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 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±4.29 U/L) which was significantly higher (P<0.05) than the normal healthy (71.51±5.65 U/L) ducks. Level of AST in Khaki Campbell and Nageswari were found to be 68.39 ±3.85 U/L and 60.15 ±4.10 U/L respectively under healthy conditions.

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

Introduction
Livestock census (19th) 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±4.29 U/L which was significantly
damage to any of these tissues. The level of AST and ALT was also observed by Adamu et al. (2013) 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). 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) 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 Benjamí (1978) 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) 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). 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 used 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±S.E) of different varieties of duck of Assam in healthy and duck plague outbreak

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pati variety</th>
<th>Khaki Campbell</th>
<th>Nageswari</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST (U/L)</td>
<td>Healthy (N=125)</td>
<td>Healthy (N=75)</td>
<td>Out Break (N=35)</td>
</tr>
<tr>
<td></td>
<td>Healthy (N=75)</td>
<td>Healthy (N=50)</td>
<td>Out Break (N=20)</td>
</tr>
<tr>
<td>AST (U/L)</td>
<td>84.63 ±7.15</td>
<td>75.25 ±6.51</td>
<td>86.56 ±6.51</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>21.53 ±0.15</td>
<td>21.05 ±0.31</td>
<td>21.65 ±0.28</td>
</tr>
<tr>
<td>ALP (U/L)</td>
<td>86.56 ±4.56</td>
<td>60.15 ±4.15</td>
<td>84.63 ±6.63</td>
</tr>
</tbody>
</table>

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

References