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The effect of vitamin A and complex of vitamin E and selenium on serum level and humoral immunity in broiler chickens

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ABSTRACT

A total of 96 one day-old Ross 308 chickens, divided, in to 12 groups (3 treatment with 4 replicate in a same environmental conditions. Group A, was control group and group B and C were experimental groups. From first day, vitamin A premix was added to group B diets and complex of vitamin E premix and selenium was added to group C diets. Blood sampling accomplished in 3 period , first period was at 9th day of breeding period, second period was at 2 weeks after first period and last sampling period was at 42nd day of breeding period. For Humoral Immunity (HI) and serum level of vitamin A and E and selenium test, 2 ml blood was derived from any chickes. Obtained results from HI test, showed that HI level against newcashe disease vaccine had significant difference in vitamin A and E and selenium group versus control group ($p<0.05$). So presumed that vitamin A and complex of vitamin E and selenium develop HI in broiler chickens.

Keyword: vitamin A, complex of vitamin E and selenium, Humoral immune, serum level, broiler chickens.

INTRODUCTION

Vitamin E is a fat soluble vitamin which has vegetative source and it is essential for reproduction, neural, muscular and immunity system. Characteristically, vitamin E have direct effects on immune cells and indirect effect on endocrine and metabolic parameter, vitamin E represented as an antioxidant which decrease free radicals that produced in natural metabolites and inflammatory reactions. vitamin E introduced as the first body defensive barrier against oxidant factors, therefore it has an effective role in immune response [Vakili and daliri, 2008]. Selenium is an important mineral which act as an element that incorporated with glutathione peroxide. Complex of vitamin E and selenium has important role in growth and immune system maintenance. selenium Supplementation could be effective for intracellular transport of signals which is essential for lymphocyte generation [Yamuna and Thangavel, 2011].

Increasingly, amount of vitamin A and E, causes increasing immune system response and use of level 18000 IU of vitamin A had the best immune system response, but in the level 24000 IU of vitamin A had decline in immune system response [kashani, 2006].

MATERIALS AND METHODS

A total of 96 one day-old Ross 308 chickens, divided, in to 12 groups (3 treatment and 4 replicate pens per treatment) and they breed in a same environmental conditions. Group A, was control group and group B and C were experimental groups. From first day, vitamin A premix was added to group B diets (2kg/ton) and complex of

vitamin E premix and selenium was added to group C diets (2kg/ton). Blood sampling accomplished in 3 periods, first period was at 9th day of breeding period, second period was at 2 weeks after first sampling and last sampling period was at 42nd day of breeding (last day of breeding period). For HI and serum level of vitamin A and vitamin E and selenium test, 2 ml blood derived from any chickes. for blood sampling randomly two bird of each pens at days 9, 23 and 42 were elected and blood sampling was achieved via wing vein. Than blood samples centrifuged at 4000 rpm for 10 minute than blood serum was separated and used for HI test against Newcastle vaccine.

Statistical Analysis of data

The present study was performed in CRD model. Data were analyzed with SAS (software) and means were separated with duncans test. Statistical model of this study was factorial design based on CRD.

RESULTS

Means comparison results, showed that there is not a significant variation between vitamin A group and control group for HI, at 9th day but at day 23, There is a significant variation between vitamin A group and control group and day 42, There was not a significant variation between vitamin A group and group ($p<0.05$) (table 2). Serum level of vitamin A has significant variation between vitamin A group versus control group and vitamin E and selenium group ($p<0.05$) (table 1). Means comparison results, showed that there is not a significant variation between vitamin E and selenium group and control group for, HI, but at day 23, There is a significant variation between vitamin E and selenium and control group likewise at day 42 there is not a significant variation between vitamin E and selenium group and control group. Means comparison, showed that there is a significant variation between vitamin A group and vitamin E and selenium group at day 42 ($p<0.05$)(table 2). Serum level of vitamin E and selenium, has significant variation between vitamin E and selenium group and vitamin A group and serum level of selenium has significant variation between vitamin E and selenium group versus control group and vitamin A group ($p<0.05$) (table 1).

DISCUSSION

Dalloul etal (2003) reported that increasing of vitamin A level cause better immune systems proceed in broiler chickens which occur via vitamin A effect on lymphocytes and antibody producing that is corresponded with our findings. Other studies about the role of natural antioxidants like carotenoides and vitamin A, E and C on animal health, showed that this components via free radicals elimination, that produced within cellular activities and by environmental stress factor , get protect immune cells structure and immune system improvement [Brake , 1989]. Ross [1992] showed that chickens feed few amount of vitamin A had less antibody production and vitamin A adding to broiler chickens diet are effective on immune system cells and humoral immune that is corresponded with our findings. Lessard , etal [1997] reported via upper level of diet vitamin A , immune system and humoral immune were increased. Aburto and briton [1998] showed that upper level of diet vitamin A cause decreasing liver and plasma vitamin E level , this is corresponded with our findings. In another study reported that selenium deficiently cause decrease in immune response , the mechanism of this decrease is selenium decreasing cause glutathione peroxidase decreasing and increasing in lipidic hydroxides and peroxidase , this action cause that toxic materials compressed and increased in neotrophiles , thereby cause decline in immune system [Wen , etal , 1998].

In a recent study reported that vitamin E effect immune system by protect of diets saturated fatty acids and these fatty acids improve immune system [Villaverd , 2004].

In another study expressed that use of vitamin E prevented arashidonic acid oxidation and decreased prostaglandins and cause improved immune system in poultry [Yu , 1994].

In a recent study reported that vitamin E is the major biologic antioxidant and has important role growth and retention of hummoral immune system [Yamuna and thagavel , 2011].

Table 1: serum level data in vitamin A group (mg)

	serum level		
Treated group	vitamin A	vitamin E	selenium
control	75.50±5.55b	76.88±6.15b	.108±.0b
vitamin A	135.50±11.058a	75.63±5.20b	.109±.0b
vitamin E + selenium	74.38±6.16b	145.50±1.85a	.128±.0a

Colum means with various alphabet marks have singnificant differeces ($p<0.05$).

Table 2: humoral immune response exploring against newcastle disease vaccine

Treated group	9th day	23rd day	42nd day
Vitamin A	2.50±0.53a	3.875±0.35a	2.625±0.52b
control	2.25±0.46a	2.375±0.74b	2.75±0.89b
Vitamin E + selenium	2.50±0.53a	4.625±0.74a	4.250±1.16a

Colum means with various alphabet marks have singnificant differeces ($p<0.05$)

CONCLUSION

Serum level of vitamin E has significant variation in vitamin E and selenium group versus control and vitamin A groups. Serum level of selenium has significant variation in vitamin E and selenium group versus control and vitamin A groups ($p<0.05$). it results from the above that vitamin A and vitamin E and selenium improve humoral immune system against Newcastle disease vaccine in broiler chickens.

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