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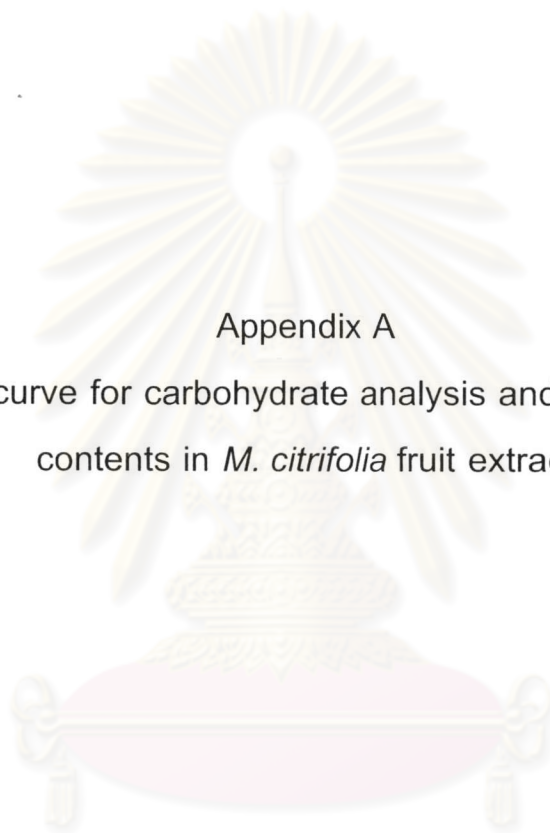
ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย





APPENDICES

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย



Appendix A

Standard curve for carbohydrate analysis and carbohydrate contents in *M. citrifolia* fruit extract

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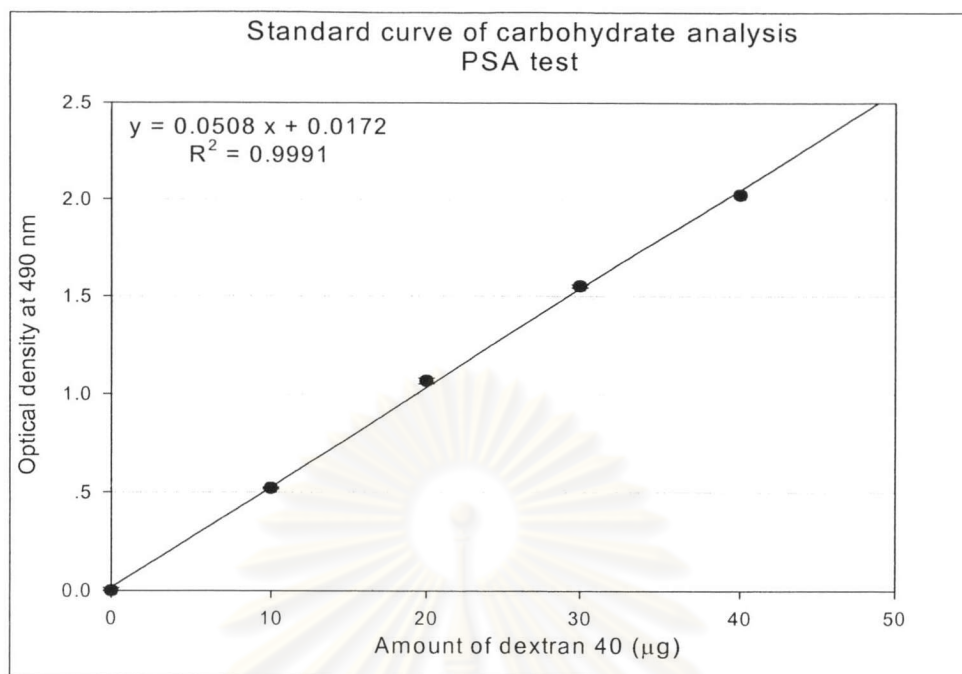


Figure A1. A representative standard curve of dextran versus the optical density at 490 nm as determined by the PSA test. The individual mark represented mean of optical density with an error bar of SD (n=2)

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Table A1 Carbohydrate contents equivalent to mg of dextran in *M. citrifolia* fruit extract

Experimental tube	Amount of <i>M. citrifolia</i> fruit extract (mg)			
	20	25	40	50
Tube 1	9.031	12.142	18.933	24.189
Tube 2	9.268	11.945	18.657	23.756
<b>Average</b>	9.150	12.043	18.795	23.972
<b>SD</b>	0.168	0.139	0.195	0.306

Unit express as equivalent to mg of dextran



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Appendix B

Body weight and liver weight

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Table B1 Five-day body weight of individual rat

Rat No.	day0	day5	day10	day15	day20	day25	day30
control							
1	206	242	286	316	342	373	388
2	192	234	281	306	329	352	367
3	195	230	272	297	316	347	355
4	207	238	286	317	341	364	381
5	201	241	280	313	330	348	368
6	206	238	280	307	314	340	355
7	252	276	308	328	332	346	350
8	246	273	294	315	320	333	343
9	246	266	318	338	347	366	390
10	-	233	277	302	320	342	366
M-group I							
1	196	230	277	309	342	351	369
2	196	236	273	298	329	327	342
3	199	236	271	297	316	333	348
4	201	236	280	309	341	340	353
5	208	241	280	313	330	340	362
6	210	245	294	332	314	368	405
7	267	297	311	313	332	349	348
8	278	313	347	372	320	417	441
9	268	299	320	335	347	362	377
10	259	291	324	328	320	357	374
M-group II							
1	198	233	273	296	308	320	332
2	221	261	297	328	349	372	389
3	211	249	299	328	348	370	390
4	203	238	280	306	327	346	358
5	212	246	254	294	315	331	349
6	216	254	302	334	358	381	402
7	267	300	328	336	365	372	393
8	269	298	333	300	330	361	380
9	272	308	334	346	360	376	388
10	262	298	333	358	365	391	400

Unit expressed as g

Table B2 Food consumption of individual rat

Rat No.	day0	day5	day10	day15	day20	day25	day30
control							
1	18	19	22	22	27	23	25
2	21	21	20	17	25	21	22
3	15	16	20	30	28	23	24
4	16	20	22	19	25	19	20
5	18	20	20	21	23	24	26
6	17	19	23	23	22	13	19
7	16	17	28	17	23	20	23
8	15	18	19	18	21	18	16
9	20	23	23	17	24	22	22
10	21	23	24	20	19	21	20
M-group I							
1	20	22	23	20	27	21	25
2	13	14	19	14	16	14	20
3	12	17	3	14	17	15	18
4	19	19	21	20	25	17	14
5	20	16	21	21	25	18	20
6	20	21	12	19	14	23	28
7	18	17	19	18	20	16	21
8	15	16	22	20	23	21	23
9	15	19	21	18	21	18	17
10	20	22	24	25	26	19	18
M-group II							
1	14	15	20	20	13	17	20
2	10	12	23	20	22	16	18
3	30	29	26	24	25	25	25
4	20	19	19	20	25	18	20
5	12	14	8	15	20	18	22
6	15	16	25	20	27	22	23
7	11	12	21	23	28	15	19
8	18	19	23	24	6	21	21
9	19	20	24	21	31	21	21
10	20	21	24	22	26	22	22

Unit expressed as g/day

Table B3 Water consumption of individual rat

Rat No.	day0	day5	day10	day15	day20	day25	day30
control							
1	57	44	60	56	80	80	75
2	45	40	35	58	32	30	35
3	41	36	50	50	62	55	52
4	33	40	68	43	48	45	46
5	47	38	40	50	41	40	42
6	44	32	42	55	38	45	50
7	51	28	32	36	36	39	33
8	50	39	38	38	30	30	35
9	82	32	32	40	32	40	44
10	36	38	38	42	56	58	54
M-group I							
1	45	50	48	42	52	50	52
2	50	30	40	36	38	38	40
3	51	31	35	35	33	33	36
4	41	34	32	36	34	36	37
5	66	60	64	75	60	66	68
6	63	50	65	60	60	65	66
7	53	30	37	30	26	30	28
8	54	44	40	42	42	42	50
9	46	34	44	30	40	40	44
10	49	40	44	46	54	54	55
M-group II							
1	41	32	42	38	38	32	35
2	47	32	35	40	35	40	45
3	41	62	52	50	60	50	52
4	51	34	41	44	30	45	36
5	46	30	40	56	52	50	52
6	49	60	55	40	40	45	45
7	47	40	40	76	53	70	60
8	56	34	28	32	32	35	40
9	46	40	32	29	32	30	35
10	46	34	52	58	34	38	40

Unit expressed as ml/day



**Table B4** Terminal body weight of individual rat

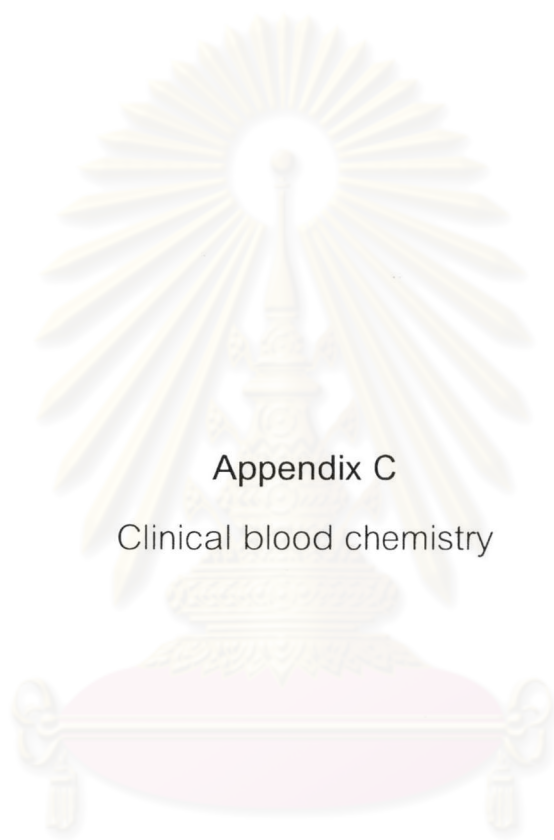
Rat No.	group		
	Control	M-group I	M-group II
1	362	346	313
2	347	329	390
3	343	334	375
4	384	345	358
5	361	354	331
6	369	429	414
7	337	344	384
8	336	335	374
9	380	375	394
10	369	370	395
Average	358.80	356.10	372.80
SEM	5.47	9.37	9.78

Unit expressed as g

**Table B5** Liver weight of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	10.84	10.20	10.22
2	11.20	10.79	13.94
3	10.38	9.28	10.57
4	11.54	12.35	11.19
5	13.82	10.40	10.17
6	14.13	15.47	15.25
7	10.37	11.38	14.30
8	13.03	17.51	15.25
9	12.64	11.60	13.85
10	11.76	11.52	13.90
Average	11.97	12.05	12.86
SEM	0.43	0.80	0.66

Unit expressed as g



Appendix C

Clinical blood chemistry

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Table C1 SGOT concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	142.00	225.00	-
2	287.00	146.00	139.00
3	183.00	145.00	181.00
4	118.00	135.00	208.00
5	242.00	169.00	170.00
6	117.00	140.00	202.00
7	-	191.00	183.00
8	272.00	214.00	150.00
9	93.00	136.00	94.00
10	-	139.00	182.00
Average	181.75	164.00	167.67
SEM	26.92	10.79	11.78

Unit expressed as U/L

Table C2 SGPT concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	69.00	43.00	-
2	49.00	50.00	58.00
3	63.00	51.00	62.00
4	69.00	57.00	33.00
5	38.00	58.00	35.00
6	85.00	45.00	61.00
7	-	35.00	74.00
8	36.00	81.00	63.00
9	47.00	74.00	64.00
10	-	34.00	36.00
Average	57.00	52.80	54.00
SEM	6.09	4.86	5.05

Unit expressed as U/L

Table C3 Serum ALP concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	92.00	91.00	-
2	87.00	151.00	135.00
3	108.00	92.00	107.00
4	95.00	102.00	92.00
5	100.00	84.00	97.00
6	120.00	147.00	122.00
7	-	104.00	92.00
8	138.00	124.00	147.00
9	127.00	117.00	151.00
10	-	84.00	95.00
Average	108.38	109.60	115.33
SEM	6.46	7.77	8.01

Unit expressed as U/L

Table C4 Serum total bilirubin concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	0.14	0.26	0.21
2	0.15	0.19	0.17
3	0.27	0.17	0.09
4	0.20	0.24	0.27
5	0.67	0.13	0.20
6	0.14	0.20	0.13
7	-	0.24	0.24
8	0.51	0.28	0.57
9	0.11	0.27	0.24
10	1.12	0.16	0.32
Average	0.37	0.21	0.24
SEM	0.11	0.02	0.04

Unit expressed as mg/dl

Table C5 Serum direct bilirubin concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	0.080	0.170	0.900
2	0.120	0.100	0.090
3	0.140	0.110	0.070
4	0.060	0.170	0.140
5	0.190	0.090	0.090
6	0.100	0.140	0.110
7	-	0.130	0.090
8	0.290	0.180	0.140
9	0.060	0.130	0.110
10	0.460	0.070	0.130
Average	0.167	0.129	0.187
SEM	0.044	0.012	0.080

Unit expressed as mg/dl

Table C6 BUN concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	19.00	17.00	22.00
2	24.00	22.00	30.00
3	22.00	21.00	27.00
4	20.00	21.00	19.00
5	20.00	21.00	28.00
6	28.00	30.00	31.00
7	-	22.00	23.00
8	28.00	31.00	31.00
9	23.00	33.00	31.00
10	29.00	19.00	26.00
Average	23.67	23.70	26.80
SEM	1.28	1.75	1.35

Unit expressed as mg/dl

Table C7 SCr concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	0.40	0.50	0.50
2	0.30	0.40	0.40
3	0.40	0.30	0.60
4	0.40	0.30	0.30
5	0.40	0.60	0.50
6	0.60	0.50	0.50
7	-	0.50	0.40
8	0.40	0.60	0.40
9	0.40	0.40	0.40
10	-	0.40	0.40
Average	0.41	0.45	0.44
SEM	0.03	0.03	0.03

Unit expressed as mg/dl

Table C8 Serum total cholesterol concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	39.00	60.00	57.00
2	59.00	71.00	61.00
3	64.00	63.00	47.00
4	83.00	66.00	71.00
5	54.00	60.00	60.00
6	94.00	60.00	70.00
7	-	69.00	76.00
8	88.00	67.00	75.00
9	65.00	70.00	80.00
10	95.00	68.00	87.00
Average	71.22	65.40	68.40
SEM	6.54	1.37	3.81

Unit expressed as mg/dl

Table C9 Serum HDL-C concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	64.00	-	-
2	49.00	61.00	46.00
3	53.00	54.00	40.00
4	75.00	63.00	67.00
5	43.00	53.00	48.00
6	79.00	53.00	59.00
7	-	59.00	66.00
8	67.00	55.00	61.00
9	54.00	59.00	72.00
10	-	58.00	72.00
Average	60.50	57.22	59.00
SEM	4.52	1.21	3.92

Unit expressed as mg/dl

Table C10 Serum TG concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	117.00	83.00	91.00
2	47.00	74.00	82.00
3	84.00	69.00	53.00
4	166.00	76.00	61.00
5	96.00	64.00	55.00
6	145.00	153.00	118.00
7	-	84.00	72.00
8	159.00	149.00	132.00
9	92.00	137.00	145.00
10	137.00	56.00	74.00
Average	115.89	94.50	88.30
SEM	13.12	11.67	10.34

Unit expressed as mg/dl

Table C11 Serum glucose concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	136.00	105.00	125.00
2	151.00	94.00	108.00
3	118.00	127.00	123.00
4	121.00	96.00	109.00
5	106.00	86.00	87.00
6	151.00	140.00	157.00
7	156.00	108.00	128.00
8	130.00	108.00	114.00
9	130.00	134.00	142.00
10	178.00	148.00	105.00
Average	137.70	114.60	119.80
SEM	6.75	6.72	6.29

Unit expressed as mg/dl

Table C12 Serum sodium concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	144.00	145.00	142.00
2	149.00	151.00	149.00
3	154.00	155.00	149.00
4	146.00	147.00	147.00
5	143.00	147.00	145.00
6	145.00	149.00	144.00
7	-	148.00	148.00
8	144.00	147.00	145.00
9	147.00	145.00	146.00
10	142.00	147.00	145.00
Average	146.00	148.10	146.00
SEM	1.22	0.95	0.71

Unit expressed as mEq/L



Table C13 Serum potassium concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	4.00	4.70	7.20
2	6.00	4.50	4.50
3	5.20	4.00	4.80
4	5.60	4.50	4.30
5	4.50	3.40	3.70
6	4.40	4.50	4.50
7	-	4.20	4.20
8	5.00	5.00	4.00
9	4.10	4.00	5.20
10	5.00	3.90	4.20
Average	4.87	4.27	4.66
SEM	0.23	0.15	0.31

Unit expressed as mEq/L

Table C14 Serum chloride concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	100.00	103.00	103.00
2	97.00	100.00	101.00
3	104.00	102.00	103.00
4	103.00	102.00	102.00
5	104.00	104.00	104.00
6	104.00	106.00	105.00
7	-	105.00	103.00
8	103.00	106.00	103.00
9	101.00	102.00	102.00
10	100.00	102.00	100.00
Average	101.78	103.20	102.60
SEM	0.81	0.63	0.45

Unit expressed as mEq/L



Appendix D

Hematology

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Table D1 Hb of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	15.50	14.70	15.80
2	16.60	16.90	16.90
3	15.90	16.20	16.30
4	15.60	16.40	16.30
5	15.20	15.70	16.10
6	15.90	15.10	15.30
7	16.70	15.30	15.90
8	15.60	15.20	15.50
9	16.30	15.80	15.20
10	12.80	15.70	15.20
Average	15.61	15.70	15.85
SEM	0.35	0.21	0.18

Unit expressed as g/dl

Table D2 Hct of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	46.90	44.30	48.00
2	50.20	50.10	50.80
3	48.50	48.50	49.70
4	46.40	48.20	47.00
5	44.50	45.40	47.80
6	48.70	46.90	46.40
7	49.30	45.10	48.20
8	49.10	48.20	49.10
9	47.90	45.90	44.80
10	38.80	49.80	34.00
Average	47.0300	47.2400	46.5800
SEM	1.0527	0.6384	1.4969

Unit expressed as %

Table D3 Platelet count of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	639.00	452.00	449.00
2	644.00	586.00	462.00
3	657.00	820.00	539.00
4	615.00	299.00	643.00
5	499.00	241.00	709.00
6	659.00	697.00	643.00
7	132.00	389.00	672.00
8	583.00	544.00	669.00
9	130.00	280.00	196.00
10	126.00	591.00	350.00
Average	468.40	489.90	533.20
SEM	75.45	60.40	52.93

Unit expressed as  $\times 10^3/\mu\text{l}$

Table D4 WBC count of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	2.25	1.53	1.67
2	0.77	0.86	2.81
3	4.02	2.51	3.04
4	3.43	2.61	3.34
5	3.29	3.03	3.79
6	2.14	3.17	2.81
7	1.85	1.04	1.50
8	2.00	0.93	1.86
9	3.75	2.25	2.38
10	1.15	1.86	3.57
Average	2.47	1.98	2.68
SEM	0.35	0.27	0.25

Unit expressed as  $\times 10^9/\text{L}$

Table D5 Percent differential WBCs of individual rat

Rat No.	% differential WBCs			
	N	L	Mo	Eo
Control				
1	7.90	59.90	28.40	0.90
2	7.90	54.90	31.10	1.00
3	4.90	77.80	13.40	0.70
4	9.90	69.10	17.00	0.60
5	18.20	55.60	19.80	2.00
6	6.90	74.00	16.40	0.70
7	21.30	68.80	6.90	1.70
8	4.60	66.60	23.00	0.30
9	38.70	50.20	9.40	0.60
10	21.70	61.60	12.60	1.70
M-group I				
1	9.80	60.10	20.20	2.10
2	47.00	47.70	2.10	0.70
3	7.90	71.30	19.30	1.10
4	6.80	75.90	13.60	0.90
5	16.40	63.60	18.10	1.20
6	2.90	87.60	7.70	0.80
7	21.80	65.80	7.60	2.60
8	6.80	63.30	25.00	0.70
9	20.40	64.20	10.60	2.20
10	10.90	74.60	11.40	0.60
M-group II				
1	11.00	62.60	23.90	1.10
2	8.80	58.60	31.20	0.60
3	5.70	72.90	19.20	0.80
4	9.50	70.20	19.20	0.50
5	3.60	79.30	14.20	2.30
6	4.90	80.00	13.40	0.70
7	6.00	71.40	19.10	1.70
8	3.60	84.50	10.80	0.60
9	19.50	69.60	9.10	0.70
10	23.90	68.40	4.40	2.10

Unit expressed as %

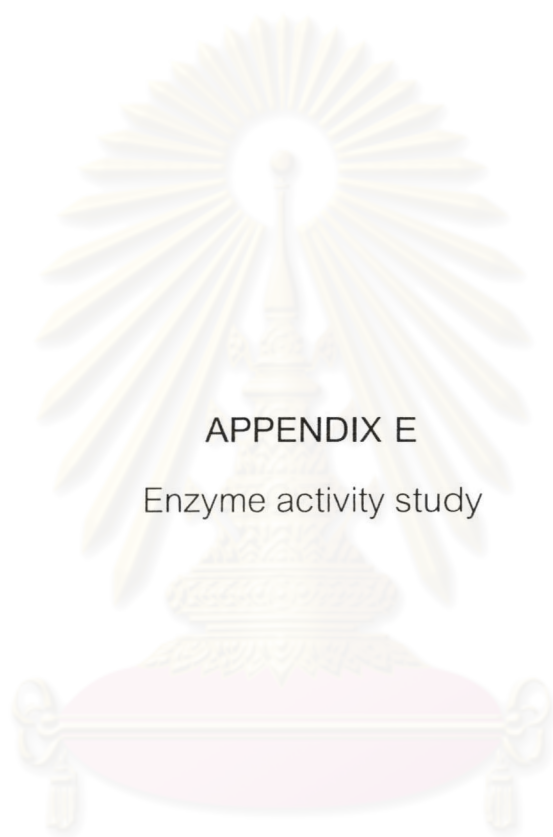
N = neutrophil      L = leukocyte      Mo = monocyte      Eo = eosinophil

Table D6 RBC morphology of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	Normal	Normal	Normal
2	Normal	Normal	Normal
3	Normal	Normal	Normal
4	Normal	Normal	Normal
5	Normal	Normal	Normal
6	Normal	Normal	Normal
7	Normal	Normal	Normal
8	Normal	Normal	Normal
9	Normal	Normal	Normal
10	Normal	Normal	Normal



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APPENDIX E

Enzyme activity study

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Table E1 Microsomal protein concentration of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	46.46	39.09	41.20
2	45.65	34.46	52.03
3	31.18	28.73	29.02
4	54.73	42.50	40.80
5	40.10	34.37	38.08
6	45.35	51.89	48.64
7	44.32	44.83	42.55
8	36.77	52.20	41.37
9	52.21	42.65	50.53
10	44.92	52.90	36.41
Average	44.17	42.36	42.06
SEM	2.17	2.64	2.20

Unit expressed as mg/ml

Table E2 Hepatic microsomal total CYP content of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	0.701	0.599	0.698
2	0.560	0.429	0.456
3	0.637	0.582	0.632
4	0.585	0.505	0.527
5	0.657	0.684	0.451
6	0.393	0.434	0.451
7	0.654	0.560	0.635
8	0.448	0.354	0.412
9	0.489	0.420	0.423
10	0.393	0.349	0.473
Average	0.552	0.492	0.516
SEM	0.04	0.04	0.03

Unit expressed as nmol/mg protein



Table E3 Hepatic microsomal EROD activity of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	66	50	48
2	80	28	36
3	-	67	59
4	-	60	56
5	106	74	80
6	56	49	34
7	42	42	32
8	84	40	28
9	50	43	36
10	67	46	38
Average	68.88	49.9	44.70
SEM	7.30	4.32	5.10

Unit expressed as pmol/mg protein/min

Table E4 Hepatic microsomal MROD activity of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	24	20	22
2	16	20	22
3	-	30	19
4	-	24	25
5	36	28	31
6	18	14	20
7	18	14	8
8	23	12	8
9	12	10	14
10	18	12	12
Average	20.63	18.40	18.10
SEM	2.60	2.25	2.37

Unit expressed as pmol/mg protein/min

Table E5 Hepatic microsomal BROD activity of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	60	50	40
2	44	37	38
3	82	60	76
4	62	52	41
5	79	52	67
6	40	48	54
7	40	36	28
8	28	20	32
9	30	34	28
10	21	24	30
Average	48.6	41.3	43.4
SEM	6.48	4.45	3.13

Unit expressed as pmol/mg protein/min

Table E6 Hepatic microsomal PROD activity of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	10	8	12
2	8	14	10
3	26	16	18
4	22	12	13
5	21	12	14
6	8	14	10
7	12	10	10
8	10	4	9
9	6	6	8
10	8	6	6
Average	13.10	10.20	11.00
SEM	2.25	1.28	1.08

Unit expressed as pmol/mg protein/min

Table E7 Hepatic microsomal aniline -4hydroxylase activity of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	0.077	0.143	0.127
2	0.113	0.129	0.114
3	0.138	0.166	0.125
4	0.068	0.099	0.098
5	0.107	0.154	0.151
6	0.058	0.051	0.067
7	0.082	0.119	0.098
8	0.094	0.044	0.088
9	0.060	0.060	0.054
10	0.051	0.095	0.078
Average	0.085	0.106	0.100
SEM	0.009	0.014	0.009

Unit expressed as nmol/mg protein/min

Table E8 Hepatic microsomal erythromycin N-demethylase activity of individual rat

Rat No.	group		
	Control	M-group I	M-group II
1	1.4250	1.5989	1.6620
2	1.5075	1.7994	1.6725
3	2.3460	2.0363	2.0550
4	1.7175	2.1639	1.8990
5	1.9635	1.9634	1.8990
6	1.8090	1.8086	1.9185
7	2.0085	2.0273	2.0175
8	1.9905	1.7355	2.0640
9	1.5345	1.6626	1.8180
10	1.8090	1.6901	1.8090
Average	1.8111	1.8486	1.8815
SEM	0.0886	0.0595	0.0453

Unit expressed as nmol/mg protein/min

## CURRICULUM VITAE

Miss Aporn Charoenpiriya was born in November 15, 1975 in Trang, Thailand . She graduated with a Bachelor of Sciences in Pharmacy in 1997 from the Faculty of Pharmaceutical Sciences, Mahidol University, Bangkok, Thailand. After graduation, she worked as a pharmacist at Pranungklao Hospital for four years.



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