

**SERUM BIOCHEMICAL CHANGES IN KETOTIC BUFFALOES
(BUBALUS BUBALIS)**

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ABSTRACT

The present study was carried out to evaluate the variations in serum minerals (viz. calcium, magnesium and phosphorus) and transaminases in ketotic buffaloes. Results of blood analysis revealed a significant ($P \leq 0.05$) reduction in serum phosphorus in ketotic buffaloes whereas nonsignificant ($P > 0.05$) difference occur in serum calcium and magnesium in ketotic buffaloes as compared to control. At the same time significant increase in transaminases GPT, GOT and GGT have been observed .

KEY WORDS: Ketosis, Buffaloes, Serum Minerals

INTRODUCTION

High-yielding dairy buffaloes are susceptible to several postpartum diseases, including ketosis, milk fever and downer syndrome. (Shin and Norio,2002). Amongst these disease, ketosis is a multifactorial metabolic disorder of energy metabolism in high producing dairy animals during early lactation in both industrialized and developing countries.

Control of metabolic diseases including ketosis is crucially important because affected animals even after recovery have high incidences of reproductive and infectious diseases. It has been reported that the stimulus for milk production is at its maximum at the early stage of lactation and the demand of the mammary gland for glucose is often greater than the glucose available in blood and this imbalance increases hepatic ketogenesis. (Yao et al., 2003; Akamatsu et al., 2007). Ketosis in buffaloes is an undesirable disease with a severe impact on animal performance and consequently on economic well being of dairies due to loss of milk production as well as sharp drop in the SNF content of milk and failure of affected animal to return to normal production after recovery. During ketosis many physiological and biochemical changes takes place ,hence the present study was undertaken to evaluate some enzymatic and mineral changes during ketosis in Buffaloes (*Buballus Buballis*).

MATERIALS AND METHODS

In the present study total twenty eight (ten clinically healthy, Group I and eighteen ketotic Group II) Murrah buffaloes of 4-8 year of age with average body weight 400-480 Kg from Kuchaman city, Nagour (RAJ.) were included. Group II animals were clinically diagnosed as suffering from ketosis and were in 3rd to 6th lactation and recently parturated (about 15-20 days) and having history of inappetence, pica and sudden fall in milk production. The urine samples of suspected animals were analysed by means of Rothera's test and strip test for confirmation of ketosis. Clinical examination of ketotic buffaloes revealed almost normal rectal temperature (100-102^oF), slightly elevated pulse (60-80/min) and respiratory rate (30-40/min). A characteristic sweetish odour was also detected in breath, urine and milk in most of the ketotic buffaloes.

Blood samples were collected from ten healthy and eighteen ketotic buffaloes from jugular vein into plain tubes, the samples were kept at room temperature to clot and serum was collected and stored immediately at -20°C till further analysis. Biochemical analysis for serum calcium, magnesium and phosphorus was carried out using Systronics 169 spectrophotometer – following standard methods : Calcium by colorimetric method using O-Cresolphthalein complexone , Magnesium by Accucare Magnesium Xylidyl Blue method and Phosphorus by Accucare Phosphorus UV End Point method). Serum samples were analyzed for serum enzymes i.e. SGOT, SGPT and GGT by using commercially available diagnostic kits. The data obtained were statistically analyzed for level of significance (Snedecor and Cochran,1994).

RESULTS AND DISCUSSION

The results of the present study are depicted in table 1 and 2 . The data revealed non significant decrease in the level of Calcium and Magnesium whereas there were significant decrease in Phosphorus level in the serum of ketotic buffaloes as compared to the non ketotic buffaloes. Similar findings in buffaloes were reported by Ghanem and El-deeb (2010), Youssef *et al.*, (2010) and Farag and Metwally (2012). Calcium level might be reduced due to increased loss of base in the urine to compensate for the acidosis reported in cows with ketosis (Radostitis *et al.*, 2000).

Table 1: Mean \pm S.E. concentration and t-value of serum Calcium, Magnesium and Phosphorus in control and Ketotic buffaloes.

Phases	No. of Observations	Calcium (mg/dl)	Magnesium (mg/dl)	*Phosphorus (mg/dl)
Group I	10	8.9 \pm 1.1	3.5 \pm 0.649 ^a	6 \pm 0.74 ^a
Group II	18	8.4 \pm 0.9	3.02 \pm 0.427 ^b	3.6 \pm 0.4 ^b
% Increase		-5.61	-13.71	-40
t-value		0.3592	0.648099	3.7423

Mean superscript with different letters differ significantly ($P \leq 0.05$) from each other.

*=Significant at 5% level ($P \leq 0.05$)

Table 2: Mean \pm S.E. concentration and t-value of SGOT, SGPT and GGT in control and Ketotic buffaloes

Phases	No. of Observations	Calcium	Magnesium	*Phosphorus
Phases	No. of Observations	*SGOT (IU/L)	*SGPT (IU/L)	*GGT (IU/L)
Group I	10	48.813 \pm 2.743	27.571 \pm 6.321	20.48 \pm 3.375
Group II	18	88.163 \pm 3.193	50.642 \pm 7.712	33.95 \pm 4.508
% Increase		80.61%	80.61%	63.61%
t-value		2.7591	2.6416	2.2753

Mean superscript with different letters differ significantly ($P \leq 0.05$) from each other.*=Significant at 5% level ($P \leq 0.05$)

Low level of serum phosphorus in ketotic buffaloes may be due to insufficient phosphorus supply in the diet, prolonged anorexia and increased urinary phosphorus excretion.

In the present study, t-test showed significant ($p < .05$) increase in serum SGOT, SGPT and GGT in ketotic buffaloes as compared to control. Similar findings were reported by Ghanem and El-deeb (2010), Youssef *et al.*, (2010) and Farag and Metwally (2012) in buffaloes. Increased SGPT activity in the serum is a sensitive marker of liver damage. Level of serum SGOT increase in ketotic animal as compared to control may be attributed to liver and bile duct malfunction (Steen *et al.*, 1997). Increase in serum GGT are most often observed with cholestasis and conditions resulting in biliary hyperplasia in all animal species, so its activity is a useful clinical indicator of cholestasis in dairy animals. (Kaneko *et al.*, 2008). The results of study conducted by Simonov and Vlizlo (2015) in dairy cows with clinical ketosis are in support of our study. High serum activity of GGT in cows with signs of ketosis indicates engorgement in hepatobiliary system.

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