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อนุกุล สวัสดิ์พานิช. ผลของสารสกัดด้วยเอทานอลจากว่านชักมดลูกต่อการหดตัวของกล้ามเนื้อของหนูขาวทั้งภายในและที่แยกจากร่างกาย. วิทยานิพนธ์ปริญญาโทบริหารบัณฑิต, ภาควิชาเภสัชวิทยา คณะเภสัชศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย. 2537.

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Appendices

Appendix A

Body weight, liver weight, food and water consumption

Table A1 Body weight of an individual rat in the control group

Rat No.	Day 0	Day 7	Day 14	Day 21	Day 28
1	301.80	302.20	331.00	354.20	359.30
2	297.60	312.00	330.20	351.20	366.00
3	305.60	316.50	346.40	355.00	378.50
4	285.40	315.50	334.50	348.00	372.00
5	305.00	328.70	348.10	365.00	384.50
6	336.20	356.50	374.60	385.90	402.00
7	339.60	359.20	382.60	397.00	407.50
8	335.10	343.60	354.50	367.00	369.00
9	387.00	412.10	421.40	456.00	469.20
10	333.50	355.40	369.20	379.50	389.30
Average	322.68	340.17	359.25	375.88	389.73
SEM	9.39	10.32	9.01	10.26	10.09

Unit express as g

Table A2 Body weight of an individual rat in the *C. comosa* group 1*(C. comosa* hexane extract 250 mg/kg/day)

Rat No.	Day 0	Day 7	Day 14	Day 21	Day 28
1	280.00	299.50	307.20	331.30	334.10
2	300.70	306.10	302.60	329.50	332.70
3	283.40	313.30	326.30	338.00	345.00
4	279.20	307.50	309.70	319.00	322.00
5	281.50	288.30	284.10	278.70	289.00
6	289.70	307.60	306.50	312.60	315.50
7	295.80	300.20	304.00	313.70	315.50
8	318.00	323.90	324.20	317.50	307.50
9	355.50	366.60	381.60	386.60	307.50
10	304.00	310.90	316.30	312.00	392.50
Average	298.78	312.39	316.25	323.89	326.13
SEM	7.44	6.71	8.18	8.63	8.93

Unit express as g

Table A3 Body weight of an individual rat in the *C. comosa* group 2
(*C. comosa* hexane extract 500 mg/kg/day)

Rat No.	Day 0	Day 7	Day 14	Day 21	Day 28
1	288.20	303.20	299.50	305.80	300.40
2	309.80	293.80	301.00	305.00	316.10
3	305.50	310.00	316.20	329.00	311.90
4	285.80	320.50	333.80	342.40	352.90
5	343.60	345.00	353.40	366.10	367.00
6	314.00	322.20	330.90	324.50	329.00
7	360.70	366.30	381.30	387.00	387.50
8	332.60	332.20	337.00	343.50	321.00
9	353.00	362.20	361.10	360.50	362.20
Average	321.47	328.38	334.91	340.42	338.67
SEM	9.11	8.45	9.09	9.19	9.89

Unit express as g

Table A4 Body weight of an individual rat in the *C. comosa* group 3
(*C. comosa* ethanolic extract 250 mg/kg/day)

Rat No.	Day 0	Day 7	Day 14	Day 21	Day 28
1	279.90	285.10	320.20	343.30	357.00
2	284.30	324.00	342.70	363.60	343.80
3	292.20	308.40	323.90	326.80	330.50
4	301.50	317.20	326.70	345.50	355.90
5	344.50	305.50	327.20	348.00	331.00
6	338.90	355.70	371.30	383.60	392.50
7	297.40	310.30	330.00	334.00	347.50
8	331.20	344.10	369.60	331.90	357.00
9	315.00	332.80	346.00	380.00	391.30
10	323.40	340.70	348.50	350.00	345.60
Average	310.83	322.38	340.61	350.67	355.21
SEM	7.29	6.73	5.83	6.15	6.81

Unit express as g

Table A5 Body weight of an individual rat in the *C. comosa* group 4
(*C. comosa* ethanolic extract 500 mg/kg/day)

Rat No.	Day 0	Day 7	Day 14	Day 21	Day 28
1	298.60	294.00	306.20	320.00	342.60
2	307.20	304.00	324.00	336.00	351.50
3	313.40	321.30	355.70	372.00	384.00
4	305.00	315.60	330.30	335.90	334.00
5	323.70	329.30	336.00	344.10	356.00
6	348.20	361.40	371.00	380.80	387.90
7	287.50	297.40	301.40	306.00	314.00
8	321.30	330.30	342.40	349.50	355.00
9	365.30	386.30	392.50	398.40	401.00
10	319.00	326.10	340.00	350.10	360.00
Average	318.91	326.62	339.94	349.19	358.44
SEM	8.16	10.12	9.84	9.88	9.30

Unit express as g

Table A6 Food consumption of individual rat in the control group

Rat No.	Day 7	Day 14	Day 21	Day 28
1	18	16.6	12.3	20.5
2	19.5	18.59	15.3	20.2
3	18.1	18.1	20.4	18
4	19.5	18.7	18.5	16.9
5	19.5	16.7	18.99	16
6	20.72	12	18.5	17.6
7	17.9	20	17	17.9
8	17.1	16.3	14.9	12.9
9	18.5	22.5	19.9	21
10	20.2	19.2	15.8	20.5
Average	18.90	17.87	17.16	18.15
SEM	0.36	0.87	0.81	0.80

Unit express as g

Table A7 Food consumption of individual rat in the *C. comosa* group 1
(*C. comosa* hexane extract 250 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	24	13.1	18.5	22.2
2	20	19.75	20.7	20
3	22.5	44.5	19.1	13
4	12.5	12.6	16.8	12.3
5	11.69	16	12.4	16.2
6	18.41	-	15.14	14.7
7	22.7	7.5	16.9	5.1
8	12.2	14.4	11.4	24.6
9	13	17.3	-	19.5
10	8.6	15.6	12.1	23.6
Average	16.56	17.86	15.89	17.12
SEM	1.76	3.34	1.06	1.91

Unit express as g

Table A8 Food consumption of individual rat in the *C. comosa* group 2
(*C. comosa* hexane extract 500 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	22	14.9	29.6	20.9
2	23	12.39	15.2	19.9
3	17.12	11.8	16.2	9.7
4	17.1	21.8	18.3	17
5	19.79	13.4	15.3	11.4
6	16.81	11.5	-	12.2
7	24.5	17.3	29.7	15.5
8	24.1	16.7	15	14.9
9	19.3	16	8.4	13.8
Average	20.41	15.09	18.46	15.03
SEM	1.03	1.10	2.49	1.25

Unit express as g

Table A9 Food consumption of individual rat in the *C. comosa* group 3
(*C. comosa* ethanolic extract 250 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	23	16.78	-	17.9
2	19.5	10.82	20	13.4
3	17.4	18.9	18.3	10.7
4	17.8	17	18.2	17.5
5	20.8	14	20.4	15.7
6	19.79	11.1	16.9	16.3
7	7.9	18.8	13.7	14.9
8	22.1	20.2	9.7	14.3
9	19.7	21.3	23.9	21.8
10	18	21.1	15.2	12.7
Average	18.60	17	17.37	15.52
SEM	1.32	1.22	1.31	0.98

Unit express as g

Table A10 Food consumption of individual rat in the *C. comosa* group 4
(*C. comosa* ethanolic extract 500 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	19	2.6	6.4	11.8
2	20	18.1	10.2	20.4
3	17.1	11.8	21.4	16.5
4	14.7	0.3	13.3	9.8
5	20.75	16.7	23.1	19.2
6	17.3	-	19.8	22.3
7	16.1	-	12.3	12.2
8	18.1	17.9	16.5	16
9	22.9	22.2	18.1	17.7
10	18.4	12.8	15.8	16.5
Average	18.4	12.8	15.7	16.2
SEM	0.84	2.79	1.84	1.41

Unit express as g

Table A11 Water consumption of individual rat in the control group.

Rat No.	Day 7	Day 14	Day 21	Day 28
1	73.7	68.5	94.8	96.2
2	46	39.05	26.6	95.7
3	49.32	98.33	62.9	50
4	52.72	46.5	39.1	43.8
5	81.65	51.4	56.8	56.8
6	39.89	156.2	44.1	33.4
7	38.4	36.6	32.2	25
8	43.1	51.6	33.8	26.8
9	18.9	71.9	52.6	53
10	47.5	70.2	51.6	67.1
Average	49.118	69.028	49.45	54.78
SEM	5.61	11.32	6.24	8.04

Unit express as g

Table A12 Water consumption of individual rat in the *C. comosa* group 1*(C. comosa* hexane extract 250 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	53.5	68.08	59.8	55.6
2	70	67.85	67.9	71.1
3	-	60.3	48.8	26.5
4	44.25	75.8	51.3	46
5	20.47	34.3	42.4	40.9
6	41.73	36.2	32.6	31.2
7	41.3	0.1	38.1	13
8	81.7	47.8	35.9	46.5
9	65.3	61	47.1	50.5
10	47	-	45.3	48.2
Average	51.69	50.16	46.92	42.95
SEM	5.79	7.47	3.43	5.13

Unit express as g

Table A13 Water consumption of individual rat in the *C. comosa* group 2
(*C. comosa* hexane extract 500 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	49	52.09	15.8	89.5
2	48	41.6	40.8	42.1
3	50.9	53.5	82	36.4
4	88.15	89.5	49.4	58.8
5	48.3	46.6	49.7	29.7
6	39.29	31.5	55.1	34.1
7	30	45.1	59.6	36.3
8	-	43.8	38.6	36.9
9	66.5	45.3	-	71.2
Average	52.52	49.89	48.88	48.33
SEM	6.27	5.38	6.70	6.80

Unit express as g

Table A14 Water consumption of individual rat in the *C. comosa* group 3.
(*C. comosa* ethanolic extract 250 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	61	63.32	-	84.8
2	43	44.32	32.5	41.9
3	39.2	55.1	41.1	45
4	63.25	85.5	66.2	42.5
5	51.8	52.4	68.4	45.6
6	36.32	26.2	43.7	18.4
7	19	44.4	27.3	27.9
8	78.1	54.9	17.2	30.5
9	30.4	43.8	18.6	27.8
10	47.2	89.9	40	39
Average	46.93	55.98	39.44	40.34
SEM	5.48	6.14	5.81	5.70

Unit express as g

Table A15 Water consumption of individual rat in the *C. comosa* group 4.*(C. comosa* ethanolic extract 500 mg/kg/day)

Rat No.	Day 7	Day 14	Day 21	Day 28
1	36.5	22.59	40.6	-
2	46.5	64.59	25.8	25.3
3	6.7	59.5	41.8	47
4	53.86	47.4	36.7	28
5	72.1	47.3	56.7	42
6	35.6	34.6	47.6	33.7
7	50.2	0.1	31.5	33.4
8	44.1	61.1	40.8	38.5
9	45.8	57.5	37.4	45.5
10	43.8	44	40	35.7
Average	43.52	43.87	39.89	36.57
SEM	5.83	7.11	2.96	2.64

Unit express as g

Table 16 Liver weight of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	12.32	13.48	12.26	13.99	11.39
2	13.18	15.31	14.85	11.25	11.94
3	10.61	12.64	11.53	10.42	12.18
4	9.95	12.1	12.79	11.09	10.97
5	10.25	8.82	13.56	9.82	12.55
6	10	10.51	12.78	11.33	10.32
7	11.69	10.92	16	10.9	9.55
8	8.74	12.47	13.86	10	13.98
9	15.49	19.46	17.55	13	13.94
10	13.7	13.07	-	10.61	13.68
Average	11.59	12.88	13.91	11.24	12.05
SEM	0.66	0.92	0.65	0.41	0.48

Unit express as g

Appendix B

Verification of methods for the determination of
alkoxyresorufin O-dealkylation, aniline 4-hydroxylation and
erythromycin N-demethylation

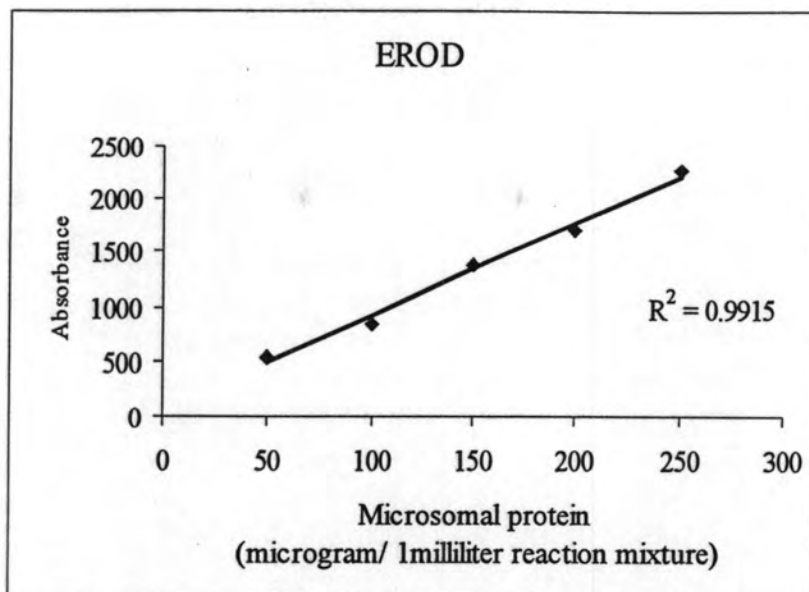


Figure B1 Verification of ethoxyresorufin O-dealkylation. Correlation between amounts of microsomal protein used in the reaction and the corresponding fluorometric absorbances was shown to possess a correlation coefficient (r^2) of 0.9915. each point was mean of $n = 2$. (Procedure was demonstrated in the Materials and Methods).

Microsomal protein ($\mu\text{g/ml}$ reaction mixture)	Absorbance
50	544.63
100	853.68
150	1392.7
200	1717.9
250	2265

Data shown were mean of the absorbance of the duplicated reactions.

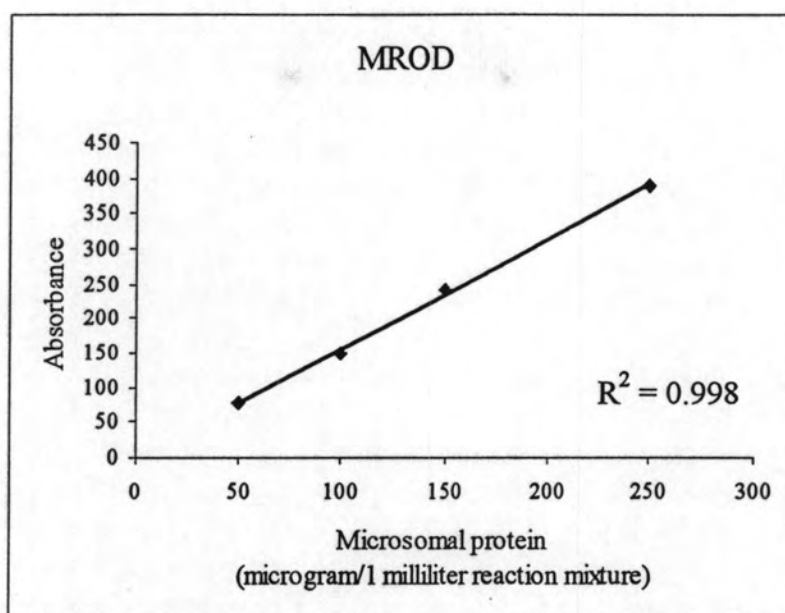


Figure B2 Verification of methoxyresorufin O-dealkylation (MROD). Correlation between amounts of microsomal protein used in the reaction and the corresponding fluorometric absorbances was shown to possess a correlation coefficient (r^2) of 0.9915. each point was mean of $n=2$. (Procedure was demonstrated in the Materials and Methods)

Microsomal protein ($\mu\text{g/ml}$ reaction mixture)	Absorbance
50	77.33
100	150.34
150	243.12
250	389.95

Data shown were mean of the absorbance of the duplicated reactions.

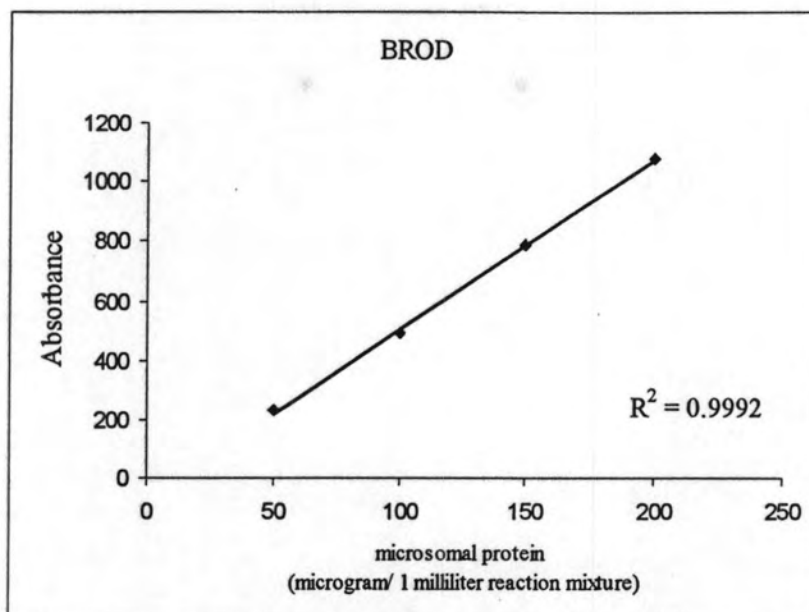


Figure B3 Verification of benzyloxyresorufin O-dealkylation (BROD). Correlation between amounts of microosomal protein used in the reaction and the corresponding fluorometric absorbances was shown to possess a correlation coefficient (r^2) of 0.9915. each point was mean of $n = 2$. (Procedure was demonstrated in the Materials and Methods)

Microsomal protein ($\mu\text{g/ml}$ reaction mixture)	Absorbance
50	235.9
100	494
150	791.22
200	1078.64

Data shown were mean of the absorbance of the duplicated reactions.

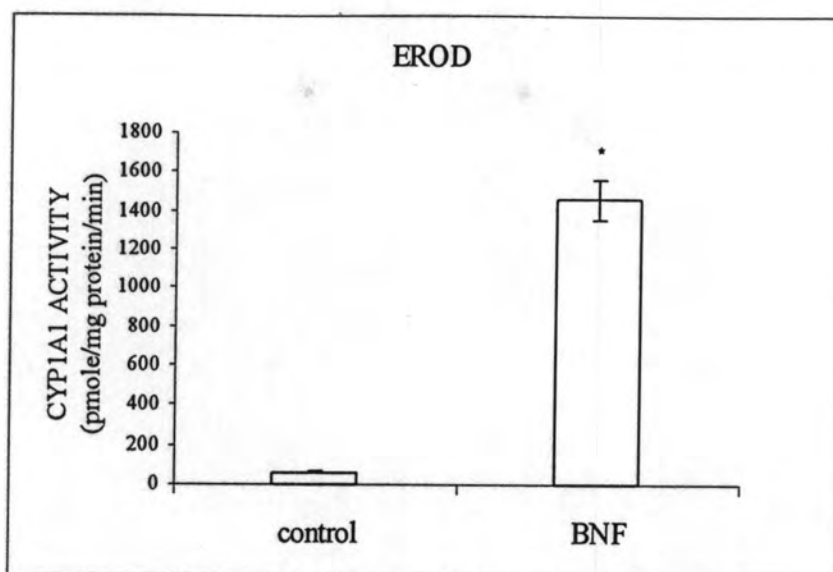


Figure B4 Effect of β -NF on rat hepatic CYP1A1 activity. Rat were received β -NF 80 mg/kg/day intraperitoneally for 3 days or corn oil for the treatment group and the control group, respectively. The individual bar graph represented mean of EROD activity with a standard error of the mean (n = 4).

* p < 0.05; β -NF treatment group vs control group

Rat no.	CYP1A1 activity	
	Control group	β -NF induced group
1	50.83163	1203.839
2	56.46046	1469.435
3	73.58795	1469.952
4	70.18827	1701.732
Average	62.76708	1461.239
SEM	5.43441	101.7493

Unit express as pmol/mg protein/min

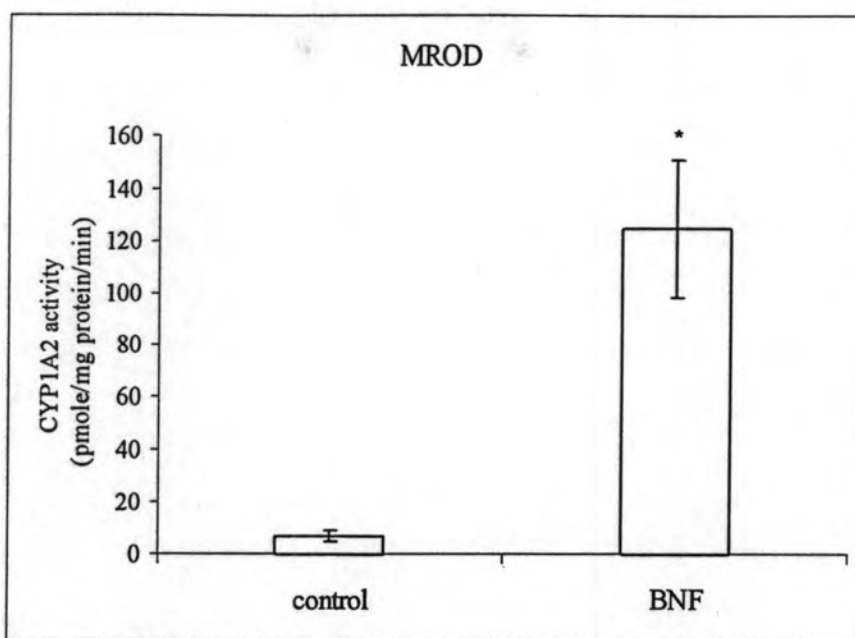


Figure B5 Effect of β -NF on rat hepatic CYP1A1 activity. Rat were received β -NF 80 mg/kg/day intraperitoneally for 3 days or corn oil for the treatment group and the control group, respectively. The individual bar graph represented mean of MROD activity with a standard error of the mean ($n = 4$).

* $p < 0.05$; β -NF treatment group vs control group

Rat no.	CYP1A2 activity	
	Control group	β -NF induced group
1	11.8085	78.23561
2	4.432491	199.2039
3	9.592254	102.1194
4	1.966649	120.4949
Average	6.949973	125.0134
SEM	2.268593	26.19946

Unit express as pmol/mg protein/min

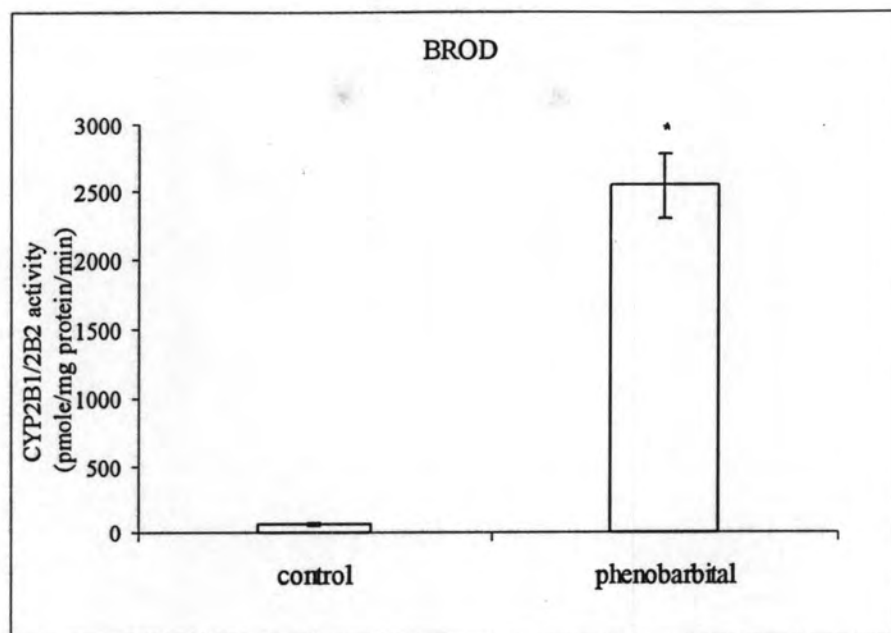


Figure B6 Effect of Phenobarbital on rat hepatic CYP2B1/2B2 activity. Rat were received phenobarbital 80 mg/kg/day intraperitoneally for 3 days or corn oil for the treatment group and the control group, respectively. The individual bar graph represented mean of BROD activity with a standard error of the mean (n = 4).

* p < 0.05; phenobarbital treatment group vs control group

Rat no.	CYP2B1/2B2 activity	
	Control group	phenobarbital induced group
1	29.22001	2086.455
2	64.55083	2341.474
3	53.66326	2543.561
4	99.36525	3209.64
Average	61.69984	2545.282
SEM	14.56691	240.3875

Unit express as pmol/mg protein/min

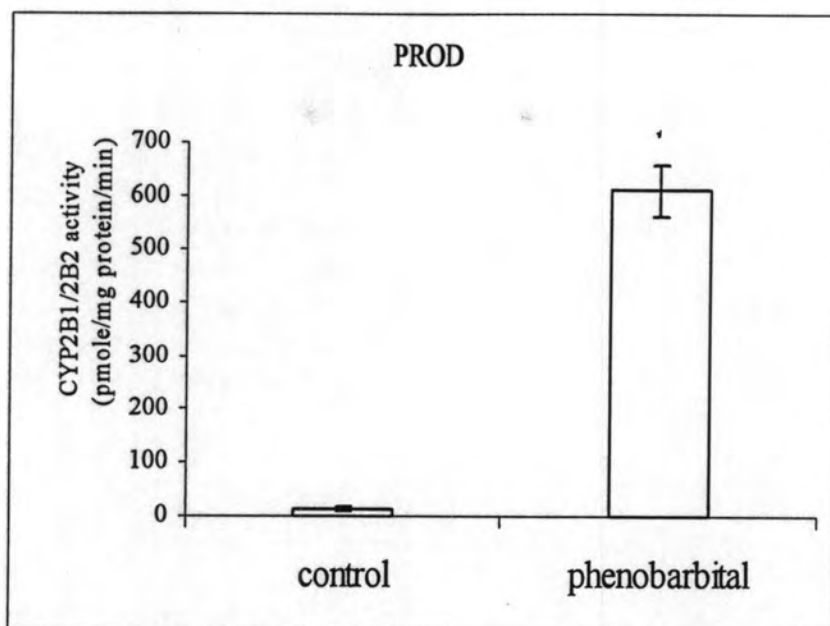


Figure B7 Effect of Phenobarbital on rat hepatic CYP2B1/2B2 activity. Rat were received phenobarbital 80 mg/kg/day intraperitoneally for 3 days or corn oil for the treatment group and the control group, respectively. The individual bar graph represented mean of PROD activity with a standard error of the mean (n = 4).

* $p < 0.05$; phenobarbital treatment group vs control group

Rat no.	CYP2B1/2B2 activity	
	Control group	phenobarbital induced group
1	3.57	560.52
2	15.02	526.65
3	15.49	625.58
4	23.71	742.46
Average	14.45	613.80
SEM	4.14	47.55

Unit express as pmol/mg protein/min

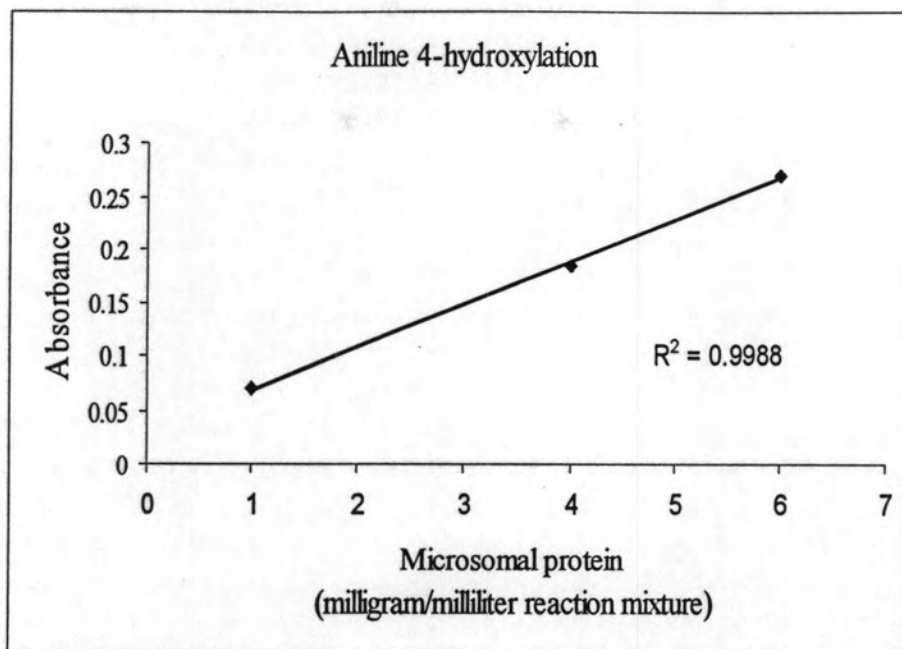


Figure B8 Verification of aniline 4-hydroxylation. Correlation between amounts of microsomal protein used in the reaction and the corresponding fluorometric absorbances was shown to possess a correlation coefficient (r^2) of 0.9988. each point was mean of $n=2$. (Procedure was demonstrated in the Materials and Methods).

Microsomal protein (mg/ml reaction mixture)	Absorbance
1	0.07
4	0.1845
6	0.271

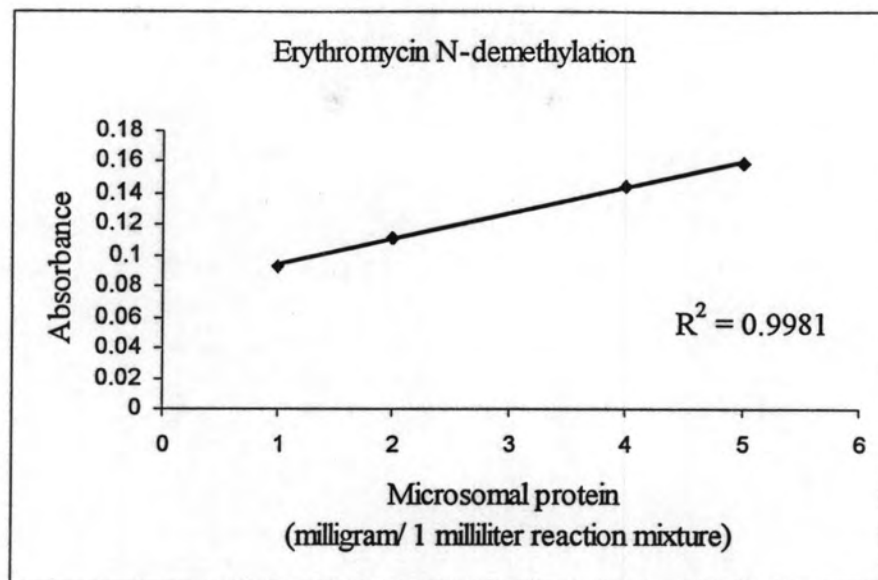


Figure B9 Verification of erythromycin N-demethylation. Correlation between amounts of microosomal protein used in the reaction and the corresponding fluorometric absorbances was shown to possess a correlation coefficient (r^2) of 0.9981. each point was mean of $n = 2$. (Procedure was demonstrated in the Materials and Methods).

Microsomal protein (mg/ml reaction mixture)	Absorbance
1	0.093
2	0.1115
4	0.1455
5	0.1595

Appendix C

Enzyme activity study

Table C1 Microsomal protein concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	30.56	45.96	46.26	38.56	40.96
2	16.26	37.46	41.66	30.26	37.26
3	42.46	42.76	54.96	43.26	43.86
4	42.36	35.96	52.76	63.23	47.36
5	28.86	35.06	50.56	46.36	46.16
6	26.23	44.56	37.96	39.46	53.26
7	62.86	60.16	67.66	50.56	68.06
8	50.46	53.06	72.16	53.96	47.66
9	51.69	53.76	74.26	63.26	68.76
10	49.76	45.96	-	58.46	71.31
Average	40.15	45.47	55.36	48.74	52.46
SEM	4.29	2.48	3.94	3.34	3.73

Unit expressed as mg/ml

Table C2 Hepatic microsomal total CYP content of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	0.51	-	0.66	0.70	0.72
2	-	0.85	0.57	0.60	0.41
3	0.37	0.88	0.76	1.11	-
4	0.58	-	1.10	0.58	0.38
5	0.57	0.85	0.81	0.51	0.39
6	0.56	-	1.30	0.72	0.42
7	0.54	0.77	0.79	0.68	0.55
8	0.41	0.71	0.54	0.66	0.46
9	0.50	0.49	0.64	0.57	0.49
10	0.49	0.65	-	0.47	-
Average	0.50	0.74	0.80	0.66	0.48
SEM	0.02	0.05	0.08	0.05	0.04

Unit express as nmol/mg protein

Table C3 Hepatic microsomal EROD activity of individual rat.

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	52.18	190.32	75.70	90.73	51.08
2	76.25	128.73	54.11	205.16	157.88
3	91.04	195.32	186.81	206.84	83.21
4	85.85	213.78	119.93	118.61	13.80
5	70.44	151.08	70.55	117.70	26.71
6	52.00	108.43	181.32	89.88	55.32
7	48.85	176.43	63.47	130.63	77.52
8	60.84	156.30	73.78	146.70	68.52
9	33.20	167.60	75.01	172.83	77.58
10	59.42	78.70	-	131.80	141.88
Average	63.39	156.67	100.07	141.09	75.35
SEM	5.13	13.17	16.98	13.28	14.34

Unit expressed as pmol/mg protein/min

Table C4 Hepatic microsomal MROD activity of individual rat.

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	3.42	6.46	23.70	15.48	10.48
2	18.30	21.38	12.42	5.71	20.45
3	14.14	24.08	21.87	22.42	25.15
4	10.83	28.99	28.95	18.46	8.99
5	13.32	24.01	18.36	19.83	11.18
6	10.87	14.11	18.94	22.68	15.63
7	11.87	21.54	22.74	18.84	26.84
8	16.53	12.99	15.42	29.26	11.86
9	15.00	11.92	14.03	20.88	23.92
10	12.61	6.85	-	4.16	21.17
Average	12.94	17.23	19.60	17.77	17.57
SEM	1.18	2.46	1.75	2.42	2.12

Unit expressed as pmol/mg protein/min

Table C5 Hepatic microsomal BROD activity of individual rat.

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	37.12	886.00	543.63	198.28	63.67
2	41.51	802.42	189.66	57.98	109.76
3	60.15	1052.09	1192.68	154.34	308.31
4	24.71	914.91	1807.80	150.75	18.94
5	42.86	444.91	903.24	497.21	49.67
6	32.32	434.14	1373.30	419.71	48.91
7	89.84	876.55	810.20	342.18	353.67
8	39.08	481.45	682.65	152.85	67.82
9	17.08	604.58	1461.63	100.54	120.84
10	32.45	365.55	-	145.20	419.75
Average	41.71	686.26	996.09	221.91	156.13
SEM	6.46	78.10	168.86	46.17	46.32

Unit expressed as pmol/mg protein/min

Table C6 Hepatic microsomal PROD activity of individual rat.

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	27.69	335.20	184.01	178.27	152.15
2	16.88	274.33	62.50	11.23	174.61
3	19.74	304.81	284.63	184.51	185.08
4	14.86	345.75	431.64	24.15	11.43
5	22.80	176.15	297.02	156.38	99.86
6	8.83	135.59	385.10	155.67	100.23
7	19.62	303.13	132.25	143.25	163.41
8	13.67	220.15	282.89	135.79	130.01
9	6.73	199.80	295.44	28.98	166.36
10	16.76	114.51	-	174.82	125.20
Average	27.69	240.94	261.72	119.30	130.83
SEM	2.20	26.32	39.08	21.92	16.27

Unit expressed as pmol/mg protein/min

Table C7 Hepatic microsomal aniline 4 hydroxylase activity of individual rat.

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	0.133	0.121	0.102	0.170	0.010
2	0.117	0.145	0.079	0.045	0.146
3	0.206	0.160	0.134	0.293	0.059
4	0.130	0.221	0.231	0.246	0.046
5	0.089	0.236	0.181	0.321	0.155
6	0.155	0.130	0.184	0.200	0.130
7	0.194	0.233	0.172	0.125	0.364
8	0.193	0.122	0.237	0.188	0.188
9	0.088	0.039	0.116	0.101	0.203
10	0.113	0.142	-	0.099	0.375
Average	0.136	0.155	0.160	0.179	0.168
SEM	0.014	0.019	0.019	0.028	0.039

Unit expressed as nmol/mg protein/min

Table C8 Hepatic microsomal erythromycin N-demethylation activity of individual rat.

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	0.0943	0.0838	0.1257	0.1964	0.0927
2	0.3250	0.1100	0.2567	0.1746	0.3491
3	0.2882	0.4034	0.1624	0.2509	0.1255
4	0.1310	0.2096	0.2073	0.3655	0.1855
5	0.0733	0.3510	0.2891	0.1855	0.1527
6	0.2882	0.1153	0.2509	0.1800	0.2594
7	0.1938	0.2410	0.1582	0.3600	0.3764
8	0.2410	0.2515	0.2455	0.2509	0.3164
9	0.1274	0.0828	0.1582	0.1473	0.3059
10	0.2620	0.1153	-	0.2837	0.3761
Average	0.2024	0.1964	0.2060	0.2395	0.2540
SEM	0.0287	0.0362	0.0190	0.0244	0.0338

Unit expressed as nmol/mg protein/min

Appendix D

Clinical blood chemistry

Table D1 Serum sugar concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	127	154	126	145	106
2	163	100	126	104	113
3	98	86	-	91	100
4	93	106	79	106	83
5	114	136	-	161	-
6	119	137	167	134	86
7	128	129	116	96	114
8	201	118	120	189	96
9	162	-	-	94	178
10	127	-	-	-	86
Average	133.89	120.75	122.33	124.44	109.50
SEM	11.67	7.94	11.47	11.57	10.58

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D2 BUN concentration of individual rat

Rat No..	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	28	27	21	32	35
2	29	39	25	26	37
3	14	20	19	24	24
4	17	16	18	20	16
5	-	-	-	-	-
6	-	26		20	
7	21	29	23	25	19
8	21	36	20	25	35
9	28	27	-	23	-
10	24	39	-	39	21
Average	22.22	27.57	21.00	26.00	26.71
SEM	1.79	3.08	1.06	2.01	3.30

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D3 SCr concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	0.6	0.5	0.7	0.7	0.6
2	0.6	0.7	0.5	0.5	0.7
3	0.8	0.8	0.7	0.8	0.8
4	0.8	0.6	0.8	0.6	0.6
5	-	-	-	-	-
6	-	-	-	-	-
7	0.7	-	0.8	0.7	0.6
8	0.6	0.5	0.7	0.8	0.5
9	0.6	0.5	-	0.5	-
10	0.4	0.6	-	0.6	0.5
Average	0.622	0.600	0.700	0.644	0.614
SEM	0.04	0.04	0.04	0.04	0.04

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D4 Serum total cholesterol concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	74	76	54	79	94
2	66	52	36	73	70
3	64	69	28	60	89
4	78	62	41	53	60
5	-	-	-	73	-
6	-	-	-	46	-
7	87	-	27	83	39
8	84	77	42	58	81
9	72	56	-	-	-
10	69	44	-	65	63
Average	75.33	62.29	38.00	65.56	70.86
SEM	2.79	4.70	4.11	4.12	7.18

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D5 Serum triglyceride concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	180	110	67	48	30
2	95	125	86	39	27
3	69	122	58	48	53
4	80	93	73	74	-
5	-	-	-	-	-
6	-	-	-	52	56
7	111	-	66	62	89
8	136	175	114	66	87
9	126	292	-	76	-
10	124	102	-	40	77
Average	115.44	145.57	77.33	56.11	59.86
SEM	10.95	26.37	8.26	4.64	9.65

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D6 Serum HDL-C concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	62	71	47	76	81
2	60	43	35	60	65
3	55	58	26	57	79
4	70	52	35	49	52
5	71	-	-	72	-
6	72	-	-	-	-
7	64	-	25	42	36
8	58	62	24	73	72
9	77	29	-	54	-
10	-	36	-	61	62
Average	65.44	50.14	32.00	60.44	63.86
SEM	2.46	5.65	3.61	3.83	6.00

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D7 Serum LDL-C concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	5	2	3	7	9
2	4	3	2	11	7
3	3	1	2	2	3
4	3	2	1	2	4
5	3	-	-	4	-
6	3	-	-	-	-
7	1	-	1	2	1
8	5	2	1	3	5
9	1	0	-	4	-
10	-	4	-	5	2
Average	3.11	2.00	1.67	4.44	4.43
SEM	0.48	0.49	0.33	0.99	1.07

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D8 AST-concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	145	77	83	118	209
2	111	113	117	155	137
3	96	157	251	137	177
4	122	253	107	159	145
5	-	-	-	126	-
6	160	-	-	-	-
7	192	-	157	107	157
8	127	79	167	172	103
9	166	123	-	148	-
10	191	124	-	125	105
Average	145.56	132.29	147.00	138.56	147.57
SEM	11.43	22.68	24.43	7.13	14.35

Unit expressed as U/L

Missing value (-) was due to blood insufficiency

Table D9 ALT-concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	32	31	31	51	76
2	31	36	29	44	38
3	35	28	54	27	40
4	32	105	24	27	19
5	30	-	-	49	-
6	34	-	-	-	-
7	31	-	38	30	45
8	37	28	28	32	37
9	38	33	-	51	-
10	-	33	-	34	31
Average	33.33	42.00	34.00	38.33	40.86
SEM	0.94	10.56	4.42	3.44	6.64

Unit expressed as U/L

Missing value (-) was due to blood insufficiency

Table D10 ALP-concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	137	158	106	168	222
2	132	170	158	121	144
3	76	125	166	85	111
4	73	107	85	116	111
5	70	-	-	126	-
6	101	-	-	-	-
7	155	-	81	98	109
8	183	154	109	127	135
9	104	113	-	139	-
10	-	106	-	96	97
Average	114.56	133.29	117.50	119.56	132.71
SEM	13.24	10.12	14.82	8.38	16.10

Unit expressed as U/L

Missing value (-) was due to blood insufficiency

Table D11 Serum total protein-concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	6.4	6.9	6.8	6.7	7.3
2	6.3	7.3	7.0	6.2	6.4
3	6.5	6.6	6.8	6.4	6.4
4	6.3	6.6	7.0	6.4	5.7
5	-	-	-	6.8	-
6	6.5	-	-	-	-
7	6.5	-	6.8	6.5	6.6
8	6.6	6.7	7.2	7.0	6.5
9	6.1	7.4	-	5.9	-
10	6.4	6.1	-	6.3	6.8
Average	6.40	6.80	6.933	6.467	6.529
SEM	5.000E-02	0.169	6.667E-02	0.11	0.18

Unit expressed as g/dl

Missing value (-) was due to blood insufficiency

Table D12 Serum albumin concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	3.5	3.9	3.3	3.8	3.8
2	3.3	4.3	3.9	3.0	3.5
3	3.6	3.7	3.4	3.6	3.7
4	3.5	3.8	4.1	3.6	2.8
5	-	-	-	3.8	-
6	3.8	-	-	-	-
7	3.7	-	3.8	3.9	3.7
8	3.7	3.7	4.2	3.8	3.5
9	3.2	4.2	-	3.1	-
10	3.6	3.3	-	3.6	3.8
Average	3.544	3.843	3.783	3.578	3.543
SEM	0.06	0.127	0.149	0.106	0.132

Unit expressed as g/dl

Missing value (-) was due to blood insufficiency

Table D13 Total bilirubin concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	.10	0.0	0.0	.00	.10
2	1.00	0.0	0.0	.10	.00
3	.00	0.1	0.2	.10	.00
4	.00	0	0.2	.40	.10
5	-	-	-	.20	-
6	.00	-	-	-	-
7	.00	0.0	0.1	.00	.00
8	.00	0.0	0.2	.20	.00
9	.00	0.0	-	.00	.00
10	.00	0.0	-	.00	.00
Average	0.122	0.02	0.175	0.125	0.03
SEM	0.11	0.02	0.03	0.05	0.02

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Table D14 Direct bilirubin concentration of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	1	0	0	0	0.1
2	0	0	0	0.1	0
3	0	0.1	0.2	0.1	0
4	0	0	0.2	0.4	0.1
5	0	-	-	0.2	-
6	0	-	-	0	-
7	0	.0	0.1	0.2	0
8	0	.0	0.2	0	0
9	0	.0	-	0	-
10	0	-	-		0
Average	0.01	0.01	0.117	0.111	0.03
SEM	0.01	0.01	0.04	0.05	0.02

Unit expressed as mg/dl

Missing value (-) was due to blood insufficiency

Appendix E

Hematology

Table E1 WBC of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	1710	2870	2850	3320	3100
2	1950	1500	3080	3560	1530
3	2690	2450	-	2650	2590
4	3400	2000	1950	3090	5290
5	4660	-	-	1430	2120
6	2760	-	-	3170	2400
7	3090	2480	3820	2740	1770
8	4570	4170	2310	2040	2110
9	990	3750	1910	1860	-
10	-	1890	3820	-	-
Average	2868.89	2638.75	2653.33	2651.11	2613.75
SEM	411.54	326.21	302.60	242.49	418.95

Unit expressed as cells/cumm

Missing value (-) was due to blood insufficiency

Table E2 RBC count of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	7.30	7.83	7.22	8.06	7.35
2	7.51	8.83	7.45	7.01	7.48
3	7.76	7.80	-	7.76	7.75
4	7.51	7.48	7.78	8.01	7.39
5	8.38	-	-	8.24	8.36
6	7.96	-	-	8.41	8.07
7	7.77	8.51	8.02	8.29	8.06
8	7.35	8.11	7.95	7.72	7.91
9	7.41	8.17	7.52	8.13	-
10	-	7.86	8.02	-	-
Average	7.66	8.07	7.66	7.96	7.80
SEM	0.12	0.15	0.13	0.14	0.13

Unit expressed as cells/cumm

Missing value (-) was due to blood insufficiency

Table E3 Hb of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	13.8	14.6	13.5	15.5	13.8
2	14.6	15.4	14.2	14.2	15.6
3	15.2	15.8	-	15.3	15.2
4	15.4	14.5	15.5	15.7	15.0
5	16.1	-	-	-	-
6	15.0	-	-	16.0	-
7	15.9	15.0	14.2	15.6	14.9
8	14.6	15.5	14.8	14.8	15.0
9	15.9	15.0	-	14.9	15.4
10	-	14.7	13.9	15.0	15.1
Average	15.17	15.06	14.35	15.22	15.00
SEM	0.25	0.16	0.29	0.18	0.19

Unit expressed as g/dl

Missing value (-) was due to blood insufficiency

Table E4 Hct of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	49	49	44	50	45
2	50	53	48	45	50
3	50	51	-	49	47
4	48	47	51	49	45
5	50	-	-	49	-
6	48	-	-	-	-
7	48	51	47	51	49
8	45	47	49	49	46
9	44	48	-	47	45
10	-	46	44	46	47
Average	48.00	49.00	47.17	48.33	46.75
SEM	0.73	0.87	1.14	0.65	0.67

Unit expressed as %

Missing value (-) was due to blood insufficiency

Table E5 MCV of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	66.4	62.7	60.7	62.3	61.6
2	66.2	63.1	63.9	64.2	66.3
3	64.0	65.4	-	63.4	60.1
4	64.2	62.8	65.5	61.7	61.2
5	60.0	-	-	-	-
6	60.3	-	-	59.8	-
7	61.1	59.5	59.0	60.2	59.0
8	61.1	58.1	64.8	59.0	57.0
9	58.7	58.8	-	60.2	56.0
10	-	59.0	58.1	56.2	59.4
Average	62.44	61.18	62.00	60.78	60.08
SEM	0.94	0.94	1.29	0.81	1.12

Unit expressed as fL

Missing value (-) was due to blood insufficiency

Table E6 MCH of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	18.9	18.6	18.7	19.2	18.8
2	19.4	18.5	19.1	20.3	20.9
3	19.6	20.3	-	19.9	19.6
4	20.5	19.4	19.9	19.6	20.3
5	19.2	17.6	-	19.4	-
6	18.8	19.1	-	-	-
7	20.5	18.4	17.7	18.5	17.8
8	19.9	18.7	18.6	17.9	18.6
9	21.5	-	-	19.3	19.1
10	-	-	18.5	18.5	19.1
Average	19.81	18.83	18.75	19.18	19.28
SEM	0.29	0.28	0.30	0.25	0.35

Unit expressed as pg

Missing value (-) was due to blood insufficiency

Table E7 MCHC of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	28.5	29.7	30.8	30.9	30.5
2	29.4	29.3	29.8	31.6	31.5
3	30.6	31.0	-	31.5	32.6
4	32.0	30.9	30.9	31.8	33.2
5	32.0	-	-	-	-
6	31.3	-	-	-	-
7	33.5	29.6	30.0	32.5	30.2
8	32.6	32.9	30.1	30.8	32.6
9	36.6	31.3	-	30.3	34.1
10	-	31.7	31.8	32.0	32.1
Average	31.83	30.80	30.57	31.58	32.10
SEM	0.79	0.43	0.31	0.27	0.47

Unit expressed as g/dl

Missing value (-) was due to blood insufficiency

Table E8 Platelet count of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	344	568	377	300	370
2	354	382	333	319	311
3	663	785	-	618	569
4	617	638	580	482	886
5	622	-	-	400	-
6	641	-	-	-	-
7	805	713	841	756	777
8	592	771	657	864	758
9	328	920	-	630	701
10	-	587	949	764	250
Average	552	671	623	570	578
SEM	56.23	580.99	100.23	68.42	84.96

Unit expressed as 10^3 cell/cumm

Missing value (-) was due to blood insufficiency

Table E9 PMN of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	19	9	40	14	50
2	16	18	15	33	26
3	23	27	-	26	24
4	28	31	11	18	42
5	5	18	-	17	20
6	20	23	-	-	11
7	11	-	17	24	12
8	7	-	23	37	21
9	18	7	-	17	-
10	-	8	16	16	-
Average	16.33	17.63	20.33	22.44	25.75
SEM	2.49	3.21	4.24	2.71	4.85

Unit expressed as %

Missing value (-) was due to blood insufficiency

Table E10 Lymphocyte of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	68	89	51	82	43
2	74	74	82	58	70
3	66	68	-	67	70
4	66	59	82	77	52
5	88	-	-	-	-
6	74	-	-	75	-
7	84	77	78	71	77
8	89	74	70	55	86
9	68	89	-	79	86
10	-	89	81	79	73
Average	75.22	77.38	74.00	71.44	69.63
SEM	3.13	3.90	4.96	3.21	5.38

Unit expressed as %

Missing value (-) was due to blood insufficiency

Table E11 Monocyte of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	7	1	8	2	6
2	8	4	2	8	2
3	9	3	-	5	4
4	5	5	6	3	5
5	5	1	-	5	-
6	3	2	-	-	-
7	3	3	3	3	3
8	3	1	4	5	2
9	6	-	-	3	1
10	-	-	2	4	5
Average	5.44	2.50	4.17	4.22	3.50
SEM	0.75	0.53	0.98	0.60	0.63

Unit expressed as %

Missing value (-) was due to blood insufficiency

Table E12 Eosinophil of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	3	1	1	2	1
2	2	4	1	1	2
3	2	2	-	2	2
4	1	5	1	2	1
5	2	-	-	3	-
6	3	-	-	-	-
7	2	4	2	2	-
8	1	1	3	3	1
9	8	1	-	1	1
10	-	2	1	1	1
Average	2.67	2.50	1.50	1.89	1.29
SEM	0.71	0.57	0.34	0.26	0.18

Unit expressed as %

Missing value (-) was due to blood insufficiency

Table E13 Platelet of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	adequate	increase	adequate	adequate	adequate
2	adequate	adequate	adequate	adequate	adequate
3	increase	increase	-	increase	increase
4	increase	increase	increase	increase	increase
5	increase	-	-	adequate	increase
6	increase	-	-	-	increase
7	increase	increase	increase	increase	increase
8	increase	increase	increase	increase	adequate
9	adequate	increase	-	increase	-
10	-	increase	increase	increase	-

Missing value (-) was due to blood insufficiency

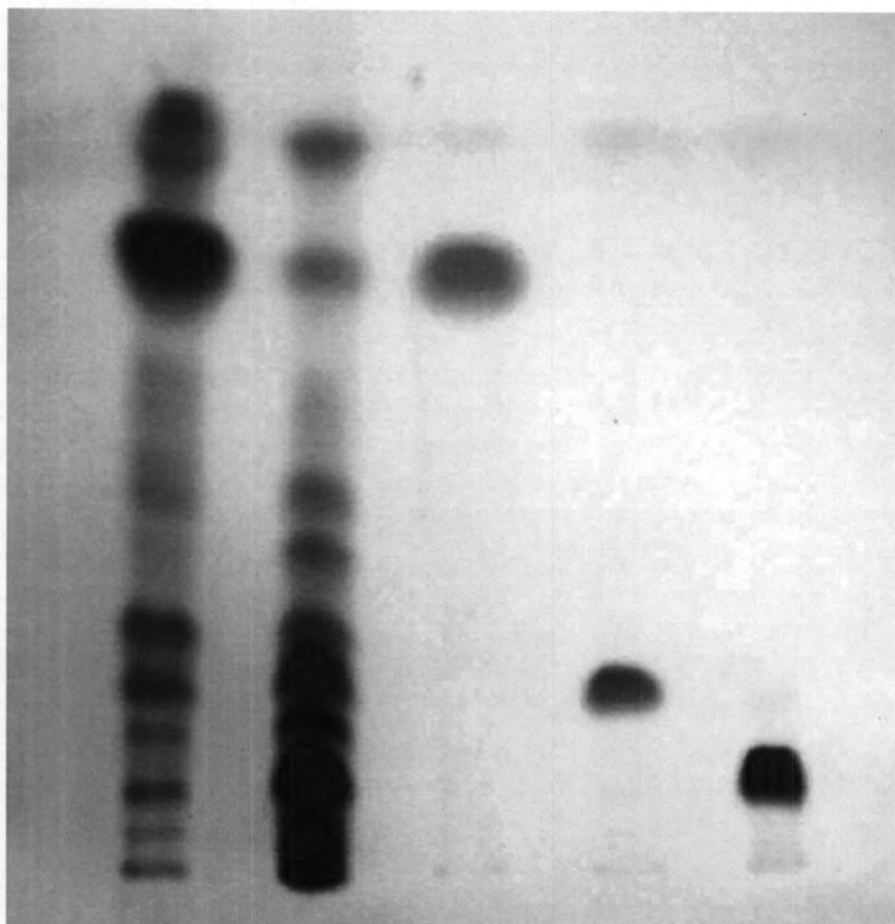
Table E14 RBC morphology of individual rat

Rat No.	Group				
	Control	<i>C. comosa</i> group 1	<i>C. comosa</i> group 2	<i>C. comosa</i> group 3	<i>C. comosa</i> group 4
1	Micro 1+	Micro 1+	Micro 1+	Micro 1+	Micro 1+
2	Micro 1+	Micro 1+	Micro 1+	Micro 1+	Micro 1+
3	Micro 1+	Micro 1+	-	Micro 1+	Micro 1+
4	Micro 1+	Micro 1+	Micro 1+	Micro 1+	Micro 1+
5	Micro 2+	Micro 2+	Micro 2+	Micro 3+	Micro 2+
6	Micro 2+	Micro 2+	Micro 2+	Micro 2+	Micro 2+
7	Micro 2+	Micro 2+	Micro 2+	Micro 2+	Micro 2+
8	Micro 2+	Micro 2+	-	Micro 2+	Micro 3+
9	Micro 3+	-	-	Micro 2+	-
10	-	-	-	-	-

Missing value (-) was due to blood insufficiency

Appendix F

Thin layer chromatography (TLC) of *C. comosa* extracts



Solvent system

CH_2Cl_2 : MeOH (40 : 1)

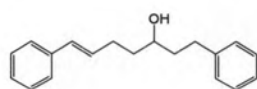
Spot 1 = *C. comosa* hexane extract 2.5 mg (250 $\mu\text{g/ml}$)

Spot 2 = *C. comosa* ethanolic extract 5.0 mg (500 $\mu\text{g/ml}$)

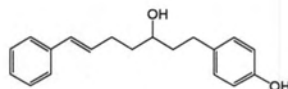
Spot 3 = trans-1,7-Diphenyl-5-hydroxy-1-heptene (1) 1.0 mg (100 $\mu\text{g/ml}$)

Spot 4 = 5-hydroxy-7-(4-hydroxyphenyl)-1-phenyl-(1*E*)-1-heptene (2) 1.0 mg (100 $\mu\text{g/ml}$)

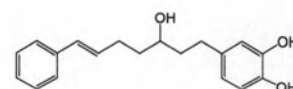
Spot 5 = 7-(3,4-Dihydroxyphenyl)-5-hydroxy-1-phenyl-(1*E*)-1-heptene (3) 1.0 mg (100 $\mu\text{g/ml}$)



(1)



(2)



(3)

CURRICULUM VITAE

Miss Chonthicha Kittichanun was born in April 25, 1980 in Narathiwat, Thailand. She graduated with a Bachelor of Pharmacy in 2003 from the Faculty of Pharmaceutical Sciences, Khonkaen University, Khonkaen, Thailand.