



Blood profiles of mithun under different physiological stages

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The mithun (*Bos frontalis*), a threatened bovine species, of north eastern states of India is believed to have descended from *Bos gaurus*. The metabolic profile test is intended to be a measure of balance between input in terms of nutrients absorbed from gastrointestinal tract and output in terms of requirements of those nutrients for maintenance, pregnancy and lactation. Blood serum constituents were measured to assess the effects of different feeding regimens on production and reproduction status of the animal. Keeping these factors in view the present study was undertaken to find out the relationship between blood profile with different stages of reproduction.

The study was carried out in the herd of mithun maintained at Jharnapani farm, NRC on Mithun, Nagaland. Mithuns (32) were divided into 3 groups such as heifer (8), oestrus (8), pregnant (8) and non pregnant (8) based on per rectal examination and farm record and were clinically normal and are maintained in standard feeding ration of farm. These mithun were evenly distributed in 4 strains of mithun namely Arunachalee (8), Mizoram (8), Nagaland (8) and Manipur (8). Each stage comprises 2 mithuns of each strain. The animal has a matured graafian follicle (fluctuation), has showing oestrous signs were considered as cyclic oestrous animals, the pregnant animals were selected between the 3–7 months of pregnancy. The blood samples were collected from jugular vein into collection tubes containing EDTA at early morning between 7.0 – 9.0 AM from November to January 2012. The blood samples were examined for the biochemical parameters such as ALK, SGPT (ALT), SGOT (AST), total protein, albumin, globulin, AG ratio and glucose and haematological profiles were TRBC, Hb, ESR, PCV, MCV, MCH, MCHC and TWBC.

Estimation of hematological profiles was carried out as

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per Coles (1986) and Sastry (1989). The biochemical parameters were carried out using commercial diagnostic chemical kits by using double UV spectrophotometer. Each sample was analyzed twice and the averages of the 2 readings were taken as the estimated value. Statistical analysis was carried out SPSS 15 software.

Haematological parameters (TRBC, TWBC and PCV) and biochemical profile (ALK, SGOT (ALT), SGPT (AST)) and serum glucose were significantly ($P < 0.05$) different between various stage of reproduction. Increased TRBC in oestrus cows is due to hyperactivity and excitement, which may be due to high level of estrogen (anabolic effects) from graafian follicle (Coles 1986). The TWBC was higher in non-pregnant mithun as compared to pregnant and estrus mithun because during estrous period excessive migrating of these cells to uterus for uterine defense mechanism and during pregnancy progesterone induces the immune suppressive effect (Sastry 1989). Other blood parameters were nonsignificantly higher in estrus than heifer, pregnant and non pregnant animals (Kumar and Sharma 1991). The haematological and biochemical parameters were nonsignificantly different between various strains except the ESR ($P < 0.05$). There is no information regarding on blood parameters at different stages of reproduction in mithun. The biochemical parameters such as total protein, albumin, and globulin were nonsignificantly higher in pregnant than heifer, estrus and non – pregnant mithun cows because progesterone hormone have to increase total protein and albumin level for fetal development. The higher globulin concentrations may be due to longer exposure to various antigens and pathogens, and production of antibodies led to higher total serum proteins and lower albumin to globulin ratio (Bogin 1994, Kaneko *et al.* 1997). ALP showed a significant ($P < 0.05$) difference, being much higher in young animals. This difference is seen in other species and is due to faster growth rate in young animals and leakage of the enzyme from growing bones and intestines into the blood (Bogin 1994, Kaneko *et al.* 1997). Decrease in alkaline phosphatase with advancement of pregnancy was due to transportation of alkaline phosphatase

from mother's blood to foetus (Sharma and Luktuke 1981). SGPT was higher in oestrus cows, may be due to excessive hormone metabolism in liver leads to release of liver enzyme. Increased SGOT during gestation may probably be because of origin of this enzyme from either placenta or uterine muscle (Singh *et al.* 1992).

On the basis of results of our study, it was concluded that high erythrocytic count and low white blood cell count were observed in oestrus mithun cows and alkaline phosphatase and glucose concentration was significantly ($P < 0.05$) higher in mithun heifer. SGOT and SGPT were significantly ($P < 0.05$) higher in pregnant and oestrous mithun cows, respectively.

SUMMARY

Mithuns (32) were divided in to 3 groups, viz. heifer (8), oestrus cows (8), pregnant cows (8) and non pregnant cows (8) based on per rectal examination and farm records and these were clinically normal. The blood samples were examined for the biochemical parameters such as alkaline phosphatase (ALK), SGPT (ALT), SGOT (AST), total protein, albumin, globulin, AG ratio and glucose and haematological profiles were total red blood cells (TRBC), haemoglobin (Hb), erythrocyte sedimentation rate (ESR), packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean

corpuscular haemoglobin concentration (MCHC) and total white blood cell (TWBC). Significant difference was observed in TRBC, TWBC, PCV, ALK, SGOT, SGPT and glucose between the different stages of reproduction in mithun. These biochemical and haematological parameters were not significant different between the strains of mithun except ESR.

REFERENCE

- Bogin E. 1994. *Handbook for Veterinary Clinical Chemistry*. Kodak Publication. USA.
- Coles E H. 1986. *Veterinary Clinical Pathology*. 4th edn. W.B. Saunder's Company, London, UK.
- Kaneko J J, Harvey J W and Bruss M L. 1997. *Clinical Biochemistry of Domestic Animals*. Acad. Press, New York.
- Kumar S and Sharma M C. 1991. Level of haemoglobin and certain serum biochemical constituents in rural cows during fertile and non fertile oestrus. *Indian Veterinary Journal* **68**: 361–64.
- Sastry G A. 1989. *Veterinary Clinical Pathology*. 3rd edn. CBS. Publishers and Distributors (Pvt.) Ltd. Dehli, India.
- Singh R, Setia M S and Singha S P S. 1992. Plasma enzyme levels during pregnancy in buffalo (*Bubalus bubalis*). *Buffalo Journal* **3**: 287–91.
- Sharma S S and Luktuke S N. 1981. Ascorbic acid, cholesterol and alkaline phosphatase variation in buffalo and foetal blood serum during pregnancy. *Indian Journal of Animal Sciences* **34** (2) : 226–28.