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Research Article

SERUM BIOCHEMICAL PROFILE OF JERSEY CROSS BRED HEIFERS

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ABSTRACT
Blood biochemical constituents and enzyme chemistry in cross bred (Jersey x ND) heifers during anoestrus or oestrus conditions were studied. The glucose and urea nitrogen levels in anoestrus animals were significantly lower than in oestrus animals. Significant differences in the serum enzymes like AST, ALP and LDH were observed. Calcium, phosphorus, magnesium and iron concentrations were higher in oestrus animals than in the anoestrus animals.

***Key Words**: Serum Enzyme, Anoestrous Cows, Biochemical Profile*

INTRODUCTION
Blood serum constituents reflect the metabolic status of the animal and are frequently used to assess the reproductive and productive performance of the farm animals. Heifers are the farm animals, in which period, great care has to be exercised for the earlier reproduction and for better production thereafter. Under filed conditions, crossbred heifers are usually underfed, which results in deficiencies of certain nutrients and ultimately reflected in the levels of certain biochemical constituents. Keeping in view, the present study has been undertaken to analyze and compare the serum enzymes and biochemical metabolites of oestrus and anoestrous crossbred heifers maintained in Karur District of Tamil Nadu.

MATERIALS AND METHODS
The animals (Jersey X ND), which were brought to the mass contact campaigns organized in the nearby villages, were utilized for the present study. The animals were maintained under standard animal husbandry conditions providing well ventilated asbestos roofed shed having concrete floor. The animals were fed as per standard feedings norms.

Collection and Handling of Blood Samples
Each 10 ml of blood samples were collected from the jugular vein of the goats, following aseptic procedures. Each 10 ml of blood was collected in a clean vacutainer. The blood samples were allowed to clot. The serum was separated by centrifugation and stored in deep freezer at -20^{O}C until the biochemical analysis were carried out.

Analysis
Biochemical analyses were carried out with reagents and procedures supplied along with the kits (Span diagnostics Ltd., Surat, India). Total protein, albumin, urea nitrogen, cholesterol, AST, ALT, ALP and LDH were analyzed as per the standard protocols. Concentration of serum minerals, sodium, potassium and phosphorus were estimated as per the standard prescribed methods. Calcium, magnesium and iron were analyzed by using atomic absorption spectrophotometer. The values were analyzed by the method suggested by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION
The serum enzyme and biochemical indices of the Tellicherry goats are provided in table.

Table 1: Blood biochemical, enzymatic and mineral status of oestrua and anoestrus cross-bred heifers

Parameters	Oestrus	Anoestrus
I. Biochemical Metabolites: Glucose (mg/dl)	57.32± 3.11*	40.01±1.88
Cholesterol (mg/dl)	87.88±9.90	111.55±10.12
Blood urea nitrogen (mg/dl)	19.11±1.02*	12.13±1.19
Total proteins (g/dl)	6.23±0.11	5.83±0.12
Albumin (g/dl)	2.82±0.08*	2.11±0.05
Globulin (g.dl)	3.36±0.12	3.72±0.10
Albumin: globulin ratio	0.833±0.25*	0.567±0.014
II. Serum Enzymes: AST(IU/l)	87.36±3.62*	111.14±6.68
ALT (IU/l)	33.61±2.68	26.42±2.21
LDH (iu/l)	888.75±18.27*	801.45±23.58
ALP (IU/l)	25.83±2.86*	9.48 ±1.55
III. Serum Minerals: Sodium (mmol/l)	150.49±12.92	138.67±8.99
Potassium (mmol/l)	4.85±0.27	4.07±0.13
Calcium (mg/dl)	11.12±0.91*	8.38±0.53
Phosphorus (mg/dl)	6.85±0.35*	4.30±0.05
Magnesium(mmol/l	0.94±0.04	0.64±0.04
Iron (micromole/l)	21.82±0.57	19.26±0.54

**Differ significantly (p<0.01)*

Discussion

The mean plasma glucose concentration was significantly (P<0.01) higher in oestrus animals that that in anoestrus animals. These values agree well with the observations of Singh and Singh (2006). The increased concentration of plasma glucose level could elevate the progesterone production directly by increasing the LH production (Kaneko, 1989). According to Arthur *et al*., (1982) the temporary cessation of oestrus in cows and delayed puberty in heifers occur when they were exposed to negative energy balance. In the anoestrus group of animals, the mean value of cholesterol was insignificantly higher than the mean value in oestrus animals. The mean values of the serum total protein of crossbred heifers for the oestrus group as well as the anoestrus group were found in the normal range. An optimum level of total protein in blood serum is essential for the expression of oestrus sign in cows. Deficiency of protein intake in cows causes weak expression of oestrus (Hafez, 2000).

The average value of enzyme aspartate amino transaminase (AST) was statistically higher (P<0.01) in anoestrus group of animals. Lactate dehydrogenase (LDH) was significantly lower in anoestrous animals. The hormonal imbalance and deranged enzymatic action affects normal reproductive behavior, as suggested by Vanlalngehta *et al*., (2003).

A significant difference in the levels of calcium, phosphorus, magnesium and iron was observed in the case of serum minerals. Mean phosphorus level in the anoestrus animals was lower than the suggested critical level of 4.5 g/100ml (Kunj *et al*., 2006).

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