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APPENDICES

APPENDIX A

Table A1 Typical calibration curve for determination of dicloxacillin using linear regression[1]

Standard No.	Concentration (mg/mL)	Absorbance	Inversely estimate concentration[2] (mg/mL)	% recovery[3]
1	0.08	0.120	0.080	100.34
2	0.1	0.151	0.102	101.50
3	0.12	0.177	0.119	99.04
4	0.2	0.295	0.200	100.05
5	0.3	0.438	0.298	99.19
6	0.4	0.591	0.403	100.64
7	0.5	0.732	0.499	99.82
8	0.6	0.880	0.600	100.04

*Each data point was determined tripicately

1. $R^2 = 0.9999$, $y = 1.4604x + 0.0031$

2. Inversely estimated concentration (mcg/ml) = $\frac{(\text{Absorbance}-0.0031)}{1.4604}$

3. % recovery = $\frac{\text{Inversely estimated concentration} \times 100}{\text{Known concentration}}$

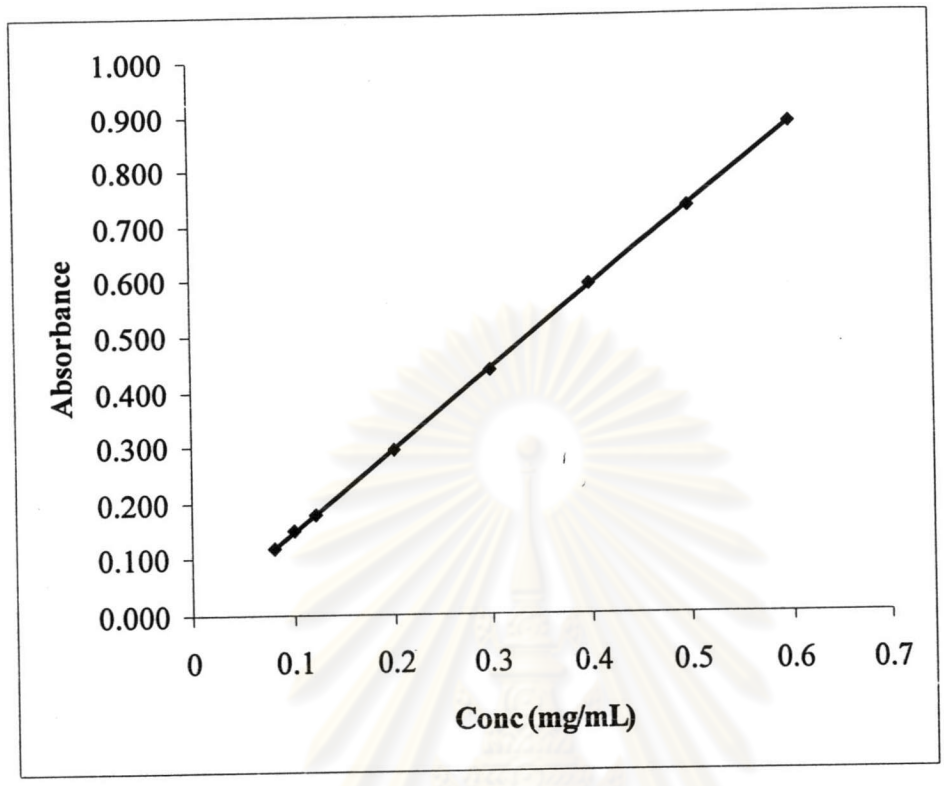

Figure A1 Calibration cure for determination of dicloxacillin in water

APPENDIX B

Table A2 The maximum stress, extension at break and %moisture content of starch-gelatin capsules

Starch type	% starch substitution	Max stress ± SD (N/mm^2)	Ext. at break± SD (mm)	Moisture content ± SD (%)
Rice	5	68.656 ± 3.704	2.218 ± 0.292	14.60 ± 0.09
	10	62.211 ± 2.596	1.928 ± 0.122	14.62 ± 0.13
	15	58.226 ± 0.912	1.762 ± 0.133	15.10 ± 0.09
	20	50.353 ± 1.376	1.710 ± 0.068	14.54 ± 0.20
	25	35.687 ± 2.326	1.222 ± 0.095	14.07 ± 0.12
	30	23.497 ± 0.605	0.906 ± 0.033	16.95 ± 0.23
Eragel®	5	79.772 ± 2.355	2.054 ± 0.216	13.81 ± 0.18
	10	73.850 ± 1.721	2.899 ± 0.264	14.93 ± 0.03
	15	68.847 ± 1.929	2.433 ± 0.105	14.39 ± 0.08
	20	63.535 ± 1.024	2.312 ± 0.130	15.06 ± 0.12
	25	65.517 ± 2.299	2.617 ± 0.073	14.40 ± 0.12
	30	54.072 ± 1.221	2.244 ± 0.080	14.62 ± 0.18
	35	46.189 ± 1.213	1.821 ± 0.094	13.55 ± 0.08
Glutinous	5	72.900 ± 2.993	1.821 ± 0.022	14.54 ± 0.19
	10	60.150 ± 2.062	1.648 ± 0.05	14.46 ± 0.07
	15	54.595 ± 0.946	1.427 ± 0.071	14.56 ± 0.19
	20	42.568 ± 2.357	1.269 ± 0.023	14.03 ± 0.09
	25	30.935 ± 1.220	1.036 ± 0.049	14.22 ± 0.21
Tapioca	5	68.665 ± 1.968	2.005 ± 0.050	15.07 ± 0.26
	10	69.442 ± 2.089	1.950 ± 0.157	14.70 ± 0.12
	15	50.251 ± 1.231	1.549 ± 0.078	14.58 ± 0.11
	20	18.026 ± 4.354	0.839 ± 0.110	14.28 ± 0.08

Table A2 The maximum stress, extension at break and %moisture content of starch-gelatin capsules (cont.)

Starch type	% starch substitution	Max stress ± SD (N/mm^2)	Ext. at break± SD (mm)	Moisture content ± SD (%)
Alpha starch®	5	85.154 ± 1.643	1.808 ± 0.072	13.48 ± 0.28
	10	63.831 ± 2.528	1.796 ± 0.136	14.68 ± 0.06
	15	43.891 ± 2.826	1.276 ± 0.058	14.33 ± 0.10
	20	20.206 ± 5.387	0.826 ± 0.187	13.75 ± 0.09
Elastigel 3000M®	5	85.166 ± 1.553	1.902 ± 0.064	13.69 ± 0.38
	10	74.345 ± 1.947	1.929 ± 0.073	14.78 ± 0.08
	15	68.174 ± 2.706	1.878 ± 0.087	14.78 ± 0.04
	20	62.474 ± 1.042	2.177 ± 0.115	14.63 ± 0.26
	25	41.718 ± 2.727	1.406 ± 0.113	13.76 ± 0.15
	30	39.161 ± 1.22	1.251 ± 0.070	14.35±0.04
Elastigel 2000C®	5	76.708 ± 3.862	1.929 ± 0.089	13.77 ± 0.24
	10	77.029 ± 1.904	2.344 ± 0.237	14.67 ± 0.01
	15	70.333 ± 1.371	2.376 ± 0.114	15.02 ± 0.10
	20	66.372 ± 2.018	2.078 ± 0.102	14.10 ± 0.13
	25	63.09 ± 1.659	2.179 ± 0.106	14.26 ± 0.04
	30	61.757 ± 2.254	2.254 ± 0.044	14.33 ± 0.08
	35	62.111 ± 1.038	2.358 ± 0.231	13.87 ± 0.06
	40	56.025 ± 1.784	1.859 ± 0.183	13.88 ± 0.09
	45	43.280 ± 1.114	1.387 ± 0.096	14.12 ± 0.04
Elastigel 1000J®	5	80.470 ± 2.446	1.951 ± 0.075	14.04 ± 0.47
	10	77.311 ± 2.130	2.695 ± 0.261	14.89 ± 0.05
	15	64.315 ± 1.178	1.964 ± 0.091	14.80 ± 0.21
	20	51.706 ± 1.062	1.896 ± 0.089	14.53 ± 0.14
	25	52.386 ± 2.023	2.074 ± 0.258	14.52 ± 0.21
Pure gelatin	0	86.149 ± 3.839	2.537 ± 0.275	14.16 ± 0.10

Table A3 Mechanical properties and moisture contents of starch-gelatin containing plasticizers films

35% substitution with Elastigel 2000C®

(w/w)	Max. stress (N/mm^2) ± SD.		Ext. at break (mm) ± SD.		Moisture content (%) ± SD.	
	Sorbitol	Glycerine	Sorbitol	Glycerine	Sorbitol	Glycerine
0	62.111 ± 1.038	62.111 ± 1.038	2.358 ± 0.231	2.358 ± 0.231	13.87 ± 0.06	13.87 ± 0.06
1	59.710 ± 1.413	53.751 ± 2.460	1.730 ± 0.067	1.674 ± 0.134	13.02 ± 0.09	13.12 ± 0.04
2	55.773 ± 1.925	49.592 ± 1.696	1.630 ± 0.148	1.605 ± 0.067	12.39 ± 0.15	11.45 ± 0.24
3	44.551 ± 0.890	29.768 ± 1.053	1.767 ± 0.082	2.648 ± 0.135	13.04 ± 0.21	11.86 ± 0.28
4	44.674 ± 1.263	17.522 ± 0.774	1.814 ± 0.060	5.590 ± 0.650	12.65 ± 0.19	11.63 ± 0.31
5	32.745 ± 2.051	10.086 ± 1.323	2.229 ± 0.224	16.896 ± 1.762	13.24 ± 0.28	14.91 ± 0.33
6	31.313 ± 1.187	-	2.759 ± 0.103	-	12.38 ± 0.12	-
7	23.253 ± 0.997	-	4.993 ± 1.086	-	12.09 ± 0.30	-
10	13.283 ± 0.463	-	25.732 ± 1.141	-	13.56 ± 0.24	-

25% substitution with Eragel®

Concentration (w/w)	Max. stress (N/mm^2) ± SD.		Ext. at break (mm) ± SD.		Moisture content (%)± SD.	
	Sorbitol	Glycerine	Sorbitol	Glycerine	Sorbitol	Glycerine
0	65.517 ± 2.299	65.517 ± 2.299	2.617 ± 0.073	2.617 ± 0.073	14.40 ± 0.12	14.40 ± 0.12
1	56.581 ± 0.443	62.095 ± 1.452	2.207 ± 0.067	2.485 ± 0.029	12.96 ± 0.02	13.28 ± 0.20
2	58.527 ± 0.238	59.729 ± 1.622	2.398 ± 0.097	2.322 ± 0.053	12.91 ± 0.13	12.06 ± 0.17
3	63.382 ± 0.967	49.161 ± 1.035	2.522 ± 0.275	2.315 ± 0.018	12.20 ± 0.13	11.65 ± 0.42
4	49.360 ± 1.033	39.747 ± 1.692	2.446 ± 0.118	3.399 ± 0.166	12.31 ± 0.16	11.51 ± 0.39
5	44.616 ± 0.612	15.831 ± 0.293	2.950 ± 0.083	19.964 ± 1.605	12.92 ± 0.44	12.42 ± 0.04
6	31.307 ± 1.150	-	9.637 ± 1.179	-	12.23 ± 0.31	-
7	26.449 ± 0.932	-	10.585 ± 0.756	-	12.49 ± 0.42	-
10	21.500 ± 0.610	-	28.876 ± 0.635	-	11.87 ± 0.19	-

Table A3 Mechanical study results of starch-gelatin containing plasticizer films (cont.)

20% substitution with Elastigel 3000M®

Concentration (w/w)	Max. stress (N/mm^2)		Ext. at break (mm)		Moisture content (%) P	
	Sorbitol	Glycerine	Sorbitol	Glycerine	Sorbitol	Glycerine
0	62.474 ± 1.042	62.474 ± 1.042	2.177 ± 0.115	2.177 ± 0.115	14.63 ± 0.26	14.63 ± 0.26
1	61.364 ± 2.006	64.044 ± 1.561	2.035 ± 0.029	2.158 ± 0.046	13.81 ± 0.17	13.16 ± 0.09
2	61.023 ± 1.583	56.710 ± 4.190	2.224 ± 0.084	2.338 ± 0.077	13.40 ± 0.22	12.21 ± 0.38
3	67.461 ± 1.064	61.645 ± 1.252	2.382 ± 0.092	2.361 ± 0.056	12.36 ± 0.11	11.03 ± 0.12
4	64.150 ± 1.500	39.994 ± 0.954	2.493 ± 0.075	2.717 ± 0.055	11.94 ± 0.27	11.36 ± 0.36
5	57.634 ± 1.060	23.990 ± 1.680	2.457 ± 0.168	9.660 ± 1.200	12.74 ± 0.29	11.86 ± 0.30
6	47.066 ± 1.449	-	3.034 ± 0.148	-	12.27 ± 0.23	-
7	22.159 ± 1.862	-	8.658 ± 1.547	-	13.04 ± 0.23	-
10	18.140 ± 0.843	-	25.560 ± 1.032	-	13.26 ± 0.37	-

Table A4 Mechanical properties of gelatin film storaged at 40°C, 75% RH

Maximum stress (N/mm^2)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	88.404 ± 2.553	70.371 ± 7.563	75.514 ± 3.064	69.390 ± 7.965	49.931 ± 1.200
1	85.311 ± 3.755	71.771 ± 1.602	69.077 ± 2.167	69.342 ± 3.887	32.524 ± 1.090
2	96.007 ± 2.637	90.429 ± 2.61	73.187 ± 0.694	74.630 ± 1.986	33.249 ± 2.901
4	97.546 ± 0.880	89.837 ± 1.497	66.712 ± 2.604	65.000 ± 1.324	22.731 ± 1.561
8	97.614 ± 1.143	82.110 ± 1.331	55.215 ± 2.383	67.697 ± 2.458	21.308 ± 0.887
12	91.739 ± 1.509	85.261 ± 4.727	44.719 ± 1.636	49.591 ± 2.036	15.072 ± 0.571

Extension at break (mm.)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	2.652 ± 0.126	1.681 ± 0.254	2.992 ± 0.388	2.069 ± 0.345	4.145 ± 0.422
1	2.49 ± 0.065	2.501 ± 0.109	2.914 ± 0.062	2.029 ± 0.24	13.584 ± 1.289
2	2.43 ± 0.077	2.77 ± 0.049	3.651 ± 0.166	2.821 ± 0.061	14.322 ± 1.916
4	2.626 ± 0.068	2.791 ± 0.065	3.642 ± 0.265	2.791 ± 0.131	19.902 ± 2.029
8	2.518 ± 0.037	2.626 ± 0.062	3.917 ± 0.844	2.856 ± 0.053	21.416 ± 1.075
12	2.532 ± 0.071	2.728 ± 0.090	5.588 ± 0.855	3.962 ± 0.306	22.856 ± 0.343

Moisture content (%)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	14.24 ± 0.06	12.90 ± 0.13	12.64 ± 0.04	12.02 ± 0.07	11.86 ± 0.28
1	14.15 ± 0.04	12.93 ± 0.12	12.71 ± 0.01	12.29 ± 0.08	12.64 ± 0.13
2	13.517 ± 0.05	13.05 ± 0.03	12.61 ± 0.16	12.12 ± 0.01	12.02 ± 0.03
4	13.86 ± 0.13	14.04 ± 0.05	13.38 ± 0.13	12.61 ± 0.53	13.58 ± 0.08
8	14.23 ± 0.17	13.56 ± 0.15	12.90 ± 0.11	13.70 ± 0.37	12.98 ± 0.19
12	14.49 ± 0.12	13.65 ± 0.12	13.43 ± 0.02	13.59 ± 0.37	14.04 ± 0.07

Table A5 Mechanical properties of 35% substitution with Elastigel 2000C®

Maximum stress (N/mm^2)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	66.753 ± 4.03	63.308 ± 1.362	59.436 ± 0.823	58.566 ± 1.81	40.184 ± 0.805
1	74.262 ± 1.808	68.592 ± 2.379	55.282 ± 2.234	54.708 ± 2.652	39.494 ± 1.645
2	77.962 ± 1.938	68.641 ± 3.017	63.436 ± 1.613	66.477 ± 0.989	25.759 ± 0.131
4	71.555 ± 1.718	64.337 ± 2.454	52.016 ± 1.707	54.979 ± 0.634	32.185 ± 1.819
8	75.950 ± 3.144	59.914 ± 2.59	58.167 ± 2.01	52.338 ± 1.498	15.324 ± 0.749
12	74.368 ± 0.956	63.395 ± 2.221	52.803 ± 1.516	47.466 ± 2.243	13.205 ± 0.812

Extension at break (mm.)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	2.287 ± 0.068	1.899 ± 0.124	2.22 ± 0.204	1.984 ± 0.117	2.333 ± 0.051
1	2.244 ± 0.097	2.017 ± 0.056	2.007 ± 0.079	1.844 ± 0.082	2.257 ± 0.043
2	2.295 ± 0.056	1.886 ± 0.031	2.079 ± 0.105	2.142 ± 0.058	2.733 ± 0.235
4	2.234 ± 0.064	1.962 ± 0.126	2.007 ± 0.064	1.907 ± 0.033	2.019 ± 0.082
8	2.244 ± 0.091	1.674 ± 0.093	2.119 ± 0.039	2.021 ± 0.059	7.076 ± 0.711
12	2.249 ± 0.031	1.81 ± 0.062	2.167 ± 0.037	1.890 ± 0.046	6.426 ± 0.470

Moisture content (%)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	13.52 ± 0.01	12.42 ± 0.15	12.33 ± 0.11	12.32 ± 0.14	11.37 ± 0.14
1	13.70 ± 0.05	12.19 ± 0.02	12.02 ± 0.03	11.90 ± 0.14	11.65 ± 0.24
2	13.20 ± 0.14	12.06 ± 0.03	11.57 ± 0.10	11.56 ± 0.11	11.57 ± 0.11
4	13.77 ± 0.12	12.74 ± 0.03	12.74 ± 0.58	12.48 ± 0.05	11.08 ± 0.32
8	13.55 ± 0.08	12.58 ± 0.19	12.37 ± 0.16	12.31 ± 0.27	12.01 ± 0.25
12	13.32 ± 0.20	12.44 ± 0.06	12.02 ± 0.16	12.36 ± 0.04	12.20 ± 0.24

Table A6 Mechanical properties of 25% substitution with Eragel®

Maximum stress (N/mm^2)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	61.527 ± 2.781	64.539 ± 0.647	64.020 ± 1.653	59.400 ± 1.094	40.466 ± 1.357
1	64.837 ± 1.611	70.143 ± 2.903	61.753 ± 1.684	71.109 ± 3.701	35.765 ± 3.245
2	79.110 ± 1.316	69.613 ± 3.907	71.092 ± 1.625	68.988 ± 2.201	44.824 ± 1.481
4	69.160 ± 1.763	73.581 ± 1.365	68.911 ± 1.396	56.905 ± 0.763	27.384 ± 1.691
8	65.234 ± 1.898	68.096 ± 2.307	46.129 ± 0.885	45.143 ± 1.138	10.509 ± 1.17
12	70.159 ± 2.915	62.766 ± 1.733	41.769 ± 0.466	46.647 ± 1.739	15.389 ± 1.276

Extension at break (mm.)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	2.477 ± 0.157	2.390 ± 0.221	2.852 ± 0.087	2.521 ± 0.060	2.980 ± 0.110
1	2.228 ± 0.034	2.500 ± 0.059	2.814 ± 0.12	2.457 ± 0.324	2.854 ± 0.195
2	2.510 ± 0.066	2.547 ± 0.015	2.656 ± 0.043	2.736 ± 0.080	2.749 ± 0.084
4	2.293 ± 0.042	2.427 ± 0.050	2.751 ± 0.092	2.672 ± 0.151	3.828 ± 0.451
8	2.078 ± 0.047	2.460 ± 0.105	2.713 ± 0.179	2.477 ± 0.123	9.989 ± 0.566
12	2.324 ± 0.072	2.412 ± 0.158	2.764 ± 0.035	2.639 ± 0.127	15.124 ± 0.565

Moisture content (%)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	14.43 ± 0.08	13.12 ± 0.05	12.58 ± 0.06	12.58 ± 0.08	11.75 ± 0.20
1	13.74 ± 0.04	12.64 ± 0.12	12.01 ± 0.02	12.23 ± 0.01	11.72 ± 0.10
2	13.80 ± 0.24	13.07 ± 0.10	12.02 ± 0.12	12.53 ± 0.02	12.10 ± 0.30
4	14.48 ± 0.01	12.21 ± 0.06	11.95 ± 0.15	12.85 ± 0.11	12.58 ± 0.40
8	13.00 ± 0.08	12.43 ± 0.12	12.78 ± 0.08	12.20 ± 0.41	12.14 ± 0.17
12	13.20 ± 0.62	12.93 ± 0.04	12.37 ± 0.39	12.09 ± 0.14	12.74 ± 0.49

Table A7 Mechanical properties of 20% substitution with Elastigel 3000M®

Maximum stress (N/mm^2)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	71.603 ± 1.923	68.959 ± 1.89	60.776 ± 1.748	67.085 ± 1.465	36.301 ± 0.896
1	78.119 ± 1.13	73.517 ± 3.828	64.745 ± 0.445	64.654 ± 2.698	44.418 ± 1.654
2	73.624 ± 2.258	68.579 ± 1.500	56.018 ± 0.617	63.32 ± 2.28	37.444 ± 1.645
4	78.968 ± 1.612	78.139 ± 3.272	67.081 ± 1.219	69.492 ± 1.232	25.806 ± 1.602
8	76.538 ± 2.398	68.924 ± 1.48	45.224 ± 0.903	50.18 ± 1.035	15.558 ± 0.332
12	72.339 ± 3.964	66.883 ± 2.919	46.196 ± 1.753	56.18 ± 2.466	17.781 ± 1.408

Extension at break (mm.)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	2.214 ± 0.012	2.147 ± 0.099	2.21 ± 0.042	2.471 ± 0.087	4.804 ± 0.437
1	2.212 ± 0.028	2.126 ± 0.172	2.243 ± 0.065	2.306 ± 0.066	3.296 ± 0.284
2	2.073 ± 0.016	2.15 ± 0.048	2.276 ± 0.053	2.309 ± 0.149	3.188 ± 0.289
4	1.988 ± 0.057	2.298 ± 0.076	2.422 ± 0.058	2.309 ± 0.073	8.45 ± 1.159
8	2.141 ± 0.085	2.334 ± 0.072	2.585 ± 0.112	2.283 ± 0.052	13.502 ± 0.749
12	2.065 ± 0.104	2.16 ± 0.149	2.662 ± 0.143	2.323 ± 0.06	16.976 ± 1.514

Moisture content (%)

Time (weeks)	No plasticizer	Sorbitol 2%	Sorbitol 4%	Glycerin 2%	Glycerin 4%
0	14.48 ± 0.75	13.46 ± 0.80	12.85 ± 0.71	12.77 ± 0.14	12.09 ± 0.29
1	14.06 ± 0.08	13.01 ± 0.07	12.69 ± 0.24	12.33 ± 0.08	12.28 ± 0.03
2	13.86 ± 0.08	12.67 ± 0.07	12.52 ± 0.04	12.43 ± 0.18	11.55 ± 0.23
4	13.54 ± 0.01	12.42 ± 0.28	12.08 ± 0.17	12.00 ± 0.40	12.06 ± 0.18
8	13.81 ± 0.14	13.35 ± 0.43	12.67 ± 0.37	12.32 ± 0.04	12.19 ± 0.05
12	13.41 ± 0.01	12.54 ± 0.07	12.60 ± 0.10	12.66 ± 0.15	12.52 ± 0.07

APPENDIX C

Table A8 Disintegration time of each capsules at initial time

Type	Capsule Unit					
	1	2	3	4	5	6
Gelatin CP (min)	2.22	3.00	3.25	3.38	3.42	3.51
Gelatin dip (min)	2.55	3.02	4.31	4.42	5.31	5.48
E2C (min)	2.46	3.48	4.42	5.09	6.07	6.37
Eragel (min)	4.55	5.17	5.30	6.51	7.39	8.32
E3M (min)	6.04	7.06	3.15	8.24	8.47	10.09

Table A9 Disintegration time of each capsules after 1 month

	Type	Capsule Units					
		1	2	3	4	5	6
no bag 40	Gelatin CP capsule	2.57	3.15	3.22	3.55	5.31	5.55
in bag 40	(commercial)	3	3.12	3.27	4.03	4.27	4.44
no bag 30		2	2.26	2.37	3.09	3.17	3.29
in bag 30		2.05	2.16	2.24	2.37	2.54	3.49
no bag 40	Dipped gelatin	4.28	5.31	5.5	6.14	6.57	10.47
in bag 40		3.48	5.57	7.24	8.49	13.21	13.57
no bag 30		3.00	4.24	5.21	5.4	6.21	11.24
in bag 30		2.01	2.30	2.45	4.12	5.07	5.58
no bag 40	Elastigel 2000C®-	3.51	5.42	6.24	7.2	15.36	16.06
in bag 40	capsules	5.28	5.35	5.48	5.57	6.08	6.47
no bag 30		3.34	4.19	5.42	5.55	6.41	9.49
in bag 30		3.43	4.07	4.14	4.46	5.23	5.37
no bag 40	Eragel®–gelatin	5.47	7.3	12.42	17.02	22.09	28.45
in bag 40		5.43	8.22	10.31	11.02	12.16	13.35
no bag 30		4.03	5.49	6.38	7.04	7.35	12.55
in bag 30		3.34	4.43	5.39	6.17	6.54	7.33
no bag 40	Elastigel 3000M®-	8.40	9.50	10.20	12.11	19.42	20.10
in bag 40	Gelatin capsules	7.05	8.24	9.48	13.35	14.08	16.43
no bag 30		6.35	7.29	8.15	9.01	11.59	12.38
in bag 30		6.24	6.32	7.02	7.4	7.51	9.07

Table A10 Disintegration time of each capsule after 3 months

	Type	Capsule Units					
		1	2	3	4	5	6
no bag 40	Gelatin CP capsules	2.4	2.51	3.37	4.37	10.12	11.21
in bag 40	(commercial)	2.37	2.5	3.14	3.39	7.08	8.12
no bag 30		2.00	2.19	2.47	3.01	3.56	4.34
in bag 30		2.27	2.38	3.07	4.01	4.48	6.33
no bag 40	Dipped gelatin	21.22	21.44	24.15	26.34	32.00	32.45
in bag 40	capsules	7.18	7.24	8.02	10.06	15.21	18.53
no bag 30		4.50	5.03	6.10	6.27	6.44	8.39
in bag 30		5.45	5.54	6.02	6.13	6.37	7.42
no bag 40	Elastigel 2000C®-	6.35	7.21	7.56	18.02	24.52	26.58
in bag 40	gelatin capsules	7.03	8.10	9.40	12.18	21.33	25.45
no bag 30		5.42	6.11	6.29	6.55	7.36	8.15
in bag 30		3.00	5.27	5.48	6.21	6.48	7.51
no bag 40	Eragel®-gelatin	18.20	23.49	24.16	25.47	29.43	33.45
in bag 40	Capsules	8.17	9.40	10.45	11.03	14.27	15.33
no bag 30		6.06	7.55	10.57	11.05	12.14	14.21
in bag 30		3.07	4.19	5.33	7.02	9.30	11.24
no bag 40	Elastigel 3000M®-	15.11	27.27	32.56	33.37	37.22	38.01
in bag 40	gelatin capsules	8.21	8.38	9.50	10.07	10.47	13.24
no bag 30		6.45	7.23	8.33	9.09	12.34	14.18
in bag 30		6.20	8.46	9.01	9.38	10.05	10.29

APPENDIX D

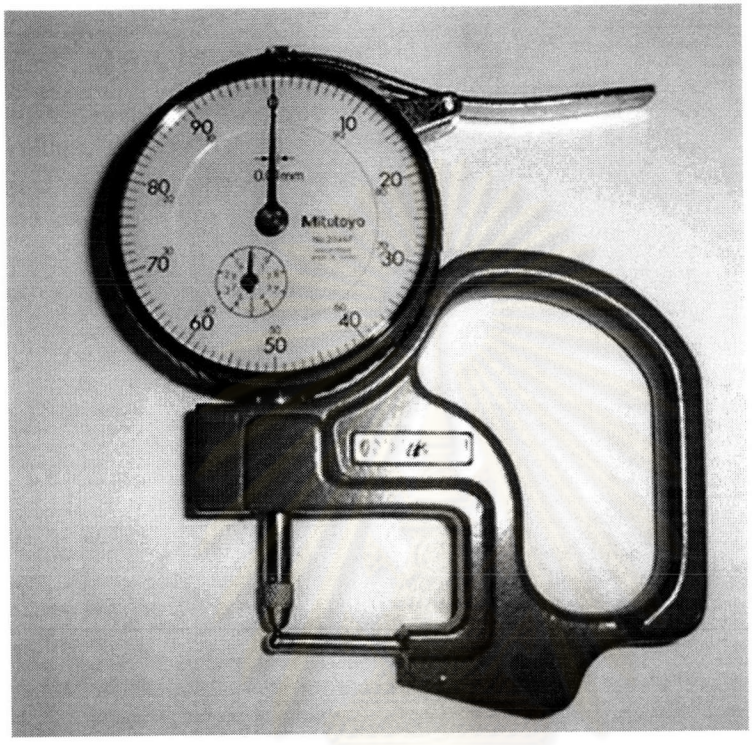

Figure A2 Dial gauge micrometer (Mitutoyo, Japan, No 2046F)

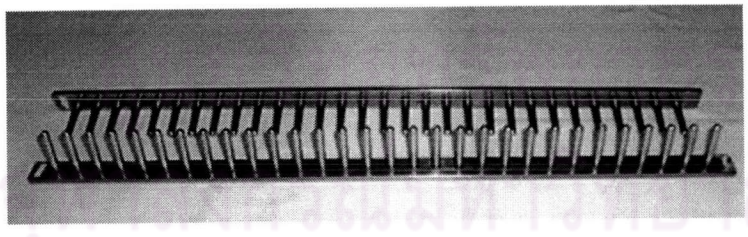

Figure A3 Pins bar

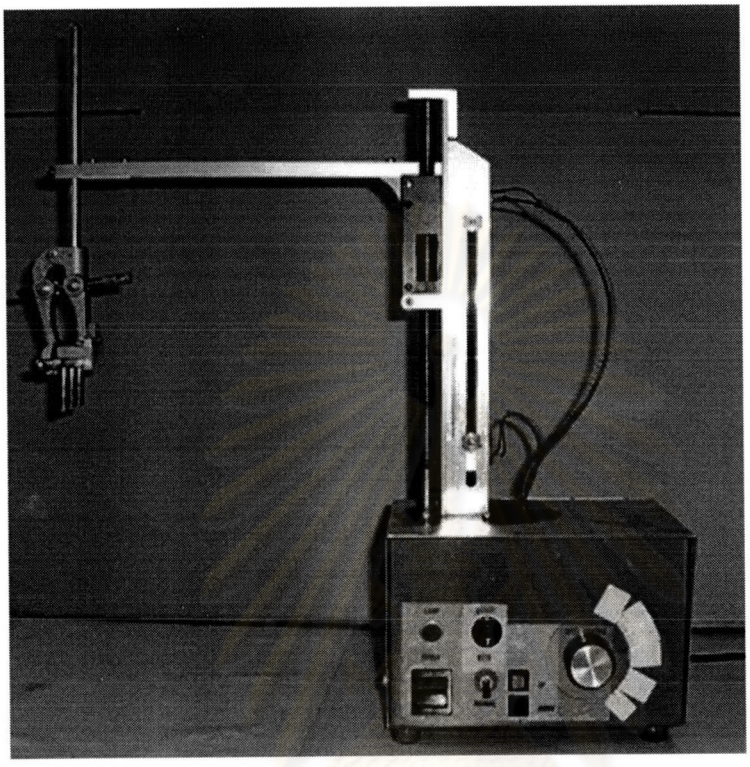

Figure A4 Hard capsule dipping I™ (STREC, Chulalongkorn University Thailand)

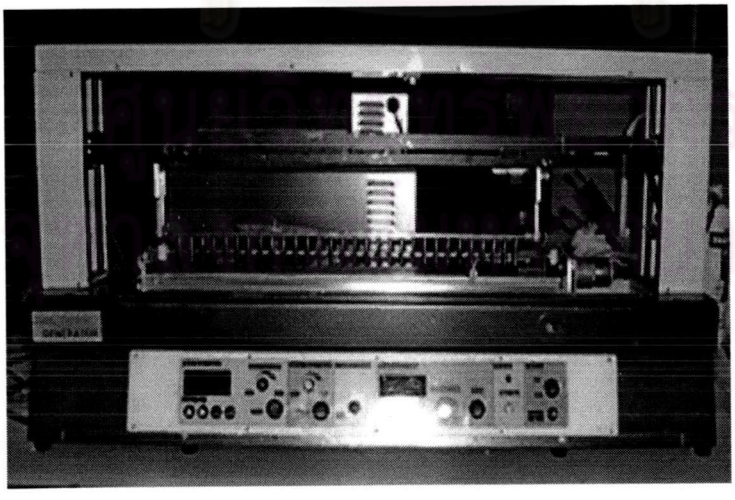

Figure A5 Hard capsule dipping II™ (STREC, Chulalongkorn University Thailand)

VITA

Mr. Somsak Wongpoomchai was born on April 24, 1972 in Bangkok, Thailand. He received the Bachelor degree of Sciences from the Faculty of Pharmacy, Mahidol University in 1997. Since graduation, He is working as pharmacist at Sarabure Hospitol, Sarabure, Thailand.