

Short Communication

Inter-Relationship of Certain Biochemical Parameters of Physiological Significance with Reproductive Pattern in Crossbred Cows

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ABSTRACT

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Reproductive performance is one of the important factors which determine the profitability of the dairy farmers. To explore the metabolic status, blood chemistry is a vital diagnostic aid for reproductive deficiency diseases. High incidence of repeat-breeding and anoestrus are associated with the deficiencies of glucose, protein, albumin and globulin. The study was aimed at examining biochemical parameters in crossbred cows during Double PGF_{2α} protocol. Blood glucose levels during Double PGF_{2α} protocol were not significantly different ($P>0.05$) within group. On the day of induced estrus, the mean total protein concentration increased significantly ($P<0.05$) from 7.25 ± 0.29 to 8.51 ± 0.41 g/dl. The effect of a low level intake of protein on reproduction may be due to reduced intake of feed resulting in a delay in estrus and thus delay in the onset of estrus cycle. On the day of induced estrus, there was increase in the mean phosphorus value (6.43 ± 0.52 mg/dl) than the 0 day value (5.98 ± 0.88 mg/dl) and significant difference ($P<0.05$) was found within groups. Thus, the present investigation reveals that biochemical parameters can be an important tool for the assessment of reproductive pattern in crossbred cows.

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Reproductive performance is one of the important factors which govern the profitability of the dairy farmers. It is well known fact that factors such as breed, sex, age, behavior, handling, physiological changes and the period of the day, can influence the cellular constituents and serum biochemistry of the blood (Taylor, 1997). To explore the metabolic status of the cows, blood chemistry is a vital diagnostic aid for reproductive deficiency diseases.

Glucose, one of the nutrients apparently enhances postpartum reproductive performance by increasing the energy status of the animals and thus stimulate the ovarian follicular growth and luteal functions. High incidence of repeat-breeding and anoestrus are associated with the deficiencies of glucose (Jani *et al.*, 1995), protein, albumin and globulin (Joe Arosh *et al.*, 1998). Marginal deficiency of phosphorus cause disturbance in the pituitary-ovarian-axis including ovulation. The study was aimed at examining biochemical parameters of physiological significance with reproductive pattern in crossbred cows during Double PGF_{2α} protocol.

The proposed investigation was conducted at Livestock Farm, Adhartal, Jabalpur (M.P.) A total of 6 Crossbred cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. Blood samples (5 ml with 10 % aqueous solution of Ethylene Diamine Tetra Acetic acid (EDTA) as anticoagulant) were collected from each animal aseptically by jugular vein puncture by using sterilized needle for biochemical parameters on day 0, 1, 12, 13 & 14 (Double PGF_{2α} protocol). Blood or plasma samples were evaluated for the blood glucose (mg/dl) using commercial Acuu-Chek glucose meter. Total protein (g/dl) and phosphorus (mg/dl) were evaluated by using autoanalyser and their

respective kits. The data generated were analyzed statistically, using Completely Randomized Design (CRD) as per the method described by Snedecor and Cochran (1994). It is apparent from table that blood glucose levels during Double PGF_{2α} protocol were not significantly different ($P>0.05$) within group. Thus, it may be concluded that blood glucose level alone is not responsible for expression of heat symptoms.

On the day of induced estrus, the mean total protein increased significantly ($P<0.05$) from 7.25 ± 0.29 to 8.51 ± 0.41 g/dl. The present findings is close to the finding of Sharma *et al.* (1984) who observed that total protein of cyclic and anestrus cows as 8.25 ± 1.22 and 6.35 ± 1.01 g/dl respectively. According to Podar and Oroian (2003) estrus causes increase in total plasma protein in dairy cattle. The effect of low level of protein on reproduction may result in delay in the onset of estrus cycle.

On the day of induced estrus, there was increase in the mean phosphorus value (6.43 ± 0.52 mg/dl) than the 0 day value (5.98 ± 0.88 mg/dl) and ($P<0.05$) significant difference found within groups. This observation is in agreement with the report of Verma (1980) stated that concentration of phosphorus in anestrus Buffaloes averaged 5.49 mg/dl whereas; the value averaged 6.0 mg/dl on day of induced estrus. Sane (1977) reported that with a phosphorus deficient ration in cows leads to suppression in the symptoms of estrus to such an extent that heat detection was difficult even with a vasectomized bull. Mahadevan (1963) observed delay in sexual maturity and irregularity in estrus due to direct or indirect deficiency of phosphorus. Recommended phosphorus levels for growing heifers are 0.21–0.23% in the diet. Levels below 0.14% are generally considered to be low and conducive to reproductive problems.

Parameters	Mean±SE				
	Day 0	Day 11	Day 12	Day 13	Day 14
Glucose (mg/dl)	64.50±2.5	63.50±2.12	63.17±1.25	61.33±1.05	64.50±1.93
TP (g/dl)	7.25 ^c ±0.29	7.49 ^{bc} ±0.23	7.97 ^{bc} ±0.46	9.99 ^a ±0.50	8.51 ^{ab} ±0.41
Phosphorus (mg/dl)	5.15 ^b ±0.30	4.40 ^b ±0.19	4.62 ^b ±0.51	6.43 ^a ±0.52	5.98 ^a ±0.88

Mean values with different superscripts in a row vary significantly ($P<0.05$)

Based on the results of the present study, it can be concluded that biochemical parameters can be an important tool for the assessment of reproductive behavior in crossbred cows, evaluation of physiological status, metabolic disorders, management problems of the farm which have great relation to health status of the animal and probably crucial for the normal ovulatory processes.

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Table: Mean plasma concentration of biochemical parameters in Double PGF₂α protocol