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STUDIES ON THE BIOCHEMICAL CONTENTS OF MARATHWADI BUFFALO BLOOD

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ABSTRACT

The study includes certain blood biochemical constituents in the three groups of Marathwadi buffaloes. Group 1: First lactation (10 animals). Group 2: Second lactation (10 animals). Group 3: Third lactation (10 animals), urea, total lipid, decreased as the lactation number increased. Rations of blood total observed that the urea, is higher concentration in blood. Whereas the total lipids, calcium, phosphorus and potassium have higher concentration in milk as compared to blood.

Keywords: *Bubalus bubalis*, buffaloes, blood urea nitrogen, serum total lipids, Marathwadi buffalo

INTRODUCTION

Marathwadi buffaloes are reared in Nanded, Latur, Beed, Parbhani, Hingoli, Osmanabad, Jalna and Aurangabad districts of Maharashtra state due to genetic potential for milk and adaptation to local environmental conditions. Marathwadi buffaloes are entirely different from the Western and Northern types and clearly represents vary ancient Indigenous types characterized by lighter to medium built with compact stature of 300 to 370 kg as an average weight. Coat colour varies from greyish black to jet black. Sometimes white markings are observed on forehead and on lower parts of the limbs, with white switch. Horns are medium in length parallel to neck reaching up to shoulder but never beyond the shoulder blade. Forehead in moderately broad, neck is short, legs are properly set which in males suit for draft work of transportation in hilly tracts. The tail is moderate in length reaching up to hock joint. By virtue of its potentialities and the adaptability to varied circumstances prevailing, these buffaloes are reared vastly in this region, but the detailed literature on the economic characters of this species is lacking. Therefore, an attempt is being made for characterization, evaluation and conservation of Marathwadi buffalo under ICAR ad-hoc research project by Gujar *et al.* (2000).

MATERIALS AND METHODS

Experimental groups

The experimental animals selected from different villages randomly around Parbhani city. The animals were categorized according to the stage of lactation into three groups.

Group 1: First lactation (10 animals)

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Group 2: Second lactation (10 animals)
Group 3: Third lactation (10 animals)

The categorization of animal was based on the records available from owner and clinical examination/ physical examination of the animal, in which dental formula, horning, number of calving and age of animal was taken into account.

Management and feeding of animals

All the animals are selected from the well-established animals shed. Animals were maintained under free range system and animals were let loose for grazing in the field. The animals had free access to drinking water and were provided with abundant free clean water. All the buffaloes selected from the villages owners have good pedigree record and good maintains in the sence of feeding, clean water, and prompt vaccinations. Hygienic conditions near the shed.

Collection and handling of blood samples

Blood samples from the experimental animal were collected in the morning hours. The blood samples were obtained from Jugular vein by puncturing with a sterile disposable needles. About 15 ml blood samples were collected in the clean and sterilized test tube and tubes kept on ground immediately in slanting position for the extraction of serum. And about 3 ml blood in glass vials with anticoagulant (EDTA). The whole blood sample was immediately deproteinized by Folin and Wu methods as described by Oser (1965) to avoid loss of blood glucose samples collected in large size (50 ml capacity) plastic bottles for estimation of physico-chemical constituents. The blood samples were carried in ice to the laboratory for further processing.

Serum was separated from blood samples within 4 to 5 h. of collection and stored at -20°C until further analyses. The whole blood samples were immediately used for estimation of blood glucose.

Analyses of blood biochemical constituents

Techniques

The blood constituents were analysed by using standard techniques categorized. By spectrophotometry: A spectrophotometer ** (systronic spectrophotometer model 106) was used to read the transmittance of colored solution. The constituents estimated were as follows:

I) Blood constituents: i) serum urea nitrogen, ii) serum total protein,

Blood constituents

Procedures

Urea estimation

Blood urea was estimated by using berth lot method with modification introduced by faweett and Scott (1960) as per the procedure described in a kit supplied by commercial Becon.* (Becacon diagnostics, Code No. p 17) principle: this method uses urease to hydrolyze urea to produce ammonia and carbon dioxide. The ammonia fenerated reacts with alkaline hypo chloride and sodium silicate in the presence of sodium nitroprusside to form a colored chromophore. The intensity of color produced is proportion to the amount of urea in the specimen.

$$\text{Urea} + H_2O \xrightarrow{\text{Urease}} 2NH_3 + 2CO_2$$

$$NH_3 + 5NaCl + 2\ \text{Salicylate} \longrightarrow \text{Indophenol} + 5NaCl + 5H_2O$$

Calibration: calibration for blood urea estimated (containing 1,2,3,4,5 ug of urea) and processing in the same way as samples and bland. The colour was read at 600 nm. Calibration graph

obtained is shown in Table 1.

Urea (mg/dl) = Reading from graph X Dilutionfactor X Factor for% (Calculation)

= Reading from graph X 8

Serum total lipids

Serum total lipids were estimated by phosphovanillin method using a kit supplied by a commercial firm *. (Span dignostics Ltd., Surat (Code no. 25924))

Principal: lipids, on heating with the concentrated sulphuric acid react with the phosphovanillin reagent and produce pink coloured complex with is measured colorimetrically or spectrophoto- metrically at 540 nm.

Calibration: Total lipids were calibrated by using working lipids standard (containing 0.14,0.28,0.42, 0.56, 0.70 mg of total lipids) and processing those in the same way as blank and samples. standard graph obtained by calibration is shown in Table 2..

Serum total lipids (g/dl) = Reading from graph X Dilution factor X (Factor for % calculation)

= Reading from graph X 3.9

Statistical analyses

The data on constituents of blood samples were analysed by applying completely randomized design for comparison of graph mean. (Panse and Sukhatme, 1985) Similarly, simple correlation coefficients of dependent variables were also computed.

RESULT AND DISCUSSION

Marathwadi buffalo entirely different from the Western and Northern types and clearly represents very ancient Indigenous types characterized by lighter to medium built with compact stature of 300 to 370 kg as an average weight. An attempt is being made for characterization, evaluation and conservation of Marathwadi buffaloes under ICAR adhoc research project by Gujar *et al*. (2000) in which the qualitative and quantitative characterization in relation to morphological traits, production potential and reproductive status is being studied.

However, studies on blood Biochemical constituents, in lactating Marathwadi buffalo is not available hence, present investigation was conducted to have a base line data on blood biochemical parameters,

The biochemical constituents studied in this project were blood glucose, serum urea nitrogen, total protein, total lipid, total cholesterol, calcium, phosphorus, sodium, potassium and chloride.

Blood urea nitroge

The blood urea nitrogen level during first, second and third lactation ranged between 13.8 to 18.83 mg/dl with non-significant variation (Table 3).

Blood urea nitrogen

The average blood urea nitrogen level in first, second and third lactation was 16.51±0.59, 16.04±0.6 and 14.82±0.34 mg/dl in Marathwadi buffaloes. These values are in agreement with values reported by Kulkarni *et al*. (1984) in dry Murrah buffaloes (16.15±0.87 mg %), however, significantly higher concentration of serum urea nitrogen in lactating buffaloes was reported by Kulkarni *et al*. (1984).

Table 1. Blood biochemical parameters in lactating Marathwadi buffaloes.

Sr. No	Parameter	Unit	Group 1	Group 2	Group 3	Grand mean
1	Blood urea nitrogen (S)	mg/dl	16.51±0.59	16.05±0.60	14.82±0.34	15.79
2	Total lipid (S)	g/dl	1.68±0.03	1.65±0.02	1.64±0.03	1.66

**- (P<0.01) Significantly at 1% level.

*- (P<0.05) Significantly at 5% level.

Table 2. ANOVA for blood biochemical constituents of lactating Marathwadi buffaloes.

Sr. No	Parameter	Source	d.f.	M.S.S.	F-values
1	Blood urea nitrogen (S)	Treatment	2	7.633	2.7494
		error	27	2.7762	
2	Total lipid (S)	Treatment	2	0.0047633	0.56366
		error	27	0.0084507	

**- (P<0.01) Significantly at 1% level

*- (P<0.05) Significantly at 5% level

Table 3. Ratio of blood to milk related constituents during different stages of lactation in lactating Marathwadi buffalo.

Parameters	Unit	Group 1	Group 2	Group 3	Overall
Urea	mg/dl	1.129	1.012	0.888	1.00
Total lipids	g/dl	0.207	0.204	0.203	0.204

Serum total lipids

The mean serum total lipids level ranged between 1.55 to 1.84 g/dl. The variation in serum total lipids between different stages of lactation is not significant.

They mean serum total lipids levels were 1.68±0.03, 1.65±0.02 and 1.64±0.03 g/dl in first, second and third lactation in Marathwadi buffalo with non-significant variation. These values were higher as compared to values reported by Ambore (1997) in healthy buffaloes.

Blood biochemical constituents

The mean values of blood and serum biochemical constituents in group first, second and third respectively, were as follows: urea nitrogen 16.51±0.59, 16.05±0.60 and 14.82±0.34 mg/dl total lipid 1.68±0.03, 1.65±0.02 and 1.64±0.03 g/dl, whereas serum urea nitrogen, total lipid, differed non-significantly. Urea, total lipid, decreased as the lactation number increased. Urea, increased with parity

Rations of blood total observed that the urea, have higher concentration in blood. Whereas the total lipids, calcium, phosphorus and potassium have higher concentration in milk as compared to blood.

CONCLUSION

Blood urea nitrogen

The blood urea nitrogen level during first, second and third lactation ranged between 13.8 to 18.83 mg/dl with nonsignificant variation (Table 6).

Serum total lipids

The mean serum total lipids level ranged between 1.55 to 1.84 g/dl. The variation in serum total lipids between different stages of lactation is not significant.

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