

EFFECT OF SELENIUM SUPPLEMENTATION ON ANTIBODY TITRES AGAINST INFECTIOUS BURSAL DISEASE VACCINE IN BROILER CHICKS

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ABSTRACT

A total of 200 chicks were raised upto 43 days of age under controlled experimental conditions. The birds were randomly divided into four groups A, B, C and D of 50 birds each at the age of day one. Birds of groups A and B were not supplemented with selenium, while those of groups C and D were given selenium @ 0.06 mg/Kg of feed from day one to day 43. The birds of groups B and D were vaccinated against infectious bursal disease (IBD) at the age of day 10 and boosted at the age of day 25. The effect of selenium on humoral immune response was evaluated by recording weekly serum antibody titres against IBD through indirect haemagglutination (IHA) test. The cumulative mean titres (CMT) recorded in groups A, B, C and D were 15, 53, 16 and 61, respectively ($P < 0.05$). These results indicate that selenium supplementation may help to increase post vaccination humoral immune response against IBD in broiler chicks.

Key words: Infectious bursal disease, selenium, antibody titre, broilers.

INTRODUCTION

Infectious bursal disease (IBD) is an acute and highly contagious viral disease of young chicken. It is of great economic importance because of the resulting morbidity and mortality as well as the immune suppression, which may occur if chicken are infected at an early age. The disease affects primarily bursa of Fabricius and other lymphoid organs to lesser degree.

Restoration of normal immune functions may increase resistance to infectious diseases and reduce the severity of disease. It can mainly be possible by immunostimulation, which is the enhancement of immune response by increasing the rate at which the response occurs, elevating its magnitude, thus prolonging the response or directing the response to a particular fact of the immune response. Substances capable of these actions may be specific or non-specific immuno-potentiators (Hyde and Patnode, 1991).

There are many immunostimulating substances that have been used in poultry with success. Some of these agents include levamisole, vitamin E and selenium (Koller, 1982; Bashir, 1994). Selenium supplementation of animals in diets enhances the immune status and ability of the immune system to respond to disease challenges. The parental administration of selenium has been reported to enhance humoral immune response, as described by Droke and Loerch (1989). The objective of the present study was to know the effect of selenium supplementation on humoral immune response against IBD in broiler chicks.

MATERIALS AND METHODS

Experimental design

A total of 200 day-old broiler chicks were divided into four groups A, B, C and D, each having 50 birds. Birds of groups A and B were not supplemented with selenium, while those of groups C and D were given selenium @ 0.06 mg/Kg of feed from day one to day 43. The birds of groups B and D were vaccinated against IBD on day 10 (intraocular) and day 25 (drinking water) using D 78 vaccine of IBD. All the groups were maintained under standard housing and management conditions.

Measurement of serum antibody titres

Blood samples were obtained from randomly selected 10 birds of each group at weekly intervals from day one to day 43 of age. The indirect haemagglutination (IHA) antibody titres against IBD were measured in sera samples, as described by Rahman *et al.* (1994). Geometric mean titres (GMT) of each group were calculated at each week and cumulative mean titres (CMT) of each group were measured for the whole period (7 weeks).

Statistical analysis

Data on IHA antibody titres against IBD were analyzed statistically through analysis of variance and cumulative mean titres were compared through Duncan's Multiple Range test (Steel and Torrie, 1984).

RESULTS AND DISCUSSION

Vaccine failure and disease prevalence may be attributed to immunosuppression, which is a recurring economic problem in commercial poultry flocks. Factors such as poor biosecurity, imbalanced ventilation, extreme ambient temperature, stress, substandard vaccines and medicines, irrational use of antibiotics and poor quality feed cumulatively make the birds vulnerable to the attack of various infectious diseases. Nutrition plays a significant role in the development and function of the immune system (Khan *et al.*, 1993).

The geometric mean titres (GMT) against IBD measured through IHA in the present study are presented in Table 1. The highest cumulative mean titres (CMT) were recorded in group D (61), followed by groups B (53), C (16) and A (15). The statistical analysis of CMT indicated that the titres in the vaccinated groups B and D were significantly higher than those of non-vaccinated groups A and C ($P < 0.05$). The titres of groups A and C were almost same, whereas the titres of group D were significantly higher than those of group B ($P < 0.05$). These results indicate that selenium supplementation helps to increase post vaccination humoral immune response against IBD in broiler chicks.

The findings of the present study are supported by the observations of Calnago *et al.* (1984) and Madron and Vrzigulova (1988), who reported that selenium supplementation enhanced the immune system and increased the natural resistance of animals by increasing response of the organism to antigenic stimuli. The findings of the present study are also supported by the results of Schrauzer (2000), who recorded an increase in humoral antibody titres when selenium was used in feed.

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Table 1: IHA titres against IBD from day one to day 43 of age

Groups	Geometric mean titres (GMT)							CMT
	Day 1	Day 8	Day 15	Day 22	Day 29	Day 36	Day 43	
A	43	24	10	8	7	6	6	15 ^c
B	45	22	28	51	64	81	83	53 ^b
C	41	23	12	12	9	8	8	16 ^c
D	42	24	30	64	79	92	94	61 ^a

CMT values with different superscripts differ significantly ($P < 0.05$).