



Haemato-biochemical parameters of Burmese pig of subtropical hill agro ecosystem

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ABSTRACT

Normal Burmes pigs (100) were selected for haemato-biochemical studies. The mean values for different hematological parameters, viz. packed cell volume (PCV), total erythrocyte count (TEC), total leukocyte count (TLC) and hemoglobin (Hb) were studied. The MCV (fl), MCH (pg) and MCHC (g/dl) ranged from 56.06 ± 1.00 to 60.35 ± 0.51 , 14.70 ± 0.19 to 16.56 ± 0.52 and 31.15 ± 0.70 to 35.05 ± 0.60 respectively. The neutrophil (%), lymphocytes (%), monocytes (%), basophil (%) and eosinophil (%) ranged from 28.92 to 58.36, 28.60 to 59.24, 8.48 to 12.88, 1.44 to 1.60 and 1.48 to 1.92 respectively. The Hb, TEC, PCV, TLC, MCHC increased with the age of the pigs. The mean serum glucose (mg/dl) level ranged from 155.10 to 214.27. The values obtained for serum cholesterol (mg/dl), serum albumin (g/dl), serum total protein (g/dl), serum urea nitrogen (mg/dl) and serum bilirubin (mg/dl) ranged between 109.68 to 114.72, 3.05 to 3.46, 6.36 to 7.01 and 23.37 to 26.96 and 0.06 to 0.102 respectively. The mean values of serum transaminases, viz. AST and ALT increased with increase in age.

Key words: Aizawl, Burmese pig, Haemato-biochemical value

Pig keeping is important in eastern states of the country and particularly for the tribal communities (Rangnekar 2006). The pig population of the state was 217 184 of which Burmes pigs account for 85 246. Pig rearing is a traditional custom of the Mizo people throughout the state and closely related with the socio-economic life of the rural people. More preference for pork and the religious attachment with most of the communities makes this species an important economic contributor for the people of the state. Hair color of these pigs varies from brownish to black with very short and convex snout, big neck, concave topline, short scanty hairs, brownish skin, short stout legs, blackish to whitish hooves, short tail, horizontal ears, and bear seven pairs of teats. The litter size at birth was recorded to vary from 5–16 numbers with an average body weight of 1.13 ± 1.18 kg and average numbers of piglets at weaning were 4–10 numbers with an average body weight of 6.38 ± 1.02 kg (Kumaresan *et al.* 2006). It also was observed that this unique variety occupies an important part of the pig husbandry for their adaptability to the harsh hilly condition. The establishment of reference values is an important basis for clinical interpretation of laboratory data (Lumsden *et al.* 1978). In the present study reference values are established for hemato-biochemical parameters for different category of growing pigs. The lack of any baseline hemato-biochemical values have prevented any meaningful comparison of hemato-

biochemical changes of diseased with those of normal Burmese pig. The importance of base line information on haemato-biochemical values for a meaningful assessment of health status as well as an intelligent interpretation of arising pathological condition was documented elsewhere in cattle (Schalm *et al.* 1975), in camel (Banerjee *et al.* 1962), in sheep (Grunsell 1955), in goat (Millson *et al.* 1960) and in pigs (Copland 1976).

MATERIALS AND METHODS

A total of 100 normal pigs (showed normal behaviour, appetite, temperature, respiration, pulse rate, defecation and urination) were selected and divided into 4 groups, viz. A (weaner pigs), B (feeder pigs), C (gilts) and D (sows), according to their age and each group consisted 25 pigs. All the animals were reared under same environment and managerial conditions.

Sample collection: Animals were bled by venipuncture of the anterior vena cava (Carle and Dewhirst 1942). Blood was collected into 3ml vacuumtainer tube containing ethylenediaminetetracetic acid (EDTA) as the anti-coagulant and into four 10ml vacuumtainer tubes containing no anti-coagulant. Two peripheral blood smear slides for differential white cell counts were prepared.

Analysis of haematological parameter: Hematological parameters, viz. Hb, PCV, TEC, MEV, MCHC, and TLC were estimated (Automatic blood cell counter). DLC was estimated as per Jain *et al.* (1986).

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Analysis of biochemical parameter: Glucose, cholesterol, total protein, albumin, urea nitrogen, bilirubin, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) in serum were measured with the UV-Vis double beam Spectrophotometer version 6.51, using standard kits.

Analysis of data: Results of hemato- biochemical findings were analyzed as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The mean Hb level ranged from 9.99 ± 0.20 to 13.12 ± 0.10 in weaner, feeder, gilt and sows. The level of hemoglobin

decreased in weaner pigs which might be due to rapid destruction of fetal hemoglobin and increased requirement of Hb during growing period. The Hb level of Burmes pig from weaner to sows was similar with other domestic swine (Thorn 2000, Blood 1995). The PCV (%) and TEC (m/mm^3) in weaner pig. The level was similar with other workers (Thoron 2000). The MCV (fl), MCH (pg) and MCHC (g/dl), are given in Table 2. Neutrophil (%), lymphocytes (%), monocytes (%), basophil (%) and eosinophil (%) ranged from 28.92 ± 0.35 to 58.88 ± 0.62 , 59.24 ± 0.40 to 27.24 ± 0.58 , 8.48 ± 0.26 to 12.88 ± 0.16 , 1.44 ± 0.15 to 1.52 ± 0.37 and

Table 1. Hemato-biochemical value of Burmese pig of different age group

Parameters	Weaner pig			Feeder pigs			Gilts			Sows		
	Mean $\pm$ SE	Min	Max	Mean $\pm$ SE	Min	Max	Mean $\pm$ SE	Min	Max	Mean $\pm$ SE	Min	Max
Hb (g/dl)	9.99 ± 0.20^a	8	12	13.12 ± 0.10^a	11.9	14	12.74 ± 0.16^a	11	14.6	12.50 ± 0.14^a	10.8	13.9
PCV (%)	30.68 ± 0.50^a	26	35	48.78 ± 0.76^a	38.	53.8	36.44 ± 0.54^a	32	41	42.62 ± 0.56^a	38.5	47.8
TEC (M/ mm^3)	5.32 ± 0.10^a	4.3	6	5.78 ± 0.08^a	4.	6.3	6.60 ± 0.1^a	4.7	7.4	6.83 ± 0.12^a	5.7	7.8
TLC (m/ mm^3)	8.28 ± 0.22^a	6	9.8	15.07 ± 0.25^a	11.34	16.6	18.60 ± 0.61^a	12.5	23.9	17.52 ± 0.44^a	12.4	21.3
MCV (fl)	56.96 ± 0.83^a	42.6	67.7	60.35 ± 0.51^a	55.4	67.7	56.29 ± 0.71^a	42.6	61.6	56.06 ± 1.00^a	42.6	67.7
MCH (pg)	14.70 ± 0.19^a	13.5	16.8	15.98 ± 0.15^a	14.3	17	16.56 ± 0.52^a	13.5	21.8	14.70 ± 0.19^a	13.5	16.8
MCHC (g/dl)	35.04 ± 0.6^a	29.8	41.6	31.15 ± 0.70^a	26.7	41.6	34.69 ± 0.49^a	29.8	41.6	35.04 ± 0.60^a	29.8	41.6
Neutrophil (%)	28.92 ± 0.35^a	25	33	58.36 ± 0.56^a	54	66	35.6 ± 1.19^a	24	56	57.88 ± 0.62^a	53	66
Lymphocyte (%)	59.24 ± 0.40^a	56	65	28.60 ± 0.57^a	24	34	50.20 ± 0.99^a	36	58	27.24 ± 0.58^a	23	34
Monocyte (%)	8.48 ± 0.26^a	10	17	9.40 ± 0.23^a	8	12	11.40 ± 0.33^a	7	15	12.88 ± 0.16^a	10	17
Basophile (%)	1.44 ± 0.15^a	0	3	1.60 ± 0.17^a	0	3	1.44 ± 0.15^a	0	3	1.52 ± 0.37^a	0	3
Eosinophil (%)	1.92 ± 0.17^a	1	4	1.52 ± 0.19^a	0	3	1.48 ± 0.18^a	0	3	1.64 ± 0.16^a	0	3
Glucose (mg/dl)	$155.10^a \pm 6.07$	104.65	199.34	$210.27^a \pm 6.26$	151.03	278.87	$221.46^a \pm 5.95$	167.68	284.78	$214.27^a \pm 4.22$	167.68	255.67
Cholesterol (mg/dl)	$110.01^a \pm 2.46$	88.98	130.42	$114.72^a \pm 1.89$	98.87	134.67	$112.79^a \pm 1.62$	98.99	134.67	$109.68^a \pm 1.23$	98.99	125.26
Albumin (g/dl)	$3.05^a \pm 0.17$	1.35	4.1	$3.141^a \pm 0.15$	1.78	4.1	$3.22^a \pm 0.15$	1.78	4.1	$3.460^a \pm 0.16$	2.27	4.1
Total protein (g/dl)	$6.36^a \pm 0.19$	4.43	7.7	$6.51^a \pm 0.19$	4.43	7.86	$6.66^a \pm 0.18$	4.45	7.86	$7.01^a \pm 0.16$	5.36	9.05
urea nitrogen (mg/dl)	$24.11^a \pm 1.42$	11.23	37.36	$23.37^a \pm 1.01$	14.38	33.8	$26.96^a \pm 1.11$	18.45	38.45	$26.85^a \pm 1.11$	18.45	38.45
Bilirubin (mg/dl)	$0.06^a \pm 0.02$	0.00	0.248	$0.06^a \pm 0.0$	0.00	0.248	$0.102^a \pm 0.01$	0.00	0.253	$0.10^a \pm 0.02$	0.00	0.253
AST (U/ml)	$0.057^a \pm 0.01$	0.018	0.099	$0.05^a \pm 0.01$	0.018	0.099	$0.061^a \pm 0.004$	0.018	0.099	$0.14^a \pm 0.02$	0.023	0.268
ALT (U/ml)	$0.024^a \pm 0.003$	0.008	0.048	$0.03^a \pm 0.003$	0.008	0.073	$0.049^a \pm 0.01$	0.008	0.099	$0.07^a \pm 0.01$	0.028	0.173

Superscript 'a' stands for nonsignificant difference ($P < 0.05$) between the column.

1.92±0.17 to 1.64±0.16 in weaner to sow respectively. Age is an important source of variation for some of the parameters. The Hb, TEC, PCV, TLC, MCHC increased with the age of the pigs. The observed difference in adult and young pigs suggested that the oxygen carrying capacity of the blood was high in adult (Daramola *et al.* 2005). The TLC levels of weaner pig were approximately one-half to that of adult swine which was similar with the result of Swenson *et al.* (1993). Other values of leukocyte series (neutrophil, lymphocytes, monocytes, basophil and eosinophil) were within the recommended physiological ranges (Table 1).

The mean glucose (mg/dl) level ranged from 155.10±6.07 to 221.46±5.45 in weaner, feeder, gilt and sows. The level of glucose decreased in weaner pigs which might be due to newborn piglet can be born with low glycogen reserves in the liver and during the first few days of life it is unable to mobilize this to provide adequate levels of glucose in the blood. An increase in glucose was observed with aging (Table 1). Increased excitability and forced activity are known to elevate serum enzymes, glucose and cholesterol (Barrett and Chalmers 1977). The cholesterol (mg/dl) level ranged from 109.68±1.23 to 114.72±1.89 in consent with Friendship *et al.* (1984) and the level was lower in sow which might be due to age as well as gestation and lactation. Albumin (g/dl) and total protein (g/dl) were ranged from 3.05±0.17 to 3.46±0.11 and 6.36±0.19 to 7.01±0.16, in weaner to sow respectively. Aging in growing pigs caused an increase in protein and albumin concentration (Smith 1990). The urea nitrogen (mg/dl) level was higher in sow in comparison to weaner pig. The AST and ALT level of Burmese pigs were increasing with age might be due to the biochemical changes of different organ systems whose enzyme activities increase with age up to body maturity, (Cilliers *et al.* 1995). Obviously, tissue development and modification during the growing period could induced high serum enzyme activity.

In summary, the reference data presented in this study provides a baseline for interpreting haemato-biochemical changes of individual sick pigs or from herds with suspected subclinical disease. These values will be useful for clinicians or scientists for data interpretation.

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