COMPARATIVE EFFICACY AND HUMORAL RESPONSES OF AN INACTIVATED INFECTIOUS BURSAL DISEASE VIRUS VACCINE PREPARED FROM A LOCAL ISOLATE WITH THAT OF A COMMERCIAL LIVE VACCINE IN LAYER BIRDS


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ABSTRACT

The humoral immune response and efficacy of an inactivated adjuvanted infectious bursal disease virus (IBDV vaccine) prepared with a variant local isolate was compared with a live commercial IBDV vaccine (Novibis D789, Intramuscular route) in 20 layer flocks during the period from October to November 2002. Two day-old experimental birds were divided into four groups (A, B, C and D), each consisting of 5 birds. Each flock of groups A, B and C was immunized with live IBDV vaccine (Novibis D789, Intramuscular route) 5 live IBDV vaccine, and inactivated IBDV vaccine, respectively, at day 7, day 21 and day 28, whereas birds of group D served as unvaccinated controls. The titers of antibody were determined with either confroved (live + inactivated) or only inactivated IBDV vaccine shown clear trend of precipitation with age gel (immunodiffusion test (AGID)) and higher antibody titre with ELISA. The results revealed that the experimentally prepared (inactivated IBDV vaccine gave 100% protection against 80% protection in layer birds immunized with live commercial vaccine. Key words: Efficacy, humoral immune response, IBDV, inactivated vaccine, live vaccine, layer birds

INTRODUCTION

The infectious bursal disease (IBD) is an emergent viral disease in all of the major poultry-producing countries of the world including Bangladesh (Cateek et al., 1997; Samad, 2000). Poultry raisers of many countries including Bangladesh are still unaware despite of following regular vaccination schedule to their chickens using imported conventional IBD virus vaccine available in Bangladesh. No prophylactic vaccine against IBD has yet been developed or manufactured in Bangladesh using the prevailing local isolates of IBD virus. A local isolate of IBD virus M6 strain was isolated and characterized in Bangladesh (Begum et al., 2004) which are still being evaluated for their usefulness as vaccine virus. This paper describes the comparative efficacy and humoral immune responses of an inactivated IBD virus vaccine prepared from local isolate (M6) with that of a commercial live vaccine in layer birds.

MATERIALS AND METHODS

Chicken embryo fibroblasts (CEF) cell culture propagated infectious bursal disease virus (IBDV) M6 strain was purified and concentrated at 1 mg/ml in PBS and 2.5 μl of commercial formaldehyde (2%) was added with 250 μg of purified concentrated virus present in 250 μl of PBS (1×) and kept at room temperature for about 72 hours to inactivate the virus properly. Then 2.5% glutaraldehyde was added in the inactivated virus which was used as an adjuvant and the inactivated adjuvanted IBDV vaccine was used for experimental immunization of chickens.

The immunization trial experiment was conducted with the locally prepared IBDV vaccine, in layer chickens during the period from October to November 2002. Two day-old 20 layer chickens were purchased from the local hatchery (Begum Rokyas Poultry Farm, Mymensingh) on the month of October 2002. These layer chicks were divided into four groups (A, B, C and D), each consisting of five birds. Each bird of group A was vaccinated with live IBDV vaccine (Novibis D789, Intramuscular route) 5 live IBDV vaccine, and inactivated prepared IBDV vaccine, intramuscularly. Groups B, C and D were vaccinated with the combination of live (Novibis D789, Intramuscular route), intramuscularly and then live IBDV vaccine and inactivated IBDV vaccine, respectively, at day 7, day 21 and day 28 of age respectively. Birds of group D served as unvaccinated controls. The dose rate of the inactivated adjuvanted vaccine was 0.5 ml (10^5ID50) bird through IM route where one drop of live vaccine (Novibis D789, Intramuscular route) was inoculated in each eye of chicks at veterinary manufacturer instruction. Birds of group D which served as unvaccinated controls and group C vaccinated with only the inactivated vaccine were kept in separate cages in separate room.

At 3 days post-immunization, all the birds of the four groups and D were challenged orally with 0.5 ml of homologous virulent IBDV M6 virus suspension diluted in PBS contains 10^5.0ID50/dose. Each of the challenged birds was closely observed to record the development of any clinical signs or mortality. Serum was collected from all the birds of each group 7 days interval of post-immunization, and 14 days of post-challenge. Each of the collected sera was tested with agar gel immunodiffusion test as described by Asai and Lymen (1991) and a commercial IBD vaccine test kit (BDEXX Lab., USA) to detect the humoral immune responses in layer chickens.

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RESULTS AND DISCUSSION

The results of humoral immune responses and efficiency of live aq (inactivated vaccines against IBD in layer birds are presented in Table 1). The antibody ELISA titer of sera of chickens immunized with live Nobilis DTVP commercial IBD vaccine was found remain unchanged during the post-immunization period, whereas 10 fold increased antibody titer was recorded with inactivated vaccine (Table 1). These observations support the earlier reports of Ragh et al. (1987), Martin et al. (1992) and Esman et al. (1994) who reported higher level of antibodies at 21 and 28 days of post immunization by ELISA.

Table 1: Humoral responses and efficiency of vaccines against infectious bursal disease in layer birds

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of birds</th>
<th>Immunized with vaccine</th>
<th>Post-immunization, days</th>
<th>Post challenge</th>
<th>All-respond</th>
<th>Efficiency results (%)</th>
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<tbody>
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<td></td>
<td></td>
<td>21</td>
<td>28</td>
<td>35</td>
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<td>A</td>
<td>5</td>
<td>Nobilis DTVP</td>
<td>No band</td>
<td>10</td>
<td>No band</td>
<td>AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA</td>
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<tr>
<td>B</td>
<td>5</td>
<td>Nobilis DTVP + BAU-IBDV</td>
<td>No band</td>
<td>100</td>
<td>100</td>
<td>AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA</td>
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<td>C</td>
<td>5</td>
<td>BAU-IBDV</td>
<td>No band</td>
<td>100</td>
<td>100</td>
<td>AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA</td>
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<td>D</td>
<td>5</td>
<td>Control</td>
<td>No band</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA AGIDT ELISA</td>
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Challenged after 32 days of post-immunization.

However, they also recorded poor humoral responses either with live or killed IBDV vaccine in chickens having regardles higher or lower maternal derived antibodies in their blood during the time of immunization. The results of aq gel immunodiffusion test revealed that birds vaccinated with only the live IBDV Vaccine failed to show any band of precipitation on the agar gel, whereas the sera of chickens vaccinated with either combined (live + inactivated) or only inactivated IBDV vaccine showed clear band of precipitation on the agar gel within 3-5 days of incubation at 4°C. The result of AGIDT of the sera of vaccinated groups of chicken strongly supports the findings of Elmesbah and Abouelwafa (1995), and Zaman et al. (1991) who detected the precipitating antibody in the sera a puller of day 24 of post-vaccination with killed IBDV vaccine.

REFERENCES


38