

A STUDY ON SERUM PROTEIN PROFILE AT DIFFERENT LACTATION STAGES IN UPGRADED MURRAH BUFFALOES

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Abstract – The aim of the present study was to find out the serum protein profile of upgraded Murrah buffaloes in different lactation stages. The blood samples were collected from 12 healthy lactating upgraded Murrah buffaloes in early (0-13 weeks), mid (14-26 weeks) and late (27-40 weeks) lactation stages and separated serum was analyzed for total protein, albumin, globulin, albumin: globulin ratio, urea, uric acid and creatinine. All the constituents under study differed significantly within the respective means amongst the three stages of lactation with exception of albumin:globulin ratio. The values of total serum protein, globulin and uric acid were decreased significantly throughout the lactation period while urea and creatinine increased significantly with progress of lactation. Serum albumin was decreased from early to mid stage then increased from mid to late lactation.

INTRODUCTION

The metabolic profile test is intended to be a measure of balance between 'input' interms of nutrients absorbed from gastrointestinal tract and 'output' in terms of requirements of those nutrients for maintenance, pregnancy and lactation (Blowey, 1985). Pregnancy and lactation have a great impact on the intensity of metabolism and on metabolic parameters in the blood. The estimates of biochemical constituents are the prerequisites to diagnose several pathophysiological and metabolic disorders in cattle (McDowell, 1992). The present study was undertaken to study the some of the blood protein profile alterations according to stages of lactation in buffaloes.

MATERIALS AND METHODS

The study was carried out in dairy farm of College of Veterinary Science and A.H., Mhow (M.P.) on six apparently healthy lactating upgraded Murrah buffaloes in good nutritional condition. During the trial, all animals were kept under natural photoperiod and ambient temperature. All animals were free from internal and external parasites. The animals were maintained under standard nutritional and managemental conditions. During the lactation, they were milked twice a day by full hand method and fed twice daily during the experimental period. All the experimental subjects were selected on the basis of their lactation status. The entire lactation period was divided in 3 successive stages *i.e.*, Early

(0–13 weeks), Mid (14–26 weeks) and Late lactation (27–40 weeks) as per Akasha *et al.*(1987). Blood samples (10 ml) were collected at weekly interval at the same hour in the morning from jugular vein into glass tubes without any anticoagulant and serum was harvested. Serum total protein, albumin, urea, uric acid and creatinine were estimated by commercial biochemical kits (Erba Mannheim) using an autoanalyser – STAT FAX 2000. Globulin concentration is calculated by subtracting the albumin from total protein concentration. Serum albumin : globulin ratio is obtained by dividing albumin concentration by globulin concentration. The observations were subjected to two way analysis of variance using following statistical model (Pillai and Sinha, 1968).

RESULTS AND DISCUSSION

Serum protein profiles (mean \pm SE) in early, mid and late lactation stages in upgraded Murrah buffaloes are depicted in Table 1.

Serum total protein

Lactation stage had highly significant ($P<0.01$) effect on concentration of serum total protein. Previously Grasso *et al.* (2004) and Balusami *et al.*(2008) in buffaloes also found similar results. There was significant decrease in serum total protein as lactation advances. Similar observations were made by Prabhakar *et al.* (1999) and Grasso *et al.* (2004) in buffaloes. The highest value of total protein in early lactation may be attributed to the haemoconcentration and water losses occurred following parturition.

Serum albumin

The mean values of serum albumin concentration were 3.63 ± 0.06 , 3.20 ± 0.07 and 3.33 ± 0.08 g/dl during early, mid and late stage of lactation,

respectively. The differences in level of serum albumin among three stages of lactation were significant ($P<0.05$). Serum albumin concentration showing decreasing trend in postpartum stage is in agreement with reported findings of Lone *et al.* (2003) in Murrah buffaloes and Kholif (1999) in buffaloes.

Serum globulin

The serum globulin followed the similar trend to that of serum total protein. The decreasing trend in serum globulin concentration with the advancement of lactation were statistically highly ($P<0.01$) significant. The results are supported by findings of Kholif (1999) in buffaloes.

Serum albumin: globulin ratio

The mean values of serum A: G ratio in descending order were 0.84 ± 0.02 , 0.79 ± 0.02 and 0.90 ± 0.02 during early, mid and late stages of lactation, respectively. Lactation stages exert non significant effect on concentration of serum A: G ratio in upgraded Murrah buffaloes.

Serum urea

There was significant increase in serum urea concentration as lactation advances. The observations of the present study are in agreement with the observation of Balusami *et al.* (2008) in Murrah buffaloes. Serum urea concentration may also increase if energy intake is restricted, which is thought to reflect increased breakdown of endogenous protein for energy production.

Serum uric acid

Serum uric acid exhibited similar trend to that of serum total protein. There is significant decrease in serum uric acid level as lactation advances. Similarly Otto *et al.* (2000) in cows reported highest uric acid level in lactating cows than pregnant (mid and late

Table 1. Serum protein profiles at different stages of lactation in upgraded Murrah buffaloes

Parameters	Early lactation	Mid lactation	Late lactation
Total protein	8.02 ^b \pm 0.06	7.26 ^a \pm 0.06	7.08 ^a \pm 0.08
Albumin	3.63 ^b \pm 0.06	3.20 ^a \pm 0.07	3.33 ^a \pm 0.08
Globulin	4.39 ^c \pm 0.06	4.06 ^b \pm 0.05	3.73 ^a \pm 0.04
A:G ratio	0.84 \pm 0.02	0.79 \pm 0.02	0.90 \pm 0.02
Urea	36.13 ^a \pm 0.50	39.37 ^b \pm 0.56	45.70 ^c \pm 0.38
Uric acid	3.59 ^c \pm 0.06	2.75 ^b \pm 0.05	1.89 ^a \pm 0.05
Creatinine	1.52 ^a \pm 0.01	1.72 ^b \pm 0.01	1.85 ^c \pm 0.01

Means for a particular class with atleast one common alphabet as superscript do not differ significantly with each other.

lactation) earlier.

Serum creatinine

Highly significant effect ($P < 0.01$) of lactation stages was found on serum creatinine. There was significant increase in serum creatinine level as lactation advances. Increased level of creatinine indicated a reduction in muscular mass. Present observations were corroborated with the findings of Grasso *et al.* (2004) in lactating buffaloes.

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