Immune response and efficacy of pigeon pox virus vaccine and fowl pox virus vaccine in chickens

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Abstract

The humoral immune response of chicken vaccinated with fowl and pigeon pox virus vaccines was determined with the protective potentiality of the two vaccines in field condition of Bangladesh. Different aged Fayoumi chicks were subjected for the study. To assess the relationship with better immune response among experimental groups, the average percentage of 'take reaction' was examined and recorded to 97.77% in group A, 93.33% in group B and 100.0% in group C. The level of immune status induced by different vaccinated group was measured by passive hemagglutination (PHA) microplate test method. The mean PHA titer levels after primary vaccination were 33.06 ± 14.13 in group A, 32.0 ± 14.81 in group B, and 33.0 ± 13.66 in group C. Following booster vaccination, the mean PHA titer levels in prior of challenge were increased to 55.46 ± 14.64 in groups A and C, and 46.93 ± 16.52 in group B. The recorded PHA titer levels of each group at two weeks after challenge were significantly increased to 106.66 ± 31.22, 93.86 ± 33.04 and 110.93 ± 29.29, respectively. The PHA titer levels after vaccination and challenge were significantly increased compared to pre-vaccination titer levels (P<0.01). Although the PHA titer levels among three groups administrated different vaccine combinations in prior of challenge were
significantly varied ($P<0.01$), it was observed that all of the vaccinated chicks were highly protected against challenge infection.

**Key Words**: humoral immune response, chicken, fowl and pigeon pox virus vaccine, passive hemagglutination (PHA) titer.

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**Introduction**

Smallholder Livestock Development Project (SLDP 2) in five southern district in Bangladesh is underway to improve the rural poultry production system by applying sustainable modern technologies to help them to create self employment opportunities of women and poor people and to improve their nutritional status and social conditions. In relation to disease management in the project area of SLDP 2, the preventive measures were practiced by vaccination, but incidence of different diseases are likely to be seen, and fowl pox is an important viral endemic disease with mortality reaching as high as 60-70% per incident. The occurrence of such incidents have been frequently reported annually in Bangladesh$^1$.

Fowl pox is a common slow-spreading economically important viral disease of chicken, turkey, pigeons, canaries and wild birds characterized by discrete nodular proliferative skin lesions on nonfeathered parts or fibrino-necrotic lesions in mucous membranes of mouth, esophagus with intracytoplasmic inclusion bodies. It terminates with the formation of scabs and desquamation of degenerated epithelium$^2$.

Economic losses caused by this virus lead to the mild weight reduction and drop of egg production in laying chicken. This loss due to fowl pox has been minimized by chicken vaccination with fowl pox and/or pigeon pox vaccines$^3$ and also practiced in the country. On the other hand, vaccination schedule and combination, vaccine type, maternal derived antibody (MDA) in chicks and pathogenicity of the field challenge are the important factors.

**Materials and Methods**

1. **Virus**

Local strain of fowl pox virus isolated from field outbreak was used and propagated in 10 to 12 days embryonated eggs via chorioallantoic membrane (CAM) route for 3 to 5 passages$^4$. The dead embryos within 24 hours of inoculation were discarded and all of alived and dead embryos up to 5 days were chilled at 4°C for 18 hours. The CAM with discrete or confluent growth of pocks were selected and processed for further passage. The egg-infective-doses of fifty percents (EID$_{50}$) of the test viruses were calculated following the method of Reed and Muench$^5$.

2. **Experimental design**

The study was carried out in the project area of SLDP 2. One hundred and eighty Fayoumi chicks were divided into three groups namely A, B and C.