	0.0002	1.6949
C28+CA1(*)+0 mm.	0.0112	0.0126	0.0112	0.0124	0.0113	0.0114	0.0117	0.0006	5.1282
C28+CA1(*)+0 .8 mm.	0.0113	0.0111	0.0112	0.0113	0.0125	0.0112	0.0114	0.0005	4.3860
C26+CA1(*)+0 mm.	0.0122	0.0121	0.0119	0.0120	0.0123	0.0119	0.0121	0.0002	1.6529
C26+CA1(*)+0 .8 mm.	0.0118	0.0119	0.0115	0.0124	0.0125	0.0112	0.0119	0.0005	4.2017
C27+CA1(*)+0 mm.	0.0114	0.0111	0.0121	0.0115	0.0113	0.0115	0.0115	0.0003	2.6087
C27+CA1(*)+0 .8 mm.	0.0114	0.0121	0.0125	0.0123	0.0115	0.0116	0.0119	0.0005	4.2017
C23+CA2(*)+0 mm.	0.0103	0.0112	0.0115	0.0114	0.0117	0.0112	0.0112	0.0005	4.4643
C23+CA2(*)+0 .4 mm.	0.0110	0.0115	0.0107	0.0109	0.0116	0.0112	0.0112	0.0004	3.5714
C23+CA3(*)+0 mm.	0.0112	0.0115	0.0116	0.0115	0.0111	0.0108	0.0113	0.0003	2.6549
C23+CA3(*)+0 .4 mm.	0.0110	0.0114	0.0116	0.0117	0.0110	0.0115	0.0114	0.0003	2.6316
C21+CA4(*)+0 mm.	0.0126	0.0128	0.0136	0.0132	0.0130	0.0131	0.0131	0.0003	2.2901

Formula	No.1	No.2	No.3	No.4	No.5	No.6	AVG	SD	%CV
C21+CA4(*)+0 mm.+ 0.1588M KCl	0.0132	0.0136	0.0148	0.0139	0.0145	0.0137	0.0140	0.0006	4.2857
C21+CA4(*)+0 mm.+ 0.5M KCl	0.0126	0.0174	0.0133	0.0122	0.0133	0.0140	0.0138	0.0019	13.7681
C21+CA4(*)+0 mm.+ 1M KCl	0.0131	0.0132	0.0126	0.0137	0.0131	0.0144	0.0134	0.0006	4.4776
C21+CA4(*)+0 mm.+ 2M KCl	0.0130	0.0139	0.0141	0.0131	0.0128	0.0138	0.0135	0.0005	3.7037
C21+CA4(*)+0 mm.+ PH1.2(isotonic)	0.0119	0.0114	0.0118	0.0124	0.0121	0.0123	0.0120	0.0004	3.3333
C21+CA4(*)+0 mm.+ PH6.8(isotonic)	0.0115	0.0137	0.0129	0.012	0.0122	0.0143	0.0128	0.0011	8.5938
C21+CA4(*)+0 mm.+ PH change	0.0142	0.0130	0.0132	0.0125	0.0129	0.0138	0.0133	0.0006	4.5113
C22+CA4(*)+0 mm.	0.0110	0.0117	0.0115	0.0110	0.0105	0.0122	0.0113	0.0006	5.3097
C23+CA4(*)+0 mm.	0.0089	0.0084	0.0082	0.0093	0.0081	0.0088	0.0086	0.0005	5.8140
C23+CA4(*)+0. 4 mm.	0.0086	0.0082	0.0089	0.0091	0.0088	0.0085	0.0087	0.0003	3.4483
C26+CA4(*)+0 mm.	0.0132	0.0120	0.0127	0.0123	0.0128	0.0117	0.0125	0.0006	4.8000
C23+CA3(**)+0 mm.	0.0273	0.0280	0.0272	0.0292	0.0296	0.0270	0.0281	0.0011	3.9146
C23+CA3(**)+0 .4 mm.	0.0281	0.0290	0.0287	0.0285	0.0273	0.0279	0.0283	0.0006	2.1201

Formula	No.1	No.2	No.3	No.4	No.5	No.6	AVG	SD	%CV
C23+CA4(**)+ 0 mm.	0.0295	0.0263	0.0292	0.0281	0.0271	0.0298	0.0283	0.0014	4.9470
C23+CA3(***) +0mm.	0.0364	0.0362	0.0359	0.0356	0.0354	0.0351	0.0358	0.0005	1.3966
C23+CA3(***) +0.4mm.	0.0348	0.0356	0.0361	0.0359	0.0361	0.0350	0.0356	0.0006	1.6854
C23+CA3(***) +0.8mm.	0.0347	0.0353	0.0360	0.0361	0.0358	0.0359	0.0356	0.0005	1.4045
C23+CA3(***) +1 mm.	0.0365	0.0346	0.0356	0.0352	0.0358	0.0362	0.0357	0.0007	1.9608
C23+CA3(***) +1 mm.(beside)	0.0366	0.0358	0.0355	0.0362	0.0358	0.0353	0.0359	0.0005	1.3928
C23+CA3(***) +1 mm.(2holes on the ending)	0.0345	0.0346	0.0365	0.0370	0.0370	0.0361	0.0344	0.0029	8.4302
C24+CA3(***) +1 mm.	0.0345	0.0346	0.0365	0.0370	0.0370	0.0361	0.0360	0.0011	3.0556
C25+CA3(***) +1 mm.	0.0375	0.0372	0.0281	0.0329	0.0354	0.0348	0.0343	0.0035	10.2041
C25+CA3(***) +1mm.+ basket 100 rpm.	0.0366	0.0379	0.0329	0.0416	0.0377	0.0362	0.0372	0.0028	7.5269
C25+CA3(***) +1mm.+ paddle 50 rpm.	0.0365	0.0356	0.0353	0.0368	0.0345	0.0372	0.0360	0.0010	2.7778
C26+CA3(***) +1 mm.	0.0361	0.0358	0.0351	0.0354	0.0361	0.0364	0.0358	0.0005	1.3966
C23+CA4(***) +0 mm.	0.0419	0.0412	0.0414	0.0412	0.0421	0.0421	0.0417	0.0004	0.9592

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Table 6B : Orifice size from measurement with optical microscope(X100).

Size of driller	Orifice size from measurement with optical microscope.	Size of driller	Orifice size from measurement with optical microscope.
0.4 mm.	0.448	0.6 mm.	0.612
	0.448		0.621
	0.432		0.613
	0.440		0.614
	0.440		0.624
	0.392		0.612
	0.408		0.621
	0.448		0.612
	0.472		0.613
	0.424		0.621
	0.408		0.614
	0.456		0.621
	0.416		0.616
	0.440		0.621
	0.424		0.628
	0.424		0.646
	0.408		0.631
	0.416		0.625
	0.416		0.631
	0.416		0.626
Mean+/-SD	0.429+/- 0.020	Mean+/-SD	0.621+/- 0.009

Size of driller	Orifice size from measurement with optical microscope.	Size of driller	Orifice size from measurement with optical microscope.
0.8 mm.	0.835	1 mm.	1.024
	0.824		1.051
	0.829		1.026
	0.824		1.031
	0.831		1.042
	0.821		1.053
	0.846		1.061
	0.844		1.049
	0.825		1.044
	0.831		1.031
	0.824		1.042
	0.835		1.035
	0.814		1.024
	0.835		1.035
	0.826		1.048
	0.831		1.051
	0.846		1.062
	0.824		1.036
	0.842		1.046
	0.831		1.064
Mean+/-SD	0.831+/-0.009	Mean+/-SD	1.043+/-0.012

\* OM = optical microscope.

## APPENDIX C

### Percentage Amount of Drug Release

Table 1C : Cumulative percent drug release of propranolol HCl coated capsules(HPMC capsule No.1) from capsules containing drug:NaCl(1:1)(formula C23) were coated with 335 ml. of CA solution plasticized with 23.08 %w/w of DEP in polymer (coating formula DP1) with orifice size of 0.25 mm and 0.4 mm.

Time (hr.)	0.25 mm.					0.4 mm.				
	1	2	3	AVG	SD	1	2	3	AVG	SD
0	0	0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0.4276	0	0.1425	0.2469
3	0	0	0	0	0	0.2825	0.8511	0.0446	0.3927	0.4144
4	0.5320	0.2593	0.2535	0.3483	0.1591	0.5526	1.2203	0.3004	0.6911	0.4753
5	1.1730	0.4960	0.7846	0.7758	0.3539	0.9300	1.4426	0.6925	1.0217	0.3834
6	1.3180	0.8702	1.2575	1.1065	0.2628	1.4566	2.0444	1.2223	1.5744	0.4235
7	1.9685	1.3890	1.6338	1.6217	0.3052	2.0528	2.6469	1.8740	2.1912	0.4046
8	2.5942	2.0195	2.7822	2.4233	0.4185	2.4871	3.0934	2.6314	2.7373	0.3167
10	3.0907	2.5863	3.6769	3.0759	0.5659	3.6165	4.4090	3.6001	3.8752	0.4624
12	4.6070	4.0743	4.7908	4.4486	0.3933	4.7349	5.4139	4.4515	4.8668	0.4946

Table 2C : Cumulative percent drug release of propranolol HCl coated capsules(HPMC capsuleNo.1) from capsules containing drug:NaCl(1:1)(formula 23) were coated with 335 ml. of CA solution plasticized with 23.08 %w/w of DEP in polymer (coating formula DP1) with orifice size of 0.6 mm and 0.8 mm.

Time (hr.)	0.6 mm.					0.8 mm.				
	1	2	3	AVG	SD	1	2	3	AVG	SD
0	0	0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0.0214	0	0.4856	0.1690	0.2744	0.2535	0.3638	0.2419	0.2864	0.0774
5	0.5741	0.6903	1.2618	0.6519	0.3893	0.4710	0.9596	0.3026	0.5777	0.3819
6	1.2458	0.9855	1.6975	1.1194	0.3943	1.0564	1.2255	0.5264	0.9361	0.2894
7	2.0409	1.8699	2.6253	1.9885	0.4272	1.3466	1.8772	0.7005	1.3081	0.5691
8	2.8447	2.2824	3.4413	2.6660	0.6156	2.0401	2.4779	1.2303	1.9161	0.5618
10	3.9763	3.5059	4.5969	3.8362	0.5823	3.0604	3.6595	2.4622	3.0607	0.5988
12	5.8687	5.2010	6.1884	5.5625	0.5417	4.4166	4.8423	3.8062	4.3550	0.4873

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Table 3C : Cumulative percent drug release of propranolol HCl coated capsules(HPMC capsuleNo.1) from capsules containing drug:NaCl(1:1)(formula 23) were coated with 335 ml of CA solution plasticed with 23.08 %w/w of DEP in polymer (coating formula DP1) with orifice size of 1 mm.

1 mm.					
Time (hr.)	1	2	3	AVG	SD
0	0	0	0	0	0
0.25	0	0	0	0	0
0.5	0	0	0	0	0
0.75	0	0	0	0	0
1	0	0	0	0	0
1.5	0	0	0	0	0
2	0	0	0	0	0
2.5	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0.5378	0.8801	0	0.4726	0.4437
6	0.8107	1.4469	0.1259	0.7945	0.6606
7	1.4752	2.0547	0.8815	1.4705	0.5866
8	2.6925	2.9939	2.0865	2.5910	0.4621
10	4.3814	4.9819	3.6239	4.3291	0.6805
12	5.0793	6.8176	4.3948	5.4306	1.2490

Table 4C : Cumulative percent drug release of propranolol HCl coated capsules(HPMC capsuleNo.1) from capsules containing drug:NaCl(1:1)(formula 23) were coated with 335 ml of CA solution plasticized with 23.08 %w/w of DEP in polymer (coating formula DP1) with 2 holes and 3 holes of orifice size 0.6 mm.

Time (hr.)	2 holes					3 holes				
	1	2	3	AVG	SD	1	2	3	AVG	SD
0	0	0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0.6887	0.0214	0	0.2367	0.3916
2	0	0.4624	0	0.1541	0.2670	1.2185	0.1145	0.1085	0.4805	0.6391
2.5	0	0.6126	0	0.2042	0.3537	1.5511	0.4059	0.1445	0.7005	0.7481
3	0.1665	0.7586	0	0.3061	0.3949	1.8702	0.6947	0.1751	0.9113	0.8697
4	0.5571	1.3471	0.7525	0.8833	0.4077	2.6852	1.2245	0.6934	1.5267	1.0233
5	1.1376	1.8840	1.5093	1.5080	0.3698	3.6775	2.6710	1.8556	2.7270	0.9048
6	1.8116	2.7168	1.8799	2.1339	0.5002	5.2839	3.8144	2.6594	3.9115	1.3075
7	2.7192	3.4658	2.7302	2.9695	0.4240	5.7067	7.3374	4.4118	5.8109	1.4651
8	3.5207	4.4897	3.3402	3.7813	0.6144	7.4391	9.7676	5.6089	7.5975	2.0834
10	5.6071	6.2615	4.6355	5.4991	0.8150	10.7913	12.7403	7.1553	10.2213	2.8318
12	7.7975	8.6267	7.1633	7.8603	0.7304	16.3383	19.2667	11.9093	15.8304	3.7017

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Table 5C : Cumulative percent drug release of propranolol HCl coated capsules(HPMC capsuleNo.1) from capsules containing drug:NaCl(1:1)(formula 23) were coated with 335 ml of CA solution. plasticized with 23.08 %w/w of DEP in polymer (coating formula DP1) with 4 holes and 5 holes of orifice size 0.6 mm, .

Time (hr.)	4 holes					5 holes				
	1	2	3	AVG	SD	1	2	3	AVG	SD
0	0	0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
1.5	0.0214	0.0795	0	0.0336	0.0411	0.6829	0.4276	0.2999	0.4701	0.1950
2	1.8493	0.2080	0	0.6858	1.0130	1.2126	0.6876	0.8080	0.9027	0.2750
2.5	2.4558	0.5004	0.1549	1.0370	1.2408	1.8294	1.0027	1.0200	1.2840	0.4724
3	3.0360	0.7905	0.3423	1.3890	1.4440	2.4471	1.3212	1.2285	1.6656	0.6784
4	4.4021	1.3908	0.6652	2.1412	1.9679	3.6343	2.3800	2.6228	2.8790	0.6653
5	5.6279	3.4193	1.8039	3.6056	1.9065	5.1244	4.9183	3.7539	4.5989	0.7390
6	7.9924	7.0832	3.7907	6.2773	2.2002	5.6849	8.3258	4.6013	6.2040	1.9157
7	9.6456	10.2710	5.9850	8.6224	2.3084	9.0128	11.5094	7.9758	9.4993	1.8163
8	11.7050	11.9094	7.7158	10.4320	2.3565	12.0694	14.8841	11.4917	12.8151	1.8150
10	14.7202	19.2449	10.8924	14.9411	4.1799	17.8801	20.8478	16.8385	18.5221	2.0803
12	18.0808	23.8407	14.9041	18.9304	4.5305	26.7478	29.1735	23.4617	26.4610	2.8667

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Table 6C: Cumulative percent drug release of propranolol HCl coated capsules(HPMC capsuleNo.1) from capsules containing drug:NaCl (1:1)(formula 23) were coated with 335 ml of CA solution plasticized with 23.08 %w/w of DEP in polymer (coating formula DP1) with 6 holes of orifice size 0.6 mm.

6 holes					
Time (hr.)	1	2	3	AVG	SD
0	0	0	0	0	0
0.25	0	0	0	0	0
0.5	0	0	0	0	0
0.75	0	0	0	0	0
1	0	0	0	0	0
1.5	0	0.3638	0	0.1213	0.2100
2	0.3289	0.6945	0	0.3411	0.3474
2.5	0.5183	1.2594	0.1607	0.6461	0.5604
3	0.7038	1.7928	0.3597	0.9521	0.7481
4	1.7907	3.2189	0.6944	1.9013	1.2659
5	2.4080	4.4146	1.2243	2.6823	1.6127
6	4.1576	6.0293	3.0131	4.4000	1.5226
7	5.9437	8.9263	4.3982	6.4227	2.3017
8	7.3952	11.0076	6.2334	8.2121	2.4897
10	11.5542	15.2462	9.7304	12.1769	2.8101
12	14.6852	19.1591	11.9369	15.2604	3.6453



Table 7C: Cumulative percent drug release of propranolol HCl coated capsules(gelatin capsule No.1) from capsules containing drug:NaCl(1:1)(formula 23) were coated with 335 ml of CA solution plasticized with 23.08 %w/w of PEG400 in polymer (coating formula DP1) with orifice size of 0.4 mm and 0.8 mm.

Time (hr.)	0.4 mm.					0.8 mm.				
	1	2	3	AVG	SD	1	2	3	AVG	SD
0	0	0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0
0.75	0.4044	0.1955	0.3463	0.3154	0.1078	0	0	1.0078	0.3359	0.5819
1	0.5771	0.3891	0.7969	0.5877	0.2041	0.8105	0.8337	1.3149	0.9864	0.2848
1.5	0.7865	0.8982	1.7283	1.1377	0.5145	1.8697	1.6901	3.5979	2.3859	1.0535
2	2.2167	1.9641	3.2327	2.4712	0.6715	6.4507	3.5538	6.9564	5.6536	1.8360
2.5	3.4653	2.7864	5.0958	3.7825	1.1869	10.5312	5.0957	9.8701	8.4990	2.9658
3	4.7275	3.5248	6.4340	4.8954	1.4619	13.0027	6.4976	11.2953	10.2652	3.3727
4	5.9802	5.1935	8.4478	6.5405	1.6980	14.7520	8.3729	12.9903	12.0384	3.2944
5	7.4840	7.3156	9.9668	8.2555	1.4844	15.9969	10.0303	14.1575	13.3949	3.0555
6	9.3114	9.4083	11.7395	10.1531	1.3747	17.7064	11.3048	15.2606	14.7573	3.2303
7	11.0305	11.6569	13.8789	12.1888	1.4968	19.2705	12.5168	16.9661	16.2511	3.4331
8	13.0113	14.1614	16.4119	14.5282	1.7297	21.2793	14.1297	18.5437	17.9842	3.6075
10	16.4690	20.3534	21.8145	19.5456	2.7628	25.5128	17.9637	22.1131	21.8632	3.7807
12	21.6115	28.1152	29.3174	26.3480	4.1458	30.4756	24.1595	25.5081	27.0477	3.1924

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Table 8C : Cumulative percent drug release of propranolol HCl coated capsules(gelatin capsule No.1) from capsules containing drug:NaCl(1:1) (formula 23) were coated with 335 ml of CA solution plasticized with 23.08 %w/w of DEP in polymer(coating formula DP1) with orifice size of 0.4 mm and 0.8 mm.

Time (hr.)	0.4 mm.					0.8 mm.				
	1	2	3	AVG	SD	1	2	3	AVG	SD
0	0	0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0.9730	0	0	0.3243	0.5618
1.5	0	0	0	0	0	1.1346	0	0	0.3782	0.6551
2	0	0	0	0	0	2.4758	0	0	0.8253	1.4294
2.5	0	0	0	0	0	3.9535	2.3813	1.3501	2.5616	1.3110
3	0	0	0	0	0	4.9310	2.4930	1.4463	2.9568	1.7880
4	0	0	0	0	0	5.7564	2.8204	1.4680	3.3483	2.1924
5	0	0	0	0	0	6.5382	5.9826	2.0990	4.8733	2.4186
6	0	0	0	0	0	7.4092	10.3518	6.1426	7.9679	2.1595
7	0	0	0	0	0	14.0737	15.5523	13.9267	14.5176	0.8991
8	0	1.1702	0	0.3901	0.6756	17.8987	20.6875	17.2536	18.6133	1.8251
10	1.6866	3.2836	0.7409	1.9037	1.2852	22.1591	27.7754	24.5380	24.8242	2.8191
12	4.1248	2.8789	1.3293	2.7777	1.4005	25.0316	32.0908	27.0623	28.0616	3.6341

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Table 9C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula 23) were coated with 286 ml. of CA solution plasticized with 33.33 %w/w of PEG400 in polymer (coating formula CA2) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0.0679	0	0	0.0113	0.0277
1.5	0	0	0	0.2137	0.2648	0.1259	0.1007	0.1190
2	0.1897	0.4624	0.3754	1.3880	1.5368	0.3598	0.7187	0.5847
2.5	0.7024	2.0689	1.0700	2.2099	3.1528	1.2689	1.7455	0.9025
3	1.1163	3.5713	2.0333	3.5977	4.6259	2.6987	2.9405	1.2554
4	2.1730	5.5137	4.3359	5.3720	6.2648	4.6986	4.7263	1.4196
5	3.3456	6.8565	5.4745	6.4635	7.6259	5.2689	5.8392	1.5029
6	4.5949	8.3295	6.7644	8.4368	9.2158	7.3689	7.4517	1.6428
7	5.9157	9.8123	8.2188	9.6538	10.9548	8.3659	8.8202	1.7458
8	7.3724	12.3027	9.9438	11.2314	13.5267	10.3568	10.7890	2.1240
10	10.4504	15.0604	16.1836	14.3339	16.2657	13.6598	14.3256	2.1548
12	13.6599	18.8019	20.3390	17.7365	19.5214	16.4256	17.7474	2.4261

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Table10C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula 23) were coated with 286 ml. of CA solution plasticized with 33.33% w/w of PEG400 in polymer(coating formula CA2) with orifice size of 0.4 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0.6364	0.3231	0	0.2477	0.1259	0.6481	0.3302	0.2655
0.75	0.6725	0.3325	0.5030	0.3143	0.3477	1.2645	0.5724	0.3656
1	0.8772	0.6205	0.9437	0.5440	0.5489	1.3190	0.8089	0.3021
1.5	1.7107	1.5556	2.0043	1.2346	1.1293	2.1573	1.6320	0.4092
2	2.7331	2.6519	2.9141	1.6660	1.5479	3.1557	2.4448	0.6727
2.5	3.4825	3.4063	3.3870	2.4559	2.1566	4.3157	3.2007	0.7803
3	3.9555	4.1455	4.0099	3.4574	2.4644	5.1690	3.8670	0.8873
4	5.2689	5.6294	5.2253	4.2493	4.6146	6.1532	5.1901	0.6847
5	6.9967	7.4890	6.6741	6.1519	5.4946	8.1457	6.8253	0.9445
6	8.6967	9.9661	8.4112	8.7656	6.4592	10.2466	8.7576	1.3479
7	10.2580	12.0696	9.9056	11.4599	8.5188	11.2674	10.5799	1.2863
8	12.1374	14.4157	11.5375	13.2141	11.5462	12.3565	12.5346	1.1100
10	20.1750	20.3257	15.2809	18.1252	19.2479	16.4327	18.2646	2.0563
12	34.2242	28.6204	21.7972	24.2672	30.1553	22.5486	26.9355	4.8805

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Table 11C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing pure lactose (formula C26) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating formula CA1) without orifice size.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0.1027	0.2767	0	0.0632	0.1124
2	0.5146	0	0.3696	0.6028	0.4248	0.3463	0.3764	0.2075
2.5	0.8742	0	0.5883	0.8415	0.7544	0.6461	0.6174	0.3218
3	3.4078	0	0.7109	2.0286	1.5228	0.9549	1.4375	1.1888
4	8.6324	0.4276	0.8985	3.5421	4.2317	1.2671	3.1666	3.0791
5	16.7635	2.1323	1.5349	5.2636	8.2643	8.3478	7.0511	5.5732
6	22.2280	2.6781	14.7512	18.2596	18.2651	15.2169	15.2332	6.7103
7	26.9562	31.5319	36.7185	33.6448	32.5244	30.1564	31.9220	3.2944
8	33.6315	57.6543	48.2439	52.1667	47.2648	40.2646	46.5376	8.5396
10	43.3774	75.2322	64.9753	67.2580	65.2474	60.2145	62.7175	10.6680
12	51.6670	85.1947	76.2731	76.2589	81.2512	71.2718	73.6528	11.7784

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Table12C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing lactose(formula C26) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating formula CA1) with orifice size of 0.8 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0.5552	0	0.0925	0.2267
0.75	0	0	0	0	0.6658	0	0.1110	0.2718
1	0	0	0	0	0.7544	0	0.1257	0.3080
1.5	0	0	0	0	0.4783	0.1317	0.1017	0.1919
2	0	1.2341	0.6132	1.3501	1.0462	0.7191	0.8271	0.4957
2.5	0.8917	5.0713	1.7572	3.1231	2.9548	1.6786	2.5795	1.4820
3	2.3173	10.7554	5.0026	6.5692	5.0991	2.8112	5.4258	3.0495
4	4.6522	16.9024	9.6241	11.3239	9.843	5.1165	9.5770	4.4930
5	9.0608	26.4177	16.5242	19.4493	17.7082	11.5259	16.7810	6.1340
6	20.3815	43.2834	31.1121	28.6383	28.375	20.0133	28.6339	8.5233
7	35.6621	52.3645	43.5105	42.8008	41.1134	31.9472	41.2331	7.0545
8	56.2798	81.9582	62.3784	62.7947	52.4439	55.8970	61.9587	10.5866
10	79.5240	93.6063	77.2877	84.5384	71.8264	76.8885	80.6119	7.5836
12	88.4020	94.7789	87.9490	93.257	83.5562	84.9732	88.8194	4.4415

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Table 13C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating formula CA1) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0.1723	0	0	0.0287	0.0703
1	0	0	0	0.3309	0.2709	0.2883	0.1484	0.1637
1.5	0.1665	0.8917	0.8337	0.4912	0.7842	1.7187	0.8143	0.5195
2	0.8124	1.7603	1.1563	0.5546	1.6289	2.0918	1.3341	0.5923
2.5	1.9818	3.1839	1.5984	1.1002	2.4423	2.6140	2.1534	0.7489
3	3.2279	3.5380	2.3469	1.7331	3.0151	3.2811	2.8570	0.6826
4	4.3135	3.8849	3.6722	2.5585	3.919	4.2108	3.7598	0.6327
5	5.7184	4.8901	5.5980	3.2536	4.8036	5.1911	4.9091	0.8901
6	7.1557	5.7088	7.5795	3.9503	5.7382	6.1819	6.0524	1.2808
7	8.9216	6.8318	10.4410	5.0199	6.3404	7.6242	7.5298	1.9299
8	10.7469	7.7114	13.6409	6.1010	7.4418	9.0819	9.1207	2.7204
10	14.1069	9.8357	21.0387	8.1681	9.3670	11.9707	12.4145	4.7203
12	16.4884	12.3799	29.4184	10.6521	11.2895	14.8849	15.8522	7.0043

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Table14C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) with orifice size of 0.4 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	3.4562	3.3576	3.7057	0.3638	0.4450	0	1.8881	1.7829
1	4.9045	3.8881	3.9674	0.4954	0.5544	0.3696	2.3632	2.1020
1.5	6.5425	5.039	5.0321	0.6808	0.6591	0.5129	3.0777	2.7512
2	7.4845	5.8426	5.8124	0.7752	1.3451	1.0233	3.7139	2.9879
2.5	8.1460	6.6545	6.5716	0.9693	1.7660	1.3943	4.2503	3.2074
3	9.6031	7.8054	7.5417	1.3337	2.4583	1.8969	5.1065	3.6051
4	10.5010	8.6433	8.6552	2.5028	3.3553	2.9272	6.0975	3.5470
5	12.2025	9.8784	10.6447	4.0385	4.7030	4.3457	7.6355	3.6689
6	13.7013	11.0740	11.9242	5.8754	5.6301	5.7739	8.9965	3.6464
7	15.0412	12.1947	13.8897	8.2079	7.4140	8.8594	10.9345	3.2038
8	17.0732	13.7965	15.9105	11.1226	9.2170	12.4890	13.2681	2.9449
10	20.9221	16.8561	23.8534	16.4069	14.1723	18.2815	18.4154	3.4740
12	28.4842	21.1150	38.8886	23.0076	21.8330	25.7439	26.5121	6.6477

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Table 15C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) with orifice size of 0.8 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	5.5449	0	4.3149	0.6074	2.4757	4.6195	2.9271	2.2714
0.75	7.6605	2.3887	4.4383	1.0029	3.1240	9.2635	4.6463	3.1980
1	9.1490	3.0128	10.5966	1.7566	9.2679	19.6536	8.9061	6.3938
1.5	11.1753	8.5985	22.3927	7.2647	23.5619	26.8365	16.6383	8.5720
2	12.2888	22.9083	31.0056	15.2009	39.2552	34.2689	25.8213	10.7992
2.5	13.2858	38.8497	35.8299	22.3135	46.1443	37.5146	32.3230	12.1283
3	14.1879	45.1658	37.3679	25.9756	48.2604	40.2618	35.2032	12.8593
4	15.6671	47.3727	38.9477	29.6873	54.3691	42.1538	38.0330	13.7244
5	17.7064	53.4349	41.4283	43.1497	63.2637	45.2568	44.0400	15.2340
6	19.5229	62.9369	46.0032	61.0373	82.3606	52.1536	54.0024	20.9272
7	22.2568	81.6392	49.1505	78.6685	94.1486	59.1635	64.1712	26.1590
8	28.0416	93.4376	58.7443	94.9943	99.9077	65.2157	73.3902	27.9630
10	44.4652	98.2805	74.3714	99.2064	99.9611	79.2518	82.5894	21.7083
12	62.0313	99.5496	91.1454	99.9291	99.9890	95.1526	91.2995	14.7617

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Table16C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) with orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	2.1548	4.2461	3.7925	5.2416	2.1584	1.4256	3.1698	1.4788
0.75	6.2451	8.4242	5.2416	9.1452	4.9875	9.4214	7.2442	1.9924
1	10.1524	13.1542	12.1549	13.9874	9.2451	14.2154	12.1516	2.0533
1.5	17.2461	22.9875	19.246	24.3124	17.2431	20.2541	20.2149	2.9347
2	27.5421	32.4214	27.9548	28.2451	23.5421	31.5624	28.5447	3.1813
2.5	30.2144	36.4514	40.2548	35.2310	30.2548	38.5428	35.1582	4.1855
3	32.1431	43.5142	45.2143	39.5421	35.4261	45.1000	40.1566	5.4454
4	36.2451	50.1243	53.1242	45.2456	43.2154	55.3512	47.2176	7.0682
5	42.5462	60.1245	59.5481	52.4216	50.1246	66.5143	55.2132	8.5413
6	49.7001	62.1546	67.2541	59.2541	55.6241	73.5421	61.2549	8.4498
7	58.4261	67.2546	72.1524	77.2486	66.2548	75.9212	69.5430	7.0214
8	66.2541	73.4215	79.1524	81.2456	71.2548	80.1289	75.2429	5.9196
10	75.2461	82.4214	86.2412	89.5421	81.4256	96.4100	85.2144	7.3027
12	90.1254	96.2451	99.2541	94.2514	92.4401	99.1423	95.2431	3.6695

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Table 17C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:2.38)(formula C25) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0.3986	0	0.2187	0	0.4276	0	0.1742	0.2038
1.5	0.5306	0	0.8710	0.6655	0.5600	0	0.4379	0.3596
2	2.0102	0.5958	1.2055	1.0674	1.2218	0.6306	1.1219	0.5152
2.5	2.6880	0.9506	1.2710	1.4099	2.0185	1.0670	1.5675	0.6637
3	2.8858	1.2222	1.5633	1.6748	2.8413	1.4675	1.9425	0.7290
4	3.6192	2.1987	2.0328	2.0934	3.0116	2.3075	2.5439	0.6347
5	4.2618	3.0002	2.7916	2.9109	3.6998	2.6402	3.2174	0.6291
6	4.6674	3.3173	2.8798	3.0295	4.5752	3.3536	3.6371	0.7832
7	5.2453	3.8115	3.9318	3.7060	5.3554	3.9410	4.3318	0.7559
8	6.2874	4.6416	3.9449	4.1401	5.7783	4.3547	4.8578	0.9528
10	6.5223	5.6951	5.0717	5.2285	6.5068	5.3528	5.7295	0.6418
12	8.4359	7.1658	5.3576	5.5742	7.8869	6.5877	6.8347	1.2339

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Table 18C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:2.38)(formula C25) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer with orifice size of 0.8 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0.8511	0	0	0	0	0.1419	0.3475
0.5	0.6016	1.0346	0	0	0	0	0.2727	0.4441
0.75	1.6469	1.5914	0.0795	0.6597	0.9382	0.7409	0.9428	0.5971
1	5.3262	2.3051	4.3506	4.3803	4.4240	6.6178	4.5673	1.4142
1.5	18.3177	4.7497	11.9183	12.6039	13.1180	16.5813	12.8815	4.6995
2	23.5739	5.5735	16.1290	16.2245	16.7443	20.1335	16.3965	6.0471
2.5	30.3599	5.7966	19.1550	19.5705	20.2294	23.2187	19.7217	7.9989
3	31.4802	6.1781	21.4584	21.8899	21.4652	24.3286	21.1334	8.2670
4	33.1083	6.2557	22.1024	22.2485	21.9522	25.0248	21.7820	8.7203
5	33.5439	13.4989	22.4494	22.8462	22.8424	25.7436	23.4874	6.4482
6	36.2373	15.2403	23.4009	23.3726	23.3396	26.1951	24.6310	6.7838
7	37.9008	16.0015	23.8905	24.0703	24.1239	26.9853	25.4954	7.1096
8	38.5052	17.4366	24.3711	24.4598	28.4534	31.1120	27.3897	7.1457
10	44.0551	22.5700	28.0048	27.8389	32.0565	36.9585	31.9140	7.6429
12	52.8825	30.2590	33.7474	33.8578	37.3036	39.8439	37.9824	8.0067

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Table 19C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing pure sucrose (formula C27) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
2.5	0.2477	0	0	0.2651	0	0.4218	0.1558	0.1811
3	0.3781	0	0	0.4595	5.2142	0.6237	1.1126	2.0250
4	1.4324	0.5030	1.2921	2.2168	10.2677	2.3654	3.0129	3.6178
5	9.6929	14.6713	15.5445	16.2474	20.4592	15.214	15.3049	3.4472
6	30.6644	34.1317	26.6655	29.2442	30.1535	31.3671	30.3711	2.4604
7	42.5206	48.8286	35.7033	43.2478	40.2721	42.3658	42.1564	4.2680
8	52.3380	59.5041	43.6140	53.2524	48.2601	51.3741	51.3905	5.3004
10	66.3843	73.2222	55.3741	70.2526	60.2133	70.3404	65.9645	6.8647
12	75.0393	81.8928	63.6475	81.2125	70.1468	80.3587	75.3829	7.2990

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Table 20C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing pure sucrose (formula C27) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) with orifice size of 0.8 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0.7989	0	0	0.4392	0	0.2064	0.3393
0.75	0.4856	1.0399	0.5494	0.6887	1.3434	0.2651	0.7287	0.3956
1	0.5838	1.9274	1.0545	2.1526	2.3678	0.4247	1.4185	0.8386
1.5	3.5029	6.4336	3.9729	5.2457	8.3467	2.3557	4.9763	2.1726
2	9.3378	10.4035	6.3783	11.2449	12.3147	10.3653	10.0074	2.0376
2.5	12.5741	15.9659	10.8406	14.2524	18.2694	17.3265	14.8715	2.8524
3	17.8179	20.6026	17.5449	19.5490	26.3427	23.6500	20.9179	3.4599
4	29.5238	34.3689	26.3124	31.2559	37.2594	33.5462	32.0444	3.8649
5	42.4193	49.5159	39.7587	44.2566	53.2058	46.2183	45.8958	4.8802
6	55.6028	60.1795	53.4502	57.2446	63.2123	59.2508	58.1567	3.4743
7	64.8180	67.8013	64.7282	66.7437	71.2342	68.4126	67.2897	2.4515
8	74.0331	75.4230	76.0062	76.2428	79.2560	77.5744	76.4226	1.8039
10	84.7998	89.7989	87.8696	86.1186	91.2640	86.5647	87.7359	2.4220
12	89.9042	95.0422	99.8847	91.2503	97.2168	92.5415	94.3066	3.7938

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Table 21C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing pure KCl (formula C28) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0.2303	0.2593	0	0.0214	0.8917	0.1259	0.2548	0.3293
2	0.3257	0.3492	0.1839	0.1029	1.6559	0.2665	0.4807	0.5829
2.5	0.7992	1.3568	1.1143	0.6262	2.1558	0.4261	1.0797	0.6241
3	1.1156	1.8882	1.8751	1.0277	3.1599	0.5468	1.6022	0.9234
4	1.1510	2.5414	2.6674	1.8513	4.2620	1.2665	2.2899	1.1517
5	1.2621	3.4684	3.5960	2.2546	5.4862	1.6575	2.9541	1.5570
6	1.5774	4.8348	4.6622	3.2133	6.2594	2.5169	3.8440	1.7194
7	2.1165	5.4676	5.9080	4.2579	7.2551	3.1535	4.6931	1.8888
8	2.6329	6.0478	7.0975	5.1569	8.2553	4.2553	5.5743	2.0148
10	3.6593	8.4978	10.5449	7.2143	10.2522	6.3843	7.7588	2.5891
12	4.8883	11.5951	14.0530	9.2127	13.1231	8.2115	10.1806	3.4199

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Table 22C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing KCl (formula C28) were coated with 286 ml. of CA solution plasticized with 23.08 % w/w of PEG400 in polymer(coating solution CA1) with orifice size of 0.8 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0.6422	0.6016	0.4044	0.3580	0.9672	0.1143	0.5146	0.2918
0.5	1.3224	1.2349	0.8498	0.7565	1.3550	0.2664	0.9642	0.4237
0.75	5.0735	1.5851	1.0333	0.8170	2.3447	0.7683	1.9370	1.6471
1	8.7965	1.8984	1.1954	0.8724	4.1227	1.2642	3.0249	3.0616
1.5	16.2851	3.9556	2.0265	1.3576	6.2218	2.1658	5.3354	5.6463
2	18.8430	5.5944	2.3561	2.5444	8.2452	3.1237	6.7845	6.3237
2.5	23.0286	7.0943	2.5151	3.5469	11.1663	4.2660	8.6029	7.7250
3	24.4618	7.8154	2.7858	3.5681	13.4575	6.1517	9.7067	8.1680
4	26.6625	9.6227	3.5465	4.2563	15.2158	9.2472	11.4252	8.5791
5	31.3738	10.7182	4.7157	5.1664	17.2647	12.4518	13.6151	9.8896
6	36.2735	12.2482	6.5763	10.3564	19.2476	18.2438	17.1576	10.5194
7	40.4639	14.8268	10.8707	14.8782	23.2173	21.3485	20.9342	10.6023
8	44.2672	17.2352	15.0946	19.4490	27.2694	24.2553	24.5951	10.6317
10	55.5406	25.5055	32.3356	36.2472	31.2595	35.1568	36.0075	10.2824
12	67.1051	33.2332	51.2928	56.4761	40.2687	50.2490	49.7708	11.9312

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Table 23C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0.2303	0.5262	0.1259	0.3231	0.2419	0.1549	0.2671	0.1448
1	0.7957	1.0484	0.4464	0.8141	0.5231	0.4583	0.6810	0.2431
1.5	2.1970	2.5047	1.6059	2.0647	1.5152	1.0262	1.8190	0.5366
2	3.3584	3.5941	2.8131	3.0565	2.5125	1.5655	2.8167	0.7230
2.5	4.7240	4.7649	3.8014	4.2562	3.5439	2.2673	3.8930	0.9334
3	5.4487	5.4204	4.7308	5.2137	4.3195	3.1972	4.7217	0.8654
4	7.2137	7.5446	6.8303	7.9218	7.1282	5.3498	6.9981	0.8900
5	8.6785	10.0457	8.9295	9.5165	8.5462	7.2532	8.8283	0.9538
6	10.7679	13.3685	11.1904	12.5145	11.5455	9.5485	11.4892	1.3388
7	12.6880	16.1875	13.9511	14.6106	15.4649	13.5451	14.4079	1.2835
8	14.6456	20.7884	17.4490	16.5139	20.4650	18.5482	18.0684	2.3617
10	19.3793	31.4784	25.1093	22.5153	30.1487	28.6587	26.2150	4.7071
12	26.0844	45.0464	35.2082	30.1596	40.5237	38.1599	35.8637	6.9269

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Table 24C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0.2303	0.5262	0.1259	0.3231	0.2419	0.1549	0.2671	0.1448
1	0.7957	1.0484	0.4464	0.8141	0.5231	0.4583	0.6810	0.2431
1.5	2.1970	2.5047	1.6059	2.0647	1.5152	1.0262	1.8190	0.5366
2	3.3584	3.5941	2.8131	3.0565	2.5125	1.5655	2.8167	0.7230
2.5	4.7240	4.7649	3.8014	4.2562	3.5439	2.2673	3.8930	0.9334
3	5.4487	5.4204	4.7308	5.2137	4.3195	3.1972	4.7217	0.8654
4	7.2137	7.5446	6.8303	7.9218	7.1282	5.3498	6.9981	0.8900
5	8.6785	10.0457	8.9295	9.5165	8.5462	7.2532	8.8283	0.9538
6	10.7679	13.3685	11.1904	12.5145	11.5455	9.5485	11.4892	1.3388
7	12.6880	16.1875	13.9511	14.6106	15.4649	13.5451	14.4079	1.2835
8	14.6456	20.7884	17.4490	16.5139	20.4650	18.5482	18.0684	2.3617
10	19.3793	31.4784	25.1093	22.5153	30.1487	28.6587	26.2150	4.7071
12	26.0844	45.0464	35.2082	30.1596	40.5237	38.1599	35.8637	6.9269

ศูนย์วิทยทรัพยากร  
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Table 25C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) with orifice size of 0.4 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0.2883	0	0.7235	0.2593	0.3463	0	0.2696	0.2675
1	1.4055	0.8801	1.5380	0.7554	0.8666	1.5474	1.1655	0.3691
1.5	2.7149	2.6305	3.1796	3.4849	1.4622	3.1543	2.7711	0.7155
2	4.3869	4.2552	4.3982	4.1211	3.155	4.6571	4.1623	0.5246
2.5	6.5934	5.5611	5.6300	6.0113	4.5126	5.6482	5.6594	0.6815
3	8.4178	6.8403	7.0200	7.545	6.1576	6.0173	6.9997	0.8954
4	11.3814	8.899	10.2466	11.5376	9.5145	8.7512	10.0551	1.2102
5	15.2589	11.7513	14.3321	15.4866	13.5113	12.1530	13.7489	1.5642
6	22.6360	16.6244	20.3300	20.4586	20.5163	17.5469	19.6854	2.2069
7	33.2670	23.8246	28.0870	28.5127	31.5137	25.4650	28.4450	3.5505
8	44.3441	32.9479	36.6356	36.1896	43.5186	34.1595	37.9659	4.8189
10	71.6179	58.8718	60.2374	58.4856	67.2457	57.4644	62.3205	5.7484
12	91.2553	79.7370	88.2777	83.4586	90.5173	81.5431	85.7982	4.8686

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Table 26C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 572 ml. of CA solution plasticized with 41.18% w/w of PEG400 in polymer(coating solution formula CA3) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
2.5	0	0.0853	0.0853	0.5436	0.1955	0.2013	0.1852	0.1914
3	0.4798	0.6026	0.5794	1.4606	1.2536	1.2247	0.9335	0.4256
4	1.9588	1.7813	1.4735	3.4610	2.8631	3.0891	2.4378	0.8053
5	3.4078	2.8743	2.3485	4.3521	4.1886	4.3765	3.5913	0.8537
6	4.8785	3.9619	3.1866	5.8213	4.9946	5.7822	4.7709	1.0346
7	7.2180	5.2063	4.2368	7.0800	5.9774	7.0232	6.1236	1.2120
8	9.3508	6.6961	5.2519	8.2359	7.0459	8.1786	7.4599	1.4370
10	13.0149	9.8554	7.3801	11.9915	10.2607	11.5856	10.6814	1.9868
12	17.2930	13.3101	9.6126	14.5056	13.0056	14.5305	13.7096	2.5135

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Table 27C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1)(formula C23) were coated with 572 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer and orifice size of 0.4 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0.2013	0.0336	0.0822
0.75	0.2477	0.1201	0.1897	0.3521	0	0.3486	0.2097	0.1367
1	0.3955	0.2897	0.2556	0.7448	0.2535	0.4221	0.3935	0.1863
1.5	1.5313	1.0413	1.3086	1.7220	0.8829	1.3840	1.3117	0.3094
2	2.1458	1.8941	2.4951	2.4836	1.8210	2.9484	2.2980	0.4266
2.5	2.8830	3.087	3.6888	3.0679	2.8913	4.2863	3.3174	0.5590
3	3.7616	3.9564	4.8200	4.4474	3.6657	5.2268	4.3130	0.6262
4	5.3285	5.0323	6.3405	5.5807	5.4521	6.7690	5.7505	0.6629
5	7.5737	6.5491	8.9449	6.7436	7.8091	9.1458	7.7944	1.0820
6	9.7794	7.7804	11.7167	7.6053	9.9016	12.0704	9.8090	1.8833
7	13.0183	9.4133	15.2318	8.4991	12.6836	15.0960	12.3237	2.8232
8	16.7387	10.7443	18.6860	9.3496	15.5069	18.6759	14.9502	4.0100
10	25.7439	14.1081	27.5088	11.2646	22.3112	28.2699	21.5344	7.2111
12	34.8703	18.1056	38.4348	14.1164	30.5701	39.6914	29.2981	10.7696

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Table 28C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing pure lactose(formula C26) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) and orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0.0911	0.1027	0.1027	0.0853	0.1143	0.1143	0.1017	0.0118
1	0.2835	0.2605	0.3243	0.3531	0.3534	0.2374	0.3020	0.0490
1.5	1.0177	1.1278	1.2446	1.3433	1.3205	0.9827	1.1728	0.1538
2	4.1273	4.6447	4.7802	4.6538	5.4661	3.5464	4.5364	0.6476
2.5	8.2576	9.2565	9.3122	10.5246	12.4542	5.1406	9.1576	2.4379
3	13.2571	14.2555	14.2596	15.4681	19.2524	11.0107	14.5839	2.7320
4	18.259	19.2625	19.5682	21.5965	25.1556	17.2529	20.1825	2.8368
5	22.4561	24.2653	24.2669	26.5495	29.2423	20.1516	24.4886	3.1586
6	24.3653	25.6836	27.2575	29.5417	32.1529	22.2449	26.8743	3.5852
7	27.2561	29.5457	30.1216	32.1577	35.4288	25.2699	29.9633	3.5845
8	29.5437	30.5408	32.1267	34.5498	37.5421	27.2177	31.9201	3.6940
10	34.2555	35.9531	37.5445	40.1267	42.6452	28.5110	36.5060	4.9228
12	39.5441	40.9577	42.5489	43.5451	45.2652	37.9558	41.6361	2.6844

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Table 29C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0
3	0.0969	0	0	0	0	0	0.0162	0.0361
4	1.5426	0.4624	0.8743	0	0	1.1180	0.6662	0.5693
5	3.0683	1.7266	2.3636	0.4856	0.8163	2.3024	1.7938	0.9018
6	4.2800	3.3760	3.6719	1.4425	2.0057	3.6914	3.0779	1.0072
7	5.7020	5.1597	4.9250	2.0271	2.7855	5.0142	4.2689	1.3577
8	6.2052	6.5682	5.9942	2.7514	3.6226	6.2236	5.2275	1.4742
10	7.3342	9.8832	8.2119	4.2900	5.1765	8.8442	7.2900	1.9773
12	8.7244	13.1066	10.9409	5.6887	7.1650	11.3480	9.4956	2.5521

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Table 30C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 41.18% w/w of PEG400 in polymer (coating solution CA 3) when punctured to have orifice size of 0.4 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0.1781	0	0	0.1317	0.0795	0.0649	0.0709
1	0.0795	0.1917	0	0	0.4987	0.5213	0.2152	0.2182
1.5	0.5387	0.5883	0.7649	0.7003	0.5564	1.5714	0.7867	0.3600
2	0.5969	0.7283	1.4462	1.9729	1.4502	2.6390	1.4723	0.6991
2.5	1.3809	1.2584	2.1697	2.9695	2.0870	3.5499	2.2359	0.8142
3	2.0749	1.8872	2.9650	3.6868	2.8641	4.5113	2.9982	0.9009
4	2.8171	2.3255	4.3606	4.5973	3.7831	6.2720	4.0259	1.2842
5	3.7646	3.0412	6.4096	5.5060	4.9498	8.6029	5.3790	1.8133
6	4.9369	3.9213	8.5736	6.6098	6.2102	11.4347	6.9478	2.4711
7	5.8549	4.9963	11.1207	7.8355	7.6175	14.5696	8.6658	3.2669
8	6.7186	5.9088	14.223	9.1610	8.9294	18.7766	10.6196	4.5077
10	8.3572	7.6142	19.8127	11.9915	12.1001	28.6971	14.7621	7.3776
12	10.2626	9.4596	25.4628	14.7363	16.4943	37.8495	19.0442	9.9069

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Table 31C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(formula CA3) when punctured to have orifice size of 0.8 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0.5146	0.4566	0.5784	0.5378	0.3479	0.2723
0.75	0.7641	0.7061	0.5957	0.5719	0.8692	0.8107	0.7196	0.1183
1	1.4514	1.1781	0.8460	1.2628	1.4937	1.1503	1.2304	0.2350
1.5	1.8446	1.8641	1.4935	1.4450	1.9279	2.9442	1.9199	0.5414
2	2.4914	2.4706	2.1713	2.1396	2.7032	4.5953	2.7619	0.9229
2.5	3.1510	3.0836	2.8854	3.6482	4.5371	6.4734	3.9631	1.3656
3	4.4791	4.0512	3.8509	4.1406	5.2132	6.7877	4.7538	1.1053
4	6.0942	5.3367	5.0472	5.9899	6.2867	8.7004	6.2425	1.2945
5	8.0342	7.2917	6.8018	8.0275	9.3136	10.7843	8.3755	1.4540
6	11.2541	8.9660	8.1053	10.5395	11.7409	13.1050	10.6185	1.8385
7	15.3327	11.2614	9.4631	13.6239	14.0433	15.9550	13.2799	2.4784
8	20.8362	14.2485	10.7247	16.7529	17.2575	18.1795	16.3332	3.4790
10	30.7098	21.0214	13.8385	22.8973	22.4784	20.7227	21.9447	5.4051
12	40.3309	30.3568	17.1539	30.6918	28.4458	26.8892	28.9781	7.4590

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Table 32C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer (coating solution CA3) when punctured to have orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0.6481	0	0	0	0.1296	0.2646
0.75	0.3928	0.3463	0.8409	0.2129	0.2071	0.3057	0.3843	0.2354
1	0.9425	0.8202	1.5116	0.3255	0.3254	0.7385	0.7773	0.4423
1.5	2.2294	3.5852	3.9360	4.7850	3.0096	1.2920	3.1395	1.2489
2	3.5942	5.3713	5.8245	9.4449	4.8648	2.4493	5.2582	2.3948
2.5	4.4750	6.3471	6.8166	11.0577	5.6552	6.1663	6.7530	2.2556
3	5.3536	6.9211	7.9178	12.0781	6.4945	9.0540	7.9699	2.3739
4	6.6010	8.4117	8.8911	13.6886	7.9922	12.3675	9.6587	2.7513
5	8.0126	9.9354	10.5415	14.9269	10.2543	15.0670	11.4563	2.8822
6	9.8684	11.8058	12.5572	16.8619	12.2330	18.1488	13.5792	3.2072
7	11.5639	13.9510	14.5942	18.6542	13.9714	21.9536	15.7814	3.7993
8	14.1939	15.8692	16.8669	21.5900	16.1280	26.4366	18.5141	4.6107
10	18.4821	19.3330	21.5478	23.9180	18.9161	35.3764	22.9289	6.4286
12	23.3268	24.7364	27.9962	28.6017	24.2919	44.5864	28.9232	7.9573

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Table 33C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 41.18% w/w of PEG400 in polymer(coating solution CA3) when punctured to have orifice size of 1 mm. at the side of capsule.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0.5088	0	0.2593	0.1280	0.1948
0.75	0	0	0.3231	0.9436	0.0388	0.4363	0.2903	0.3370
1	0.0388	7.8773	0.4196	1.7723	0.7761	0.6499	1.9223	2.7149
1.5	0.6369	12.2119	2.5883	3.3236	2.4673	3.3898	4.1030	3.7384
2	1.2300	13.5477	8.535	4.6481	2.7847	4.3672	5.8521	4.0997
2.5	1.8992	14.4906	14.24	5.5751	3.5405	5.5872	7.5554	4.9781
3	2.8600	16.098	18.0926	6.8947	4.5132	7.4584	9.3195	5.7313
4	5.1598	17.7505	20.0717	9.9109	8.8151	11.0381	12.1244	5.1696
5	8.1348	20.1215	21.8384	12.9365	13.3092	14.0242	15.0608	4.6219
6	11.0435	21.8263	23.3961	16.0004	17.9509	16.5548	17.7953	4.0412
7	14.9989	24.3309	25.1542	19.4333	23.3619	19.1583	21.0729	3.5534
8	18.6720	27.4469	27.3525	23.0417	30.1654	23.9354	25.1023	3.7227
10	24.6759	32.1959	34.3938	30.1284	41.9211	31.0204	32.3893	5.1864
12	32.3862	35.5208	44.4285	38.0512	69.2838	41.4883	43.5265	12.1558

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Table 34C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) and orifice size of 1 mm. at the two end of the capsule.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	1.2341	0	0	1.9303	0	0	0.5274	0.8462
0.5	1.5495	0.7351	1.1644	2.0678	0.5610	0.6364	1.1190	0.5965
0.75	2.1003	1.0275	3.1152	4.7420	0.5905	1.1599	2.1226	1.5697
1	4.4325	3.0232	6.8282	7.2021	2.0068	4.3928	4.6476	2.0496
1.5	7.591	8.9862	12.2646	11.4701	4.1467	8.6595	8.8530	2.9081
2	8.8811	13.9417	15.0452	14.1310	5.9910	11.8242	11.6357	3.5399
2.5	9.9002	17.3963	16.3931	15.8280	7.3970	13.1083	13.3372	3.9792
3	11.0804	19.0773	18.0152	17.4435	8.6669	14.3183	14.7669	4.1784
4	15.1388	21.0592	21.336	20.0789	11.2266	17.6172	17.7428	3.9655
5	20.7494	22.9795	24.8018	23.4666	13.8832	20.0054	20.9810	3.9027
6	25.3704	25.5744	29.2551	27.9282	17.4441	23.2244	24.7994	4.1749
7	32.2567	30.3420	34.7064	35.1345	22.7604	30.6137	30.9690	4.4917
8	42.2741	36.8945	40.9169	43.8971	49.2412	38.0127	41.8728	4.4531
10	59.936	45.1059	61.2682	52.3036	78.1969	67.1813	60.6653	11.5128
12	79.9196	52.5690	77.3880	67.2034	99.4328	91.3638	77.9794	16.7649

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Table 35C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1.69)(formula C24) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) and orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0.8685	0	0	1.1122	0	0.3301	0.5172
0.75	0.4682	0.8898	0.4682	0.5436	1.4959	0.8917	0.7929	0.3966
1	2.2836	4.6825	5.2832	4.9012	3.1253	2.6538	3.8216	1.2851
1.5	6.4748	17.9164	15.2865	11.0476	5.6140	8.5664	10.8176	4.9279
2	12.3368	25.1931	19.5113	12.1387	6.6214	16.0065	15.3013	6.4838
2.5	15.2112	28.6844	21.3732	12.6776	10.7202	18.1382	17.8008	6.5485
3	16.1435	29.5076	22.6269	13.3140	12.4848	18.7772	18.8090	6.4239
4	17.2583	30.3713	23.6366	14.6115	13.6354	20.3437	19.9761	6.2923
5	18.7026	31.5021	24.7361	15.9798	15.0236	21.8614	21.3009	6.1749
6	20.2074	33.1757	26.2627	17.3384	16.8955	23.4111	22.8818	6.1870
7	22.3939	35.6243	27.3914	18.7741	18.6936	25.2248	24.6837	6.3776
8	24.9504	39.216	29.0982	20.2237	21.9427	27.4215	27.1421	6.7733
10	33.7177	46.6727	32.5034	23.8281	27.6742	32.0533	32.7416	7.7548
12	44.9641	51.9393	35.9721	27.8648	33.4495	36.2982	38.4147	8.6280

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Table 36C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:2.38)(formula C25) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution formula CA3) and orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0.1259	0.2999	0	0	0	0.0710	0.1229
1	1.2689	3.3068	3.4363	1.0136	2.7078	2.6439	2.3962	1.0249
1.5	8.5819	9.5458	8.6847	6.0494	10.2456	8.6262	8.6223	1.4222
2	13.4985	14.2873	12.0995	9.2379	12.8424	16.4848	13.0751	2.4085
2.5	14.8715	16.3649	13.6945	11.4981	13.8596	22.8399	15.5214	3.9238
3	15.1731	17.2918	14.5341	12.4941	14.5442	24.239	16.3794	4.1456
4	15.7026	18.2735	15.4161	13.5753	15.4262	25.854	17.3746	4.4175
5	16.6190	18.6896	16.1090	14.0055	15.8463	26.7008	17.9950	4.5223
6	17.2827	19.2822	16.8890	14.8102	16.8263	27.6003	18.7818	4.5485
7	18.9613	20.5059	18.5228	15.8369	18.1692	29.1854	20.1969	4.6549
8	20.5115	22.4487	20.1728	16.8732	19.5250	30.7849	21.7194	4.7931
10	24.4150	25.9540	24.5659	21.1336	27.5139	44.5830	28.0276	8.3810
12	29.4502	29.5944	28.9997	25.4393	35.5893	60.2485	34.8869	12.8467

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Table 37C: Cumulative percent drug release of propranolol HCl coated capsules using basket apparatus at 100 rpm. from capsules containing drug:NaCl(1:2.38) (formula C25) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) when punctured to have orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0.2941	0.3870	0.1549	0.3521	0.5494	0.0679	0.3009	0.1717
0.75	0.5005	0.9018	0.5569	0.4373	1.0487	0.1382	0.5972	0.3298
1	4.7937	5.4606	5.8023	2.0028	1.6811	3.3134	3.8423	1.7720
1.5	12.0413	19.2776	25.7153	17.9515	6.3934	9.9703	15.2249	7.0661
2	14.7273	25.9544	42.0776	26.8130	9.2142	15.3895	22.3627	11.8422
2.5	19.9307	28.1194	49.6111	29.0520	11.4505	18.1697	26.0556	13.2749
3	20.9315	29.9805	50.7770	29.2065	12.6836	18.9773	27.0927	13.3056
4	21.8307	30.9884	51.7467	30.0671	13.7898	19.8032	28.0377	13.2987
5	22.4647	32.0504	52.6835	31.1309	14.5528	20.4504	28.8888	13.4105
6	23.4051	35.5142	56.4220	33.1755	15.6199	21.3160	30.9088	14.5557
7	24.3451	38.5666	60.1606	35.2201	16.6866	22.1815	32.8601	15.6944
8	25.9823	46.1045	63.8707	38.1965	18.9056	24.1732	36.2055	16.8279
10	29.0679	52.4919	69.4862	44.6133	23.1838	27.9018	41.1242	17.8205
12	32.1905	52.8489	77.2019	51.0683	28.7025	33.7055	45.9529	18.3695

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Table 38C : Cumulative percent drug release of propranolol HCl coated capsules using 50 rpm. of paddle apparatus from capsules containing drug:NaCl(1:2.38) (formula C25) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer (coating solution CA3) and orifice size of 1 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0.1955	0.2129	0	0.0681	0.1056
0.75	0.0330	0.3173	0.4624	0.8069	2.1821	0.3289	0.6884	0.7737
1	2.1859	1.7772	1.5177	3.3165	3.0709	0.7852	2.1089	0.9593
1.5	6.4225	5.7016	10.0692	6.0221	4.5552	8.3945	6.8609	2.0100
2	11.6457	14.0790	13.8361	8.7516	7.5816	19.5172	12.5685	4.3003
2.5	16.7290	18.6266	15.5723	10.1008	13.6522	24.5021	16.5305	4.8687
3	18.5311	20.2059	16.6473	11.0462	14.9738	25.908	17.8854	5.0388
4	19.5854	21.4930	17.7323	11.7572	16.5984	27.5934	19.1266	5.2942
5	20.8812	22.5947	19.1059	13.2348	17.9551	30.2633	20.6725	5.6724
6	21.9802	23.9788	21.0438	15.5223	20.2473	37.433	23.3676	7.4407
7	23.4777	26.0718	22.9952	17.5610	26.1543	49.6394	27.6499	11.2172
8	34.0171	29.2297	28.6907	20.2529	31.4689	66.2678	34.9879	16.0106
10	85.716	40.5365	62.6824	27.5911	43.9643	94.7189	59.2015	26.6698
12	99.9727	92.5774	96.6334	43.0732	77.7487	99.8560	84.9769	22.1272

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Table 39C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing pure lactose (formula C26) were coated with 286 ml. of CA solution plasticized with 50.00%w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0.0979	0.0795	0	0	0	0	0.0296	0.0462
0.75	0.1211	0.0977	0	0	0	0	0.0365	0.0570
1	0.2095	0.2091	0	0.0446	0.1317	0.1433	0.1230	0.0856
1.5	0.8036	0.9888	0.4566	0.5209	0.6669	0.7077	0.6908	0.1929
2	2.0077	2.2182	1.5408	1.4898	1.8463	1.7831	1.8143	0.2766
2.5	3.6544	4.285	3.1302	3.1657	3.7118	3.642	3.5982	0.4233
3	6.2475	15.2399	5.4682	17.8622	6.5783	8.9736	10.0616	5.2274
4	24.6620	45.4278	26.6708	34.5319	41.7759	30.273	33.8902	8.3196
5	41.8182	65.2274	52.0162	47.9327	65.4090	48.3793	53.4638	9.7492
6	60.1544	77.8088	68.3565	60.5264	78.7629	62.5604	68.0282	8.4755
7	72.8522	85.2713	76.2415	69.8745	85.7154	71.831	76.9643	6.9229
8	80.8246	90.849	83.1905	78.9710	90.0377	79.587	83.9100	5.2691
10	88.6157	94.3753	89.0906	85.8394	93.5419	86.6081	89.6785	3.5391
12	92.7848	97.1467	92.5659	91.1646	95.8849	90.9709	93.4196	2.5370

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Table 40C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:0.7)(formula C22) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer (coating solution CA4) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0.3463	0	0	0	0	0.0577	0.1414
0.75	0.3754	0.4894	0.2540	0.2245	0.1781	0	0.2536	0.1681
1	1.3833	0.5122	0.3468	0.3372	0.3889	0.3173	0.5476	0.4153
1.5	3.4409	1.7014	0.6139	0.6020	0.6369	0.4659	1.2435	1.1678
2	5.4574	8.6478	4.3551	4.3452	4.3224	3.9697	5.1829	1.7709
2.5	7.6873	14.1858	7.5024	6.8591	7.5150	8.9048	8.7757	2.7333
3	9.7035	20.7241	11.4798	11.6343	11.3807	15.9191	13.4736	4.1110
4	15.6285	33.7737	35.1564	20.1459	19.4021	30.1699	25.7128	8.3251
5	26.7123	53.9080	45.5986	33.5606	32.379	44.9485	39.5178	10.2370
6	38.6020	67.7257	65.4598	48.7873	49.2491	61.3267	55.1918	11.4168
7	49.7331	80.2399	76.6894	59.4879	64.0309	74.0635	67.3741	11.6758
8	58.1487	84.6752	83.2156	69.0395	76.8243	81.2194	75.5205	10.2077
10	68.6100	85.2337	91.2541	82.8386	87.5328	90.1575	84.2711	8.2740
12	76.0764	92.1561	96.2146	88.8194	93.3613	95.5300	90.3596	7.4784

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Table 41C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 286 ml. of CA solution plasticized with 50.00%w/w of PEG400 in polymer(coating solution CA4) without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0.6132	0.5726	0.6132	0	0	0.2998	0.3288
0.5	0.6132	0.6549	0.6196	1.0552	0.5552	0.4218	0.6533	0.2133
0.75	1.4962	2.5651	2.4482	3.3470	1.803	1.8305	2.2483	0.6762
1	3.9727	5.6163	4.3435	5.0724	3.4475	4.1890	4.4402	0.7822
1.5	7.405	9.6526	8.1046	7.9827	7.0422	7.2639	7.9085	0.9492
2	9.8363	13.2167	11.7793	10.9886	9.7074	10.0998	10.9380	1.3663
2.5	12.5143	15.9257	15.2676	13.9341	11.7458	12.7574	13.6908	1.6479
3	14.7508	20.0557	20.5338	18.4775	14.4728	15.3969	17.2813	2.7404
4	26.2456	29.7299	36.5614	30.3686	22.7174	22.7406	28.0606	5.3014
5	38.2601	42.9730	55.1204	44.4783	35.5311	33.4364	41.6332	7.8434
6	56.2642	56.7196	70.4287	58.7878	55.0321	55.0431	58.7126	5.9034
7	71.2325	68.4292	82.6804	70.8254	70.3967	70.4078	72.3287	5.1623
8	80.2642	80.2765	91.0709	80.5239	80.9212	80.9322	82.3315	4.2916
10	91.3654	91.6235	97.4704	89.8865	90.9449	90.9559	92.0411	2.7251
12	97.2365	98.8661	99.5497	93.9332	96.4577	96.4687	97.0853	1.9989

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Table 42C : Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 286 ml. of CA solution plasticized with 50.00% w/w of PEG400 in polymer and orifice size of 0.4 mm.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	4.5470	2.4293	1.2573	3.4562	1.9483	1.8616
0.5	1.0426	1.8375	5.0211	3.2453	3.5166	5.5949	3.3763	1.7595
0.75	3.7521	6.7432	8.8244	7.2148	5.4296	7.0144	6.4964	1.7282
1	6.3872	11.0359	12.4953	10.4506	13.4555	12.5451	11.0616	2.5381
1.5	10.3681	16.9189	26.1215	20.1558	18.7559	21.5653	18.9809	5.2446
2	17.7112	27.6815	41.9283	35.143	37.5452	31.5662	31.9292	8.5109
2.5	25.4654	45.4264	55.002	50.3986	52.4586	50.002	46.4588	10.7596
3	30.2543	65.2463	67.37	65.4569	65.4689	67.1258	60.1537	14.6763
4	57.5415	91.8623	98.6872	93.5426	89.5426	90.4592	86.9392	14.7597
5	94.6500	99.1463	99.5433	99.1223	95.4286	95.4267	97.2195	2.2697
6	98.627	99.1703	99.6040	99.4729	97.8645	96.5463	98.5475	1.1694
7	98.9458	99.6548	99.6149	99.8547	98.9548	97.9214	99.1577	0.7150
8	99.1192	99.3193	99.6336	99.6643	99.2061	98.4749	99.2362	0.4341
10	99.3186	99.5228	99.6408	99.8503	99.4263	99.6153	99.5624	0.1851
12	99.7599	99.7363	99.9461	99.8722	99.7729	99.7513	99.8065	0.0838

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Table 43C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 572 ml. of CA solution plasticized with 50.00%w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
2.5	0.8047	1.675	1.2631	1.031	0.5494	0.4102	0.9556	0.4697
3	1.6259	2.297	2.0314	2.0056	1.9654	1.9871	1.9854	0.2141
4	3.6456	3.9991	3.6261	3.9018	3.4725	3.8715	3.7528	0.2015
5	5.9834	4.7567	4.6117	5.0181	4.909	5.4692	5.1247	0.5124
6	7.8535	7.1236	5.8747	6.7266	7.0516	7.6643	7.0491	0.7091
7	10.9564	8.5937	7.9751	9.4224	9.1187	11.1886	9.5425	1.2853
8	14.6439	11.5529	8.8681	10.4067	10.7611	13.3007	11.5889	2.0857
10	20.5991	15.014	12.1662	13.5069	17.4337	18.7826	16.2504	3.2391
12	25.9456	19.9626	16.0744	17.1974	20.8139	24.2832	20.7129	3.8620

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Table 44C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0.2999	0.4276	0	0	0	0.1213	0.1754
2.5	0.0969	0.5934	0.5310	0.8511	0.2767	0.3928	0.4570	0.2400
3	1.4266	0.7914	0.7631	1.1913	1.4982	0.6118	1.0471	0.3425
4	3.7110	2.5001	1.7346	2.4170	2.6056	0.8332	2.3003	0.8765
5	5.2432	4.0884	2.6529	4.7354	4.5142	1.8809	3.8525	1.1926
6	6.7223	6.1814	4.5735	6.6848	6.7163	3.1432	5.6703	1.3589
7	8.7974	7.7518	5.8361	7.9589	8.1127	4.0306	7.0813	1.6374
8	9.5893	8.7529	7.5533	8.6256	10.3013	5.4380	8.3767	1.5648
10	12.0134	11.1508	11.3020	11.6428	13.9927	7.9571	11.3431	1.7825
12	12.7344	15.1119	14.8189	12.8880	17.4454	10.7241	13.9538	2.1344

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Table 45C: Cumulative percent drug release of propranolol HCl coated capsules from capsules containing drug:NaCl(1:0.35) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0.1897	0.3115	0.3347	0.3231	0.1932	0.1585
1	0.6539	0.4610	0.4587	0.5529	0.4893	0.4312	0.5078	0.0827
1.5	1.4038	1.5156	1.5081	1.1044	1.1503	1.4745	1.3595	0.1846
2	2.7944	3.0143	2.9753	2.4626	2.9558	2.9413	2.8573	0.2074
2.5	7.7975	6.0150	5.9033	7.2532	6.8410	7.3252	6.8559	0.7589
3	12.4149	10.7895	8.7822	11.3714	10.3221	10.7769	10.7428	1.2013
4	20.7495	20.2018	14.8603	17.9075	21.6158	20.1783	19.2522	2.4773
5	31.5598	31.2584	23.3025	31.5005	33.4457	31.2494	30.3861	3.5683
6	45.6556	44.2548	35.4861	44.1341	45.0040	44.3557	43.1484	3.7972
7	54.8799	59.1564	44.5357	58.5378	58.9033	57.8971	55.6517	5.6637
8	63.7716	68.2154	57.3312	69.0810	68.1154	65.5608	65.3459	4.3958
10	76.3092	80.6478	71.5862	81.8374	80.5123	79.3078	78.3668	3.8196
12	84.1773	86.5479	82.1924	88.6207	87.2223	85.1059	85.6444	2.3032

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Table 46C : Cumulative percent drug release of propranolol HCl coated capsules in 0.1588 KCl as dissolution medium from capsules containing drug:NaCl (1:0.35) (formula C21) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0.0593	0	0	0	0.0099	0.0242
1.5	0.1898	0.1104	0.0884	0.1501	0	0	0.0898	0.0777
2	0.6742	0.4804	0.4468	0.5773	0.2806	0.3203	0.4633	0.1496
2.5	4.3522	1.5012	1.4842	1.2928	0.9134	0.8458	1.7316	1.3137
3	5.7563	10.2885	4.5188	6.0215	4.5544	4.4009	5.9234	2.2475
4	10.6815	18.7819	9.0619	11.5911	9.6426	12.8573	12.1027	3.5429
5	14.7928	27.7370	13.7513	16.1724	11.2354	17.0331	16.7870	5.7333
6	17.9386	34.3216	18.0266	23.6170	19.4029	22.3713	22.6130	6.1862
7	21.7586	39.3364	22.0697	36.9573	24.1992	25.1344	28.2426	7.8125
8	25.0970	45.6508	31.9478	44.5202	29.0180	28.2829	34.0861	8.8017
10	37.1895	60.3799	44.5484	58.5461	41.1944	40.5461	47.0674	9.8987
12	50.5235	69.7800	53.7603	73.3482	52.0118	53.3234	58.7912	10.0218

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Table 47C: Cumulative percent drug release of propranolol HCl coated capsules in 0.5M KCl as dissolution medium from capsules containing drug:NaCl (1:0.35) (formula C21) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400(coating solution CA4) in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0.2873	0.8598	0.0791	0.0618	0.1543	0.2121	0.2757	0.2982
2.5	0.5970	2.4887	0.4096	0.5540	0.7921	0.6309	0.9121	0.7822
3	2.2113	3.7654	0.8884	1.1096	1.0149	1.1815	1.6952	1.1201
4	6.5616	5.8830	5.0794	6.4308	5.3924	3.0278	5.3958	1.2942
5	8.5715	7.0463	6.9285	8.7980	9.3499	5.6231	7.7196	1.4157
6	10.3369	7.8632	9.1040	11.0056	12.1710	9.6060	10.0145	1.5074
7	11.0915	11.2735	12.1009	15.2376	15.0339	12.1288	12.8110	1.8504
8	13.3973	12.8932	14.4880	17.1096	17.8461	13.2442	14.8297	2.1321
10	15.0102	15.9927	18.4559	21.1691	21.4742	15.0530	17.8592	2.9616
12	16.2347	18.9632	22.6107	24.7744	24.8051	19.1010	21.0815	3.5140

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Table 48C: Cumulative percent drug release of propranolol HCl coated capsules in 1 KCl as dissolution medium from capsules containing drug:NaCl(1:0.35)(formula C21) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400(formula CA4) in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0.0291	0.0049	0.0119
2.5	0.0865	0.1554	0.2817	0.1726	0.2415	0.2074	0.1909	0.0687
3	0.3286	0.3581	0.3997	0.3928	0.4911	0.4739	0.4074	0.0638
4	0.8089	0.8215	0.9784	0.9599	1.1053	0.9844	0.9431	0.1117
5	1.2945	1.4335	1.5634	1.3552	3.1560	1.5925	1.7325	0.7068
6	1.9002	2.9825	2.3443	1.9788	4.4542	2.3335	2.6656	0.9561
7	2.4859	4.5485	3.1023	2.5817	5.7176	3.0513	3.5812	1.2813
8	4.2395	5.2415	4.6436	3.7745	6.6965	4.2416	4.8062	1.0482
10	6.4564	6.7169	7.1806	6.4168	8.5147	6.1942	6.9133	0.8540
12	8.6975	8.8225	10.2564	8.8814	9.3992	8.2713	9.0547	0.6911

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Table 49C: Cumulative percent drug release of propranolol HCl coated capsules in 2 KCl as dissolution medium from capsules containing drug:NaCl(1:0.35)(formula C21) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer and without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
2.5	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0.0666	0.0111	0.0272
4	0	0	0.0781	0.1301	0	0.3502	0.0931	0.1369
5	0.5169	0.4476	0.3965	0.3047	0.3437	0.4118	0.4035	0.0752
6	0.5746	0.7413	0.9263	1.6014	1.0230	0.5376	0.9007	0.3925
7	1.4989	1.5635	1.4966	1.6422	1.8195	1.2363	1.5428	0.1923
8	1.5039	1.7597	1.7209	1.7988	1.9031	1.3076	1.6657	0.2193
10	1.9129	1.9579	1.9377	1.9742	1.9838	1.6162	1.8971	0.1400
12	2.1357	2.0484	2.1666	2.4631	2.2419	2.0783	2.1890	0.1505

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Table 50C : Cumulative percent drug release of propranolol HCl coated capsules in isotonic buffer solution pH1.2 from capsules containing drug:NaCl(1:0.35) (formula C21) were coated 286 ml. of CA solution plasticized with 50.00%w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
1.5	0.5709	0.6064	0.4348	0.2277	0.4876	0.5645	0.4820	0.1394
2	1.1334	1.2758	1.7472	0.8397	1.4895	0.3515	1.1395	0.4942
2.5	2.1695	3.9760	2.7842	2.5707	2.3521	2.5624	2.7358	0.6428
3	6.1161	6.3689	3.6373	5.0486	5.3156	6.1359	5.4371	1.0220
4	12.325	15.3671	11.6586	14.3992	13.2689	12.5629	13.2636	1.3901
5	15.4782	20.1098	18.5793	21.5220	19.5698	18.2569	18.9193	2.0499
6	26.3979	29.1989	21.5819	29.0831	28.5186	27.2658	27.0077	2.8730
7	41.1408	42.2500	29.5795	37.2402	40.1256	39.2685	38.2674	4.5849
8	48.2862	50.4475	39.7519	45.3070	49.3568	48.2685	46.9030	3.8999
10	66.2195	61.0221	54.4490	57.0606	60.2456	61.2356	60.0387	4.0189
12	79.1988	74.7109	67.9513	66.4470	70.1268	72.2568	71.7819	4.6838

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Table 51C : Cumulative percent drug release of propranolol HCl coated capsules in isotonic buffer solution pH6.8 from capsules containing drug:NaCl (1:0.35) (formula C21) were coated with 286 ml. of CA solution plasticized with 50.00%w/w of PEG400 in polymer (coating solution CA4) and without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0.1095	0	0	0	0	0.0183	0.0447
0.75	0.0290	0.1222	0	0	0	0	0.0252	0.0489
1	0.0696	0.2213	0.0405	0.1555	0.0117	0.1382	0.1061	0.0791
1.5	0.8637	0.8446	0.5526	0.7666	0.5063	0.6629	0.6995	0.1502
2	1.1205	1.3484	1.4039	1.5857	1.1213	1.5959	1.3626	0.2112
2.5	1.9435	2.3463	1.8678	1.7585	1.8351	1.9470	1.9497	0.2068
3	3.9713	2.8722	2.883	2.8873	2.6890	4.4347	3.2896	0.7264
4	11.7074	8.9517	15.3041	12.0544	9.2610	8.3987	10.9462	2.6118
5	17.6202	16.3172	28.8804	17.8906	18.5159	13.1593	18.7306	5.3267
6	25.9199	24.1372	37.627	21.7838	32.1096	20.3347	26.9854	6.6338
7	30.5843	29.0524	42.9659	26.1493	38.4069	25.1678	32.0544	7.1117
8	35.2398	31.2942	45.3124	31.3424	55.3176	33.7086	38.7025	9.6513
10	42.1510	39.6573	56.2868	42.2589	65.2188	50.9827	49.4259	9.9863
12	50.8858	48.8085	63.6749	51.2667	73.1393	57.3570	57.5220	9.3902

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Table 52C: Cumulative percent drug release of propranolol HCl coated capsules in pH change from capsules containing drug:NaCl(1:0.35)(formula C21) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer without orifice.

Time (hr.)	1	2	3	4	5	6	AVG	SD
0	0	0	0	0	0	0	0	0
0.25	0	0	0	0	0	0	0	0
0.5	0	0	0	0	0	0	0	0
0.75	0	0	0	0	0	0	0	0
1	0.0575	0	0.0575	0.0518	0.0860	0.0689	0.0536	0.0289
1.5	2.2596	0	2.9562	3.0426	2.9270	2.8754	2.3435	1.1821
2	3.5736	3.1347	3.4316	3.4039	3.3098	3.3384	3.3653	0.1458
2.5	4.4298	4.2862	8.4711	5.1159	4.3526	4.4335	5.1815	1.6394
3	6.0204	6.2619	11.4938	7.2840	5.5563	9.7254	7.7236	2.3727
4	21.7831	12.4726	15.2744	15.5198	11.0441	17.1766	15.5451	3.7775
5	26.8234	22.9711	19.0496	19.4714	16.7765	25.0606	21.6921	3.8830
6	30.3916	33.1875	23.0548	35.1966	21.9380	31.0383	29.1345	5.4246
7	35.2914	37.7294	25.8531	40.1397	28.3349	34.1725	33.5868	5.4908
8	39.1655	47.1407	30.6772	45.1986	33.5626	36.2382	38.6638	6.4885
10	43.1015	56.7594	34.7575	48.8650	46.4261	46.6351	46.0908	7.2014
12	48.0944	64.0041	40.6984	61.4173	54.0972	51.3196	53.2718	8.6130

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## APPENDIX D

### Relative dissolution time

Table 1D : The relative dissolution times(RDT) of capsule containing drug:NaCl(1:0) (formula C26) were coated with 286 ml. of 1% w/v CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution formula CA1) without orifice and orifice size of 0.8 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	9.3512	8.4234	8.6649	8.4472	8.5288	8.9220	8.7229	0.3581
0.8 mm.	7.9605	6.4442	7.5853	7.3346	7.9091	8.0355	7.5449	0.6006

Table 2D : The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1) (formula C23) coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution formula CA1) without orifice and orifice size of 0.4, 0.8 and 1 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	11.0927	11.2920	10.7720	11.4675	11.3355	11.1843	11.1907	0.2420
0.4 mm.	10.3216	10.6529	10.2592	11.0438	11.1114	10.9330	10.7203	0.3685
0.8 mm.	8.9511	4.4674	6.1737	5.0542	3.5906	5.5865	5.6372	1.8530
1 mm.	6.9141	5.0125	4.9478	4.8822	5.5344	4.2957	5.2645	0.8992

Table 3D : The relative dissolution times(RDT) of capsules containing drug:NaCl (1:2.38) (formula C25) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG 400 in polymer(coating solution formula CA1) without orifice and orifice size of 0.8 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	11.4641	11.6373	11.6402	11.6323	11.4948	11.6197	11.5814	0.0799
0.8 mm.	7.9756	10.3953	9.4098	9.3862	8.2900	8.8508	9.0513	0.8745

Table 4D : The relative dissolution times(RDT) of capsules containing pure sucrose (formula C27) were coated with 286 ml.of 1%w/v CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution formula CA1) and without orifice and with orifice size of 0.8 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	8.2968	7.8427	8.8154	8.0637	8.3407	8.0875	8.2411	0.3337
0.8 mm.	8.2968	7.8427	8.8154	8.0637	8.3407	8.0875	8.2411	0.3337

Table 5D : The relative dissolution times(RDT) of capsules containing pure KCl (formula C28) were coated with 286 ml.of CA solution plasticized with 23.08 %w/w of PEG400 in polymer (coating solution formula CA1) without orifice and orifice size of 0.8 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	11.7630	11.4369	11.3507	11.5576	11.2601	11.6375	11.5010	0.1872
0.8 mm.	7.6974	10.2779	10.2984	10.0030	9.5565	9.7111	9.5907	0.9740



Table 6D : The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1) (formula C23) were coated with 286 ml.of 1%w/v CA solution plasticized with 33.33 %w/w of PEG400 in polymer(coating solution formula CA2) without orifice and with orifice size of 0.4 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	11.3664	10.9803	11.0513	11.0179	10.8728	11.1269	11.0693	0.1680
0.4 mm.	10.6619	10.6674	10.9245	10.8306	10.8428	10.8044	10.7886	0.1041

Table 7D : The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1) (formula C23) were coated with 286 ml.of 1%w/v CA solution plasticized with 41.18 %w/w of PEG400 in polymer (coating solution formula CA3), without orifice and with orifice size of 0.4 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	10.6288	10.0371	10.3876	10.4567	10.1706	10.3608	10.3403	0.2099
0.4 mm.	8.0090	8.8105	8.5019	8.5442	8.2172	8.7581	8.4735	0.3104

Table 8D : The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1) (formula C23) were coated with 572 ml.of 1% CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution formula CA3) without orifice and orifice size of 0.4 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	11.2494	11.4178	11.5563	11.2735	11.3735	11.2929	11.3606	0.1151
0.4 mm.	10.4600	11.0201	10.2871	11.1328	10.5996	10.2352	10.6225	0.3763

Table 9D : The relative dissolution times(RDT) of capsules containing drug:NaCl (1:0) (formula C26) were coated with 858 ml.of CA solution plasticized with 41.18 %w/w of PEG400 in polymer (coating solution formula CA3) with orifice size of 1 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
1 mm.	9.3861	9.2417	9.1483	8.9480	8.6799	10.2415	9.2743	0.5338

Table 10D: The relative dissolution times(RDT) of coated capsule with various orifice size from capsule containing drug:NaCl(1:1) (formula C23) were coated with 858 ml.of CA solution plasticized with 41.18 %w/w of PEG400 in polymer (coating solution formula CA3).

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	11.5259	11.4612	11.5201	11.7777	11.7147	11.4893	11.5815	0.1312
0.4 mm.	11.5244	11.4918	10.7922	11.1714	11.1867	10.2844	11.0752	0.4696
0.8 mm.	10.2011	10.6587	11.0265	10.5270	10.4940	10.4253	10.5554	0.2755
1mm.	10.7197	10.5519	10.4139	10.0466	10.5777	9.6477	10.3262	0.4038
1 mm *	10.4687	9.3865	9.2933	9.9518	9.2872	9.8755	9.7105	0.4730
1 mm. **	8.1962	8.6660	7.8869	9.1325	7.8824	8.0394	8.3006	0.5002

\* The side of capsule.

\*\* The both end of capsule.

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Table 11D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1.69) (formula C24) were coated with 858 ml.of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution formula CA3) and orifice size of 1 mm.

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
1 mm.	9.4126	8.0477	9.0601	9.9620	9.9176	9.3010	9.2835	0.7009

Table 12D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:2.38) (formula C25) were coated with 858 ml.of CA solution plasticized with 41.18 %w/w of PEG400 in polymer (coating solution formula CA3) with orifice size of 1 mm. and using 50 rpm. of paddle, 50 and 100 rpm of basket as rotating apparatus.

Orifice size(mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
Paddle 50 rpm.	7.6069	8.5304	8.1973	9.9114	8.8133	6.1929	8.2087	1.2485
basket 50 rpm.	9.9191	9.7384	9.9535	10.2556	9.8302	8.4959	9.6988	0.6147
basket 100 rpm.	9.3754	7.8594	5.6755	8.1214	10.6370	9.5311	8.5333	1.7275

Table 13D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:0) (formula C26) were coated with 286 ml.of CA solution plasticized with 50.00% w/w of PEG400 in polymer (coating solution formula CA4).

Orifice size(mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	5.9963	4.8753	5.7229	5.9095	5.0250	5.9328	5.5769	0.4963

Table 14D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:0.35) (formula C21) were coated with 286 ml.of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating solution formula CA4) and without orifice in various media.

Concentration of KCl solution	Relative dissolution time (RDT)						Mean	SD
	1	2	3	4	5	6		
Deionized water	7.0209	6.8126	7.5795	6.7674	6.7694	6.8959	6.9743	0.3116
KCl 0.1588M.	9.6385	8.1136	9.4221	8.4723	9.5484	9.4079	9.1005	0.6413
KCl 0.5 M.	10.9549	10.9327	10.8438	10.6481	10.6278	10.9928	10.8333	0.1592
KCl 1 M.	11.6495	11.5943	11.5984	11.7124	11.4863	11.6409	11.6136	0.0756
KCl 2 M.	11.8919	11.8864	11.8845	11.8719	11.8775	11.9011	11.8856	0.0103
Buffer solution pH1.2 and adjusting to isotonic solution	8.3483	8.1300	8.7841	8.4249	8.2853	8.2912	8.3773	0.2216
Buffer solution pH6.8 and adjusting to isotonic solution	9.2072	9.4008	8.2574	9.3413	8.1078	9.1735	8.9147	0.5751
pH change	8.8231	8.3951	9.4424	8.5129	8.8059	8.8059	8.7976	0.3632

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Table 15D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:0.7)(formula C22) were coated with 286 ml.of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating solution formula CA4).

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
0 mm.	7.5247	5.4685	5.5843	6.6376	6.3665	5.7264	6.2180	0.7888

Table 16D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1) (formula C23) were coated with 286 ml.of CA solution plasticized with 50.00 %w/w of PEG400 in polymer (coating solution formula CA4) without orifice and orifice size of 0.4 mm.

Orifice size(mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	5.8268	5.6167	4.8885	5.6756	5.8950	5.9010	5.6340	0.3832
0.4 mm.	3.9721	2.6180	3.4948	2.5298	2.6242	2.6816	2.9867	0.5997

Table 17D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1)(formula C23) were coated with 572 ml.of CA solution plasticized with 50.00 %w/w of PEG400 in polymer (coating solution formula CA4).

Orifice size(mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
No orifice	10.8062	11.0565	11.2203	11.1316	11.0195	10.8844	11.0197	0.1536

Table 18D: The relative dissolution times(RDT) of capsules containing drug:NaCl (1:1) (formula C23) were coated with 858 ml.of 1% CA solution plasticized with 50.00% w/w of PEG400 in polymer. (coating solution formula CA4)

Orifice size (mm.)	Relative dissolution time (RDT)							
	1	2	3	4	5	6	Mean	SD
0 mm.	11.2329	11.2801	11.3562	11.2777	11.1600	11.5453	11.3087	0.1326

## APPENDIX E

### Statistical Analysis

Table 1E : Anova test for RDT of propranolol hydrochloride coated capsules from different orifice size of capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	182.887	3	60.962	54.962	.000
Within Groups	22.184	20	1.109		
Total	205.071	23			

Table 2E : Multiple comparisons for RDT of propranolol hydrochloride coated capsules from different orifice size of capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(formula CA1).

(I)orifice size(mm.)	(J)orifice size(mm.)	Mean Difference(I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
.0	.4	.470350	.6080509	.448	-.798022	1.738722
	.8	5.553417	.6080509	.000	4.285045	6.821789
	1.0	5.926217	.6080509	.000	4.657845	7.194589
.4	.0	-.470350	.6080509	.448	-1.738722	.798022
	.8	5.083067	.6080509	.000	3.814695	6.351439
	1.0	5.455867	.6080509	.000	4.187495	6.724239
.8	.0	-.470350	.6080509	.000	-6.821789	-4.285045
	.4	5.083067	.6080509	.000	-6.351439	-3.814695
	1.0	5.455867	.6080509	.547	-.895572	1.641172
1.0	.0	-5.926217	.6080509	.000	-7.194589	-4.657845
	.4	-5.455867	.6080509	.000	-6.724239	-4.187495
	.8	-.372800	.6080509	.547	-1.641172	.895572

\* the mean difference is significant at the .05 level.

Table 3E : Anova test for RDT of propranolol hydrochloride capsules from different orifice size of capsules containing drug:NaCl(1:1)(formula C23) were coated with 858 ml. of 1%w/v cellulose acetate solution plasticized with 41.18 %w/w.of PEG400 in polymer(coating solution CA3).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.652	3	1.884	15.810	.000
Within Groups	2.383	20	.119		
Total	8.036	23			

Table 4E: Multiple comparisons for RDT of propranolol hydrochloride capsules from different orifice size of capsules containing drug:NaCl(1:1)(formula C23) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w. of PEG400 in polymer(coating solution CA3).

(I)orifice size(mm.)	(J)orifice size(mm.)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
.0	.4	.506333	.1993092	.019	.090582	.822085
	.8	1.026050	.1993092	.000	.610298	1.441802
	1.0	1.255233	.1993092	.000	.839482	1.670985
.4	.0	-.506333	.1993092	.019	-.922085	-.090582
	.8	.519717	.1993092	.017	.103965	.935468
	1.0	.748900	.1993092	.001	.333148	1.164652
.8	.0	-1.026050	.1993092	.000	-1.441802	-.610298
	.4	-.519717	.1993092	.017	-.935468	-.103965
	1.0	.229183	.1993092	.264	-.186568	.644935
1.0	.0	-1.255233	.1993092	.000	-1.670985	-.839482
	.4	-.748900	.1993092	.001	-1.164652	-.333148
	.8	-.229183	.1993092	.264	-.644935	.186568

\* the mean difference is significant at the .05 level.

Table 5E: Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with various level of PEG400 and without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	125.759	3	41.920	603.838	.000
Within Groups	1.388	20	.069		
Total	127.147	23			

Table 6E : Multiple comparisons for RDT of propranolol hydrochloride capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with various level of PEG400 and without orifice.

(I)level of PEG400	(J)level of PEG400	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
23.08 %	33.33 %	.121400	.1521203	.434	-.195917	.438717
	41.18 %	.850400	.1521203	.000	.533083	1.167717
	50.00 %	5.556733	.1521203	.000	5.239416	5.874051
33.33 %	23.08 %	-.121400	.1521203	.434	-.438717	.195917
	41.18 %	.729000	.1521203	.000	.411683	1.046317
	50.00 %	5.435333	.1521203	.000	5.118016	5.752651
41.18 %	23.08 %	-.850400	.1521203	.000	-1.167717	-.533083
	33.33 %	-.729000	.1521203	.000	-1.046317	-.411683
	50.00 %	4.706333	.1521203	.000	4.389016	5.023651
50.00 %	23.08 %	-5.556733	.1521203	.000	-5.874051	-5.239416
	33.33 %	-5.435333	.1521203	.000	-5.752651	-5.118016
	41.18 %	-4.706333	.1521203	.000	-5.023651	-4.389016

\* the mean difference is significant at the .05 level.



Table 7E: Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1) (formula C23) were coated with 286 ml. of CA solution plasticized with various level of PEG400 and orifice size of 0.4 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.585	3	.528	10.490	.000
Within Groups	1.007	20	.050		
Total	2.593	23			

Table 8E : Multiple comparisons for RDT of propranolol hydrochloride capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with various level of PEG400 and orifice size of 0.4 mm.

(I)level of PEG400	(J)level of PEG400	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
23.08 %	33.33 %	-.050593	.1295791	.700	-.320890	.219705
	41.18 %	.303763	.1295791	.030	.033466	.574060
	50.00 %	.588696	.1295791	.000	.318399	.858993
33.33 %	23.08 %	.050593	.1295791	.700	-.219705	.320890
	41.18 %	.354356	.1295791	.013	.084058	.624653
	50.00 %	.639289	.1295791	.000	.368992	.909586
41.18 %	23.08 %	-.303763	.1295791	.030	-.574060	-.033466
	33.33 %	-.354356	.1295791	.013	-.624653	-.084058
	50.00 %	.284933	.1295791	.040	.014636	.555230
50.00 %	23.08 %	-.588696	.1295791	.000	-.858993	-.318399
	33.33 %	-.639289	.1295791	.000	-.909586	-.368992
	41.18 %	-.284933	.1295791	.040	-.555230	-.014636

\* the mean difference is significant at the .05 level.

Table 9E: Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1) (formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(coating solution CA1) and various orifice size(0.4 mm and without orifice).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.664	1	.664	6.830	.026
Within Groups	.972	10	.097		
Total	1.635	11			

Table10E: Anova test for RDT of propranolol hydrochloride capsules containing drug:N (1:1) (formula C23) was coated with 286 ml. of CA solution plasticized with 33.33 %w/w of PEG400 in polymer(coating solution CA2) and various orifice size (0.4 mm and without orifice).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.236	1	.236	12.104	.006
Within Groups	.195	10	.020		
Total	.432	11			

Table11E: Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) and various orifice size (0.4 mm and without orifice).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.455	1	10.455	148.929	.000
Within Groups	.702	10	.070		
Total	11.157	11			

Table 12E :Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating solution CA4) and various orifice size.(0.4 mm and without orifice).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21.023	1	21.023	83.004	.000
Within Groups	2.533	10	.253		
Total	23.555	11			



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Table 13E :Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1)(formula C23) were coated with various amount of cellulose acetate solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA4) and without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57.977	2	28.989	64.766	.000
Within Groups	6.714	15	.448		
Total	64.691	17			

Table 14E:Multiple comparisons for RDT of propranolol hydrochloride capsules containing drug:NaCl(1:1)(formula C23) were coated with various amount of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA4) without orifice.

(I) Thickness	(J) Thickness	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
286 ml	572 ml	4.276203	.3862603	.000	3.452909	5.099498
	858 ml	3.021242	.3862603	.000	2.197948	3.844537
572 ml	286 ml	-4.276203	.3862603	.000	-5.099498	-3.452909
	858 ml	-1.254961	.3862603	.005	-2.078255	-.431667
858 ml	286 ml	-3.021242	.3862603	.000	-3.844537	-2.197948
	572 ml	1.254961	.3862603	.005	.431667	2.078255

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Table 15E: Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl(1:1)(formula C23) were coated with various amount of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA4) orifice size of 0.4 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23.183	2	11.592	75.855	.000
Within Groups	2.292	15	.153		
Total	25.476	17			

Table 16E: Multiple comparisons for RDT of propranolol hydrochloride capsules containing drug:NaCl(1:1)(formula C23) were coated with various amount of cellulose acetate solution plasticized with 41.18 %w/w of PEG400 in polymer orifice size of 0.4 mm.

(I) Thickness	(J) Thickness	Mean Difference(I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
286 ml	572 ml	-2.148983	.2256947	.000	-2.630040	-1.667926
	858 ml	-2.601667	.2256947	.000	-3.082724	-2.120610
572 ml	286 ml	2.148983	.2256947	.000	1.667926	2.630040
	858 ml	-.452683	.2256947	.063	-.933740	.028374
858 ml	286 ml	2.601667	.2256947	.000	2.120610	3.082724
	572 ml	.452683	.2256947	.063	-.028374	.933740

\* The mean difference is significant at the .05 level.

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Table17E: Anova test for RDT of propranolol hydrochloride capsules containing drug:NaCl (1:1)(formula C23) were coated with various amount of CA solution plasticized with 50.00 %w/w of PEG400(coating solution CA4) in polymer and without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	122.587	2	61.293	977.819	.000
Within Groups	.940	15	.063		
Total	123.527	17			

Table18E : Multiple comparisons for RDT of propranolol hydrochloride capsules containing drug:NaCl(1:1)(formula C23) were coated with various amount of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating solution CA4) and with orifice size of 0.4 mm.

(I) Thickness	(J) Thickness	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
286 ml	572 ml	-5.385817	.1445498	.000	-5.693917	-5.077716
	858 ml	-5.674767	.1445498	.000	-5.982867	-5.366666
572 ml	286 ml	5.385817	.1445498	.000	5.077716	5.693917
	858 ml	-.288950	.1445498	.064	-.597051	.019151
858 ml	286 ml	5.674767	.1445498	.000	5.366666	5.982867
	572 ml	.288950	.1445498	.064	-.019151	.597051

\* The mean difference is significant at the .05 level.

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Table19E :Anova test for RDT of propranolol hydrochloride capsules containing various amount of NaCl were coated with 858ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) and orifice size of 1 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1370625659.371	3	456875219.790	8.811	.001
Within Groups	985232175.926	19	51854325.049		
Total	2355857835.297	22			

Table20E: Multiple comparisons for RDT of propranolol hydrochloride capsules capsules containing various amount of NaCl were coated with 858 ml. of CA solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution CA3) and orifice size of 1 mm.

(I) drug :NaCl	(J) drug: NaCl	Mean Difference(I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1:0	1:1	-20528.074728	.4188466	.000	-29654.536261	-11401.613195
	1:1.69	-3692.377688	.4188466	.408	-12818.839221	5434.083846
	1:2.38	-9327.016108	.4188466	.046	-18453.477641	-200.554575
1:1	0	20528.074728	.4188466	.000	11401.613195	29654.536261
	1:1.69	16835.697040	.4188466	.001	8133.957396	25537.436685
	1:2.38	11201.058620	.4188466	.014	2499.318976	19902.798264
1:1.69	1:0	3692.377688	.4188466	.408	-5434.083846	12818.839221
	1:1	-16835.697040	.4188466	.001	-25537.436685	-8133.957396
	1:2.38	-5634.638420	.4188466	.191	-14336.378065	3067.101224
1:2.38	1:0	9327.016108	.4188466	.046	200.554575	18453.477641
	1:1	-11201.058620	.4188466	.014	-19902.798264	-2499.318976
	1:1.69	5634.638420	.4188466	.191	-3067.101224	14336.378065

\* The mean difference is significant at the .05 level.

Table21E : Anova test for RDT of propranolol hydrochloride coated capsules containing various amount of NaCl were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating solution CA4) without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.614	3	2.538	9.127	.001
Within Groups	5.562	20	.278		
Total	13.176	23			

Table22E: Multiple comparisons for RDT of propranolol hydrochloride capsules containing various amount of NaCl were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating solution CA4) without orifice.

(I) drug : NaCl	(J) drug: NaCl	Mean Difference(I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1:0	1:0.35	-1.397317	.3044618	.000	-2.032413	-.762220
	1:0.7	-.641033	.3044618	.048	-1.276130	-.005937
	1:1	-.056967	.3044618	.853	-.692063	.578130
1:0.35	1:0	1.397317	.3044618	.000	.762220	2.032413
	1:0.7	.756283	.3044618	.022	.121187	1.391380
	1:1	1.340350	.3044618	.000	.705254	1.975446
1:0.7	1:0	.641033	.3044618	.048	.005937	1.276130
	1:0.35	-.756283	.3044618	.022	-1.391380	-.121187
	1:1	.584067	.3044618	.069	-.051030	1.219163
1:1	1:0	.056967	.3044618	.853	-.578130	.692063
	1:0.35	-1.340350	.3044618	.000	-1.975446	-.705254
	1:0.7	-.584067	.3044618	.069	-1.219163	.051030

\* The mean different is significant at the .05 level.



Table 23E : Anova test for RDT of propranolol hydrochloride capsules with various rotating apparatus type and speed from capsules containing drug:NaCl(1:2.38)(formula C25) were coated with 858 ml. of CA solution plasticized with 41.18 %w/w PEG400 in polymer (coating solution formula CA3) and orifice size of 1 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.205	2	.603	1.776	.203
Within Groups	5.091	15	.339		
Total	6.296	17			

Table 24E:Multiple comparisons for RDT of propranolol hydrochloride capsules with various type and speed from capsules containing drug:NaCl(1:2.38)(formula C25) were coated with 858 ml. of cellulose acetate solution plasticized with 41.18 %w/w of PEG400 in polymer(coating solution formula CA3) and orifice size of 1 mm.

(I) rotating apparatus & speed	(J) rotating apparatus & speed	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
paddle 50 rpm	basket 50 rpm	.577017	.3363378	.107	-.139870	1.293904
	basket 100 rpm	.061317	.3363378	.858	-.655570	.778204
basket 50 rpm	paddle 50 rpm.	-.577017	.3363378	.107	-1.293904	.139870
	basket 100 rpm.	-.515700	.3363378	.146	-1.232587	.201187
basket 100 rpm	paddle 50 rpm	-.061317	.3363378	.858	-.778204	.655570
	basket 50 rpm	.515700	.3363378	.146	-.201187	1.232587

\* The mean different is significant at the .05 level.

Table 25E : Anova test for RDT of propranolol hydrochloride capsules in various KCl solution media from capsules containing drug:NaCl(1:0.35)(formula C21) were coated with 286 ml. of CA solution plasticized with 50.00%w/w PEG400 in polymer(coating solution CA4) without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	100.707	4	25.177	233.292	.000
Within Groups	2.698	25	108		
Total	103.405	29			

Table 26E: Multiple comparisons for RDT of propranolol hydrochloride coated capsules in various KCl solution media from capsules containing drug:NaCl(1:0.35) (formula C21) were coated with 286 ml. of CA solution plasticized with 50.00%w/w of PEG400 in polymer(coating solution CA4) without orifice.

(I) KCl medium (M)	(J) KCl medium (M)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
0	0.1588	-2.126183	.1896662	.000	-2.516808	-1.735558
	0.5000	-3.859067	.1896662	.000	-4.249692	-3.468442
	1.0000	-4.639350	.1896662	.000	-5.029975	-4.248725
	2.0000	-4.911267	.1896662	.000	-5.301892	-4.520642
0.1588	0	2.126183	.1896662	.000	1.735558	2.516808
	0.5000	-1.732883	.1896662	.000	-2.123508	-1.342258
	1.0000	-2.513167	.1896662	.000	-2.903792	-2.122542
	2.0000	-2.785083	.1896662	.000	-3.175708	-2.394458
0.5000	0	3.859067	.1896662	.000	3.468442	4.249692
	0.1588	1.732883	.1896662	.000	1.342258	2.123508
	1.0000	-.780283	.1896662	.000	-1.170908	-.389658
	2.0000	-1.052200	.1896662	.000	-1.442825	-.661575
1.0000	0	4.639350	.1896662	.000	4.248725	5.029975
	0.1588	2.513167	.1896662	.000	2.122542	2.903792
	0.5000	.780283	.1896662	.000	.389658	1.170908
	2.0000	-.271917	.1896662	.164	-.662542	.118708

(I) KCl medium (M)	(J) KCl medium (M)	Mean Difference (I-J)	Std.Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
2.0000 M	0 M	4.911267	.1896662	.000	4.520642	5.301892
	0.1588 M	2.785083	.1896662	.000	2.394458	3.175708
	0.5 M	1.052200	.1896662	.000	.661575	1.442825
	1 M	.271917	.1896662	.164	-.118708	.662542

Table27E : Anova test for RDT of propranolol hydrochloride coated capsules in isotonic buffer phosphate pH1.2 and 6.8 from capsules containing drug:NaCl(1:0.35) (formula C21) were coated with 286 ml. of CA solution plasticized with 50.00 %w/w of PEG400 in polymer(coating formula CA4) without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.579	1	.579	5.945	.035
Within Groups	.974	10	.097		
Total	1.554	11			

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Table28E : Anova test for RDT of propranolol hydrochloride coated capsules with various amount of PEG400 as plasticizer from capsules containing drug:NaCl(1:1) (formula C23) were coated with 286 ml. of CA solution and without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	66.449	1	66.449	696.127	.000
Within Groups	.955	10	.095		
Total	67.403	11			

Table29E: Anova test for RDT of propranolol hydrochloride coated capsules with various amount of PEG400 as plasticizer from capsules containing drug:NaCl(1:1) (formula C23) was coated with 572 ml. of CA solution without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.348	1	.348	18.910	.001
Within Groups	.184	10	.018		
Total	.533	11			

Table30E: Anova test for RDT of propranolol hydrochloride coated capsules with various amount of PEG400 as plasticizer from capsules containing drug:NaCl(1:1) (formula C23) were coated with 858 ml. of CA solution without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.768	1	11.768	9.979	.010
Within Groups	11.792	10	1.179		
Total	23.560	11			

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Table 31E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure lactose (formula C26) or pure sucrose(formula C27) were coated capsule with 286 ml. of CA solution plasticized with 23.08 % w/w of PEG400 in polymer(coating solution CA1) without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.696	1	.696	5.814	.037
Within Groups	1.198	10	.120		
Total	1.894	11			

Table 32E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure NaCl(formula C25)or pure KCl(formula C28) were coated with 286 ml. of CA solution plasticized with 23.08 % w/w of PEG400 in polymer (coating solution formula CA1) without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.019	1	.019	.937	.356
Within Groups	.207	10	.021		
Total	.227	11			

Table 33E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure lactose (formula C27)or pure sucrose(formula C27) were coated capsule with 286 ml. of CA solution plasticized with 23.08 % w/w of PEG400 in polymer(coating solution formula CA1) and orifice size of 0.8 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.132	1	9.132	42.488	.000
Within Groups	2.149	10	.215		
Total	11.281	11			

Table 34E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure NaCl (formula C25) or pure KCl (formula C28) were coated with 286 ml. of CA solution plasticized with PEG400 23.08 % w/w of polymer (coating solution formula CA1) and orifice size of 0.8 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.019	1	.019	.937	.356
Within Groups	.207	10	.021		
Total	.227	11			

Table 35E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure lactose (formula C26) were coated with 286 ml. of cellulose acetate solution plasticized with 23.08 % w/w of PEG400 in polymer (coating solution CA1) and orifice size of 0.8 mm. and without orifice.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.163	1	4.163	17.031	.002
Within Groups	2.445	10	.244		
Total	6.608	11			

Table 36E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure sucrose (formula C27) were coated capsule with 286 ml. of CA solution plasticized with 23.08 % w/w of PEG400 in polymer (coating solution CA1) without orifice and orifice size of 0.8 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17.875	1	17.875	198.073	.000
Within Groups	.902	10	.090		
Total	18.777	11			

Table 37E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing drug:NaCl(1:2.38) (formula C25) were coated capsule with 286 ml of CA solution plasticized with 23.08 % w/w of PEG400 in polymer (coating solution CA1) without orifice and orifice size of 0.8 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.204	1	19.204	49.806	.000
Within Groups	3.856	10	.386		
Total	23.060	11			

Table 38E : Anova test for RDT of propranolol hydrochloride coated capsules from capsules containing pure KCl (formula C28) were coated with 286 ml. of CA solution plasticized with 23.08 % w/w of PEG400 in polymer (coating solution CA1) without orifice and orifice size of 0.8 mm.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.947	1	10.947	22.257	.001
Within Groups	4.919	10	.492		
Total	15.866	11			

Table 39E : Anova test for RDT of propranolol hydrochloride coated capsules with various orifice position on the capsule from capsules containing drug:NaCl (1:1) (formula C23) were coated with 858 ml. of CA solution plasticized with 41.18 % w/w of PEG400 in polymer (coating solution CA3).

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.941	2	6.470	30.478	.000
Within Groups	3.185	15	.212		
Total	16.125	17			

Table 40E: Multiple comparisons for RDT of propranolol hydrochloride coated capsules from different orifice size of capsules containing drug:NaCl(1:1)(formula C23) were coated with 286 ml. of CA solution plasticized with 23.08 %w/w of PEG400 in polymer(formula CA1).

(I)orifice size(mm.)	(J)orifice size(mm.)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1 orifice at the end of orifice	1 orifice at the side of orifice	.61575	.2660215	.035	.048738	1.182762
	2 orifices at the both side of orifice.	2.025683	.2660215	.000	1.458672	2.592695
1 orifice at the side of capsule	1 orifice at the end of capsule	-.615750	.2660215	.035	-1.182762	-.048738
	2 orifices at the both side of orifice.	1.409933	.2660215	.000	.842922	1.976945
2 orifices at the both side of orifice.	1 orifice at the end of capsule	-2.025683	.2660215	.000	-2.592695	-1.458672
	1 orifice at the side of capsule	-1.409933	.2660215	.000	-1.976945	-.842922

\* the mean difference is significant at the .05 level.





## VITA

Miss Natchanan Siroratsakul was born on June 3, 1976. She graduated the Bachelor of Science in Pharmacy in 1997 from Faculty of Pharmaceutical Sciences, Mahidol University, Bangkok, Thailand. After graduated, she worked as a pharmacist in hospital for three years before attending the Master's Degree program in Pharmaceutical sciences at Chulalongkorn University in 2001.



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