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**DJ Kalita**

Department of Veterinary  
Biochemistry College of  
Veterinary Science Assam  
Agricultural University  
Khanapara, Guwahati, Assam,  
India

**J Barkakati**

Department of Veterinary  
Biochemistry College of  
Veterinary Science Assam  
Agricultural University  
Khanapara, Guwahati, Assam,  
India

## Serum enzyme activities in different varieties of Duck of Assam in healthy and duck plague outbreak

**DJ Kalita and J Barkakati**

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**Abstract**

Serum enzyme activities in three different varieties of duck namely Pati, Khaki Campbell and Nageswari from different parts of Assam state were evaluated in during duck plague outbreak and compared with healthy ducks. A significant increase ( $P < 0.05$ ) of serum aspartate amino transferase (AST) and non significant rise in serum alanine amino transferase (ALT) and alkaline phosphatase (ALP) level was recorded in unhealthy birds. The level of AST in Pati ducks during disease outbreak was recorded as  $(75.20 \pm 4.29 \text{ U/L})$  which was significantly higher ( $P < 0.05$ ) than the normal healthy  $(71.51 \pm 5.65 \text{ U/L})$  ducks. Level of AST in Khaki Campbell and Nageswari were found to be  $68.39 \pm 3.85 \text{ U/L}$  and  $60.15 \pm 4.10 \text{ U/L}$  respectively under healthy conditions.

**Keywords:** Serum enzymes, duck plague, duck, health status

**Introduction**

Livestock census (19<sup>th</sup>) of Govt. of India, revealed that ducks constitute about 3% (23.539 millions) of total poultry (729.2 million), in India (GOI, 2012) [6]. The Pati duck population constitutes a major indigenous non-descript duck variety in the state of Assam, India. The Annual egg production per duck (Pati) is 70-95 eggs (Kalita *et al.*, 2009) [9]. The agro-climatic condition of Assam is a very congenial for duck rearing (Kalita *et al.*, 2009; Deka *et al.*, 2014) [9, 4]. Serum/plasma enzyme activity is primarily increase due to cellular injury or necrosis and help to localize any disease processes to a particular cell type (Irizaary-Rovira, 2004) [7]. However, available reports on serum enzyme activity across species and breeds of ducks are scanty (Franco *et al.*, 2012; Kabir, 2012) [5, 8]. Considering these basic facts the present investigation was carried out to compare the alterations of serum enzyme level in indigenous duck breeds of Assam during duck plague.

**Materials and methods**

In the present study, 300 blood samples (5ml) from different varieties of duck namely Pati (150), Khaki Campbell (100) and Nageswari (100) were collected from different parts of the state from healthy as well during duck plague outbreak and serum was separated. The separated serum samples were cleared by centrifugation at 3000 rpm for 5 minutes. Serum enzymes *viz.* Alanine aminotransferase (ALT), Aspartate Transaminase (AST) and Alkaline Phosphatase (ALP) were estimated immediately using commercially available kit procured from Invitro Diagnostic Kits manufactured by Span Diagnostic Limited (Autospan Liquid Gold), GIDC, Sachin-394 230 (Surat), Gujarat, India. Data generated from the study were analyzed as per methods of Snedecor and Cochran (1994) [15]

**Results and discussion**

Different serum enzyme activities of the present work have been presented in the table no. 1. The evaluation of the serum enzyme activities has a tremendous value for diagnosis of the different diseases (Kaneko *et al.* 2009) [10]. In the present investigation, serum enzymes activities of healthy Pati duck, Khaki Campbell and Nageswari ducks were estimated and compared with the same variety of ducks during disease outbreak. The level of AST in Pati ducks during disease outbreak was recorded as  $75.20 \pm 4.29 \text{ U/L}$  which was significantly

**Corresponding Author:****DJ Kalita**

Department of Veterinary  
Biochemistry College of  
Veterinary Science Assam  
Agricultural University  
Khanapara, Guwahati, Assam,  
India

( $P < 0.05$ ) higher than the normal healthy ( $71.51 \pm 5.65$  U/L) ducks. The level of AST in healthy Khaki Campbell and Nageswari were found to be  $68.39 \pm 3.85$  U/L and  $60.15 \pm 4.10$  U/L respectively. Non significant rise in ALT and ALP was recorded in unhealthy ducks compared to healthy ones. The level of ALP in Khaki Campbell was found to be  $85.78 \pm 5.61$  U/L in healthy whereas during disease outbreak the ALP activity was  $86.56 \pm 6.51$  U/L. Noticeably increased serum activities of ALP was also observed by Adamu *et al.* (2013) [1] and Kerr, 2002 during different disease condition associated with liver and bone. Moderate to significant increase of AST, ALT and ALP are often associated with soft tissue injury (Lewandowski *et al.*, 1986) [12]. AST is present in higher concentrations in hepatic, renal, cardiac and skeletal muscle cells and erythrocytes, hence damage to any of these tissues may increase serum AST levels. Ahmed *et al.*, (1975) [2] reported a significant elevation in levels of alkaline phosphatase, glutamic pyruvic transaminase, which might be attributed primarily to a deranged liver function associated with duck virus hepatitis infection. The present finding is in accordance with the findings of Benjamin (1978) [3] who reported an elevation in the levels of AST and ALT in both

the infected groups that might be attributed to hepatocellular damage with alterations in cell membrane permeability and leakage of cytoplasmic enzymes into the blood. Mondal *et al.* (2011) [13] reported that ALT used as indicators of cellular necrosis and increase in serum concentration which is corroborated with our finding may indicate liver malfunction (Rosenthal, 1997) [14]. From the present study it can be concluded that, there is a rise of AST, ALT and ALP activities in response to disease in duck which can act as an indicator of the health status of duck. From the present study it can be concluded that that estimation of serum enzyme activities may be use for diagnosis of certain subclinical conditions of duck. Considering the importance of ducks, further studies are warranted in this area to interpret the variation and serum enzyme activities in response to different diseases.

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**Table 1:** Serum enzyme activities (Mean $\pm$ S.E) of different varieties of duck of Assam in healthy and duck plague out break

Parameters	Pati variety		Khaki Campbell		Nageswari		Level of Significance
	Healthy (N=125)	Healthy (N=75)	Healthy (N=75)	Out Break (N=35)	Healthy (N=50)	Out Break (N=20)	
AST (U/L)	71.51 <sup>a</sup> $\pm$ 5.65	75.20 <sup>b</sup> $\pm$ 4.29	68.39 <sup>a</sup> $\pm$ 3.85	75.25 <sup>b</sup> $\pm$ 3.60	60.15 <sup>a</sup> $\pm$ 4.10	64.17 <sup>b</sup> $\pm$ 4.15	0.05
ALT (U/L)	21.53 <sup>a</sup> $\pm$ 0.15	22.01 <sup>a</sup> $\pm$ 0.29	21.05 <sup>a</sup> $\pm$ 0.31	21.65 <sup>a</sup> $\pm$ 0.28	22.51 <sup>a</sup> $\pm$ 0.41	29.51 <sup>a</sup> $\pm$ 0.31	NS
ALP (U/L)	80.56 <sup>a</sup> $\pm$ 4.56	86.44 <sup>a</sup> $\pm$ 4.29	85.78 <sup>a</sup> $\pm$ 5.61	86.56 <sup>a</sup> $\pm$ 6.51	84.63 <sup>a</sup> $\pm$ 6.63	91.25 <sup>a</sup> $\pm$ 7.15	NS

NS- None Significant, \*Significant at 5% ( $P \leq 0.05$ ) between the same variety of duck for the same parameter

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