

## BIOCHEMICAL ALTERATIONS IN BUFFALOES AFFECTED WITH METABOLIC DISORDERS BEFORE AND AFTER TREATMENT<sup>#</sup>

S.D. Hagawane<sup>1</sup>, S.B. Shinde<sup>2</sup> and D.N. Rajguru<sup>3</sup>

Department of Clinical Medicine, Ethics and Jurisprudence

College of Veterinary and Animal Sciences, Parbhani- 431402, Maharashtra, India

### ABSTRACT

Investigation was undertaken to study the biochemical alterations in buffaloes affected with production disorders in and around Parbhani city of Maharashtra. Screening was done by using Compton Metabolic Profile Test (CMPT). Detailed clinical examination including history, clinical findings and urine analysis was done for each case. Ketotic group (T<sub>1</sub>) treated with Nandrolone laurate @ 125mg intramuscularly once, showed significant ( $p < 0.01$ ) decline in total serum cholesterol ( $124.42 \pm 5.50$  to  $98.32 \pm 7.63$  mg/dl) whereas significant elevation of blood glucose level ( $41.54 \pm 4.21$  to  $52.95 \pm 5.29$  mg/dl) after therapy was observed. In hypocalcaemic buffaloes (T<sub>2</sub>), there was significant ( $p < 0.01$ ) increase in serum calcium ( $5.52 \pm 0.48$  mg/dl to  $7.99 \pm 0.67$  mg/dl), blood glucose ( $46.94 \pm 5.22$  to  $51.00 \pm 4.20$  mg/dl), serum phosphorus ( $4.60 \pm 0.33$  to  $5.09 \pm 0.35$  mg/dl) and serum chloride ( $101.94 \pm 3.60$  to  $107.66 \pm 5.07$  mEq/l) after oral therapy of calcium chloride and tricalcium phosphate @ 100 g twice. Hypophosphatemic buffaloes (T<sub>3</sub>) group treated with sodium acid phosphate @ 80 g intravenously for 4-5 days showed significant ( $p < 0.01$ ) rise in serum phosphorus ( $3.68 \pm 0.39$  to  $5.74 \pm 0.54$  mg/dl). Declining trend was observed in serum total protein and BUN.

**Key words:** Serum cholesterol, hypocalcaemia, hypophosphatemia, ketosis, serum phosphorus, blood glucose, sodium acid phosphate, nandrolone laurate.

### Introduction

Profile of blood metabolites has been used widely to identify problem herds and to indicate dietary causes of disease 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 pre-requisites to diagnose several pathophysiological and metabolic disorders in cattle. (McDowell, 1992; Chaffe, 1976). The present study was planned to know some of the serum biochemical profile in buffaloes affected with metabolic diseases and develop suitable therapeutic measures for their treatment and control.

### Materials and Methods

Buffaloes with history of drop in milk production presented at TVCC of the college, Parbhani and cases identified from local buffalo farm in and

around Parbhani city and at Buffalo farm of Department of LPM, Veterinary College, Parbhani, constituted the cases for this study. The clinical cases were selected for the study comprised of Murrah, Jaffarabadi, Nagpuri and Non-descript breeds of buffaloes. The study was undertaken for 8 months duration. Blood samples from the buffaloes were collected from jugular vein. Serum was separated for biochemical analysis. Blood glucose, total serum protein, blood urea nitrogen, calcium, phosphorus, serum sodium, chloride, potassium, cholesterol, GGT and magnesium were estimated using Auto Analyzer Slim (SEAC), employing standard kits. Eight clinical cases exhibited ketosis (T<sub>1</sub>), six hypocalcaemia (T<sub>2</sub>) and six hypophosphatemia (T<sub>3</sub>). These were subjected for the treatments as depicted in Table 1.

The statistical analysis was done as per the method described by Snedecor and Cochran (1994).

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<sup>1</sup> Project coordinator, ANTHRA, Pune

<sup>2</sup> Assistant Professor, Department of Medicine, Bidar Veterinary College, Karnataka.

<sup>3</sup> Professor, Department of Medicine, Nagpur Veterinary College, Nagpur, Maharashtra

**Results and Discussion**

The biochemical alterations before and after treatment in buffaloes with metabolic disorders are presented in Table 2.

After single treatment of anabolic steroid Nandrolone laurate @ 125 mg i/m in T1 group of ketotic buffaloes rapid significant (P<0.01) decline in serum cholesterol from 124.42 ± 5.50 mg/dl to 98.32 ± 7.63 mg/dl and significant (P<0.05) increase in serum glucose from 41.54 ± 52.95 ± 5.29 mg/dl was observed within 48 hours.

There was rapid and marked improvement in appetite, particularly for the concentrate intake in all the treated cases of lactating buffaloes with increase in milk yield. There were no relapses in any of these treated lactating buffaloes in this group. Similar observations were documented by Heitzman and Walker (1973), who used an anabolic steroid to treat bovine ketosis. However, anabolic steroids were highly effective in ketosis in dairy cows and are prescribed as the only effective treatment for pregnancy toxemia episodes (Radostits *et al.*, 1994).

Two treatments with combination of calcium chloride and tricalcium phosphate 100 g per os in six hypocalcaemic lactating buffaloes showed highly significant (P<0.01) rise in serum calcium (5.52 ± 0.48 mg/dl to 7.99 ± 0.67 mg/dl) and magnesium levels (4.60 ± 0.33 mg/dl to 5.09 ± 0.35 mg/dl) which simulates with the findings of Queen *et al.* (1993) however, serum glucose, phosphorus and chloride levels differed significantly. Similarly, Oetzel (1996) recorded significant increase in serum calcium on post calving days 1 and 2. The treatment resulted into reduced incidence of parturient paresis and parturient hypocalcaemia in lactating buffaloes.

During present investigation 6 buffaloes affected with post parturient haemoglobinuria (T3) were treated with sodium acid phosphate, The serum inorganic phosphorus significantly (P<0.01) increased from pre-treatment value of 3.68 ± 0.95 mg/dl to 5.74 ± 0.85 mg/dl on 4<sup>th</sup> day following treatment. There was significant decline in serum total proteins from 7.51 ± 0.85 g/dl to 6.02 ± 1.16 g/dl and blood urea nitrogen from 23.71 ± 1.16 to 16.60 ± 2.03 mg/dl in buffaloes treated with sodium acid phosphate. All the buffaloes showed remarkable recovery within a period of 1-5 days. They resumed their alertness quickly, weakness disappeared and appetite improved progressively during treatments. In this group, clinical recovery was evident with the findings of other workers who obtained speedy recovery using this drug (Samad *et al.*, 1997; Malik and Gautam, 1971 and Bhikane, 2000).

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**Table1: Treatment scheduled for metabolic disorders in buffaloes**

Group No.	No. of buffaloes treated	Treatment particulars	Dose used	Route of administration	No. of days treatment given
T1	8	Inj. Nandrolone laurate*	125 mg	I/m	Single
T2	6	Calcium chloride? + Tricalcium phosphate**	100 g	Per os	Two
T3	6	Monobasic Sodium Acid Phosphate??	80 g	I/v	Till convalescence state or followed for 5 days.

\* Nandrolone Laurate 25mg/ml M/S Intervet-International B.V. Boxmeer- Holland.

? Qualigens Fine Chemicals Ltd., Mumbai.

\*\*Loba Chemie Pvt. Ltd. Mumbai. Ranbaxy, Mumbai.

Table 2: Biochemical alterations before and after treatments in buffaloes affected with metabolic disorders

Sr.No.	Parameters	Ketotic group T1		T value	Hypocalcaemia group T2		T value	Post Parturient Haemoglobinuria group T3		T value
		BT	AT		BT	AT		BT	AT	
1	Blood glucose (mg/dl)	4.54±4.24	52.95±5.29	3.28*	46.94±5.22	51.00±4.20	2.85*	52.42±4.69	55.27±2.22	0.87NS
2	Total proteins (g/c)	7.34±0.78	9.8±1.12	2.78*	8.32±0.91	9.21±0.89	1.75NS	7.71±0.85	6.0±0.42	3.02*
3	BUA (mg/dl)	16.62±1.02	22.69±3.95	1.37NS	23.61±1.71	22.97±1.89	0.49NS	23.71±1.16	16.60±2.03	3.41*
4	Cholesterol (mg/dl)	124.42±5.50	96.32±7.63	6.70**	122.42±14.92	87.77±1.11	4.0**	127.57±11.08	115.40±7.92	0.83NS
5	Calcium (mg/dl)	7.9±0.41	9.36±0.30	2.5**	5.62±0.48	7.99±0.67	7.74**	9.94±1.24	9.4±0.96	0.72NS
6	Phosphorus (mg/dl)	4.13±0.62	5.78±0.97	1.76*	1.60±0.33	5.09±0.35	1.19	3.68±0.95	5.74±0.54	5.54**
7	Magnesium (mg/dl)	3.31±0.28	1.54±0.48	4.33*	1.92±0.26	2.57±0.20	4.35**	3.07±0.80	3.12±0.56	0.7NS
8	Sodium (mEq/l)	135.34±1.75	103.10±3.35	2.85*	132.46±6.75	128.±9.32	1.30NS	112.39±14.78	105.05±8.46	0.32NS
9	Potassium (mEq/l)	5.78±0.54	4.77±0.55	3.6**	5.54±0.72	6.39±0.44	1.31NS	4.61±0.68	4.37±0.54	0.31NS
10	Chloride (mEq/l)	93.52±2.64	111.4±4.77	5.6***	101.94±3.80	107.66±5.07	2.41*	103.27±3.87	101.69±3.74	0.37NS
11	GGT ( U./L)	10.94±1.36	9.4±0.95	2.34*	12.49±2.10	8.92±1.20	1.75NS	10.50±1.44	8.94±0.66	2.62*

NS - Not significant, \*Significant (P<0.05) at 5% level, \*\*Highly significant (P<0.01) at 1% level

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