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## APPENDIX

### Calibration Curve

The concentration versus absorbance of theophylline in phosphate buffer pH 6.6 at 272 nm. were presented in Table 40, showed a linear relationship with the correlation coefficient 0.99945. The standard curve of theophylline after regression analysis were illustrated in Figure 82.

Table 40 Absorbance of Theophylline in Phosphate Buffer pH 6.6 Determine at 272 nm.

Concentration ( $\mu\text{g/ml}$ )	Absorbance
0	0.000
4	0.228
6	0.338
8	0.447
10	0.569
12	0.671

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### The Construction of Calibration Curve in HPLC Method

The concentration versus ratio between peak area of internal standard (8-chlorotheophylline) and theophylline anhydrous with HPLC method at 272 nm. were presented in Table 41 and showed a linear relationship with the correlation coefficient = 0.999

The standard curve of theophylline anhydrous after regression analysis was illustrated in Figure 83.

**Table 41 Ratio between Peak Area of Internal Standard and Theophylline Anhydrous with PHLC Method at 272 nm.**

Concentration ( $\mu\text{g/ml}$ )	Ratio
0	0.000
20	0.279
60	0.814
100	1.347
140	1.879
180	2.385

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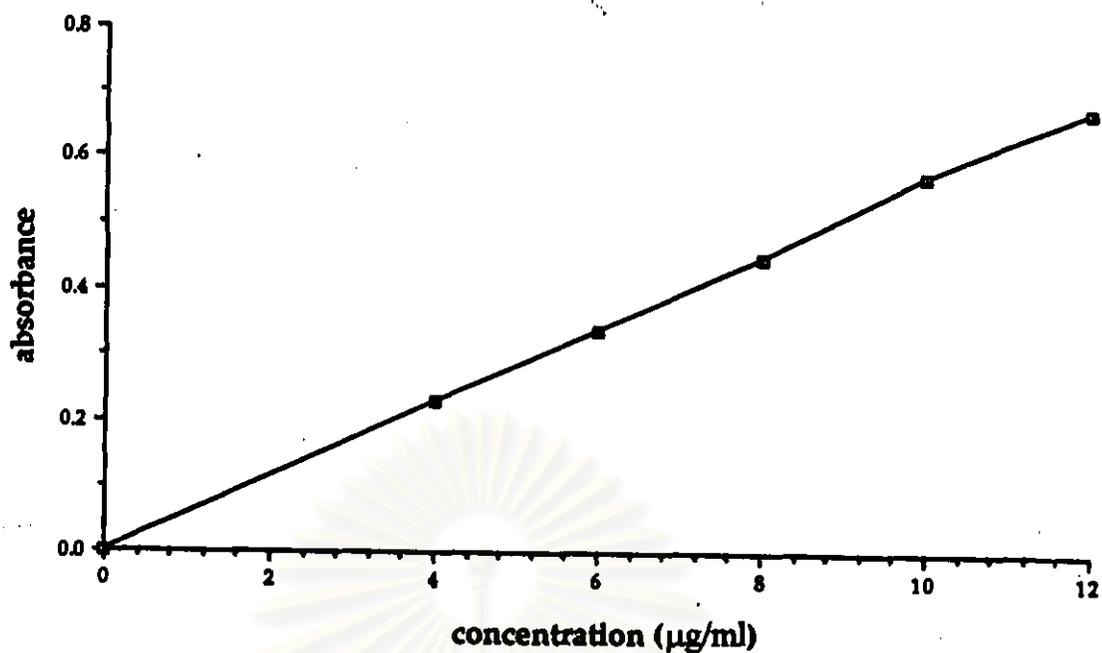


Figure82 Calibration Curve of Theophylline in Phosphate Buffer pH 6.6

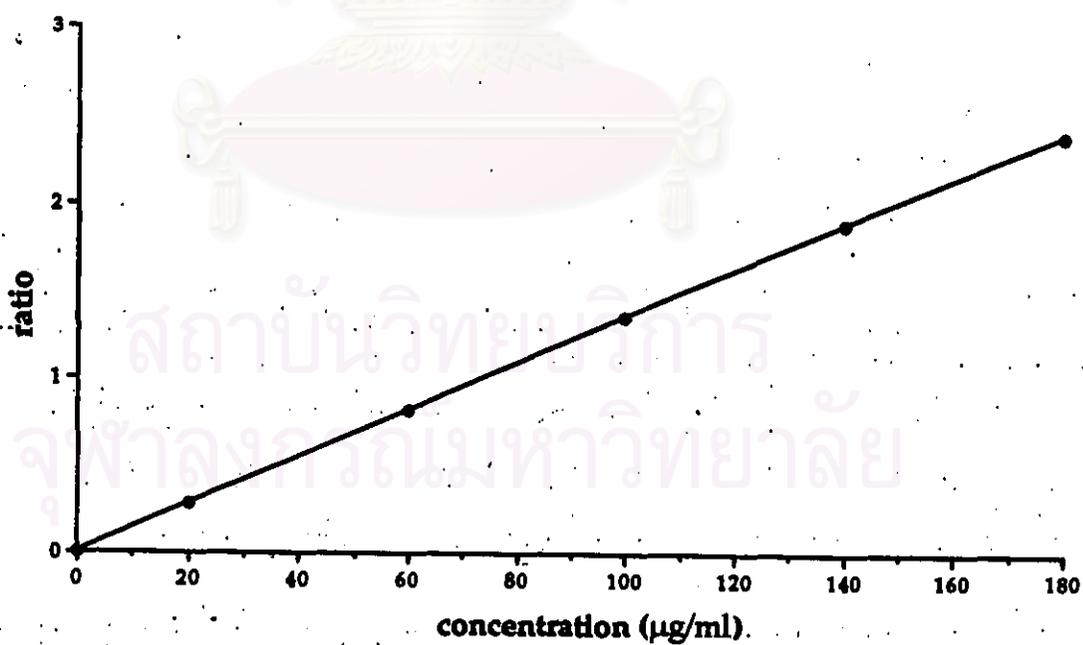
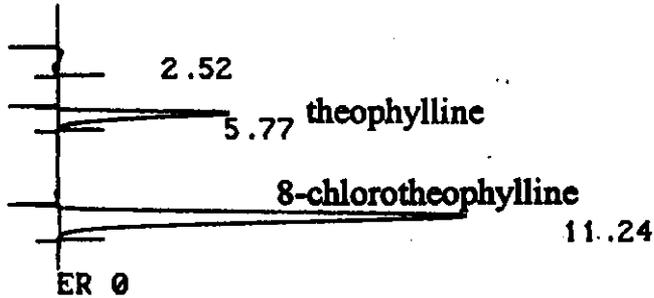


Figure83 Calibration Curve of HPLC Method

CHANNEL A INJECT 15/30/96 02:14:35 STORED TO BIN # 7



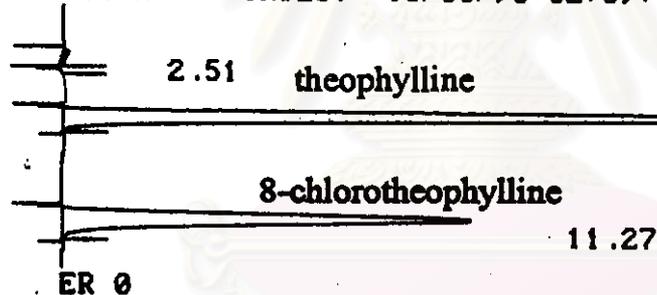
DATA SAVED TO BIN # 7

M 15/30/96 02:14:35 CH= "A" PS= 1

FILE 1. METHOD 0. RUN 7 INDEX 7 BIN

PEAK#	AREA%	RT	AREA BC
1	0.045	2.52	1499 01
2	21.821	5.77	733526 01
3	78.135	11.24	2626580 01
TOTAL	100.		3361605

CHANNEL A INJECT 15/30/96 02:59:07 STORED TO BIN # 10



DATA SAVED TO BIN # 10

M 15/30/96 02:59:07 CH= "A" PS= 1

FILE 1. METHOD 0. RUN 10 INDEX 10 BIN 1

PEAK#	AREA%	RT	AREA BC
1	0.363	2.51	27607 01
2	65.03	5.77	4950516 01
3	34.608	11.27	2634576 01
TOTAL	100.		7612699

Figure 84 The representative chromatogram of the construction of calibration curve.

A. Conc. of theophylline = 20.0 µg/ml

B. Conc. of theophylline = 140.0 µg/ml

Table 42 Amount Percent of Theophylline Release from Uncoated Granules in Phosphate Buffer PH 6.6

Size of Granules	Time (min)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
16/18	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	30.73	23.71	22.42	25.62	4.47	1.87
	2	1.41	48.13	40.48	41.13	43.25	4.24	1.75
	4	2.00	63.43	64.21	62.21	63.28	1.01	1.56
	5	2.24	87.91	79.83	73.49	80.41	7.23	1.29
	8	2.83	80.50	89.74	85.87	85.37	4.64	1.17
	10	3.16	93.75	90.13	83.98	89.29	4.94	1.03
	14	3.74	100.01	92.89	87.70	93.53	6.18	0.81
	20	4.47	95.63	98.28	91.24	95.05	3.56	0.69
	24	4.90	103.37	98.11	98.18	99.89	3.02	-0.96
18/20	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	22.50	29.39	27.45	26.45	3.55	1.87
	2	1.41	51.07	58.53	55.25	54.95	3.74	1.65
	4	2.00	72.69	77.92	75.76	75.46	2.63	1.39
	5	2.24	85.38	90.77	88.53	88.23	2.71	1.07
	8	2.83	86.08	92.06	89.52	89.22	3.00	1.03
	10	3.16	96.47	95.25	79.51	90.41	9.46	0.98
	14	3.74	91.43	93.08	90.59	91.70	1.27	0.92
	20	4.47	100.03	94.45	87.42	93.94	6.32	0.78
	24	4.90	101.13	99.82	98.97	99.97	1.09	-1.52
20/25	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	25.97	28.09	27.08	27.05	1.06	1.86
	2	1.41	68.10	73.39	63.62	68.37	4.89	1.50
	4	2.00	90.00	86.38	83.30	86.56	3.35	1.13
	5	2.24	89.46	85.33	93.33	89.37	4.00	1.03
	8	2.83	85.59	89.99	94.49	90.36	3.96	0.98
	10	3.16	90.40	91.03	94.29	91.91	2.09	0.91
	14	3.74	94.84	98.03	91.08	94.65	3.48	0.73
	20	4.47	91.03	95.27	101.73	96.01	5.39	0.60
	24	4.90	100.68	99.65	99.53	99.95	0.63	-1.30
25/30	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	26.78	25.53	32.56	28.29	3.75	1.86
	2	1.41	78.06	80.94	76.06	78.36	5.03	1.34
	4	2.00	85.47	90.04	84.09	86.53	3.11	1.13
	5	2.24	92.05	96.13	93.70	93.96	2.05	0.78
	8	2.83	93.44	96.33	96.45	95.41	1.70	0.66
	10	3.16	92.45	93.05	103.19	96.23	6.03	0.58
	14	3.74	95.14	200.07	99.50	98.24	2.70	0.25
	20	4.47	98.99	103.78	97.47	100.08	3.29	-
	24	4.90	105.15	99.47	97.71	100.78	3.89	-

\* = Mean of three determinations (%)

Table 43 Amount Percent of Theophylline Release from 16/18 mesh size of Theophylline Granules Coating with Surelease® in Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
1.92	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	39.98	40.08	45.10	41.72	2.93	1.77
	2	1.41	69.42	70.79	70.69	70.30	0.76	1.47
	4	2.00	80.94	81.49	79.72	80.72	0.91	1.29
	5	2.24	80.41	81.50	80.96	80.69	0.55	1.28
	8	2.83	87.13	83.72	85.44	85.43	1.71	1.16
	10	3.16	93.65	89.12	92.99	91.92	2.45	0.91
	14	3.74	88.50	95.23	96.00	93.24	4.13	0.83
	20	4.47	96.44	90.82	93.35	93.54	2.81	0.91
	24	4.90	93.65	96.73	97.58	95.99	2.07	0.60
3.05	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	19.09	20.11	19.72	19.64	0.51	1.91
	2	1.41	42.66	47.47	45.38	45.17	2.41	1.74
	4	2.00	70.19	66.59	69.41	68.73	1.89	1.50
	5	2.24	81.94	77.10	79.82	79.62	2.43	1.31
	8	2.83	80.21	83.07	81.94	81.74	1.44	1.26
	10	3.16	95.60	94.33	95.27	95.07	0.66	0.69
	14	3.74	95.19	97.30	99.38	97.29	2.10	0.43
	20	4.47	97.08	100.83	100.53	99.48	2.08	-0.28
	24	4.90	100.08	102.17	109.87	104.04	5.16	-
3.87	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	16.67	17.99	17.12	17.26	0.67	1.92
	2	1.41	34.98	38.20	36.92	36.70	1.62	1.80
	4	2.00	69.44	71.34	68.58	69.79	1.41	1.48
	5	2.24	78.02	80.11	77.55	78.56	1.36	1.33
	8	2.83	82.30	86.20	83.88	84.13	1.96	1.20
	10	3.16	84.90	85.70	85.08	85.23	0.42	1.17
	14	3.74	89.45	87.94	88.76	88.72	0.76	1.05
	20	4.47	91.66	92.15	92.11	91.97	0.27	0.90
	24	4.90	99.01	99.92	99.32	99.42	0.46	-0.24
6.29	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	6.32	4.89	6.45	5.89	0.87	1.97
	2	1.41	15.45	18.27	18.24	17.32	1.62	1.92
	4	2.00	35.73	41.08	37.64	38.15	2.71	1.79
	5	2.24	49.95	55.03	47.44	50.81	3.87	1.69
	8	2.83	60.91	68.43	68.39	65.91	4.33	1.53
	10	3.16	78.24	70.05	68.85	72.38	5.11	1.44
	14	3.74	80.68	85.93	84.15	83.59	2.67	1.22
	20	4.47	90.78	95.43	100.98	95.73	5.11	0.63
	24	4.90	99.78	105.66	96.17	100.54	4.79	-

\* = Mean of three determinations (%)

Table 44 Amount Percent of Theophylline Release from 18/20 mesh size  
of Theophylline Granules Coating with Surelease® in  
Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
2.04	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	19.33	15.90	10.75	15.33	4.32	1.93
	2	1.41	30.45	33.27	33.42	32.38	1.67	1.83
	4	2.00	68.89	65.16	57.37	63.81	5.88	1.56
	5	2.24	84.56	77.26	83.08	81.63	3.86	1.26
	8	2.83	84.75	81.01	80.69	82.15	2.26	1.25
	10	3.16	80.77	83.12	83.04	82.31	1.33	1.25
	14	3.74	95.97	92.89	93.63	93.50	2.54	0.81
	20	4.47	97.85	93.43	97.63	94.97	2.73	0.70
24	4.90	94.04	97.92	99.55	97.17	2.83	0.45	
3.29	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	12.43	14.46	14.15	13.68	1.09	1.94
	2	1.41	22.78	30.70	26.93	26.80	3.96	1.86
	4	2.00	51.55	57.89	51.42	53.62	3.70	1.67
	5	2.24	59.13	60.87	71.34	63.78	6.60	1.56
	8	2.83	80.86	90.82	86.02	85.90	4.98	1.15
	10	3.16	84.30	84.37	89.27	85.98	2.85	1.15
	14	3.74	92.53	88.98	87.46	89.66	2.60	1.01
	20	4.47	94.05	93.10	101.03	96.06	4.33	0.60
24	4.90	103.78	99.10	98.03	100.30	3.06	-	
7.61	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	5.77	5.36	5.37	5.50	0.23	1.98
	2	1.41	17.20	15.26	15.11	15.86	1.17	1.93
	4	2.00	37.49	34.59	34.45	35.51	1.72	1.81
	5	2.24	49.58	45.29	44.20	46.36	2.84	1.73
	8	2.83	71.75	68.95	65.48	68.73	3.14	1.50
	10	3.16	77.19	76.08	72.87	75.38	2.24	1.39
	14	3.74	85.54	88.43	81.89	85.29	3.28	1.17
	20	4.47	87.05	92.90	87.45	89.13	3.61	1.04
24	4.90	86.80	92.59	92.85	90.75	3.42	0.97	
9.00	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	10.40	9.33	8.44	9.39	0.98	1.96
	2	1.41	14.20	14.03	13.72	13.98	0.24	1.93
	4	2.00	24.43	24.12	27.56	25.37	1.90	1.87
	5	2.24	30.99	29.74	32.39	31.04	1.33	1.84
	8	2.83	46.13	44.95	49.10	46.73	2.14	1.73
	10	3.16	55.32	85.72	59.39	57.81	2.18	1.63
	14	3.74	40.62	75.76	76.95	74.44	3.36	1.41
	20	4.47	91.34	83.68	86.01	86.68	2.34	1.12
24	4.90	91.70	87.70	96.72	92.04	4.52	0.90	

\* = Mean of three determinations (%)

Table 45 Amount Percent of Theophylline Release from 20/25 mesh size  
of Theophylline Granules Coating with Surelease® in  
Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
2.48	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	82.00	79.47	75.98	79.15	3.02	1.32
	2	1.41	83.05	82.68	83.30	83.01	0.31	1.23
	4	2.00	90.82	87.43	89.95	89.40	1.46	1.03
	5	2.24	95.20	90.13	94.18	93.17	2.68	0.83
	8	2.83	94.12	92.98	95.71	94.27	1.37	0.76
	10	3.16	101.15	89.76	93.83	94.91	5.77	0.71
	14	3.74	92.27	97.18	96.96	95.47	2.77	0.66
	20	4.47	97.85	101.90	97.22	98.99	2.54	0.00
	24	4.90	98.94	103.82	99.19	100.65	2.75	-
3.86	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	64.93	64.18	69.43	66.18	2.84	1.53
	2	1.41	72.05	83.95	73.68	76.56	6.45	1.37
	4	2.00	89.14	85.72	88.93	87.93	1.92	1.08
	5	2.24	90.01	86.87	91.92	89.60	2.55	1.02
	8	2.83	84.23	90.58	97.87	90.89	6.83	0.69
	10	3.16	90.69	91.49	96.15	92.78	2.95	0.86
	14	3.74	93.78	95.58	96.43	95.26	1.35	0.68
	20	4.47	97.01	104.19	96.80	99.33	4.21	-0.17
	24	4.90	94.08	101.49	103.07	99.55	4.80	-0.35
8.39	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	12.25	12.70	16.20	13.72	2.16	1.94
	2	1.41	28.93	25.87	28.69	27.83	1.70	1.86
	4	2.00	46.72	44.43	50.77	47.31	3.21	1.72
	5	2.24	55.94	51.14	52.91	53.33	2.43	1.67
	8	2.83	57.84	61.41	65.95	61.73	4.06	1.58
	10	3.16	71.28	64.89	70.09	68.75	3.40	1.49
	14	3.74	72.72	74.62	80.05	75.80	3.80	1.38
	20	4.47	88.58	88.30	89.37	88.75	0.55	1.05
	24	4.90	94.01	97.18	97.11	96.43	2.15	0.55
12.12	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	5.71	6.38	5.20	5.76	0.59	1.97
	2	1.41	13.13	10.42	11.88	11.81	1.36	1.95
	4	2.00	21.33	21.97	20.83	21.38	0.57	1.90
	5	2.24	32.23	29.99	30.64	30.95	1.15	1.84
	8	2.83	53.11	52.98	56.48	54.19	1.98	1.66
	10	3.16	60.97	63.45	61.38	61.93	1.33	1.58
	14	3.74	71.54	69.58	70.62	70.58	0.98	1.47
	20	4.47	80.01	87.11	93.10	86.74	6.55	1.12
	24	4.90	100.08	99.15	93.73	97.65	3.43	0.37

\* = Mean of three determinations (%)

Table 46 Amount Percent of Theophylline Release from 25/30 mesh size of Theophylline Granules Coating with Surelease® in Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
7.84	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	26.57	30.97	28.07	28.54	0.24	1.85
	2	1.41	49.44	50.58	49.69	49.90	0.60	1.70
	4	2.00	73.85	73.56	73.56	73.66	0.17	1.42
	5	2.24	95.91	84.71	83.40	85.34	0.60	1.17
	8	2.83	87.85	84.03	86.01	85.96	1.91	1.15
	10	3.16	83.46	88.89	87.60	86.65	2.84	1.13
	14	3.74	92.99	96.30	94.44	94.58	1.66	0.73
	20	4.47	96.54	102.95	98.20	99.30	3.24	-0.15
	24	4.90	99.54	100.92	100.71	100.39	0.74	-
12.18	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	6.18	6.68	6.64	6.50	0.28	1.97
	2	1.41	15.70	16.20	16.06	15.99	0.26	1.92
	4	2.00	35.53	42.73	40.17	39.48	3.65	1.78
	5	2.24	42.36	46.06	45.02	44.48	1.91	1.74
	8	2.83	56.63	63.59	63.12	61.11	3.89	1.59
	10	3.16	61.20	69.94	69.19	66.78	4.84	1.52
	14	3.74	85.02	78.64	79.31	80.99	3.51	1.28
	20	4.47	93.77	96.83	95.17	95.26	1.53	0.68
	24	4.90	93.30	98.02	98.48	96.60	2.87	0.53
13.40	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	5.45	5.47	5.47	5.46	0.01	1.98
	2	1.41	13.72	14.17	13.97	13.95	0.23	1.93
	4	2.00	31.93	35.93	34.55	34.14	2.03	1.82
	5	2.24	38.96	35.38	37.57	37.30	1.80	1.80
	8	2.83	62.17	60.56	57.75	60.16	2.24	1.60
	10	3.16	76.35	67.07	70.94	71.45	4.66	1.46
	14	3.74	91.85	87.08	87.68	88.87	2.60	1.05
	20	4.47	96.48	91.27	92.55	93.43	2.72	0.82
	24	4.90	91.61	94.59	94.31	93.50	1.65	0.81
17.05	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	4.03	3.87	3.95	3.95	0.08	1.98
	2	1.41	10.53	7.14	7.60	8.42	1.84	1.96
	4	2.00	17.54	16.56	14.70	16.23	1.43	1.92
	5	2.24	21.73	19.72	17.76	19.74	1.99	1.90
	8	2.83	33.42	29.59	28.01	30.34	2.78	1.84
	10	3.16	46.03	51.43	54.34	50.60	4.22	1.69
	14	3.74	79.04	74.98	72.81	75.61	3.16	1.39
	20	4.47	85.91	84.71	85.40	85.34	0.60	1.17
	24	4.90	90.01	95.73	94.42	93.39	3.00	0.82

\* = Mean of three determinations (%)

Table 47 Amount Percent of Theophylline Release from 16/18 mesh size of Theophylline Granules Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
2.51	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	75.48	97.23	78.09	77.60	1.92	1.35
	2	1.41	80.43	90.25	89.44	86.71	5.45	1.12
	4	2.00	90.85	95.64	93.92	93.47	2.43	0.81
	5	2.24	98.10	93.72	90.49	94.10	3.82	0.77
	8	2.83	100.03	95.74	95.49	94.09	2.55	0.46
	10	3.16	101.48	93.71	97.76	97.65	3.89	0.37
	14	3.74	103.01	95.48	99.42	99.30	3.77	-0.15
	20	4.47	105.41	99.73	94.95	100.30	5.24	-
	24	4.90	108.10	99.20	100.64	102.65	4.78	-
5.96	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	60.00	58.79	63.34	60.71	2.36	1.59
	2	1.41	73.21	68.11	64.92	68.75	4.18	1.49
	4	2.00	80.83	75.71	82.90	79.81	3.70	1.31
	5	2.24	86.20	97.01	90.54	85.25	5.82	1.17
	8	2.83	91.65	91.98	91.41	91.68	0.29	0.92
	10	3.16	96.03	94.55	96.80	95.79	1.14	0.62
	14	3.74	95.14	99.24	94.04	96.14	2.74	0.59
	20	4.47	102.11	101.03	93.92	99.02	4.45	-8.77
	24	4.90	104.05	98.74	97.14	99.98	3.62	-1.70
8.53	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	45.63	50.45	49.87	48.65	2.63	1.71
	2	1.41	50.73	58.69	54.24	54.55	3.99	1.66
	4	2.00	55.18	60.04	51.96	55.73	4.07	1.65
	5	2.24	57.05	91.87	56.53	58.15	2.37	1.62
	8	2.83	80.68	75.00	72.37	76.02	4.25	1.38
	10	3.16	84.98	82.17	79.90	82.35	2.54	1.25
	14	3.74	93.04	88.13	81.20	87.46	5.95	1.10
	20	4.47	97.13	92.07	92.17	90.46	2.88	0.98
	24	4.90	98.88	104.13	106.23	103.08	3.79	-
14.76	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	10.85	9.28	11.25	10.46	1.04	1.95
	2	1.41	18.11	19.00	18.93	18.68	0.49	1.91
	4	2.00	39.08	41.79	40.59	40.49	1.36	1.77
	5	2.24	50.57	54.20	52.55	52.44	1.82	1.68
	8	2.83	70.00	75.12	65.58	70.23	4.77	1.48
	10	3.16	84.79	88.56	88.52	87.29	2.17	1.10
	14	3.74	96.30	97.58	97.09	96.99	0.65	0.48
	20	4.47	96.37	104.68	97.90	99.65	4.42	-0.46
	24	4.90	102.31	105.12	101.09	102.84	2.07	-

\* = Mean of three determinations (%)

Table 48 Amount Percent of Theophylline Release from 18/20 mesh size of Theophylline Granules Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
4.04	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	79.12	75.80	72.39	75.77	3.37	1.38
	2	1.41	85.64	91.52	92.15	89.77	3.59	1.01
	4	2.00	91.11	90.20	96.03	92.45	3.14	0.88
	5	2.24	94.01	93.66	98.55	95.41	2.73	0.66
	8	2.83	93.05	99.59	98.68	97.10	3.54	0.46
	10	3.16	96.45	99.99	102.02	99.49	2.82	-0.29
	14	3.74	101.45	98.63	100.01	100.03	1.41	-
	20	4.47	102.38	99.04	99.93	100.45	1.73	-
	24	4.90	103.91	99.64	99.49	101.01	2.51	-
6.75	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	20.91	20.91	19.41	20.41	0.87	1.90
	2	1.41	52.69	51.56	51.42	51.89	0.70	1.68
	4	2.00	71.03	69.76	73.66	71.48	1.99	1.46
	5	2.24	83.16	83.71	90.93	85.93	4.34	1.15
	8	2.83	99.75	97.25	92.95	96.65	3.44	0.53
	10	3.16	100.15	98.98	100.23	99.79	0.70	-0.68
	14	3.74	99.52	100.93	99.65	100.03	0.78	-
	20	4.47	100.26	96.45	103.59	100.10	3.57	-
	24	4.90	99.11	104.25	97.22	100.19	3.64	-
10.93	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	22.14	20.15	27.36	23.22	3.72	1.89
	2	1.41	31.84	28.23	35.48	31.85	3.63	1.83
	4	2.00	59.87	57.36	66.75	61.33	4.86	1.59
	5	2.24	70.52	72.90	72.07	71.83	1.21	1.45
	8	2.83	84.96	87.77	85.29	86.01	1.54	1.15
	10	3.16	85.44	92.59	91.22	89.75	3.79	1.01
	14	3.74	99.41	99.55	99.84	99.60	0.22	-0.40
	20	4.47	104.24	100.05	105.58	103.29	2.88	-
	24	4.90	100.14	105.07	104.69	103.30	2.74	-
19.12	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	5.82	5.90	5.95	5.89	0.07	1.97
	2	1.41	13.68	10.24	15.98	13.30	2.89	1.94
	4	2.00	32.37	30.87	31.71	31.65	0.75	1.83
	5	2.24	43.20	41.81	42.60	42.54	0.70	1.76
	8	2.83	66.78	63.31	65.14	65.08	1.74	1.54
	10	3.16	79.92	76.53	78.32	78.26	1.70	1.34
	14	3.74	85.28	78.14	81.74	81.74	3.57	1.26
	20	4.47	97.82	95.36	94.40	95.86	1.76	0.62
	24	4.90	104.07	102.73	101.21	102.67	1.43	-

\* = Mean of three determinations (%)

Table 49 Amount Percent of Theophylline Release from 20/25 mesh size of Theophylline Granules Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
5.56	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	66.79	62.41	67.60	65.60	2.79	1.54
	2	1.41	66.83	66.92	67.84	67.20	0.56	1.52
	4	2.00	88.74	90.21	89.81	89.59	0.76	1.02
	5	2.24	93.68	93.14	94.37	93.73	0.62	0.80
	8	2.83	102.63	100.26	102.41	101.77	1.31	-
	10	3.16	97.63	101.05	106.99	101.89	4.74	-
	14	3.74	103.77	100.68	103.16	102.54	1.64	-
	20	4.47	105.77	105.52	106.58	105.96	0.55	-
	24	4.90	106.48	105.92	106.35	106.25	0.29	-
11.46	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	33.45	30.31	33.00	32.25	1.70	1.83
	2	1.41	53.71	49.49	46.86	50.02	3.46	1.70
	4	2.00	74.42	75.64	70.31	73.46	2.79	1.42
	5	2.24	86.16	79.18	77.51	80.95	4.59	1.28
	8	2.83	91.41	87.39	93.47	90.76	3.09	0.97
	10	3.16	96.63	94.19	91.93	94.25	2.35	0.76
	14	3.74	98.69	102.00	95.59	98.76	3.21	0.09
	20	4.47	102.27	101.45	99.17	100.96	1.61	-
	24	4.90	104.78	101.98	96.39	101.05	4.27	-
15.00	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	16.21	19.54	14.90	16.88	2.39	1.92
	2	1.41	28.49	28.94	27.39	28.27	0.80	1.86
	4	2.00	50.36	48.84	49.84	49.68	0.77	1.70
	5	2.24	60.15	57.11	58.90	58.72	1.53	1.62
	8	2.83	87.83	86.24	87.33	87.13	0.81	1.11
	10	3.16	90.45	92.87	96.95	93.42	3.29	0.82
	14	3.74	99.59	96.52	98.33	98.15	1.54	0.27
	20	4.47	102.42	100.13	101.55	101.37	1.16	-
	24	4.90	103.48	99.95	100.86	101.43	1.83	-
20.76	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	9.10	8.39	10.25	9.25	0.94	1.96
	2	1.41	19.97	21.16	20.70	20.61	0.60	1.90
	4	2.00	38.47	40.17	39.46	39.37	0.85	1.78
	5	2.24	52.93	53.55	53.38	53.29	0.32	1.67
	8	2.83	71.28	71.57	71.56	71.47	0.16	1.46
	10	3.16	87.68	87.14	88.06	86.17	1.14	1.14
	14	3.74	88.68	87.14	88.06	87.96	0.77	1.08
	20	4.47	91.69	88.95	90.46	90.37	1.37	0.98
	24	4.90	96.35	95.50	93.57	95.14	1.42	0.69

\* = Mean of three determinations (%)

Table 50 Amount Percent of Theophylline Release from 25/30 mesh size of Theophylline Granules Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
8.83	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	38.78	43.52	38.39	40.23	2.86	1.78
	2	1.41	67.12	74.23	69.31	70.32	3.61	1.47
	4	2.00	83.74	89.05	84.57	85.79	2.86	1.15
	5	2.24	91.05	85.77	90.84	89.22	2.41	1.03
	8	2.83	89.92	90.30	91.27	90.50	0.70	0.98
	10	3.16	95.17	96.28	93.28	94.91	1.52	0.71
	14	3.74	96.50	97.76	98.30	97.52	0.92	0.39
	20	4.47	100.10	98.27	99.19	99.19	0.92	-0.09
	24	4.90	101.52	105.01	103.82	103.45	1.77	-
14.57	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	21.23	25.63	22.46	23.11	2.27	1.89
	2	1.41	43.59	48.89	46.62	46.37	2.66	1.73
	4	2.00	82.32	80.00	81.54	81.29	1.18	1.27
	5	2.24	87.78	86.37	87.45	87.20	0.74	1.11
	8	2.83	89.27	87.24	88.63	88.38	1.04	1.07
	10	3.16	92.90	86.53	90.09	89.84	3.19	1.01
	14	3.74	91.30	89.10	90.58	90.33	1.12	0.99
	20	4.47	98.91	100.23	103.66	100.93	2.45	-
	24	4.90	105.38	103.05	98.23	102.22	3.65	-
17.68	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	13.16	13.28	13.18	13.21	0.06	1.94
	2	1.41	31.54	28.91	30.42	30.29	1.32	1.84
	4	2.00	62.10	63.07	62.78	62.65	0.50	1.57
	5	2.24	67.33	67.03	67.39	67.26	0.18	1.52
	8	2.83	84.15	79.74	82.14	82.01	2.21	1.26
	10	3.16	86.57	84.75	85.86	85.73	0.92	1.15
	14	3.74	100.33	100.67	100.70	100.57	0.21	-
	20	4.47	103.43	100.15	99.33	100.97	2.17	-
	24	4.90	100.22	102.09	101.35	101.22	0.94	-
22.37	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	9.49	8.80	9.22	9.17	0.35	1.96
	2	1.41	22.11	21.40	21.89	21.80	0.36	1.89
	4	2.00	42.08	43.50	42.93	42.84	0.71	1.76
	5	2.24	54.98	58.41	56.83	56.74	1.72	1.64
	8	2.83	73.08	73.18	73.27	73.18	0.10	1.43
	10	3.16	89.27	91.82	90.68	90.59	1.28	0.97
	14	3.74	97.05	97.73	97.53	97.44	0.35	0.41
	20	4.47	99.14	99.73	99.57	99.48	0.31	-0.28
	24	4.90	105.44	102.62	101.54	103.20	2.01	-

\* = Mean of three determinations (%)

Table 51 Amount Percent of Theophylline Release from Commercial Product, Theo-24<sup>®</sup> 200 mg, in Phosphate Buffer PH 6.6

Product	Time (hours)	Time	% Drug Release			Mean*	SD	Log% drug remained
			1	2	3			
Theo-24 <sup>®</sup>	0	0.00	0.00	0.00	0.00	0.00	0.00	2.00
	1	1.00	5.31	5.76	5.78	5.62	0.27	1.97
	2	1.41	10.88	12.18	12.97	12.01	1.06	1.94
	4	2.00	30.17	32.35	31.91	31.48	1.15	1.84
	5	2.24	30.64	38.06	27.38	32.03	5.47	1.83
	8	2.83	59.80	62.47	62.96	61.74	1.70	1.58
	10	3.16	57.48	63.20	65.20	91.96	4.01	1.58
	14	3.74	77.09	78.43	83.46	79.66	3.36	1.31
	20	4.47	89.59	92.81	101.04	94.48	5.91	0.74
	24	4.90	97.76	96.58	103.30	99.21	3.59	-0.10

\* = Mean of three determinations (%)

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Table 52 The Release Rate of Uncoated Granules in Phosphate Buffer  
PH 6.6

Size of Granules (mesh)	Mean Time (hours)	Release Rate (%/hour)
16/18	2.50	25.62
	7.50	17.63
	12.50	10.02
	17.50	17.13
	22.50	1.65
	27.50	1.96
	35.00	1.06
	45.00	0.25
	55.00	1.21
18/20	2.50	26.45
	7.50	28.50
	12.50	10.26
	17.50	12.77
	22.50	0.33
	27.50	0.60
	35.00	0.32
	45.00	0.38
	55.00	1.50
20/25	2.50	27.05
	7.50	41.32
	12.50	9.10
	17.50	2.81
	22.50	0.33
	27.50	0.78
	35.00	0.69
	45.00	0.23
	55.00	0.99
25/30	2.50	28.29
	7.50	50.07
	12.50	4.09
	17.50	7.43
	22.50	0.48
	27.50	0.41
	35.00	0.50
	45.00	0.31
	55.00	0.18

**Table 53 The Release Rate of 16/18 mesh size of Theophylline Granules  
Coating with Surelease® in Phosphate Buffer PH 6.6**

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
1.92	0.50	41.72
	1.50	28.58
	3.00	5.21
	4.50	0.24
	6.50	1.49
	9.00	3.25
	12.00	0.33
	17.00	0.05
	22.00	0.61
3.05	0.50	19.64
	1.50	25.53
	3.00	11.78
	4.50	10.89
	6.50	0.71
	9.00	6.67
	12.00	0.56
	17.00	0.37
	22.00	1.14
3.87	0.50	17.26
	1.50	19.44
	3.00	16.55
	4.50	8.77
	6.50	1.86
	9.00	0.55
	12.00	0.87
	17.00	0.54
	22.00	1.86
6.29	0.50	5.89
	1.50	11.43
	3.00	10.42
	4.50	12.66
	6.50	5.03
	9.00	3.24
	12.00	2.80
	17.00	2.02
	22.00	1.20

Table 54 The Release Rate of 18/20 mesh size of Theophylline Granules  
Coating with Surelease® in Phosphate Buffer PH 6.6

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
2.04	0.50	15.33
	1.50	17.05
	3.00	15.72
	4.50	17.82
	6.50	0.17
	9.00	0.08
	12.00	2.80
	17.00	0.25
	22.00	0.55
3.29	0.50	13.68
	1.50	13.12
	3.00	13.41
	4.50	10.61
	6.50	7.37
	9.00	0.04
	12.00	0.92
	17.00	1.07
	22.00	1.06
7.61	0.50	5.50
	1.50	10.36
	3.00	9.83
	4.50	10.82
	6.50	7.46
	9.00	3.33
	12.00	2.48
	17.00	0.64
	22.00	0.41
9.00	0.50	9.39
	1.50	4.59
	3.00	5.70
	4.50	5.67
	6.50	5.23
	9.00	5.54
	12.00	4.16
	17.00	2.04
	22.00	1.34

Table 55 The Release Rate of 20/25 mesh size of Theophylline Granules  
Coating with Surelease® in Phosphate Buffer PH 6.6

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
2.48	0.50	79.15
	1.50	3.86
	3.00	3.20
	4.50	3.77
	6.50	0.37
	9.00	0.32
	12.00	0.14
	17.00	0.59
	22.00	0.42
3.86	0.50	66.18
	1.50	10.38
	3.00	5.69
	4.50	1.67
	6.50	0.43
	9.00	0.95
	12.00	0.62
	17.00	0.68
	22.00	0.06
8.39	0.50	13.72
	1.50	14.11
	3.00	9.74
	4.50	6.02
	6.50	2.80
	9.00	3.51
	12.00	1.76
	17.00	2.16
	22.00	1.92
12.12	0.50	5.76
	1.50	6.05
	3.00	4.79
	4.50	9.57
	6.50	7.75
	9.00	3.87
	12.00	2.16
	17.00	2.69
	22.00	2.73

**Table 56 The Release Rate of 25/30 mesh size of Theophylline Granules  
Coating with Surelease® in Phosphate Buffer PH 6.6**

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
7.84	0.50	28.54
	1.50	21.36
	3.00	11.88
	4.50	11.68
	6.50	0.21
	9.00	0.35
	12.00	1.98
	17.00	0.79
	22.00	0.27
12.18	0.50	6.50
	1.50	9.49
	3.00	11.75
	4.50	5.00
	6.50	5.54
	9.00	2.84
	12.00	3.55
	17.00	2.38
	22.00	0.34
13.40	0.50	5.46
	1.50	8.49
	3.00	10.10
	4.50	3.16
	6.50	7.62
	9.00	5.65
	12.00	4.36
	17.00	0.76
	22.00	0.02
17.05	0.50	3.95
	1.50	4.47
	3.00	3.91
	4.50	3.51
	6.50	3.53
	9.00	10.13
	12.00	6.25
	17.00	1.62
	22.00	2.01

**Table 57** The Release Rate of 16/18 mesh size of Theophylline Granules  
Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
2.51	0.50	77.60
	1.50	9.10
	3.00	3.38
	4.50	0.63
	6.50	1.00
	9.00	0.28
	12.00	0.41
	17.00	0.17
	22.00	0.59
5.96	0.50	60.71
	1.50	8.04
	3.00	5.53
	4.50	5.44
	6.50	2.14
	9.00	2.06
	12.00	0.09
	17.00	0.48
	22.00	0.24
8.53	0.50	48.65
	1.50	5.90
	3.00	0.59
	4.50	2.42
	6.50	5.96
	9.00	3.17
	12.00	1.28
	17.00	0.50
	22.00	3.16
14.76	0.50	10.46
	1.50	8.22
	3.00	10.91
	4.50	11.95
	6.50	5.93
	9.00	8.53
	12.00	2.43
	17.00	0.44
	22.00	0.80

Table 58 The Release Rate of 18/20 mesh size of Theophylline Granules  
Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
4.04	0.50	75.77
	1.50	14.00
	3.00	1.34
	4.50	2.96
	6.50	0.65
	9.00	1.20
	12.00	0.14
	17.00	0.07
	22.00	0.14
6.75	0.50	20.41
	1.50	31.48
	3.00	9.80
	4.50	14.48
	6.50	3.57
	9.00	1.57
	12.00	0.06
	17.00	0.01
	22.00	0.02
10.93	0.50	23.22
	1.50	8.63
	3.00	14.74
	4.50	10.50
	6.50	4.73
	9.00	1.87
	12.00	2.46
	17.00	0.62
	22.00	0.00
19.12	0.50	5.89
	1.50	7.41
	3.00	9.18
	4.50	10.89
	6.50	7.51
	9.00	6.59
	12.00	0.87
	17.00	2.35
	22.00	1.70

**Table 59 The Release Rate of 20/25 mesh size of Theophylline Granules  
Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6**

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
5.56	0.50	65.60
	1.50	1.60
	3.00	11.20
	4.50	4.14
	6.50	2.68
	9.00	0.06
	12.00	0.16
	17.00	0.57
	22.00	0.07
11.46	0.50	32.25
	1.50	17.77
	3.00	11.72
	4.50	7.49
	6.50	3.27
	9.00	1.75
	12.00	1.13
	17.00	0.37
	22.00	0.02
15.00	0.50	16.88
	1.50	11.39
	3.00	10.71
	4.50	9.04
	6.50	9.47
	9.00	3.15
	12.00	1.18
	17.00	0.54
	22.00	0.02
20.76	0.50	9.25
	1.50	11.36
	3.00	9.38
	4.50	13.92
	6.50	6.06
	9.00	7.35
	12.00	0.45
	17.00	0.40
	22.00	1.19

Table 60 The Release Rate of 25/30 mesh size of Theophylline Granules  
Coating with Eudragit® NE 30 D in Phosphate Buffer PH 6.6

Percent Coated	Mean Time (hours)	Release Rate (%/hour)
8.83	0.50	40.23
	1.50	30.09
	3.00	7.74
	4.50	3.43
	6.50	0.43
	9.00	2.21
	12.00	0.65
	17.00	0.28
	22.00	1.07
14.57	0.50	23.11
	1.50	23.26
	3.00	17.46
	4.50	5.91
	6.50	0.39
	9.00	0.73
	12.00	0.12
	17.00	1.77
	22.00	0.32
17.68	0.50	13.21
	1.50	17.08
	3.00	16.18
	4.50	4.61
	6.50	4.92
	9.00	1.86
	12.00	3.71
	17.00	0.06
	22.00	0.06
22.37	0.50	9.17
	1.50	12.63
	3.00	10.52
	4.50	13.90
	6.50	5.48
	9.00	8.71
	12.00	1.71
	17.00	0.34
	22.00	0.93

**Table 61 The Release Rate of Commercial Product, Theo-24<sup>®</sup> 200 mg,  
in Phosphate Buffer PH 6.6**

Product	Mean Time (hours)	Release Rate (%/hour)
Theo-24 <sup>®</sup>	0.05	5.62
	1.50	6.39
	3.00	9.74
	4.50	0.55
	6.50	9.90
	9.00	0.11
	12.00	4.43
	17.00	2.47
	22.00	1.18

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Table 62 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 16/18 mesh size of Theophylline Granules Coating with Surelease®

Percent Coated	$dQ / dt$	$Q$	$1/Q$
3.87	17.26	17.26	0.058
	19.44	36.70	0.027
	16.55	69.79	0.014
	8.77	78.56	0.013
	1.86	84.13	0.012
	0.55	85.23	0.012
	0.87	88.72	0.011
	0.54	91.97	0.011
	1.86	99.42	0.010
6.92	5.89	5.89	0.170
	11.43	17.32	0.058
	10.42	38.15	0.026
	12.66	50.71	0.020
	5.03	65.91	0.015
	3.24	72.38	0.014
	2.80	83.59	0.012
	2.02	95.73	0.010
	1.20	100.54	0.010

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**Table 63 Values of Rate (dQ/dt), Amount Released (Q), and the Corresponding Reciprocal (1/Q) for the Release of 18/20 mesh size of Theophylline Granules Coating with Surelease®**

Percent Coated	dQ / dt	Q	1/Q
3.29	13.68	13.68	0.073
	13.12	26.80	0.037
	13.41	53.62	0.019
	10.61	63.78	0.016
	7.37	85.90	0.012
	0.04	85.98	0.012
	0.92	89.66	0.011
	1.07	96.06	0.010
	1.06	100.30	0.010
7.61	5.50	5.50	0.182
	10.36	15.86	0.063
	9.83	35.51	0.028
	10.85	46.36	0.022
	7.46	68.73	0.015
	3.33	75.38	0.013
	2.48	85.29	0.012
	0.64	89.13	0.011
	0.41	90.75	0.011
9.00	9.39	9.39	0.106
	4.59	13.98	0.072
	5.70	25.37	0.039
	5.67	31.04	0.032
	5.23	46.73	0.021
	5.54	57.81	0.017
	4.16	74.44	0.013
	2.04	86.68	0.012
	1.34	92.04	0.011

Table 64 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 20/25 mesh size of Theophylline Granules Coating with Surelease®

Percent Coated	$dQ / dt$	$Q$	$1/Q$
8.39	13.72	13.72	0.073
	14.11	27.83	0.036
	9.74	47.31	0.021
	6.02	53.33	0.019
	2.80	61.73	0.016
	3.51	68.75	0.015
	1.76	75.80	0.013
	2.16	88.75	0.011
	1.92	96.43	0.010
12.12	5.76	5.76	0.174
	6.05	11.81	0.085
	4.79	21.38	0.047
	9.57	80.95	0.032
	7.75	54.19	0.018
	3.87	61.93	0.016
	2.16	70.58	0.014
	2.69	86.74	0.012
	2.73	97.65	0.010

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Table 65 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 25/30 mesh size of Theophylline Granules Coating with Surelease®

Percent Coated	$dQ/dt$	$Q$	$1/Q$
12.18	6.50	6.50	0.154
	9.49	15.99	0.063
	11.75	39.48	0.025
	5.00	44.48	0.022
	5.54	61.11	0.016
	2.84	66.78	0.015
	3.55	80.99	0.012
	2.38	95.26	0.010
	0.34	96.60	0.010
13.40	5.46	5.46	0.183
	8.49	13.93	0.072
	10.10	34.14	0.029
	3.16	37.30	0.027
	7.62	60.16	0.017
	5.65	71.45	0.014
	4.36	88.87	0.011
	0.76	93.43	0.011
	0.02	93.50	0.011
17.05	3.95	3.95	0.253
	4.47	8.42	0.119
	3.91	16.23	0.062
	3.51	19.74	0.051
	3.53	30.34	0.033
	10.13	50.60	0.020
	6.25	75.61	0.013
	1.62	85.34	0.012
	2.01	93.39	0.011

**Table 66 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 16/18 mesh size of Theophylline Granules Coating with Eudragit<sup>®</sup> NE 30 D**

Percent Coated	$dQ/dt$	$Q$	$1/Q$
8.53	48.65	48.65	0.021
	5.90	54.55	0.018
	0.59	55.73	0.018
	2.42	58.15	0.017
	5.96	76.02	0.013
	3.17	82.35	0.012
	1.28	87.46	0.011
	0.50	90.46	0.011
	3.16	103.08	0.010
14.76	10.46	10.46	0.096
	8.22	18.68	0.054
	10.91	40.49	0.025
	11.95	52.44	0.019
	5.93	70.23	0.014
	8.53	87.29	0.011
	2.43	96.99	0.010
	0.44	99.65	0.010
	0.80	102.84	0.010

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Table 67 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 18/20 mesh size of Theophylline Granules Coating with Eudragit® NE 30 D

Percent Coated	$dQ / dt$	$Q$	$1/Q$
10.93	23.22	23.22	0.043
	8.63	31.85	0.031
	14.74	61.33	0.016
	10.50	71.83	0.014
	4.73	86.01	0.012
	1.83	89.75	0.011
	2.46	99.60	0.010
	0.62	103.29	0.010
	0.00	103.30	0.010
19.12	5.89	5.89	0.170
	7.41	13.30	0.075
	9.18	31.65	0.032
	10.89	42.54	0.024
	7.51	65.08	0.015
	6.59	78.26	0.013
	0.87	81.74	0.012
	2.35	95.86	0.010
	1.70	102.67	0.010

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Table 68 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 20/25 mesh size of Theophylline Granules Coating with Eudragit<sup>®</sup> NE 30 D

Percent Coated	$dQ / dt$	$Q$	$1/Q$
15.00	16.88	16.88	0.059
	11.39	28.27	0.035
	10.71	49.68	0.020
	9.04	58.72	0.017
	9.47	87.13	0.011
	3.15	93.42	0.011
	1.18	98.15	0.010
	0.54	101.37	0.010
	0.02	101.43	0.010
20.76	9.25	9.25	0.108
	11.36	20.61	0.049
	9.38	39.37	0.025
	13.92	53.28	0.019
	6.06	71.47	0.014
	7.35	86.17	0.012
	0.45	87.96	0.011
	0.40	90.37	0.011
	1.19	95.14	0.011

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Table 69 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of 25/30 mesh size of Theophylline Granules Coating with Eudragit® NE 30 D

Percent Coated	$dQ / dt$	$Q$	$1/Q$
17.68	13.21	13.21	0.076
	17.08	30.29	0.033
	16.18	62.65	0.016
	4.61	67.26	0.015
	4.92	82.01	0.012
	1.86	85.73	0.012
	3.71	100.57	0.010
	0.06	100.97	0.010
	0.06	101.22	0.010
	22.37	9.17	9.17
12.63		21.80	0.046
10.52		42.84	0.023
13.90		56.74	0.018
5.48		73.18	0.014
8.71		90.59	0.011
1.71		97.44	0.010
0.34		99.48	0.010
0.93		103.20	0.010

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Table 70 Values of Rate ( $dQ/dt$ ), Amount Released ( $Q$ ), and the Corresponding Reciprocal ( $1/Q$ ) for the Release of Commercial Product, Theo-24<sup>®</sup>, 200 mg

Product	$dQ / dt$	$Q$	$1/Q$
Theo-24 <sup>®</sup>	5.62	5.62	0.178
	6.39	12.01	0.083
	9.74	31.48	0.032
	0.55	32.03	0.031
	9.90	61.74	0.016
	0.11	61.96	0.016
	4.43	79.66	0.013
	2.47	94.48	0.011
	1.18	99.21	0.010

Table 71 Comparison of Percent Water Sorption between Surelease<sup>®</sup> Films and Eudragit<sup>®</sup> NE 30 D Film

Product	Percent Water Sorption		
	1	2	3
Eudragit <sup>®</sup> NE 30 D Film	33.92	37.01	35.00
Surelease <sup>®</sup> Film (5% didutyl phthalate)	32.49	27.20	29.05
Surelease <sup>®</sup> Film (10% didutyl phthalate)	25.01	30.32	26.54
Surelease <sup>®</sup> Film (15% didutyl phthalate)	30.16	29.55	25.13
Surelease <sup>®</sup> Film (20% didutyl phthalate)	31.64	29.89	23.91
Surelease <sup>®</sup> Film (25% didutyl phthalate)	35.95	32.41	28.75

Table 72 The t-Values of Percent Water Sorption  
(degree of freedom = 4, data from Table 71)

Product I	Product II	t-value*	Results**
Surelease® Film (5% didutyl phthalate)	Eudragit® NE 30 D Film	-3.511	S
Surelease® Film (10% didutyl phthalate)	Eudragit® NE 30 D Film	-5.227	S
Surelease® Film (15% didutyl phthalate)	Eudragit® NE 30 D Film	4.426	S
Surelease® Film (20% didutyl phthalate)	Eudragit® NE 30 D Film	3.573	S
Surelease® Film (25% didutyl phthalate)	Eudragit® NE 30 D Film	-1.73	NS

\* If  $\alpha = 0.05$ , degree of freedom = 4

then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non - significance

Table 73 The t-Values of Percentage Drug Release for various levels of  
Surelease®  
(degree of freedom = 18, data from Tables 43, 45 and 46)

Product I	Product II	t-value*	Significance Test**
Surelease® Coated Granules	Surelease® Coated Granules		
3.05 % (16/18 mesh)	3.87 % (16/18 mesh)	0.33	NS
2.48 % (20/25 mesh)	3.86 % (20/25 mesh)	0.793	NS
12.18 % (25/30 mesh)	13.40 % (25/30 mesh)	0.063	NS

\* If  $\alpha = 0.05$ , degree of freedom = 18

then critical values =  $\pm 2.101$

\*\* S = Significance

NS = Non - significance

Table 74 The t-Values of Percentage Drug Release between Surelease<sup>®</sup> and Eudragit<sup>®</sup> NE 30 D Coated Granules  
(degree of freedom = 18, data from Table 43-50)

Product I	Product II	t-value*	Results**
Surelease <sup>®</sup> Coated Granules	Eudragit <sup>®</sup> NE 30 D Coated Granules		
6.29 % (16/18 mesh)	14.76 % (16/18 mesh)	-0.333	NS
7.61 % (18/20 mesh)	19.12 % (18/20 mesh)	-0.031	NS
3.86 % (20/25 mesh)	5.56 % (20/25 mesh)	-0.631	NS
7.84 % (25/30 mesh)	14.57 % (25/30 mesh)	-0.05	NS

\* If  $\alpha = 0.05$ , degree of freedom = 18  
then critical values =  $\pm 2.101$

\*\* S = Significance

NS = Non - significance

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Table 75 The t-Values of Percentage Drug Release between Surelease®  
Coated Granules and Commercial Product  
(degree of freedom = 18, data from Table 43-50)

Product I	Product II	t-value*	Results**
Surelease® Coated Granules	Commercial Product		
6.29 % (16/18 mesh)	Theo - 24®	-0.361	NS
7.61 % (18/20 mesh)	Theo - 24®	-0.242	NS
8.39 % (20/25 mesh)	Theo - 24®	-0.421	NS
12.18 % (25/30 mesh)	Theo - 24®	-0.138	NS
Eudragit® NE 30 D Coated Granules	Commercial Product	t-value*	Results**
14.76 % (16/18 mesh)	Theo - 24®	-0.679	NS
19.12 % (18/20 mesh)	Theo - 24®	-0.261	NS
20.76 % (20/25 mesh)	Theo - 24®	-0.532	NS
22.37 % (25/30 mesh)	Theo - 24®	-0.785	NS

\* If  $\alpha = 0.05$ , degree of freedom = 18  
then critical values =  $\pm 2.101$

\*\* S = Significance  
NS = Non - significance

**Table 76 Comparison of Percent Compressibility among Various Sizes of Uncoated Theophylline Granules**

Uncoated Granules	Percent Compressibility		
	1	2	3
16/18 mesh	11.33	12.03	11.65
18/20 mesh	7.10	7.21	6.48
20/25 mesh	5.55	6.00	5.97
25/30 mesh	5.32	6.01	4.91

**Table 77 The F-Ratio of Percent Compressibility for Uncoated Theophylline Granules of Various Sizes (data from Table 76)**

Uncoated Granules				F-Ratio*	Results**
Product 1	Product 2	Product 3	Product 4		
16/18 mesh	18/20 mesh	20/25 mesh	25/30 mesh	271.717	S

\* If  $\alpha = 0.05$ , degree of freedom = 3 (Among Group), 8 (Within Group)

Then critical value = 4.07

\*\* S = Significance

NS = Non-significance

Table 78 Comparison of Flow Rates among Various Sizes of Uncoated Theophylline Granules

Uncoated Granules	Flow Rates		
	1	2	3
16/18 mesh	6.98	7.12	6.93
18/20 mesh	7.96	9.01	8.93
20/25 mesh	8.69	8.73	8.59
25/30 mesh	9.25	8.68	9.01

Table 79 The F-Ratio of Flow Rates for Uncoated Theophylline Granules of Various Sizes (data from Table 78)

Uncoated Granules				F-Ratio*	Results**
Product 1	Product 2	Product 3	Product 4		
16/18 mesh	18/20 mesh	20/25 mesh	25/30 mesh	21.644	S

\* If  $\alpha = 0.05$ , degree of freedom = 3 (Among Group), 8 (Within Group)

Then critical values = 4.07

\*\* S = Significance

NS = Non-significance

**Table 80 Comparison of Percent Compressibility among Various Percent Coating Levels of Surelease® for Granules of 16/18 mesh size**

Surelease® Coated Granules	Percent Compressibility		
	1	2	3
1.92 % Coated Granules	5.13	4.98	4.89
3.05 % Coated Granules	6.23	6.70	6.12
3.87 % Coated Granules	5.70	5.98	5.84
6.29 % Coated Granules	6.13	6.98	6.27

**Table 81 Comparison of Percent Compressibility among Various Percent Coating Levels of Surelease® for Granules of 18/20 mesh size**

Surelease® Coated Granules	Percent Compressibility		
	1	2	3
2.04 % Coated Granules	4.78	4.97	5.25
3.29 % Coated Granules	5.08	5.19	5.30
7.61 % Coated Granules	4.78	5.12	5.67
9.00 % Coated Granules	4.41	3.95	4.54

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**Table 82 Comparison of Percent Compressibility among Various Percent Coating Levels of Surelease® for Granules of 20/25 mesh size**

Surelease® Coated Granules	Percent Compressibility		
	1	2	3
2.48 % Coated Granules	3.78	5.01	4.44
3.86 % Coated Granules	5.04	5.84	4.69
8.39 % Coated Granules	4.23	4.96	5.81
12.12 % Coated Granules	5.16	5.94	4.14

**Table 83 Comparison of Percent Compressibility among Various Percent Coating Levels of Surelease® for Granules of 25/30 mesh size**

Surelease® Coated Granules	Percent Compressibility		
	1	2	3
7.84 % Coated Granules	4.56	4.98	5.34
12.18 % Coated Granules	5.84	6.00	5.80
13.40 % Coated Granules	5.19	5.78	6.04
17.05 % Coated Granules	5.08	5.88	6.56

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**Table 84 Comparison of Percent Compressibility among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 16/18 mesh size**

Eudragit® NE 30D Coated Granules	Percent Compressibility		
	1	2	3
2.51 % Coated Granules	8.48	7.68	6.82
5.96 % Coated Granules	7.93	9.45	8.06
8.53 % Coated Granules	7.68	8.41	7.70
14.76 % Coated Granules	8.90	9.88	9.57

**Table 85 Comparison of Percent Compressibility among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 18/20 mesh size**

Eudragit® NE 30D Coated Granules	Percent Compressibility		
	1	2	3
4.04 % Coated Granules	9.01	8.32	9.37
6.75 % Coated Granules	8.22	6.21	7.20
10.93 % Coated Granules	7.56	8.61	8.87
19.12 % Coated Granules	7.69	8.01	9.54

**Table 86** Comparison of Percent Compressibility among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 20/25 mesh size

Eudragit® NE 30D Coated Granules	Percent Compressibility		
	1	2	3
5.56 % Coated Granules	7.93	6.98	8.16
11.46 % Coated Granules	7.49	8.13	8.17
15.00 % Coated Granules	8.88	8.65	7.04
20.76 % Coated Granules	7.56	7.14	8.34

**Table 87** Comparison of Percent Compressibility among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 25/30 mesh size

Eudragit® NE 30D Coated Granules	Percent Compressibility		
	1	2	3
8.83 % Coated Granules	8.06	8.90	8.27
14.57 % Coated Granules	7.68	8.25	9.30
17.68 % Coated Granules	7.13	7.84	8.04
22.37 % Coated Granules	8.89	9.13	8.68

**Table 88 Comparison of Flow Rates among Various Percent Coating Levels of Surelease® for Granules of 16/18 mesh size**

Surelease® Coated Granules	Flow Rates		
	1	2	3
1.92 % Coated Granules	6.53	6.92	6.56
3.05 % Coated Granules	6.73	6.92	5.85
3.87 % Coated Granules	6.90	6.14	6.16
6.29 % Coated Granules	6.35	6.91	5.46

**Table 89 Comparison of Flow Rates among Various Percent Coating Levels of Surelease® for Granules of 18/20 mesh size**

Surelease® Coated Granules	Flow Rates		
	1	2	3
2.04 % Coated Granules	7.63	7.21	7.06
3.29 % Coated Granules	7.01	6.95	8.45
7.61 % Coated Granules	6.80	6.50	6.80
9.00 % Coated Granules	6.73	6.53	6.00

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**Table 90 Comparison of Flow Rates among Various Percent Coating Levels of Surelease® for Granules of 20/25 mesh size**

Surelease® Coated Granules	Flow Rates		
	1	2	3
2.48 % Coated Granules	7.12	8.01	7.37
3.86 % Coated Granules	7.96	8.23	6.82
8.39 % Coated Granules	6.98	7.56	7.36
12.12 % Coated Granules	7.89	7.49	7.72

**Table 91 Comparison of Flow Rates among Various Percent Coating Levels of Surelease® for Granules of 25/30 mesh size**

Surelease® Coated Granules	Flow Rates		
	1	2	3
7.84 % Coated Granules	8.90	7.96	8.64
12.18 % Coated Granules	8.52	7.92	8.64
13.40 % Coated Granules	9.25	8.26	9.13
17.05 % Coated Granules	8.49	8.56	8.24

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**Table 92 Comparison of Flow Rates among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 16/18 mesh size**

Eudragit® NE 30D Coated Granules	Flow Rates		
	1	2	3
2.51 % Coated Granules	7.03	6.01	5.53
5.96 % Coated Granules	6.58	6.78	6.65
8.53 % Coated Granules	6.12	5.89	6.71
14.76 % Coated Granules	5.97	6.47	6.89

**Table 93 Comparison of Flow Rates among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 18/20 mesh size**

Eudragit® NE 30D Coated Granules	Flow Rates		
	1	2	3
4.04 % Coated Granules	6.47	6.79	7.29
6.75 % Coated Granules	6.98	6.58	6.45
10.93 % Coated Granules	5.89	6.72	6.65
19.12 % Coated Granules	6.78	6.23	6.46

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**Table 94 Comparison of Flow Rates among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 20/25 mesh size**

Eudragit® NE 30D Coated Granules	Flow Rates		
	1	2	3
5.56 % Coated Granules	6.85	7.02	6.35
11.46 % Coated Granules	6.46	6.48	6.14
15.00 % Coated Granules	6.93	6.15	6.93
20.76 % Coated Granules	6.78	6.89	5.29

**Table 95 Comparison of Flow Rates among Various Percent Coating Levels of Eudragit® NE 30D for Granules of 25/30 mesh size**

Eudragit® NE 30D Coated Granules	Flow Rates		
	1	2	3
8.83 % Coated Granules	6.78	6.45	6.90
14.57 % Coated Granules	6.78	6.12	6.42
17.68 % Coated Granules	6.95	6.78	6.82
22.37 % Coated Granules	6.75	6.79	6.68

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Table 96 The F-Ratio of Percent Compressibility for Surelease® Coated Granules of Various Sizes (data from Tables 80-83)

Size of Granules (mesh)	Surelease® Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18	1.92 % Coated Granules	3.05 % Coated Granules	3.87 % Coated Granules	6.29 % Coated Granules	15.780	S
18/20	2.04 % Coated Granules	3.29 % Coated Granules	7.61 % Coated Granules	9.00 % Coated Granules	5.868	S
20/25	2.48 % Coated Granules	3.86 % Coated Granules	8.39 % Coated Granules	12.12 % Coated Granules	0.674	NS
25/30	7.84 % Coated Granules	12.18 % Coated Granules	13.40 % Coated Granules	17.05 % Coated Granules	2.438	NS

\* If  $\alpha = 0.05$ , degree of freedom = 3 (Among Group), 8 (Within Group)

Then critical values = 4.07

\*\* S = Significance

NS = Non-significance

Table 97 The F-Ratio of Percent Compressibility for Eudragit® NE 30D Coated Granules of Various Sizes (data from Tables 84-87)

Size of Granules (mesh)	Eudragit® ND 30D Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18	2.51 % Coated Granules	5.96 % Coated Granules	8.53 % Coated Granules	14.76 % Coated Granules	4.1160	S
18/20	4.04 % Coated Granules	6.75 % Coated Granules	10.93 % Coated Granules	19.12 % Coated Granules	2.233	NS
20/25	5.56 % Coated Granules	11.46 % Coated Granules	15.00% Coated Granules	20.76 % Coated Granules	0.365	NS
25/30	8.83 % Coated Granules	14.57 % Coated Granules	17.68 % Coated Granules	22.37 % Coated Granules	2.695	NS

\* If  $\alpha = 0.05$ , degree of freedom = 3 (Among Group), 8 (Within Group)

Then critical values = 4.07

\*\* S = Significance

NS = Non-significance

Table 98 The F-Ratio of Flow Rates for Surelease® Coated Granules of Various Sizes (data from Tables 88-91)

Size of Granules (mesh)	Surelease® Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18	1.92 % Coated Granules	3.05 % Coated Granules	3.87 % Coated Granules	6.29 % Coated Granules	0.356	NS
18/20	2.04 % Coated Granules	3.29 % Coated Granules	7.61 % Coated Granules	9.00 % Coated Granules	2.995	NS
20/25	2.48 % Coated Granules	3.86 % Coated Granules	8.39 % Coated Granules	12.12 % Coated Granules	0.453	NS
25/30	7.84 % Coated Granules	12.18 % Coated Granules	13.40 % Coated Granules	17.05 % Coated Granules	0.918	NS

\* If  $\alpha = 0.05$ , degree of freedom = 3 (Among Group), 8 (Within Group)

Then critical values = 4.07

\*\* S = Significance

NS = Non-significance

Table 99 The F-Ratio of Flow Rates for Eudragit® NE 30D Coated Granules of Various Sizes (data from Tables 92-95)

Size of Granules (mesh)	Eudragit® ND 30D Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18	2.51 % Coated Granules	5.96 % Coated Granules	8.53 % Coated Granules	14.76 % Coated Granules	0.582	NS
18/20	4.04 % Coated Granules	6.75 % Coated Granules	10.93 % Coated Granules	19.12 % Coated Granules	0.834	NS
20/25	5.56 % Coated Granules	11.46 % Coated Granules	15.00% Coated Granules	20.76 % Coated Granules	0.471	NS
25/30	8.83 % Coated Granules	14.57 % Coated Granules	17.68 % Coated Granules	22.37 % Coated Granules	2.084	NS

\* If  $\alpha = 0.05$ , degree of freedom = 3 (Among Group), 8 (Within Group)  
Then critical values = 4.07

\*\* S = Significance

NS = Non-significance

Table 100 The t-Values of Percent Compressibility for Uncoated Theophylline Granules of Various Sizes (data from Table 76)

Uncoated Granules		t-Value*	Results**
Product 1	Product 2		
16/18 mesh	18/20 mesh	15.579	S
16/18 mesh	20/25 mesh	23.408	S
16/18 mesh	25/30 mesh	27.806	S
18/20 mesh	20/25 mesh	4.042	S
18/20 mesh	25/30 mesh	7.154	S
20/25 mesh	25/30 mesh	3.987	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

Table 101 The t-Values of Flow Rates for Uncoated Theophylline Granules of Various Sizes (data from Table 78)

Uncoated Granules		t-Value*	Results**
Product 1	Product 2		
16/18 mesh	18/20 mesh	- 4.744	S
16/18 mesh	20/25 mesh	- 23.555	S
16/18 mesh	25/30 mesh	- 11.274	S
18/20 mesh	20/25 mesh	- 0.108	NS
18/20 mesh	25/30 mesh	- 0.923	NS
20/25 mesh	25/30 mesh	- 1.819	NS

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

Table 102 The t-Values of Percent Compressibility for Surelease<sup>®</sup> Coated Granules of 16/18 mesh size (data from Table 80)

Surelease <sup>®</sup> Coated Granules		t-Value*	Results**
Product 1	Product 2		
1.92 % Coated Granules	3.05 % Coated Granules	- 7.063	S
1.92 % Coated Granules	3.87 % Coated Granules	- 7.856	S
1.92 % Coated Granules	6.29 % Coated Granules	- 5.362	S
3.05 % Coated Granules	3.87 % Coated Granules	2.611	NS
3.05 % Coated Granules	6.29 % Coated Granules	- 0.346	NS
3.87 % Coated Granules	6.29 % Coated Granules	- 2.252	NS

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

Table 103 The t-Values of Percent Compressibility for Surelease® Coated Granules of 18/20 mesh size (data from Table 81)

Surelease® Coated Granules		t-Value*	Results**
Product 1	Product 2		
2.04 % Coated Granules	3.29 % Coated Granules	- 1.262	NS
2.04 % Coated Granules	7.61 % Coated Granules	- 0.648	NS
2.04 % Coated Granules	9.00 % Coated Granules	3.11	S
3.29 % Coated Granules	7.61 % Coated Granules	0	NS
3.29 % Coated Granules	9.00 % Coated Granules	4.686	S
7.61 % Coated Granules	9.00 % Coated Granules	2.825	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

Table 104 The t-Values of Percent Compressibility for Eudragit® NE 30D Coated Granules of 16/18 mesh size (data from Table 84)

Surelease® Coated Granules		t-Value*	Results**
Product 1	Product 2		
2.51 % Coated Granules	5.96 % Coated Granules	- 1.201	NS
2.51 % Coated Granules	8.53 % Coated Granules	- 0.504	NS
2.51 % Coated Granules	14.76 % Coated Granules	- 3.198	S
5.96 % Coated Granules	8.53 % Coated Granules	1.014	NS
5.96 % Coated Granules	14.76 % Coated Granules	- 1.714	NS
8.53 % Coated Granules	14.76 % Coated Granules	- 4.044	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

Table 105 The F-Ratio of Percent Compressibility between Uncoated and Surelease® Coated Granules of Various Sizes (data from Tables 76 and 80-83)

Uncoated Granules	Surelease® Coated Granules				F-Ratio*	Results**
Product 1	Product 2	Product 3	Product 4	Product 5		
16/18 mesh	1.92 % Coated Granules	3.02 % Coated Granules	3.87 % Coated Granules	6.29 % Coated Granules	227.171	S
18/20 mesh	2.04 % Coated Granules	3.29 % Coated Granules	7.61 % Coated Granules	9.00 % Coated Granules	27.141	S
20/25 mesh	2.48 % Coated Granules	3.86 % Coated Granules	8.39 % Coated Granules	12.12 % Coated Granules	1.753	NS
25/30 mesh	7.84 % Coated Granules	12.18 % Coated Granules	13.40 % Coated Granules	17.05 % Coated Granules	2.991	NS

\* If  $\alpha = 0.05$ , degree of freedom = 4 (Among Group), 10 (Within Group)

Then critical value = 3.48

\*\* S = Significance

NS = Non-significance

Table 106 The F-Ratio of Percent Compressibility between Uncoated and Eudragit® NE 30D Coated Granules of Various Sizes (data from Tables 76 and 84-87)

Uncoated Granules	Eudragit® ND 30D Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18 mesh	2.51 % Coated Granules	5.96 % Coated Granules	8.53 % Coated Granules	14.76 % Coated Granules	20.305	S
18/20 mesh	4.04 % Coated Granules	6.75 % Coated Granules	10.93 % Coated Granules	19.12 % Coated Granules	3.171	NS
20/25 mesh	5.56 % Coated Granules	11.46 % Coated Granules	15.00 % Coated Granules	20.76 % Coated Granules	6.652	S
25/30 mesh	8.83 % Coated Granules	14.57 % Coated Granules	17.68 % Coated Granules	22.37 % Coated Granules	29.312	S

\* If  $\alpha = 0.05$ , degree of freedom = 4 (Among Group), 10 (Within Group)

Then critical value = 3.48

\*\* S = Significance

NS = Non-significance

Table 107 The F-Ratio of Flow Rates between Uncoated and Surelease<sup>®</sup>  
Coated Granules of Various Sizes (data from Tables 78 and 88-91)

Uncoated Granules	Surelease <sup>®</sup> Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18 mesh	1.92 % Coated Granules	3.02 % Coated Granules	3.87 % Coated Granules	6.29 % Coated Granules	1.175	NS
18/20 mesh	2.04 % Coated Granules	3.29 % Coated Granules	7.61 % Coated Granules	9.00 % Coated Granules	8.34	S
20/25 mesh	2.48 % Coated Granules	3.86 % Coated Granules	8.39 % Coated Granules	12.12 % Coated Granules	4.645	S
25/30 mesh	7.84 % Coated Granules	12.18 % Coated Granules	13.40 % Coated Granules	17.05 % Coated Granules	1.501	NS

\* If  $\alpha = 0.05$ , degree of freedom = 4 (Among Group), 10 (Within Group)

Then critical value = 3.48

\*\* S = Significance

NS = Non-significance

Table 108 The F-Ratio of Flow Rates between Uncoated and Eudragit® ND 30D Coated Granules of Various Sizes (data from Tables 78 and 92-95)

Uncoated Granules	Eudragit® ND 30D Coated Granules				F-Ratio*	Results**
	Product 1	Product 2	Product 3	Product 4		
16/18 mesh	2.51 % Coated Granules	5.96 % Coated Granules	8.53 % Coated Granules	14.76 % Coated Granules	1.711	NS
18/20 mesh	4.04 % Coated Granules	6.75 % Coated Granules	10.93 % Coated Granules	19.12 % Coated Granules	14.517	S
20/25 mesh	5.56 % Coated Granules	11.46 % Coated Granules	15.00 % Coated Granules	20.76 % Coated Granules	12.321	S
25/30 mesh	8.83 % Coated Granules	14.57 % Coated Granules	17.68 % Coated Granules	22.37 % Coated Granules	62.956	S

\* If  $\alpha = 0.05$ , degree of freedom = 4 (Among Group), 10 (Within Group)

Then critical value = 3.48

\*\* S = Significance

NS = Non-significance

Table 109 The t-Values of Percent Compressibility between Uncoated and Surelease® Coated Granules of 16/18 mesh size (data from Tables 76 and 80)

Uncoated Granules	Surelease® Coated Granules	t-Value*	Results**
16/18 mesh	1.92 % Coated Granules	31.156	S
16/18 mesh	3.05 % Coated Granules	19.749	S
16/18 mesh	3.87 % Coated Granules	26.759	S
16/18 mesh	6.29 % Coated Granules	15.697	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 110 The t-Values of Percent Compressibility between Uncoated and Surelease® Coated Granules of 18/20 mesh size (data from Tables 76 and 81)

Uncoated Granules	Surelease® Coated Granules	t-Value*	Results**
18/20 mesh	2.04 % Coated Granules	7.281	S
18/20 mesh	3.29 % Coated Granules	7.375	S
18/20 mesh	7.61 % Coated Granules	5.047	S
18/20 mesh	9.00 % Coated Granules	9.092	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 111 The t-Values of Percent Compressibility between Uncoated and Eudragit® NE 30D Coated Granules of 16/18 mesh size (data from Tables 76 and 84)

Uncoated Granules	Eudragit® NE 30D Coated Granules	t-Value*	Results**
16/18 mesh	2.51 % Coated Granules	7.708	S
16/18 mesh	5.96 % Coated Granules	6.055	S
16/18 mesh	8.53 % Coated Granules	11.913	S
16/18 mesh	14.76% Coated Granules	6.290	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 112 The t-Values of Percent Compressibility between Uncoated and Eudragit® NE 30D Coated Granules of 20/25 mesh size (data from Tables 76 and 86)

Uncoated Granules	Eudragit® NE 30D Coated Granules	t-Value*	Results**
20/25 mesh	5.56 % Coated Granules	- 11.853	S
20/25 mesh	11.46 % Coated Granules	- 6.793	S
20/25 mesh	15.00 % Coated Granules	- 8.564	S
20/25 mesh	20.76 % Coated Granules	- 21.31	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 113 The t-Values of Percent Compressibility between Uncoated and Eudragit® NE 30D Coated Granules of 25/30 mesh size (data from Tables 76 and 87)

Uncoated Granules	Eudragit® NE 30D Coated Granules	t-Value*	Results**
25/30 mesh	8.83 % Coated Granules	- 11.853	S
25/30 mesh	14.57 % Coated Granules	- 6.793	S
25/30 mesh	17.68 % Coated Granules	- 8.564	S
25/30 mesh	22.37 % Coated Granules	- 21.310	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 114 The t-Values of Flow Rates between Uncoated and Surelease®  
Coated Granules of 18/20 mesh size (data from Tables 78 and 89)

Uncoated Granules	Surelease® Coated Granules	t-Value*	Results**
18/20 mesh	2.04 % Coated Granules	3.526	S
18/20 mesh	3.29 % Coated Granules	1.954	S
18/20 mesh	7.61 % Coated Granules	5.493	S
18/20 mesh	9.00 % Coated Granules	5.511	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 115 The t-Values of Flow Rates between Uncoated and Surelease<sup>®</sup>  
Coated Granules of 20/25 mesh size (data from Tables 78 and 90)

Uncoated Granules	Surelease <sup>®</sup> Coated Granules	t-Value*	Results**
20/25 mesh	2.48 % Coated Granules	4.361	S
20/25 mesh	3.86 % Coated Granules	2.304	NS
20/25 mesh	8.39 % Coated Granules	7.823	S
20/25 mesh	12.12 % Coated Granules	7.876	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 116 The t-Values of Flow Rates between Uncoated and Eudragit® NE 30D Coated Granules of 18/20 mesh size (data from Tables 78 and 93)

Uncoated Granules	Eudragit® NE 30D Coated Granules	t-Value*	Results**
18/20 mesh	4.04 % Coated Granules	4.315	S
18/20 mesh	6.75 % Coated Granules	5.26	S
18/20 mesh	10.93 % Coated Granules	5.153	S
18/20 mesh	19.12 % Coated Granules	5.742	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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Table 117 The t-Values of Flow Rates between Uncoated and Eudragit® NE 30D Coated Granules of 20/25 mesh size (data from Tables 78 and 94)

Uncoated Granules	Eudragit® NE 30D Coated Granules	t-Value*	Results**
20/25 mesh	5.56 % Coated Granules	9.399	S
20/25 mesh	11.46 % Coated Granules	19.617	S
20/25 mesh	15.00 % Coated Granules	7.593	S
20/25 mesh	20.76 % Coated Granules	4.54	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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**Table 118** The t-Values of Flow Rates between Uncoated and Eudragit® NE 30D Coated Granules of 25/30 mesh size (data from Tables 78 and 95)

Uncoated Granules	Eudragit® NE 30D Coated Granules	t-Value*	Results**
25/30 mesh	8.83 % Coated Granules	10.654	S
25/30 mesh	14.57 % Coated Granules	10.064	S
25/30 mesh	17.68 % Coated Granules	12.311	S
25/30 mesh	22.37 % Coated Granules	13.308	S

\* If  $\alpha = 0.05$ , degree of freedom = 4

Then critical values =  $\pm 2.776$

\*\* S = Significance

NS = Non-significance

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### Vitae

Miss Saraporn Harikarnpakdee was born on December 10, 1970. She got her degree in Bachelor of Science in Pharmacy with honors in 1993 from Faculty of Pharmacy, Rangsit University, Bangkok, Thailand.



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