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Appendix A

Percent Water Sorption of Various Crosslinked Chitosan - Polymer Membranes

Formulations	Sample number	Weight of membranes		% Water sorption
		before exposure to water	after exposure to water	
CPL ₄₀	1	0.1688	0.2285	35.3673
	2	0.1732	0.2291	32.2748
	3	0.1787	0.2324	30.0504
CPL ₄₃	1	0.1471	0.2194	49.1502
	2	0.1368	0.1993	45.6871
	3	0.1525	0.2301	50.8852
CPL ₄₄	1	0.1776	0.2524	42.1171
	2	0.1920	0.2894	50.7292
	3	0.1769	0.2524	42.6795
CPL ₄₅	1	0.1781	0.2404	34.9803
	2	0.1999	0.2682	34.1671
	3	0.1764	0.2411	36.6780
CPM ₂₉	1	0.1772	0.2851	60.8916
	2	0.1659	0.2740	65.1597
	3	0.1706	0.2455	62.0588
CPM ₃₀	1	0.2004	0.2580	28.7425
	2	0.2061	0.2575	24.9393
	3	0.2054	0.2569	25.0730
CPM ₃₄	1	0.1711	0.2647	54.7049
	2	0.1905	0.3010	58.0052
	3	0.1898	0.3004	58.2719
CPM ₃₅	1	0.1581	0.2071	30.9930
	2	0.1299	0.1698	30.7159
	3	0.1483	0.2009	35.4686
CPM ₃₉	1	0.1726	0.2591	50.1159
	2	0.1581	0.2346	48.3871
	3	0.1832	0.2788	52.1834

Formulations	Sample number	Weight of membranes		% Water sorption
		before exposure to water	after exposure to water	
CPM ₄₀	1	0.1534	0.2021	31.7471
	2	0.1811	0.2271	25.9525
	3	0.1562	0.1955	25.1601
CPM ₄₄	1	0.1766	0.2790	57.9841
	2	0.1519	0.2633	73.3377
	3	0.1702	0.2773	62.9260
CPM ₄₅	1	0.1594	0.2300	44.2911
	2	0.1911	0.2814	47.2527
	3	0.1732	0.2311	33.4296
CPH ₃₃	1	0.1914	0.3176	71.1599
	2	0.2012	0.3312	64.6123
	3	0.1937	0.3247	67.6304
CPH ₃₄	1	0.2151	0.3360	56.2064
	2	0.2057	0.3224	56.7331
	3	0.2060	0.3219	56.2621
CPH ₃₈	1	0.1597	0.2773	73.6381
	2	0.2101	0.3464	64.8739
	3	0.1734	0.2956	70.4729
CPH ₃₉	1	0.1665	0.2523	51.5315
	2	0.1706	0.2619	53.5170
	3	0.1732	0.2652	53.1178
CPH ₄₀	1	0.1818	0.2420	33.1133
	2	0.1840	0.2401	30.4891
	3	0.1822	0.2372	30.1866
CPH ₄₄	1	0.1740	0.2834	62.8736
	2	0.1739	0.2770	59.2869
	3	0.1720	0.2832	64.6517
CPH ₄₅	1	0.1842	0.2782	51.0315
	2	0.1909	0.2928	53.3787
	3	0.1866	0.2711	45.2840
CC ₇	1	0.1960	0.2660	43.0108
	2	0.1863	0.2686	44.1761
	3	0.2056	0.3035	47.6167
CC ₈	1	0.1845	0.2587	40.2168
	2	0.2074	0.2861	37.9460
	3	0.1928	0.2696	39.8340

Formulations	Sample number	Weight of membranes		% Water sorption
		before exposure to water	after exposure to water	
CC ₁₅	1	0.1917	0.2740	42.9317
	2	0.1850	0.2701	46.0000
	3	0.1881	0.2723	44.7634
CC ₁₆	1	0.1986	0.2682	35.7287
	2	0.1834	0.2502	36.4231
	3	0.1966	0.2676	36.1139
CP ₇	1	0.2016	0.3060	51.7857
	2	0.2512	0.3667	45.9793
	3	0.2119	0.3121	47.2865
CP ₈	1	0.2618	0.3580	36.7456
	2	0.2345	0.3258	38.9339
	3	0.2500	0.3431	37.2400
CP ₁₅	1	0.1990	0.2905	45.9799
	2	0.2392	0.3505	46.4665
	3	0.2418	0.3515	45.3681
CP ₁₆	1	0.2394	0.3235	35.1295
	2	0.2491	0.3460	36.7322
	3	0.2233	0.3103	38.9610
CT ₄₇	1	0.1624	0.2112	30.0493
	2	0.1667	0.2106	26.3347
	3	0.1735	0.2200	26.8012
CT ₄₈	1	0.1855	0.2319	25.0135
	2	0.1733	0.2228	28.5632
	3	0.1960	0.2324	24.9462

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Appendix B

Tensile Test of Various Crosslinked Chitosan - Polymer Membranes

Formulations	Mean thickness (mm)	Cross section area (mm ²)	Breaking force (kg)	Ultimate tensile strength (kg/mm ²)	Elongation at break (%)
CPL ₄₀	0.105	0.6563	1.4878	2.2670	25
	0.100	0.6250	1.3133	2.1013	20
	0.100	0.6250	1.3827	2.2123	20
CPL ₄₃	0.110	0.3875	1.3449	1.9562	35
	0.100	0.6250	1.3006	2.0810	35
	0.105	0.6563	1.2806	1.9512	25
CPL ₄₄	0.105	0.6563	1.6092	2.4519	25
	0.105	0.6563	1.5265	2.3259	30
	0.105	0.6563	1.3561	2.0663	35
CPL ₄₅	0.100	0.6250	2.2020	3.5232	15
	0.100	0.6250	2.2326	3.5722	20
	0.105	0.6563	2.2092	3.3661	15
CPM ₃₀	0.110	0.6875	0.9593	1.3953	10
	0.110	0.6875	0.8947	1.3014	20
	0.105	0.6563	0.7516	1.1452	15
CPM ₃₅	0.100	0.6250	0.9640	1.5424	20
	0.100	0.6250	0.7793	1.2469	20
	0.110	0.6875	0.7681	1.1172	15
CPM ₃₉	0.095	0.5938	1.4133	2.3801	35
	0.090	0.5625	1.3895	2.4702	35
	0.100	0.6250	1.3267	2.1227	25
CPM ₄₀	0.090	0.5625	1.9923	3.5419	40
	0.095	0.5939	2.0760	3.4961	35
	0.090	0.5625	1.9865	3.5316	30
CPM ₄₅	0.110	0.6875	3.2429	4.7169	35
	0.105	0.6563	3.1745	4.8370	20
	0.110	0.6875	3.2184	4.6813	35

Formulations	Mean thickness (mm)	Cross section area (mm ²)	Breaking force (kg)	Ultimate tensile strength (kg/mm ²)	Elongation at break (%)
CPH ₄₀	0.095	0.5938	2.6378	4.4422	40
	0.100	0.6250	2.8153	4.5045	35
	0.095	0.5938	2.4479	4.1224	40
CPH ₄₅	0.105	0.6563	3.1857	4.8540	40
	0.105	0.6563	3.4051	5.1883	40
	0.105	0.6563	3.1939	4.8665	45
CC ₇	0.105	0.6563	0.4026	0.6134	10
	0.110	0.6875	0.9542	0.6079	15
	0.110	0.6875	0.4635	0.6742	5
CC ₈	0.100	0.6250	0.8251	1.3202	10
	0.110	0.3875	0.9542	1.3879	15
	0.110	0.6875	0.9876	1.4365	15
CC ₁₅	0.100	0.6250	0.8251	0.6274	10
	0.100	0.6875	0.3519	0.5630	7.5
	0.100	0.6250	0.3592	0.5646	7.5
CC ₁₆	0.110	0.6875	0.6989	1.0166	15
	0.110	0.6875	0.7340	1.0676	10
	0.110	0.6875	0.7527	1.0948	10
CP ₇	0.105	0.6563	0.5314	0.8097	10
	0.110	0.6875	0.5792	0.8425	7.5
	0.110	0.6875	0.5668	0.8244	10
CP ₈	0.100	0.6250	0.9638	1.5421	10
	0.100	0.6250	0.9547	1.5275	20
	0.100	0.6250	0.8372	1.3395	15
CP ₁₅	0.110	0.6875	0.3429	0.4988	10
	0.110	0.6875	0.4015	0.5840	15
	0.110	0.6875	0.3476	0.5056	20
CP ₁₆	0.110	0.6875	0.7089	1.0311	10
	0.110	0.6875	0.6844	0.9955	15
	0.110	0.6875	0.7635	1.1105	15
CT ₄₇	0.105	0.6563	0.9027	1.3754	15
	0.105	0.6563	0.8639	1.3163	15
	0.105	0.6563	0.8742	1.3320	20
CT ₄₈	0.110	0.6875	1.1253	1.6368	20
	0.110	0.6875	0.9920	1.4429	20
	0.110	0.6875	1.2316	1.7914	25

Appendix C

Percent Water Sorption of Various Crosslinked Chitosan - Polymer Membranes After Stability Test

Formulations	Sample number	Weight of membranes		% Water sorption
		before exposure to water	after exposure to water	
CPL ₄₀	1	0.1879	0.2730	29.3241
	2	0.2265	0.2989	31.9647
	3	0.2146	0.2861	33.3178
CPL ₄₃	1	0.2155	0.3189	47.9814
	2	0.1924	0.2926	52.0790
	3	0.1986	0.2972	49.6475
CPL ₄₄	1	0.1964	0.2750	40.0204
	2	0.1715	0.2416	40.8746
	3	0.2005	0.2742	36.7581
CPL ₄₅	1	0.1793	0.2421	35.0251
	2	0.1971	0.2276	36.2059
	3	0.1845	0.2650	36.2468
CPM ₃₀	1	0.1868	0.2279	22.0021
	2	0.2100	0.2564	22.0952
	3	0.2078	0.2566	23.4841
CPM ₃₅	1	0.2068	0.2689	30.0290
	2	0.2187	0.2742	25.3772
	3	0.2146	0.2803	30.6151
CPM ₃₉	1	0.1871	0.2622	40.1390
	2	0.1734	0.2507	44.5790
	3	0.1858	0.2673	43.8644
CPM ₄₀	1	0.1824	0.2295	25.8224
	2	0.1838	0.2258	22.8509
	3	0.2009	0.2592	29.0194
CPM ₄₅	1	0.1848	0.2542	37.5541
	2	0.2074	0.2753	32.7387
	3	0.2133	0.2869	34.5054

Formulations	Sample number	Weight of membranes		% Water sorption
		before exposure to water	after exposure to water	
CPH ₄₀	1	0.1807	0.2355	30.3265
	2	0.1900	0.2476	30.3158
	3	0.1938	0.2478	27.8638
CPH ₄₅	1	0.1715	0.2592	51.1370
	2	0.1775	0.2645	49.0141
	3	0.1721	0.2543	47.7629
CC ₇	1	0.1944	0.2820	45.0617
	2	0.1890	0.2689	42.2751
	3	0.1965	0.2877	46.4122
CC ₈	1	0.1744	0.2320	33.0275
	2	0.1720	0.2311	34.3605
	3	0.1719	0.2332	35.6603
CC ₁₅	1	0.1615	0.2673	39.5822
	2	0.1783	0.2473	38.6988
	3	0.1842	0.2560	39.0334
CC ₁₆	1	0.1723	0.2233	29.5995
	2	0.1943	0.2551	31.2918
	3	0.1920	0.2527	31.6146
CP ₇	1	0.2090	0.2978	42.4880
	2	0.2076	0.2971	43.1118
	3	0.2039	0.2899	42.1775
CP ₈	1	0.2155	0.2919	35.4524
	2	0.2127	0.2915	37.0475
	3	0.2248	0.2983	32.6957
CP ₁₅	1	0.1858	0.2664	43.3800
	2	0.1846	0.2658	43.9870
	3	0.1861	0.2675	43.7399
CP ₁₆	1	0.2011	0.2735	36.0020
	2	0.1942	0.2738	40.9887
	3	0.1984	0.2681	35.1318
CT ₄₇	1	0.1388	0.1717	23.7032
	2	0.1959	0.2369	22.3073
	3	0.1538	0.1948	26.6580
CT ₄₈	1	0.1679	0.2075	23.5855
	2	0.1821	0.2248	23.4487
	3	0.1898	0.2316	22.0232

Statistical Test of Water sorption Data Before and After Stability Test

Formulations	t-value	
CPL ₄₀	0.531	NS
CPL ₄₃	-0.416	NS
CPL ₄₄	1.952	NS
CPL ₄₅	-0.655	NS
CPM ₃₀	2.750	NS
CPM ₃₅	1.644	NS
CPM ₃₉	4.186	S
CPM ₄₀	0.630	NS
CPM ₄₅	1.518	NS
CPH ₄₀	1.422	NS
CPH ₄₅	0.228	NS
CC ₇	1.652	NS
CC ₈	4.816	S
CC ₁₅	2.721	NS
CC ₁₆	2.763	NS
CP ₇	1.442	NS
CP ₈	2.263	NS
CP ₁₅	2.392	NS
CP ₁₆	-0.203	NS
CT ₄₇	2.021	NS
CT ₄₈	2.437	NS

If $\alpha = 0.05$, $df = 4$, then the critical t-value = ± 2.776

NS = Non significance S= Significance

Appendix D

Tensile Test of Various Crosslinked Chitosan - Polymer Membranes After Stability Test

Formulations	Mean thickness (mm)	Cross section area (mm ²)	Breaking force (kg)	Ultimate tensile strength (kg/mm ²)	Elongation at break (%)
CPL ₄₀	0.110	0.6875	0.9196	1.3376	10
	0.110	0.6875	0.9259	1.3468	20
	0.109	0.6813	1.0459	1.5352	10
CPL ₄₃	0.109	0.6813	1.7908	2.6285	50
	0.101	0.6313	1.6510	2.6152	35
	0.109	0.6813	1.8173	2.6674	35
CPL ₄₄	0.110	0.6875	1.5898	2.3124	40
	0.110	0.6875	1.9010	2.7651	30
	0.110	0.6875	1.9184	2.7904	40
CPL ₄₅	0.110	0.6875	2.2490	3.2713	25
	0.109	0.6813	2.0276	2.9761	35
	0.110	0.6875	2.2235	3.2342	40
CPM ₃₀	0.110	0.6875	0.8668	1.2608	30
	0.110	0.6875	0.7933	1.1539	20
	0.110	0.6875	0.8416	1.2241	20
CPM ₃₅	0.110	0.6875	1.1673	1.6979	25
	0.110	0.6875	1.0634	1.5468	15
	0.110	0.6875	1.0149	1.4762	20
CPM ₃₉	0.110	0.6875	1.7010	2.4742	50
	0.110	0.6875	1.5949	2.3199	45
	0.109	0.6813	1.3694	2.0100	35
CPM ₄₀	0.110	0.6875	2.0051	2.9165	40
	0.110	0.6875	1.7202	2.4876	35
	0.110	0.6875	2.1408	3.1139	35
CPM ₄₅	0.110	0.6875	2.9398	4.2761	35
	0.109	0.6813	2.9899	4.3885	35
	0.109	0.6813	2.8929	4.2461	40

Formulations	Mean thickness (mm)	Cross section area (mm ²)	Breaking force (kg)	Ultimate tensile strength (kg/mm ²)	Elongation at break (%)
CPH ₄₀	0.109	0.6813	2.7327	4.0110	40
	0.110	0.6875	2.8592	4.1588	30
	0.110	0.6875	2.8061	4.0816	35
CPH ₄₅	0.109	0.6813	3.1388	4.6071	30
	0.105	0.6563	3.0102	4.5866	35
	0.105	0.6563	3.4878	5.3143	30
CC ₇	0.110	0.6875	0.5214	0.7584	10
	0.110	0.6875	0.4708	0.6848	5
	0.110	0.6875	0.4840	0.7040	5
CC ₈	0.110	0.6875	0.8857	1.2883	15
	0.110	0.6875	1.0097	1.4687	20
	0.090	0.5625	0.9943	1.6788	15
CC ₁₅	0.109	0.6813	0.3898	0.5721	9
	0.105	0.6563	0.5214	0.7945	9
	0.110	0.6875	0.4459	0.6486	12
CC ₁₆	0.110	0.6875	0.9480	1.3789	10
	0.110	0.6875	0.8367	1.2170	15
	0.105	0.6563	0.6500	0.9904	10
CP ₇	0.110	0.6875	0.3821	0.5558	10
	0.110	0.6875	0.6960	1.0124	15
	0.110	0.6875	0.6213	0.9037	20
CP ₈	0.110	0.6875	1.0469	1.5228	20
	0.110	0.6875	1.1061	1.6089	15
	0.110	0.6875	1.0194	1.4828	15
CP ₁₅	0.110	0.6875	0.6384	0.9286	10
	0.110	0.6875	0.3296	0.4794	15
	0.110	0.6875	0.3276	0.4765	15
CP ₁₆	0.110	0.6875	0.8821	1.2831	20
	0.110	0.6875	0.8615	1.2531	15
	0.110	0.6875	0.7344	1.0682	15
CT ₄₇	0.109	0.6813	0.9780	1.4355	20
	0.105	0.6563	0.8533	1.3002	10
	0.100	0.6250	0.8583	1.3733	10
CT ₄₈	0.110	0.6875	1.4459	2.1031	15
	0.106	0.6625	1.1582	1.7482	30
	0.105	0.6563	1.0480	1.5968	25

**Statistical test of Ultimate Tensile Strength Data Before
and After Stability Test**

Formulations	t-value	
CPL ₄₀	2.745	NS
CPL ₄₃	4.162	S
CPL ₄₄	1.774	NS
CPL ₄₅	2.723	NS
CPM ₃₀	0.853	NS
CPM ₃₅	-1.91	NS
CPM ₃₉	-0.328	NS
CPM ₄₀	2.689	NS
CPM ₄₅	-6.898	S
CPH ₄₀	2.161	NS
CPH ₄₅	-0.580	NS
CC ₇	-0.705	NS
CC ₈	-0.824	NS
CC ₁₅	-0.554	NS
CC ₁₆	-1.181	NS
CP ₇	-0.011	NS
CP ₈	0.646	NS
CP ₁₅	1.958	NS
CP ₁₆	-0.745	NS
CT ₄₇	-0.633	NS
CT ₄₈	-1.064	NS

If $\alpha = 0.05$, $df = 4$, then the critical t-value = ± 2.776

NS = Non significance S = Significance

Appendix E

Thickness of Various Permeated Test Membranes

Formulations	Sample number	Thickness (μm)				
		Point 1	Point 2	Point 3	Point 4	Point 5
CPL ₄₀	1	110	105	110	110	110
	2	105	100	105	100	110
	3	110	110	100	105	110
CPL ₄₅	1	105	110	110	110	110
	2	100	110	110	100	100
	3	115	110	105	105	110
CPM ₃₀	1	100	100	105	110	110
	2	110	105	110	110	110
	3	110	110	110	110	110
CPM ₃₅	1	105	105	105	105	110
	2	105	105	105	110	110
	3	110	110	110	110	110
CPM ₄₀	1	100	105	105	110	110
	2	110	105	100	110	110
	3	110	105	110	110	110
CPH ₄₀	1	100	100	100	95	95
	2	110	105	110	105	110
	3	110	100	110	110	110
CC ₁₆	1	100	100	100	90	90
	2	110	110	110	110	110
	3	100	90	90	100	100
CP ₈	1	110	110	110	110	110
	2	110	110	110	105	110
	3	110	110	110	110	110
CP ₁₆	1	105	110	105	110	110
	2	105	110	100	110	110
	3	110	110	110	110	110

Formulations	Sample number	Thickness (μm)				
		Point 1	Point 2	Point 3	Point 4	Point 5
CT ₄₇	1	90	90	110	95	90
	2	90	95	100	90	95
	3	90	95	110	90	90
CT ₄₈	1	90	90	90	95	90
	2	90	90	90	90	90
	3	100	95	90	100	100



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Appendix F

Cumulative Amount of ISDN Permeated through Shed Snake Skin From
ISDN Saturated Solution

Time (hours)	Cumulative drug permeated (mcg)			
	1	2	3	Mean (SD)
0.5	148.2000	109.5250	68.0500	108.5917 (40.0832)
1	215.7515	149.0817	101.5825	155.4719 (57.3521)
1.5	246.6512	209.0311	135.8957	197.1927 (53.3188)
2	267.4509	240.8321	203.9698	237.4760 (31.8780)
3	394.3551	300.3114	241.9293	312.1986 (67.9050)
4	503.9976	502.4121	505.5828	503.9975 (2.3481)
6	683.4926	536.7321	475.8604	565.3617 (106.7358)
8	834.6563	717.4913	734.8614	762.3363 (63.2302)
10	1014.1691	881.1863	836.9984	910.7846 (92.2194)

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Appendix G

Cumulative Amount of ISDN Permeated through Shed Snake Skin From
Commercial ISDN TDDS and Prepared ISDN Transdermal Patches

Formulations	Time (hours)	Cumulative drug permeated (mg)			
		1	2	3	Mean (SD)
Commercial TDDS	1	0.3177	0.2833	0.2551	0.2853 (0.0313)
	2	0.1719	0.1693	0.2392	0.1362 (0.0396)
	4	0.7143	0.5788	0.5005	0.5979 (0.1082)
	6	1.9665	1.4106	1.8878	1.7549 (0.3008)
	8	2.6330	2.1371	1.8742	2.2148 (0.3854)
	12	7.9342	6.7478	6.1834	6.9551 (0.8936)
	16	8.3792	8.0011	7.2722	7.8842 (0.5627)
	20	11.1949	11.8761	10.0222	11.0311 (0.9377)
	24	12.4151	11.1267	10.5322	11.3580 (0.9625)
CPL ₄₀	1	0.5306	0.5700	0.5473	0.5493 (0.0198)
	2	0.5421	0.4694	0.5596	0.5237 (0.0478)
	4	1.3783	1.2926	1.6289	1.4333 (0.1427)
	6	1.9493	2.4914	2.8085	2.4164 (0.3548)
	8	2.6725	2.4243	2.6337	2.5768 (0.1335)
	12	2.9440	3.2119	2.6075	2.9211 (0.3028)
	16	2.9064	3.6227	3.0273	3.1855 (0.3835)
	20	4.0246	5.9360	6.1222	5.3610 (1.1610)
	24	7.7275	7.6288	6.2451	7.2005 (0.8289)
CPL ₄₅	1	0.9838	1.0307	1.4689	1.1611 (0.2676)
	2	3.3956	2.2183	2.2634	2.6668 (0.6569)
	4	3.3334	3.2682	3.0310	3.2109 (1.6303)
	6	3.7329	4.1200	5.5429	4.4653 (0.9531)
	8	5.1617	4.9957	6.1129	5.4233 (0.6029)
	12	7.7664	4.1575	5.6306	5.8514 (1.8146)
	16	9.5786	8.2603	10.0617	9.3002 (0.9324)
	20	15.7130	8.4312	16.5793	13.5745 (4.4752)
	24	13.8800	11.7212	18.1000	14.5670 (3.2445)

Formulations	Time (hours)	Cumulative drug permeated (mg)			
		1	2	3	Mean (SD)
CPM ₃₀	1	0.5680	0.5699	0.5226	0.5538 (0.0271)
	2	0.5832	0.5238	0.5723	0.5600 (0.3165)
	4	1.3614	1.1861	1.1846	1.2441 (0.1016)
	6	1.9332	1.2706	1.2958	1.4999 (0.3759)
	8	2.9602	1.5421	1.3969	1.9664 (0.8637)
	12	2.9662	1.9586	1.6313	2.1854 (0.6957)
	16	3.2197	2.7800	2.5200	2.8400 (0.3538)
	20	3.9272	3.2175	2.7657	3.3035 (0.5855)
	24	3.9047	3.4381	3.0096	3.4508 (0.4477)
CPM ₃₅	1	0.4645	0.3887	0.3967	0.4166 (0.0416)
	2	1.1947	1.1043	0.9680	1.0890 (0.1141)
	4	1.2263	1.2592	1.1740	1.2198 (0.0430)
	6	1.5401	1.7950	1.5104	1.6152 (0.1564)
	8	2.2443	2.5740	2.1691	2.3291 (0.2153)
	12	2.2874	2.6609	2.3466	2.4316 (0.2008)
	16	2.5895	3.0346	2.5430	2.7224 (0.2714)
	20	3.2932	3.5126	3.3429	3.3829 (0.1150)
	24	3.8161	4.7224	3.7702	4.1029 (0.5370)
CPM ₄₀	1	0.4005	0.4058	0.3780	0.3947 (0.0148)
	2	1.2214	1.2518	1.1853	1.2195 (0.0272)
	4	1.8528	1.9546	1.8213	1.8763 (0.0696)
	6	3.1196	3.2277	2.5600	2.9691 (0.3584)
	8	3.0020	3.2734	2.5217	2.9325 (0.3807)
	12	3.7555	3.9308	2.8820	3.5226 (0.5619)
	16	3.7200	4.4960	3.0625	3.7560 (0.7178)
	20	4.7221	5.0600	3.8774	4.5531 (0.6091)
	24	5.3737	5.2641	5.3442	5.3273 (0.0567)
CPH ₄₀	1	-	0.5336	0.5604	0.5470 (0.0190)
	2	-	0.2483	0.1979	0.2231 (0.0357)
	4	0.3238	0.5114	0.3678	0.4010 (0.0981)
	6	1.1332	0.9673	0.9820	1.0275 (0.0918)
	8	1.2629	1.6186	1.0197	1.3004 (0.3012)
	12	1.2695	3.1857	2.5062	2.3205 (0.9715)
	16	3.6427	4.0249	3.0049	3.5575 (0.5153)
	20	4.2288	4.3666	3.7027	4.0994 (0.3504)
	24	7.7130	8.5224	7.0747	7.7700 (0.7255)

Formulations	Time (hours)	Cumulative drug permeated (mg)			
		1	2	3	Mean (SD)
CC ₁₆	1	1.5552	1.3594	1.5681	1.4942 (0.1170)
	2	2.2748	3.0292	2.1506	2.4849 (0.4755)
	4	2.6604	2.3218	2.4089	2.4637 (0.1758)
	6	3.6880	3.0315	3.2279	3.4158 (0.3370)
	8	5.8020	4.8738	3.4335	4.7031 (1.1935)
	12	7.2491	6.0460	5.7216	6.3390 (0.8047)
	16	13.5150	0.9841	0.9494	10.9500 (2.2282)
	20	17.7436	10.9573	10.6187	13.1065 (4.0194)
	24	17.9533	13.4416	12.7530	14.7160 (2.8250)
CP ₈	1	0.0363	0.0542	0.0291	0.0399 (0.0129)
	2	0.0547	0.0786	0.0667	0.0667 (0.0119)
	4	0.1497	0.1510	0.1359	0.1455 (0.0084)
	6	0.2200	0.2141	0.1857	0.2066 (0.0184)
	8	0.2966	0.3298	0.2542	0.2935 (0.0379)
	12	0.4932	0.4780	0.3919	0.4544 (0.0546)
	16	0.6630	0.6347	0.5408	0.6128 (0.0640)
	20	0.8459	0.7370	0.6881	0.7570 (0.0808)
	24	1.0722	0.8623	0.7848	0.9064 (0.1487)
CP ₁₆	1	0.0392	-	-	0.0392
	2	0.0960	0.0439	0.5440	0.0648 (0.0275)
	4	0.1852	0.1695	0.1722	0.1756 (0.0084)
	6	0.2507	0.2500	0.2494	0.2501 (0.0006)
	8	0.3579	0.3758	0.3697	0.3678 (0.0908)
	12	0.4415	0.5581	0.4788	0.4928 (0.0595)
	16	0.8456	0.7667	0.7623	0.7915 (0.1469)
	20	1.1575	0.9085	0.9664	1.0108 (0.1303)
	24	1.4289	1.0597	1.0593	1.1826 (0.2133)
CT ₄₇	1	-	-	-	-
	2	0.0730	-	0.0295	0.0512 (0.0308)
	4	0.1051	0.1055	0.1521	0.1209 (0.0270)
	6	0.2535	0.1925	0.1835	0.2098 (0.0381)
	8	0.2425	0.2413	0.2635	0.2491 (0.0125)
	12	0.4550	0.3873	0.4105	0.4176 (0.0344)
	16	0.7032	0.5430	0.5769	0.6077 (0.0844)
	20	0.8858	0.6837	0.8011	0.7902 (0.1014)
	24	0.9950	0.9672	0.9323	0.9648 (0.0314)

Formulations	Time (hours)	Cumulative drug permeated (mg)			
		1	2	3	Mean (SD)
CT ₄₈	1	0.0712	-	-	0.0712
	2	0.1003	-	-	0.1003
	4	0.1391	-	0.0703	0.1086 (0.0514)
	6	0.2192	0.1098	0.0953	0.1414 (0.0678)
	8	0.3132	0.1807	0.1717	0.2219 (0.0793)
	12	0.4226	0.3636	0.3984	0.3949 (0.0297)
	16	0.7765	0.6357	0.5984	0.6702 (0.0941)
	20	0.8805	0.6941	0.7120	0.7622 (0.1208)
	24	1.0029	0.8230	0.8649	0.8970 (0.0941)

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Appendix H

Statistical Test of Correlation Coefficient

Formulations	correlation coefficient		t-value	significance test
	zero	higuchi		
CPM ₃₀	0.8716	0.9451	-0.558	NS
	0.9818	0.9720		
	0.9657	0.9610		
CPM ₃₅	0.9487	0.9435	-0.763	NS
	0.9420	0.9525		
	0.9562	0.9729		
CPM ₄₀	0.8909	0.9263	2.790	S
	0.8866	0.9682		
	0.9024	0.9174		

If $\alpha = 0.05$, $df = 4$, then the critical t-value = ± 2.776

NS = Non significance

S = Significance

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Appendix I

Chromatograms of HPLC were shown in Figures 48 and 49. These chromatograms presented the good resolution between drug (isosorbide dinitrate) and internal standard (4-dimethylaminobenzal dehyde). The run time per sample was within 12 minutes.



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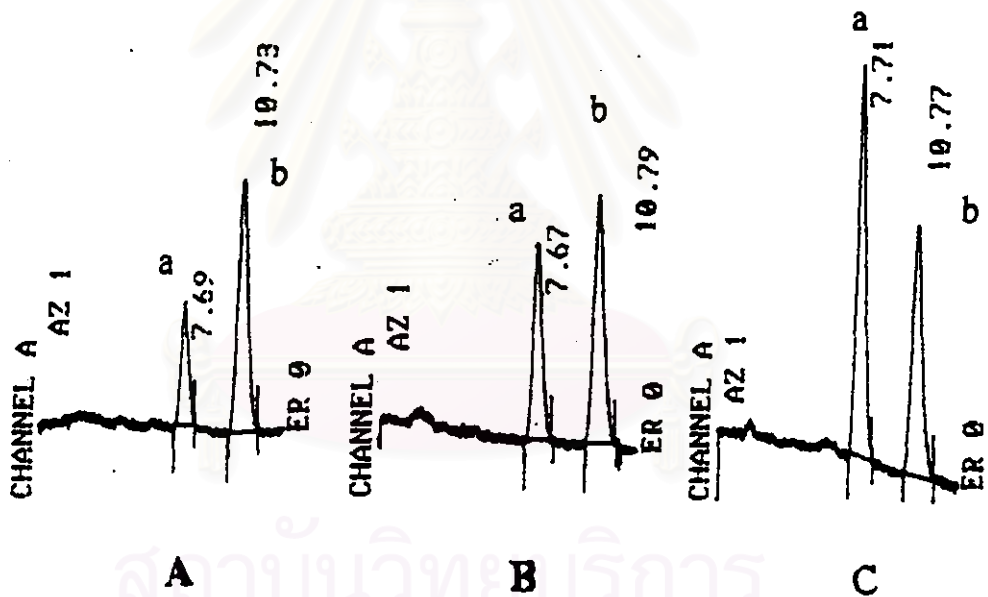


Figure 48. Typical chromatograms of some standard solutions containing of ISDN (a) and 4-dimethylaminobenzaldehyde (b) as internal standard at concentration of ISDN 0.3 $\mu\text{g/ml}$ (A), 0.5 $\mu\text{g/ml}$ (B) and 1.0 $\mu\text{g/ml}$ (C) (correlation coefficient of standard curve = 0.9972)

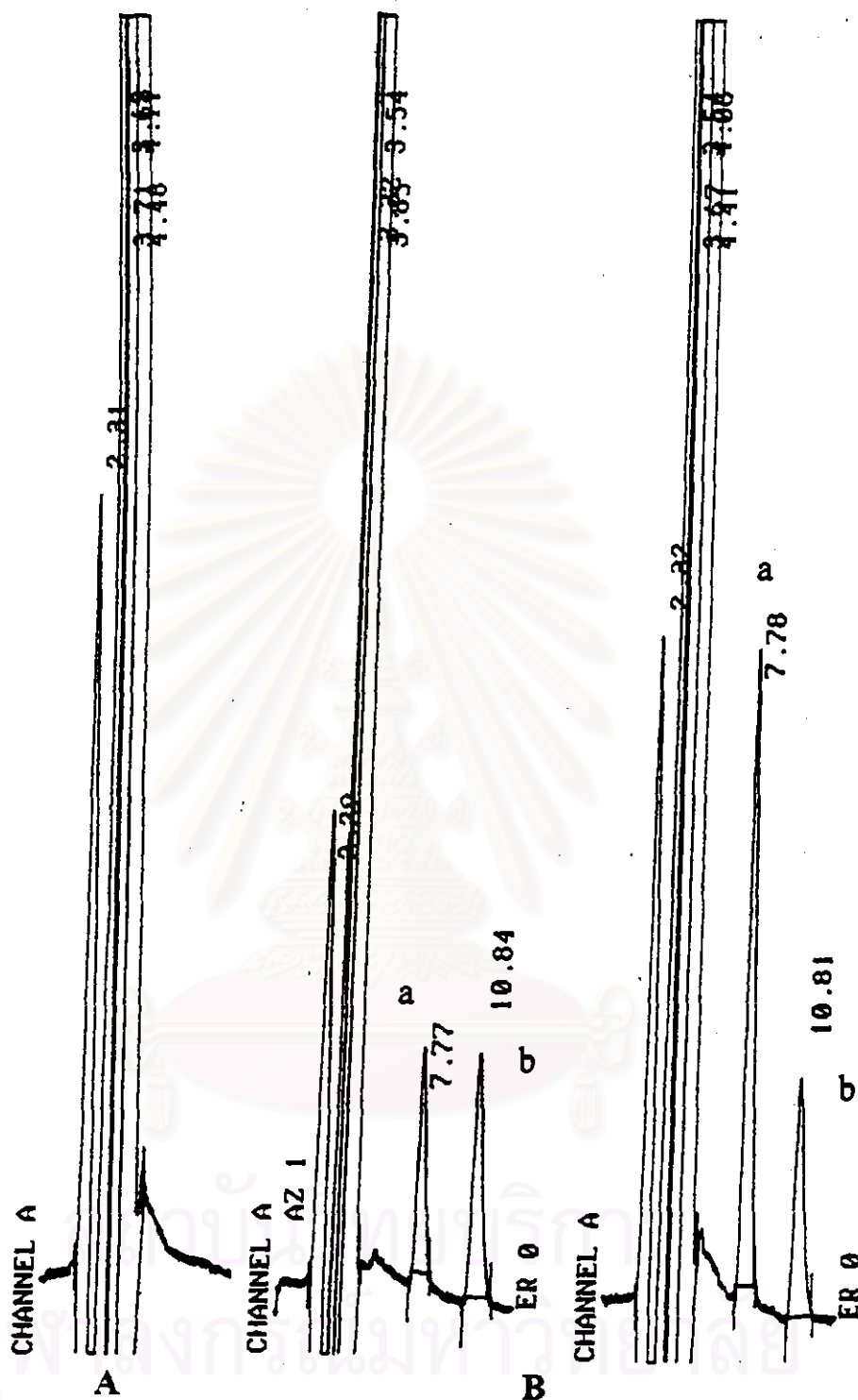


Figure 49. Chromatograms of 20% PEG 400 in reverse osmosis treated water (dissolution medium) (A) and some samples containing of permeated ISDN (a) and 4-dimethylaminobenzaldehyde(b) as internal standard (B)

Vitae

Miss Jarupa Viyoch was born on March 4, 1971, in Chonburi. She received her degree, Bachelor of Science in Pharmacy with second honors, in 1993 from Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, Thailand.



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