

Haematological and Blood Biochemical Profile in Lactating Buffaloes in and around Parbhani city

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Abstract

Fourty buffaloes in early, mid and late lactation with a drop in a milk production were screened for haematological and blood biochemical profile. In early stage of lactation haemoglobin concentration showed lowered trend as compared to recorded means in other groups of lactating buffaloes. The mean value of TLC in dry pregnant group of buffaloes was $10.05 \pm 0.89 \times 10^3$ / cmm showed slightly higher trend than the normal healthy control group. The blood glucose was significantly higher in dry buffaloes (52.72 ± 4.22 mg/dl) than the early and late lactating buffaloes (48.23 ± 3.44 mg/dl). During early stage of lactation the serum total protein values (8.36 ± 0.47 g/dl) was slightly elevated than the normal healthy control (8.00 ± 0.57 g/dl). The urea nitrogen values differ significantly ($P < 0.05$) amongst different groups of lactating buffaloes. The descending trend in the serum cholesterol concentration in dry pregnant buffaloes compared to lactating buffaloes was observed. There was drop in calcium level during early stage of lactation (8.19 ± 0.83 mg/dl) than the normal healthy buffaloes (11.21 ± 0.19 mg/dl). As the stage of lactation progresses the serum calcium level increased. Serum magnesium concentration in various groups of buffaloes did not differ significantly. Early lactation showed highest susceptibility for ketosis and hypocalcaemia. The metabolic disorder associated with hypophosphatemia was significantly high in dry (advance pregnant) buffaloes.

Keywords: glucose, total proteins, BUN, cholesterol, calcium, phosphorus and magnesium.

Introduction

Profile of blood metabolites have been used widely to identify problem and to indicate dietary causes of diseases or low production (Lee et al, 1978). The blood biochemical profiles are considered important in evaluating the health status of animals. The estimates of biochemical constituents are the prerequisites to diagnose several pathophysiological and metabolic disorders in cattles (Mc Dowell, 1992; Chaffe, 1976). The present study was undertaken to study the hematological and some of the blood biochemical alterations according to stages of lactation in buffaloes.

Materials and Methods

Buffaloes in various stages of lactation with a history of drop in a milk production presented for examination at veterinary polyclinic (TVCS), Parbhani and cases identified from local buffalo farms in and around Parbhani city were selected for the study comprised of Murrha, Jafarabadi, Nagpuri

and Non-Descript breed of buffaloes. The study period was of 8 months. Detailed clinical examination of buffaloes in various stages of lactation was performed. The procedure included collection of history in relation to age, stage of lactation, number of lactation, feeding regime, previous and present milk yield. Clinical parameters were also recorded. Then the buffaloes were divided into four groups with 10 animals each in their early lactation, mid lactation, late lactation and dry pregnant group. A fifth group comprising of 10 lactating buffaloes was observed as healthy control and for the comparison of data.

Blood samples were collected in vials and haematological parameters were determined on the same day as per Benjamin (2001). Serum samples were collected in a sterile vial for biochemical analysis. All the blood biochemical parameters were estimated using Auto Analyzer Slim (SEAC), W7 MIDC, Parbhani, Maharashtra. The statistical analysis was done by applying Completely Randomized Design.

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Table-1. Mean± S.E.values of haematological parameters according to stages of lactation.

Group	Hb (gm %)	PCV (%)	TLC (X103/ μ l)	TEC (X106/ μ l)
Early lactation	9.08±0.32	33.1±1.70	9.16±0.66	5.89±0.44
Mid lactation	9.22±0.17	35.6±3.34	10.19±0.39	5.47±0.43
Late lactation	10.1±0.68	38.1±1.68	9.71±0.51	5.83±0.19
Dry(Pregnant)	10.46±0.60	39.5±3.88	10.02±0.89	6.40±0.52
Healthy Control	9.94±0.33	35±0.96	8.22±0.35	6.53±0.42
CD	1.56	7.12	1.65	1.08
F-value	1.08NS	0.97NS	1.76NS	1.16NS

Results and Discussion

Haematological alterations

There were non significant differences in all these haematological parameters among groups of lactating buffaloes depicted in table no-1. During early stage of lactation, the mean haemoglobin concentration was 9.08±0.32 g% which showed lowered trend as compared to recorded means in other groups of lactating buffaloes (Tambare, 2005). Similarly, Flores et al, (1990) found non significant difference in haematocrit values during late gestation and early lactation. The mean value of TLC in dry pregnant group of buffaloes was 10.05± 0.89 X 10³ /cmm which showed slightly higher trend than the normal healthy control group. Similar trend of increasing values was reported by Deshpande et al, (1987).

Blood Biochemistry

Blood biochemical alterations according to stages of lactation were depicted in table-2.

Blood Glucose

The blood glucose level is regarded as one of the indicators of energy status in ruminants. The blood glucose was significantly higher in dry buffaloes (52.72±4.22 mg/dl) than the early and late lactating buffaloes (48.23±3.44 mg/dl). The lowered means of blood glucose concentrations (37.54±3.44 mg/dl) in early stage of lactation were due to large amount of blood glucose withdrawal by the mammary gland for

the synthesis of milk lactose (Schultz, 1968). The hypoglycemia after parturition was attributed to heavy drain of glucose for lactose synthesis (Nale, 2003).

Total Proteins

During early stage of lactation the serum total protein values (8.36±0.47 g/dl) was slightly elevated than the normal healthy control (8.00±0.57 g/dl). Kulkarni et al, (1983) recorded lowered concentration of total proteins than the recorded in present investigation. Higher serum total protein concentration might have been associated with infectious processes i.e. mastitis, metritis or have had improved because of dietary intake of concentrates. Total protein contents usually used as an appraisal of nutritive status of an animal reflecting food intake and metabolism. This increase in total protein concentration following parturition might be attributed to the haemoconcentration and water losses occurred following parturition.

Blood Urea Nitrogen

The urea nitrogen values differ significantly (P<0.05) amongst different groups of lactating buffaloes. The mean blood urea value in early lactating stage (17.93±0.79 mg/dl) was significantly lowered as compared to the normal healthy control (26.76±0.35 mg/dl). Poso and Lindberg (1994) revealed lowered urea concentration after parturition which simulates with the present findings. Increase in blood urea

Table-2. Mean± S.E.values of Blood biochemical parameters according to stages of lactation.

Group	Calcium (mg/dl)	Phosphorus (mg/dl)	Magnesium (mg/dl)	Glucose (mg/dl)	Total Proteins (gm/dl)	BUN (mg/dl)	Cholesterol (mg/dl)
Early lactation	8.1±0.83a	4.64±0.53a	3.02±0.36	37.54±3.44a	8.38±0.47	17.93±0.79a	14.07±3.61a
Mid lactation	9.65±0.78a	5.18±0.44a	3.13±0.27	48.22±2.81b	8.09±0.50	19.72±1.50a	45.37±7.47b
Late lactation	8.73±0.50a	4.76±0.28a	3.20±0.96	51.47±5.01a	7.50±0.59	22.92±1.30b	38.53±7.97b
Dry(Pregnant)	7.81±1.02a	4.75±0.51a	2.99±0.28	52.72±4.22a	8.19±0.62	25.09±0.80c	15.19±5.65a
Healthy Control	11.21±0.19b	6.55±0.28b	3.50±0.17	50.06±0.57a	8.00±0.57	26.76±0.35b	89.36±3.16c
CD	2.02	1.18	0.80	9.85	1.54	2.87	15.96
F-value	3.44S	3.27S	0.48NS	2.91S	0.34NS	12.22HS	14.89HS

HS-Highly significant at 1 % level (P<0.01), S- Significant at 5 % level (P<0.05), NS-Non significant.

nitrogen levels in dry pregnant buffaloes in late pregnancy could be either due to increased deamination or increased protein intake (Oliva, et al, 1991; Mulei and Daniel, 1989).

Cholesterol

The descending trend in the serum cholesterol concentration in dry pregnant buffaloes compared to lactating buffaloes was observed (Nath et al, 2005). The serum total cholesterol concentration was minimum following calving and got build up as the lactation progresses (Rowlands et al, 1990). The higher level of cholesterol with advancement of lactation was a physiological adjustment to meet the lactation requirements. The hormonal level of estrogen along with thyroxin played a vital role in reducing the cholesterol levels during pregnancy.

Calcium

There was drop in calcium level during early stage of lactation (8.19 ± 0.83 mg/dl) than the normal healthy buffaloes (11.21 ± 0.19 mg/dl). The depressed trend in Ca^{++} levels could be a result of the impaired absorption of food metabolites from the gastrointestinal precursor, excessive losses through urine, colostrums as it was much more drained in the colostrums during excessive milking and due to insufficient mobilization from the skeleton. As the stage of lactation progresses the serum calcium level increased which corroborates with the findings of Rowlands et al, (1975) and Nale (2003). Ramakrishna (1991) recorded higher values (9.77 ± 0.33 mg/dl) of calcium in lactating buffaloes.

Phosphorus

The serum phosphorus level in early stage of lactation (4.64 ± 0.53 mg/dl) was significantly ($P < 0.05$) lowered than the normal healthy control and other group of buffaloes. Moderate depression in the levels of phosphorus might be due to the necessity of it for the colostrums synthesis (Rook and Thomas, 1983) and enhanced carbohydrate metabolism.

Magnesium

Magnesium plays a vital role during the metabolism of carbohydrates, lipids, nucleic acids and proteins. In present investigation serum magnesium concentration in various groups of buffaloes did not differ significantly. However, Rao et al, (1981) recorded higher magnesium levels (3.47 ± 0.23 mg/dl) while Gupta and Rai (1987) recorded lowered magnesium mean values.

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