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APPENDIX

Table 17. Summary of clinical chemistry values and histopathological grading in effect of PA extract given 24 hours before single oral dose of ethanol (5 g/kg) (acute toxicity study) (n=6).

Groups	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)	Histopath grading
Control (distilled water)	17.24 ± 1.50	44.40 ± 1.93	82.75 ± 12.49	22.94 ± 3.90	6.78 ± 0.68	8.60 ± 0.43	44.85 ± 8.84	53.96 ± 5.41	0
Ethanol 5 g/kg	26.37 ± 1.24*	76.88 ± 6.46*	111.55 ± 11.39	25.17 ± 5.06	6.47 ± 0.48	9.64 ± 0.24	68.69 ± 23.46	60.63 ± 8.74	+1
PA 25 mg/kg	26.47 ± 1.62*	57.68 ± 3.82#	107.23 ± 14.43	20.83 ± 3.43	6.37 ± 0.28	9.10 ± 0.74	52.93 ± 5.45	45.33 ± 6.79	+1
PA 50 mg/kg	22.59 ± 1.45	51.87 ± 1.34#	113.57 ± 15.31	33.09 ± 4.68	6.57 ± 0.31	9.92 ± 0.71	53.44 ± 10.61	55.33 ± 5.57	0
PA 75 mg/kg	19.10 ± 0.66#	50.02 ± 2.89#	121.06 ± 6.78	28.84 ± 1.82	6.23 ± 0.10	9.61 ± 0.75	49.97 ± 9.84	46.90 ± 5.74	0
SL 5 mg/kg	19.97 ± 0.86#	52.35 ± 2.36#	113.74 ± 10.46	19.45 ± 3.94	6.04 ± 0.28	9.51 ± 0.41	49.98 ± 9.50	36.90 ± 8.22	0

Results are expressed as mean ± SEM and grading (0 = normal, +1 = mild, +2 = moderate and +3 = severe).

* Significant difference from control group ($p<0.05$).

Significant difference from ethanol group ($p<0.05$).

Table 18. Summary of clinical chemistry values and histopathological grading in effect of PA extract given 7 days after administration of ethanol (4 g/kg/day) for 21days (sub-acute toxicity study)(n=8).

Groups	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)	Histopath grading
Control (distilled water)	18.03 ± 0.49	40.94 ± 0.89	57.40 ± 7.85	21.30 ± 3.49	5.64 ± 0.27	10.15 ± 0.27	42.35 ± 6.43	36.71 ± 6.75	0
Ethanol 4 g/kg	27.41 ± 1.78 *	56.64 ± 2.74 *	120.90 ± 23.29	37.43 ± 4.65 *	5.95 ± 0.25	13.95 ± 0.61*	101.48 ± 26.11*	74.50 ± 9.68*	+3
Ethanol + self recovery	19.85 ± 1.16 #	45.30 ± 2.85 #	88.50 ± 30.13	28.44 ± 2.58	5.25 ± 0.18	11.48 ± 0.57#	62.09 ± 9.09	46.26 ± 6.77	+2
Ethanol + PA 75 mg/kg	19.71 ± 0.87#	47.26 ± 2.33#	53.51 ± 8.09	22.36 ± 2.31 #	5.47 ± 0.16	10.24 ± 0.28#	48.69 ± 6.84#	46.12 ± 7.57	+1
Distilled water + PA 75 mg/kg	17.52 ± 1.23 #	41.52 ± 1.51#	60.73 ± 11.71	20.95 ± 2.90 #	5.17 ± 0.14	9.65 ± 0.15#	37.54 ± 4.62#	50.24 ± 4.59	0
Ethanol + SL 5 mg/kg	18.69 ± 0.97 #	44.28 ± 1.83#	66.46 ± 8.50	29.57 ± 3.47	5.37 ± 0.13	10.62 ± 0.31#	41.58 ± 7.50#	42.88 ± 5.66#	0

Results are expressed as mean ± SEM and grading (0 = normal, +1 = mild, +2 = moderate and +3 = severe).

* Significant difference from control group ($p<0.05$).

Significant difference from ethanol group ($p<0.05$).

Table 19. Clinical chemistry values of each rats in control and ethanol (5g/kg) groups (acute toxicity study, n=6).

Groups	Rats	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)
Control (distilled water)	1	14.54	41.29	54.75	41.62	5.09	7.88	56.00	51.41
	2	11.50	38.97	97.77	22.67	5.77	8.03	43.69	37.29
	3	20.36	43.04	58.10	21.59	5.20	10.02	36.00	51.41
	4	16.87	43.04	60.90	17.79	7.96	9.50	43.69	70.24
	5	19.20	48.28	132.69	18.96	7.56	7.28	77.54	69.06
	6	20.94	51.77	92.31	15.00	9.10	8.87	12.15	44.35
Ethanol 5 g/kg	1	27.92	59.91	124.02	22.80	6.62	9.87	46.00	34.94
	2	30.25	94.23	120.14	12.73	6.61	8.61	185.23	54.94
	3	24.43	91.32	95.83	21.68	5.71	10.31	43.69	73.76
	4	22.10	87.25	64.58	47.41	4.62	9.99	39.08	49.06
	5	25.01	68.06	119.23	16.41	7.93	9.40	57.54	96.12
	6	28.50	60.49	145.51	29.96	7.33	9.68	40.62	54.94

Table 20. Clinical chemistry values of each rats in PA 25 and 50 mg/kg groups (acute toxicity study, n=6).

Groups	Rats	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)
PA 25 mg/kg	1	28.50	57.00	156.94	20.50	6.51	11.44	49.08	39.65
	2	31.99	67.47	73.61	16.69	6.51	9.69	59.08	49.06
	3	20.36	42.46	94.70	16.90	6.10	9.76	57.54	38.47
	4	24.43	51.77	77.74	37.48	5.69	9.59	39.85	33.76
	5	25.59	62.82	94.87	18.89	5.81	7.86	38.31	33.76
	6	27.92	64.57	145.51	14.52	7.59	6.24	73.69	77.29
PA 50 mg/kg	1	18.61	50.02	126.50	22.27	6.19	10.88	79.08	58.47
	2	23.26	54.09	142.50	54.39	6.34	11.89	27.54	70.24
	3	18.03	46.53	57.95	25.80	6.47	11.65	39.08	62.00
	4	26.18	55.26	81.41	32.29	6.89	8.53	49.85	37.29
	5	23.27	51.19	116.03	35.74	7.89	8.36	91.38	39.65
	6	26.18	54.10	157.05	28.05	5.64	8.21	33.69	64.35

Table 21. Clinical chemistry values of each rats in PA 75 mg/kg and SL 5 mg/kg groups (acute toxicity study, n=6).

Groups	Rats	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)
PA 75 mg/kg	1	20.94	52.93	96.65	34.77	6.39	9.59	87.54	42.00
	2	20.36	45.37	132.16	28.87	6.44	11.98	37.54	30.24
	3	17.45	43.04	109.54	21.35	6.28	11.50	26.00	42.00
	4	20.35	47.70	119.43	31.50	5.89	9.15	43.69	47.88
	5	18.03	62.82	125.00	27.63	5.98	8.02	71.38	46.71
	6	17.45	48.28	143.59	28.91	6.38	7.42	33.69	72.59
SL 5 mg/kg	1	21.52	54.68	92.95	10.15	5.43	8.40	90.62	27.88
	2	20.94	53.51	108.97	14.71	5.07	8.34	21.38	26.71
	3	19.20	54.68	83.33	9.66	6.70	9.21	46.00	14.94
	4	20.08	42.46	128.62	23.97	6.04	10.01	36.77	33.76
	5	16.29	49.44	113.78	34.26	6.19	10.61	56.77	72.59
	6	21.92	59.33	154.77	23.96	6.81	10.48	48.31	45.53

Table 22. Clinical chemistry values of each rats in control and ethanol 4 g/kg/day groups (sub-acute toxicity study, n=8).

Groups	Rats	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)
Control (distilled water)	1	19.20	40.14	42.24	15.10	6.64	10.97	33.69	23.18
	2	18.61	38.97	55.47	31.39	6.39	10.12	13.69	26.71
	3	18.03	40.14	29.01	17.06	6.35	10.23	43.69	23.18
	4	16.29	44.21	39.19	36.40	4.95	10.91	78.31	73.76
	5	16.28	41.30	77.86	30.31	5.36	10.31	47.54	37.29
	6	16.87	37.23	50.38	12.75	4.42	10.30	37.54	44.35
	7	19.78	44.79	69.21	10.15	5.48	9.83	48.31	50.24
	8	19.20	40.72	95.80	17.21	5.50	8.52	36.00	14.94
Ethanol 4 g/kg	1	22.69	47.70	91.32	56.81	6.80	13.20	75.23	73.76
	2	25.01	51.19	150.14	24.74	6.45	12.77	241.38	138.47
	3	25.59	54.68	126.61	26.64	5.98	12.62	33.69	69.06
	4	23.27	50.61	73.39	20.47	6.13	17.88	154.46	72.59
	5	31.99	69.80	91.88	46.26	5.61	13.26	43.69	65.53
	6	31.41	65.73	107.00	48.35	6.68	13.51	82.92	58.47
	7	36.06	59.33	267.59	44.04	4.84	14.94	147.54	71.41
	8	23.27	54.10	59.28	32.10	5.12	13.43	32.92	46.71

Table 23. Clinical chemistry values of each rats in ethanol (self recovery) and PA 75 mg/kg treatment groups (sub-acute toxicity study, n=8).

Groups	Rats	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)
Ethanol + self recovery	1	18.03	44.79	44.28	31.82	5.05	11.46	56.00	49.06
	2	23.27	55.84	52.84	34.52	4.16	10.43	91.38	31.41
	3	17.45	43.63	42.75	34.29	5.26	11.25	40.62	69.06
	4	22.69	48.86	103.31	22.67	5.76	8.50	64.46	32.59
	5	18.61	52.93	290.08	17.84	5.56	11.47	103.69	47.88
	6	14.54	30.25	48.18	36.38	5.65	12.85	48.31	20.82
	7	20.36	38.97	93.00	30.38	5.55	13.97	26.00	42.00
	8	23.85	47.12	33.59	19.60	5.03	11.92	66.00	77.29
Ethanol + PA 75 mg/kg	1	22.69	51.77	48.35	19.69	5.13	10.09	74.46	52.59
	2	21.52	45.37	37.66	11.26	5.21	10.53	56.77	36.12
	3	16.29	54.10	39.19	30.66	5.50	10.54	69.08	27.88
	4	20.36	39.55	102.29	19.88	4.89	9.27	32.92	38.47
	5	16.87	36.65	46.54	23.29	6.17	9.67	39.85	43.18
	6	21.52	52.35	64.82	29.25	5.66	10.54	22.92	34.94
	7	17.45	52.93	29.36	17.66	6.04	11.76	62.15	96.12
	8	20.94	45.37	59.83	27.21	5.18	9.53	31.38	39.65

Table 24. Clinical chemistry values of each rats in PA 75 mg/kg alone and SL 5 mg/kg treatment groups (sub-acute toxicity study, n=8).

Groups	Rats	ALT (U/L)	AST (U/L)	STg (mg/dl)	HTg (mg/g liver)	GSH (μmol/g liver)	MDA (nmol/g liver)	TNF-α (pg/ml)	IL-1β (pg/ml)
Distilled water + PA 75 mg/kg	1	17.45	45.37	83.97	26.49	4.92	9.35	24.46	54.94
	2	17.45	41.88	52.42	19.93	5.40	9.21	29.85	52.59
	3	23.27	48.86	40.71	19.78	5.71	9.86	29.08	32.59
	4	15.12	38.39	44.78	21.61	5.13	9.49	64.46	51.41
	5	19.20	40.14	132.32	8.28	4.53	10.04	42.15	60.82
	6	18.61	40.14	59.03	10.86	5.35	10.38	45.23	27.88
	7	18.03	42.46	43.26	29.78	5.51	9.59	36.77	62.00
	8	11.05	34.90	29.36	30.83	4.78	9.25	28.31	59.65
Ethanol + SL 5 mg/kg	1	15.12	43.04	105.85	25.28	4.90	9.49	53.69	42.00
	2	19.78	52.93	52.93	49.37	4.93	11.58	15.23	26.71
	3	16.87	44.21	53.94	26.37	5.32	9.64	46.00	19.65
	4	23.27	38.97	45.29	28.10	5.66	10.96	18.31	32.59
	5	18.03	45.95	101.79	24.11	5.60	10.03	38.31	60.82
	6	15.71	47.70	55.40	21.03	5.34	10.27	25.23	47.88
	7	20.36	36.06	68.14	39.59	5.21	11.14	61.38	47.88
	8	20.36	45.37	48.35	22.69	5.99	11.85	74.46	65.53

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Mr. Chanon Ngamtin was born on September 14, 1981 in Bangkok. He received his Bachelor of Science in Public Health (second class honours) from Faculty of Public Health, Khon Kaen University in 2004 and then studied a Master of Science in Pharmacology, Graduate School, Chulalongkorn University.