Effect Of Selenium Supplementation On Humeral Immune Response Against Infectious Bursal Disease Vaccine In Broiler Chicks.

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Supplementation of Selenium in diets of field animals enhances the immune status and ability of the immune system to respond to disease challenges. The objective of the present study was to know the impact of selenium supplementation on humoral immune response against IBD vaccine in broiler chicks. A total of (160) commercial broiler male chicks were raised up to 50 days of age under controlled experimental conditions. The chicks were randomly divided into four equal groups (A, B, C and D) at age of day one. Fourty chicks for each. Chicks of groups (A and B) were not supplemented with selenium, while those of groups (C and D) were given selenium 0.05 mg/Kg of feed from day one to day (50). Chickens of groups (B and D) were vaccinated against (IBD) using live attenuated (IBD) vaccine at the age of day (10) then, boosted at (25, 35,45) days of ages. The effect of selenium on humoral immune response was evaluated by recording antibody titres against IBD through indirect (ELISA) test in the sera of chicks of treated groups. These results indicate that there were significant differences ($P<0.05$) in the mean values of titer of antibodies against (IBDV) among all the treated groups at (15, 30, 40, 50) days of age. So that; the results showed a significant increasing ($P<0.05$) in the mean values of titer of antibodies against (IBDV) of chickens of group (D) in comparsion with other treated group at (30, 40, 50) day of age. It is concluded that selenium supplementation in diets of poultry help to increase humoral immune response post vaccination against live attenuated infectious bursal disease (IBD) in broiler chicks.

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. The disease affects primarily bursa of Fabricious 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 [4]. There are many immunostimulating substances that have been used in poultry with success. Some of these agents include levamisole, vitamin E and selenium [1,6]. The parental administration of selenium has been reported to enhance humoral immune response, as described by Droke and Loerch [3].

Materials And Methods

Experimental design

A total of (160) commercial broiler male at one day from breeder of (Arbor Acres) from Iraqi Company for production and Marketing of meats, Al-Kalis poultry fields were obtained to carry out this experiment. These chicks were divided into four groups A, B, C and D, each having 40 chicks. Chicks of groups A and B were not supplemented with selenium, while those of groups C and D were given selenium 0.05 mg/Kg of feed from day one to day fifty of age. Chicks of groups (B and D) were vaccinated against IBD using live attenuated infectious bursal disease (IBD)vaccine "Winterfeild 2512–G61" strain on (10) day of age by intraocular method then, boosted again at ages (25,35,45) days, vaccine was given with drinking water procedure. All the groups were maintained under standard housing and management conditions.

Measurement of serum antibody titres

Blood samples were obtained from randomly selected (5) chicks of each group at (15, 30, 40, 50) day of age .the titered antibodies against infectious bursal disease virus in their sera was using the indirect ELISA test.

Intraocular and drinking water Procedure

* Infectious bursal disease vaccine:

The live attenuated infectious bursal disease vaccine "Winterfeild 2512 – G61" strain has been used to vaccinate the chickens of groups (B and D). Chickens were vaccinated by intraocular method on (10) day of age then booster dose were given by drinking water method at (25, 35, 45) day of age. The vaccine contains (2500) doses was reconstitute in (5) *ml* of distilled water later on,(0.5) *ml* of the vaccine suspension was taken and mixed well with one and half liter of distilled water to vaccinate the chickens at (10) day of age. The same procedure were carried out again at (25, 35) day of age respectively but the volume of distilled water mixed with reconstituted vaccine was (4) liters and used to vaccinate the chickens at (25) day of age while the vaccine suspension has been mixed with (5.5) liters of distilled water and used to vaccinate the chickens at (35) day of age. Chickens were deprived from water for three hours before the beginning of vaccination procedure**.**

Statistical analysis

Data on Indirect Enzyme Linked Immunosorbent Assay (ELISA) antibody titres against IBD were analyzed statistically through analysis of variance and

least significance differences to determine the differences among groups [10].

Results

Results of values of antibody titres of indirect ELISA test against IBDV at (15) day of age.

The results of table (1) revealed that there were statistically significant variations (P<0.05) in the mean values of titer of antibodies against (IBDV) at (15) day of age among all the treated groups of this experiment. So; Group (D) gave the highest mean values in the titer of antibodies against (IBDV) then group (C) finally group (B). The recorded results showed that there were no significant differences (P<0.05) in the mean values of titer of antibodies against (IBDV) at (15) day of age between groups (B and C) respectively as shown in table (1) .

Table (1): Values of antibody titres of indirect ELISA test against IBDV at (15) day of age.

Groups	Mean	S. E	L.S.D
Group A	٣٨٩١	± 393	1928.4
Group B	٨٥٢٢	± 802	
Group C	٦٣٩٢	± 767	
Group D	١٢١٢٢	± 928	

Values are mean ± SE "Standard Error". (P < 0.05). (P) Means probability.L.S.D means Leatest Significant Differences.

Results of values of antibody titres of indirect ELISA test against IBDV at (30, 40, 50) day of age.

The results showed that there were an important statistically significant differences (P<0.05) in the mean values of titer of antibodies against (IBDV) among the treated groups (A, B, C and D) respectively at (30, 40, 50) day of age as shown in tables (2, 3, 4) respectively.

There were a significant increased (P<0.05) in the mean values of titer of antibody titers against (IBDV) of group (D) in comparsion with the other treated group at (30, 40, 50) day of age as shown in tables (2, 3, 4).

Table (2): Values of antibody titres by indirect ELISA test against IBDV at (30) day of age.

Groups	Mean	S. E	L.S.D
Group A	٤١١٦,٦	± 462	1902.3
Group B	٨٤٤٥	± 811	
Group C	٦٣٦٨,٤	± 809	
Group D	١٤٢٩٩,٢	± 768	

Values are mean ± SE "Standard Error". (P < 0.05). (P) Means probability. L.S.D means Leatest Significant Differences.

Table (3): Values of antibody titres by indirect ELISA test against IBDV at (40) day of age.

Groups	Mean	S. E	L.S.D
Group A	٤١٩٣	± 472	1864.2
Group B	٧٢٤٢,٦	± 994	
Group C	٦٤١٢,٤	± 740	
Group D	١٣٨٤١,٤	± 588	

Table (4): Values of antibody titres by indirect ELISA test against IBDV at (50) day of age.

Groups	Mean	S. E	L.S.D
Group A	٣١٣٤,٦	± 27	1264.2
Group B	٩٤٦٩,٨	± 341	
Group C	٦٦٢٥,٦	± 643	
Group D	١٢٨٦٤,٨	± 883	

Values are mean ± SE "Standard Error". (P < 0.05). (P) Means probability. L.S.D means Leatest Significant Differences.

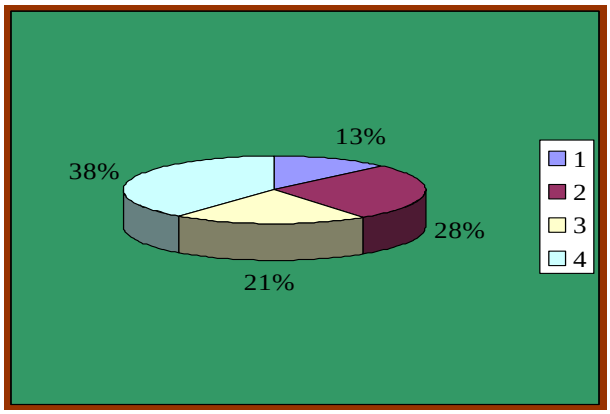

Figure (1): Values of antibody titres by indirect ELISA test against IBDV at (15) days of

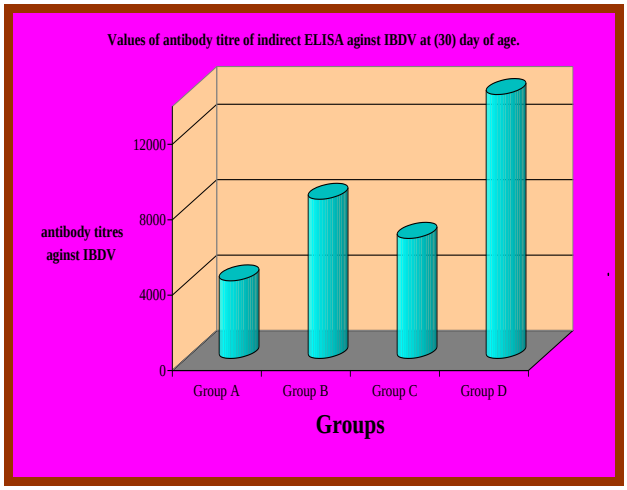

Figure (2): Values of antibody titres by indirect ELISA test against IBDV at (30) day of age.

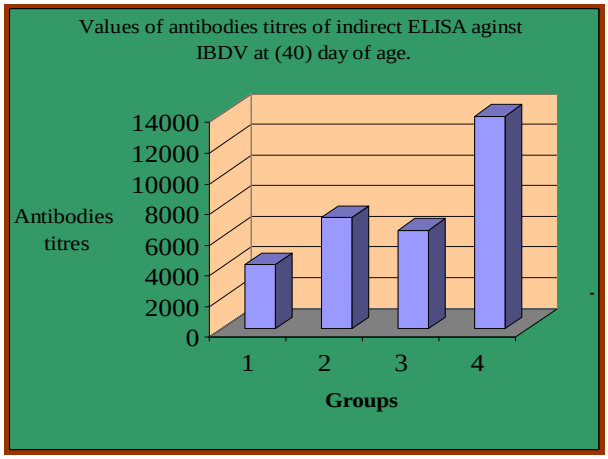

Figure (3): Values of antibody titres of indirect ELISA test against IBDV at (40) day of age.

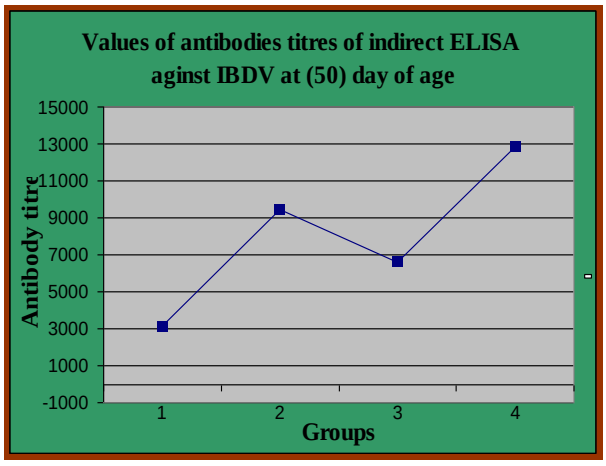

Figure (4): Values of antibody titres by indirect ELISA test against IBDV at (50) day of age.

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, mistaken usage of antibiotics and poor quality feed cumulatively make the chicks vulnerable to the attack of various infectious diseases. Nutrition plays a significant role in the development and function of the immune system [5].

The mean values of antibodies titres against IBD measured through Indirect Enzyme Linked Immunosorbent Assay (ELISA) in the present study are presented in Table 1. The highest mean titres were recorded in group D (١٢١٢٢), followed by groups B (٨٥٢٢), C (٦٣٩٢) and A (٣٨٩١) as shown in figure (1). The statistical analysis of results indicated that the titres in the vaccinated groups B and D were significantly higher ($P<0.05$) than those of non-vaccinated groups A and C as shown in figures (2, 3, 4). The titres of groups A and C were almost same, whereas the titres of group D were significantly higher ($P<0.05$) 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 [2,7] who reported that selenium supplementation, enhanced the immune system and increased the natural resistant of animals by increasing response of the organism to antigenic stimuli. The findings of the present study are also supported by the results of [9] who recorded an increase in humoral antibody titres when selenium was used in feed.

Conclusions

In conclusion, the present study suggests that the supplementation of selenium in feeds of poultry assist to increase the humeral immune response against live attenuated infectious bursal disease (IBD) in broiler chicks.

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تأثير إضافة السيلينيوم على الاستجابة المناعية الخلطية ضد لقاح مرض التهاب جراب فابريشيا الخمجي في فروج اللحم

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الملخص

إن إضافة السيلينيوم في أعلاف الحيوانات الحقلية يسرع الاستجابة المناعية ويزيد قدرة اِستجابة الجهاز المناعي ضد التحديات المرضية. هدفت الدراسة الحالية معرفة تأثير اِضافة السيلينيوم على الاستجابة المناعية الخلطية ضد فايروسات لقاح الكمبورو الحي المضعف في فروج اللحم.

تم تربية اِجمالي (١٦٠) ذكور افراخ دجاج لحم تجارية بعمر يوم واحد فقط تحت ضروف تجريبية مراقبة ولغاية (٥٠) يوم. قُسمَت الافراخ عشوائياً الى اربعة مجاميع متساوية هي (A ,B ,C , D) وبواقع (٤٠) طير لكل مجموعة عند عمر يوم واحد فقط. لم يضاف السيلينيوم في العلف الى افراخ المجموعتين (A , B) في حين أُضيفَ السيلينيوم في العلف الى افراخ المجموعتين (C , D) وبجرعة (٠,٠٥) ملغم / كغم علف من عمر يوم واحد حتى عمر (٥٠) يوم . تم تلقيح افراخ المجموعتين (B , D) بلقاح الكمبورو الحي المضعف بطريقة التقطير بالعين بعمر (١٠) ايام ثم مُنِعَتْ الافراخ بجرعة تعزيزية بطريقة ماء الشرب عند الاعمار (٤٥،٣٥،٢٥) يوم. تم تقييم الاستجابة المناعية الخلطية من خلال تسجيل معيار الاجسام المضادة ضد فايروسات مرض لقاح الكمبورو الحي المضعف باستخدام اختبار الانزيم المناعي الممتز غير المباشر Indirect ELISA في مصول الطيور المعاملة.

أَثْبَتَتْ الدراسة أَنَّ هنالك فروقات معنوية ($P<0.05$) في معدل معيار الاضداد ضد فايروسات لقاح مرض الكمبورو بين كافة المجاميع المعاملة عند الاعمار (٥٠،٤٠،٣٠،١٥) يوم، كما أثبتت النتائج تفوق معنوي ($P<0.05$) في معدل معيار الاضداد ضد فايروسات لقاح مرض الكمبورو للمجموعة (D) عند الاعمار (٥٠،٤٠،٣٠،١٥) يوم بالمقارنة مع المجاميع المعاملة الاخرى. نستنتج من ذلك ، أَنَّ اضافة السيلينيوم في أعلاف الدواجن يساعد على زيادة الاستجابة المناعية الخلطية ضد فايروسات لقاح الكمبورو الحي المضعف في فروج اللحم.