

## **Appendix**

## Appendix A

### Chemical reagents

1. Hematoxylin solution (Harris)

Potassium or ammonium (alum)	100 g
Distilled water	1000 ml

Add 50 ml of 10% alcoholic hematoxylin solution and heat to boil for 1 minute. Remove from heat and slowly add 2.5 g of mercuric oxide (red). Heat to the solution and until it becomes dark purple color. Cool the solution in cold water bath and add 20 ml of glacial acetic acid (concentrated). Filter before use.

2. Eosin Y solution (1%)

Eosin Y	10 g
Distilled water	200 ml
95% Ethanol	800 ml

Mix to dissolve and store at room temperature.

## Appendix B

### Tables of normal range

**Table 1**

Physical and chemical quality regulations by Thai Herbal Pharmacopoeia (MOPH, 2000)

<b>Physical and chemical quality regulations</b>	<b><i>T. chebula</i></b>	<b><i>T. bellerica</i></b>
Loss on drying (not more than %w/w)	11	11
Total ash (not more than %w/w)	3.5	5
Acid-insoluble ash (not more than %w/w)	0.6	0.6
Extractive value (not less than %w/w)		
Ethanol-soluble extractive	20	17
Ethanol (70%)-soluble extractive	-	29
Water-soluble extractive	28	24
Tannin content (not less than %w/w)	14	16

**Table 2**

Hematological values of female Sprague Dawley rats in the Facility of National Laboratory Animal Centre,  
Mahidol University (Inala et al., 2002)

Parameter	4 wks	6 wks	8 wks	10 wks	12 wks	Retired breeder
RBC (x106/ $\mu$ l)	5.2 - 6.4	6.0 - 7.1	7.1 - 7.7	7.2 - 8.3	7.8 - 8.7	7.4 - 8.7
Hemoglobin (g/dl)	11.4 - 13.9	13.0 - 14.7	14.7 - 15.6	14.7-16.2	15.2 - 16.9	15.1 - 16.8
Hematocrit (%)	33.8 - 41.2	37.7 - 41.2	42.0 - 44.2	39.8 - 45.2	41.0 - 46.2	41.2 - 45.4
MCV (fl)	61.0 - 68.0	56.9 - 63.8	56.2 - 59.4	52.1 - 57.0	51.1 - 53.7	50.7 - 57.7
MCH (pg)	20.8 - 23.4	20.2 - 22.5	19.8 - 21.2	19.2 - 20.9	18.4 - 19.9	18.5 - 20.5
MCHC (g/dl)	33.0 - 35.5	33.8 - 37.1	34.8 - 36.1	35.3 - 37.7	35.7 - 37.7	35.5 - 38.6
Platelet (x105/ $\mu$ l)	7.51 - 11.79	7.03 - 13.85	7.39 - 12.14	8.06 - 13.91	6.39 - 13.46	7.10 - 11.50
WBC (x103/ $\mu$ l)	1.6 - 6.0	4.3 - 9.9	5.2 - 12.5	5.4 - 11.6	4.6 - 10.9	2.9 - 8.3
Neutrophil (%)	5.0 - 22.0	3.0 - 16.0	3.0 - 15.0	5.0 - 26.0	8.0 - 25.0	14.0 - 31.0
Lymphocyte (%)	78.0 - 95.0	81.0 - 95.0	83.0 - 96.0	71.0 - 94.0	72.0 - 92.0	66.0 - 85.0
Monocyte (%)	0.0 - 2.0	0.0 - 3.0	0.0 - 2.0	0.0 - 4.0	0.0 - 4.0	0.0 - 3.0
Eosinophil (%)	0.0 - 1.0	0.0 - 2.0	0.0 - 1.0	0.0 - 2.0	0.0 - 2.0	0.0 - 1.0
Basophil (%)	0	0	0	0	0	0

**Table 3**

Hematological values of male Sprague Dawley rats in the Facility of National Laboratory Animal Centre,  
Mahidol University (Inala et al., 2002)

Parameter	4 wks	6 wks	8 wks	10 wks	12 wks	Retired breeder
RBC (x106/ $\mu$ l)	5.6 - 6.7	6.5 - 7.1	6.8 - 7.8	7.2 - 7.7	7.2 - 8.2	7.2 - 8.9
Hemoglobin (g/dl)	11.7 - 13.9	13.7 - 15.1	14.4 - 17.1	14.6 - 15.7	14.6 - 16.0	15.7 - 18.3
Hematocrit (%)	35.9 - 40.4	37.8 - 41.6	37.6 - 43.0	38.0 - 41.7	37.2 - 42.0	42.5 - 51.9
MCV (fl)	59.7 - 66.7	56.9 - 59.8	53.8 - 57.8	51.7 - 55.0	50.6 - 53.3	55.6 - 61.5
MCH (pg)	19.8 - 23.0	20.4 - 21.9	8.9 - 22.9	19.5 - 21.3	19.3 - 21.1	20.1 - 22.1
MCHC (g/dl)	32.4 - 35.5	35.4 - 37.5	34.2 - 40.5	36.5 - 39.4	36.9 - 39.8	35.1 - 37.4
Platelet (x105/ $\mu$ l)	6.00 - 9.88	6.54 - 12.73	7.07 - 11.89	6.84 - 10.22	6.39 - 9.66	6.01 - 10.11
WBC (x103/ $\mu$ l)	2.0 - 5.3	4.1 - 9.4	2.9 - 11.1	3.7 - 8.5	3.2 - 9.0	3.1 - 12.4
Neutrophil (%)	4.0 - 18.0	2.0 - 19.0	3.0 - 16.0	5.0 - 19.0	3.0 - 33.0	4.0 - 60.0
Lymphocyte (%)	82.0 - 96.0	79.0 - 98.0	82.0 - 96.0	79.0 - 94.0	66.0 - 97.0	38.0 - 90.0
Monocyte (%)	0.0 - 3.0	0.0 - 7.0	0.0 - 6.0	0.0 - 4.0	0.0 - 7.0	0.0 - 10.0
Eosinophil (%)	0.0 - 2.0	0.0 - 1.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 20
Basophil (%)	0	0	0	0	0	0

**Table 4**

Clinical blood chemistry values of female Sprague Dawley rats in the Facility of National Laboratory Animal Centre,  
Mahidol University (Inala et al., 2002)

Parameter	4 wks	6 wks	8 wks	10 wks	12 wks	Retired breeder
Glucose (mg/dl)	63.5 – 91.7	73.6 – 122.0	86.8 – 122.8	87.3 – 141.7	83.1- 133.9	114.4 – 162.9
BUN (mg/dl)	10.2 – 20.9	13.6 – 23.2	14.2 – 20.0	13.6 – 19.9	13.9 – 21.5	14.9 – 30.7
Creatinine (mg/dl)	0.37 – 0.50	0.46 – 0.58	0.50 – 0.61	0.51 – 0.70	0.50 – 0.65	0.55 – 0.70
Total protein (g/dl)	5.01 – 5.84	5.50 – 6.26	5.89 – 6.86	5.82 – 6.91	5.79 – 6.57	5.95 – 7.48
Albumin (g/dl)	3.80 – 4.40	4.10 – 4.50	4.10 – 4.70	4.10 – 4.90	4.00 – 4.70	3.90 – 4.50
Total bilirubin (mg/dl)	0.04 – 0.11	0.01 – 0.08	0.05 – 0.13	0.05 – 0.12	0.06 – 0.18	0.04 – 0.13
AST (U/l)	115 – 255	90 – 157	89 – 142	78 – 127	78 – 154	80 – 203
ALT (U/l)	27 – 43	23 – 53	22 – 37	20 – 41	21 – 50	24 – 66
ALP (U/l)	203 – 302	117 – 223	77 – 197	64 – 98	55 – 86	39 – 89

**Table 5**

Clinical blood chemistry values of male Sprague Dawley rats in the Facility of National Laboratory Animal Centre,  
Mahidol University (Inala et al., 2002)

Parameter	4 wks	6 wks	8 wks	10 wks	12 wks	Retired breeder
Glucose (mg/dl)	36.2 – 86.4	71.5 – 186.8	93.1 – 142.3	80.3 – 156.7	91.3 – 136.5	97.8 – 157.5
BUN (mg/dl)	10.2 – 18.7	12.9 – 18.1	12.1 – 22.2	10.6 – 18.5	13.2 – 21.8	12.2 – 20.2
Creatinine (mg/dl)	0.35 – 0.50	0.42 – 0.52	0.41 – 0.60	0.46 – 0.65	0.46 – 0.55	0.51 – 0.66
Total protein (g/dl)	4.86 – 5.60	5.50 – 6.26	5.89 – 6.86	5.82 – 6.91	5.79 – 6.57	5.95 – 7.48
Albumin (g/dl)	3.80 – 4.40	4.10 – 4.50	4.10 – 4.70	4.10 – 4.90	4.00 – 4.70	3.90 – 4.50
Total bilirubin (mg/dl)	0.04 – 0.11	0.01 – 0.08	0.05 – 0.13	0.05 – 0.12	0.06 – 0.18	0.04 – 0.13
AST (U/l)	115 – 255	90 – 157	89 – 142	78 – 127	78 – 154	80 – 203
ALT (U/l)	27 – 43	23 – 53	22 – 37	20 – 41	21 – 50	24 – 66
ALP (U/l)	203 – 302	117 – 223	77 – 197	64 – 98	55 – 86	39 – 89