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The effect of vitamin A and complex of vitamin E and selenium on growth factors 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 and 4 replicate pens per treatment and 8 chickens per pens) in a same environmental conditions. Group A, consider as control group and group B and C considers as 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 for study about humoral immunity (HI) were in 3 period , first sampling was at 9th day of breeding , second sampling was at 2 weeks after first sampling and last sampling was at 42nd day of breeding (last day of period). In blood sampling for HI test, 2 cc blood was derived from each samples and for study about growth factor, 8 chickens per replicate were randomly chosen. Birds fed vitamin A and complex vitamin E and selenium containing diets exhibited significant difference, against Newcastle disease's vaccine ($p<0.05$). Consequently, vitamin A and complex of vitamin E and selenium, improve humoral immune system in broiler chickens, but exhibited no effects on growth factor in broiler chickens.

Keywords: vitamin A, complex of vitamin E and selenium, Humoral immune, growth factors, broiler chickens.

INTRODUCTION

Vitamin E is a fat soluble vitamin with herbal source which is essential for reproductive, neural, muscular and immunity proceeds. Obviously vitamin E effects on immune system improvement, exist via direction effect on immune cells or indirection effects on endocrine and metabolic parameters which is effective on immune system. Vitamin E as an antioxidant, get reduce free radicals in natural metabolites and phlogiston reactions. Vitamin E introduced as first defenses barrier which effective against oxidant agents [Vakili and daliri, 2008]. Selenium is an important mineral which act as a corporate element with glutathione peroxide. Complex of vitamin E and selenium has an important role in growth and maintenance of defensive system. Supplemental selenium can be effective on intracellular transportation of signals that needful lymphocyte generation [Yamuna and Thangavel, 2011].

Increasingly, amount of vitamin A and E, get increase the response of immune system. In the level 18000 IU of vitamin A had better response, but in the level 24000 IU of vitamin A, showed reduce in immune system ability [kashani, 2006]. The present study was designed to test effect of vitamin A and complex of vitamin E and selenium on the humoral immune (Newcastle vaccine titer) and growth factors (feed intake, mean of chickens weight, FCR mean) in broiler chickens.

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 8 chickens per pens) in a same environmental conditions. Group A, consider as control group and group B and C considers as 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 for study about humoral immunity were in 3 periods, first blood sampling was at 9th day of breeding, second sampling was at 2 weeks after first sampling and last sampling was at 42nd day of breeding (last day of breeding period). In blood sampling for HI test, 2 cc bloods was derived from each samples and for study about growth factor, 8 chickens per replicate were randomly chosen.

Growth factors (feed intake, mean of chickens' weight, FCR mean) were calculated weekly. For study about HI. 2 bids randomly chosen in 9th, 23ed and 42ed and sampling was consummated through wing vein. Then samples centrifuged at 4000 rpm for 10 minute then blood serum was separated and used for HI test.

Statistical Analysis of data
Data analyzed based on factorial design based on CRD. Data were subjected to ANOVA using of SAS (software).

RESULTS

Means comparison results, showed that there is not a significant variation between vitamin A group and control group for HI , 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 ($p<0.05$). Means comparison results, showed that there is not a significant variation between vitamin E + selenium group and control group for , HI, but at day 23, There is a significant variation between vitamin E + selenium and control group likewise at day 42 there is not a significant variation between vitamin E + selenium group and control group. Means comparison, showed that there is a significant variation between vitamin A group and vitamin E + selenium group at day 42 ($p<0.05$). mean comparison results, showed that there is not a significant variation between vitamin A group and two other group at first week for feed intake but there is a significant variation between vitamin A group and control group at second week, and there is not a significant variation between vitamin A group and two other groups at the 3ed, 4th, 5th and 6th week.

Mean comparison results, showed that there is not a significant variation between vitamin A group and two other groups for body weight mean. Mean comparison results, showed that there is not a significant variation between vitamin A group and two other groups for FCR but there is a significant variation between vitamin A group and control group at third week for FCR. In recent study, showed that there is not a significant variation between experimental groups for feed intake, FCR and body weight mean, likewise there is a significant variation between vitamin E + selenium group and two other groups for improve immune system, against new castle vaccine, but there is a significant variation between vitamin A group and vitamin E + selenium group versus control group at 23rd day of breeding period for feed intake, FCR and body weight mean. Table (1-2-3-4)

Table 1: HI response against Newcastle vaccine

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

**a,b column means with various alphabet marks have significant differences (p<0.05).*

Table 2: mean comparison of feed intake (gr)

Treated group	The first week	The second week	The third week	The fourth week	The fifth week	The sixth week
VitaminA	100.75±3.8a	355.25±7.4a	1005.00±3.8a	1905.00±32.6a	2996.75±30.3a	4127.75±52.8a
control	99.50±3.1a	324.25±11.00b	862.25±20a	1853.25±53.7a	2913.75±53.8a	4088.50±49ab
VitaminE +selenium	97.00±2.9a	345.25±25.5ab	963.75±40.3a	1910.50±58.50a	2963.25±66.7a	4025.50±36.2a

**a,b column means with various alphabet marks have significant differences (p<0.05).*

Table 3: mean comparison of chicks body weight (gr)

Treated group	The first week	The second week	The third week	The fourth week	The fifth week	The sixth week
Vitamin A	115.75±5.7a	278.50±9.7a	631.75±26.8a	1072.75±52.6a	1597.0±51a	2098.25±65.8a
Control	121.00±3.6a	270.25±22.2a	629.34±31.5a	1092.75±63.3a	1598.0±96.1a	2161.00±87.8a
Vitamin E +selenium	112.75±10.6a	246.25±39.8a	577.16±45.5a	1018.10±76.7a	1539.5±87a	2037.00±110.4a

**a,b column means with various alphabet marks have significant differences (p<0.05).*

Table 4: mean comparison of FCR

Treated group	The first week	The second week	The third week	The fourth week	The fifth week	The sixth week
VitaminA	1.25±0.1a	1.525±0.05a	1.800±0.08a	2.025±0.15a	2.025±0.05a	2.175±0.05a
control	1.15±0.05a	1.525±0.26a	1.475±0.05b	2.100±0.08a	2.050±.19a	2.025±.12a
VitaminE +selenium	1.25±0.2a	1.875±0.30a	1.825±0.2a	2.075±0.12a	2.000±.18a	2.100±.11a

**a,b column means with various alphabet marks have significant differences (p<0.05).*

DISCUSSION

Our finding is corresponded with as study which reported that vitamin A supplementation, had no significant effect on feed intake, body weight and FCR [Singh and Donovan, 1973]. Also in an other study, reported that vitamin A supplementation had no significant effect on body weight and feed intake [Steel and Torrie, 1985]. Likewise, in recent study, represented that increasing vitamin A density causes immune system improvement in broiler chickens [Dalloul, etal, 2003]. Also in an other study, that is about role of natural antioxidants like carotenoides and vitamin A, E and C on animal healthiness, reported that, it cause immune systems improvement [brake,1989]. Ross [1992] reported that, chickens which consumed low levels of vitamin A, product antibodies less than those chickens which consumed optimal levels of vitamin A [ross,1992].

In an other study represented that with low levels of diets vitamin A content chickens had smaller spleen and bursa of fabricius, when as antibodies were increased likewise humoral immune was increased [lessard, 1997]. In a recent study showed that high levels of vitamin A in diet cause decrease in density of liver and plasma vitamin E content [Aburto, 1998]. In a more recent study, reported that extra vitamin E + selenium supplementation had no significant effect on chickens feed intake and FCR , likewise upper levels (upper them 200mg/kg) cause significant decrease on chicks body weight [Coetzee and Hoffman, 2001]. In a stuady reported that different levels of vitamin E + selenium had not significant effect on chicks live weight [Bartov and frigg, 1992]. Bottje et al 1997, reported that vitamin E supplementation (more than 87 mg/kg) cause decrease on feed intake, body weight and FCR broiler chickens that corresponded without finding [Bottje,etal,1997]. In recent study, reported that selenium (0.2 mg/kg) had not significant effect on feed intake [Uchaturvedi, etal, .2004].

In an other study, represented that use of selenium in diet had not significant effect on weight gain that agree with our finding [Ryu, etal, 2005].

CONCLUSION

In this study, vitamin A and E has not significant variation on feed intake, FCR. And body weight but there is a significant variation between vitamin E + selenium group and two other groups (vitamin A and control groups) for improve immune system against Newcastle vaccine, but there is a significant variation between vitamin A group and vitamin E + selenium group versus control group at 23rd day of breeding period ($p<0.05$).

Consequently, vitamin A and vitamin E + selenium cause improve HI against Newcastle vaccine broiler chicken but has not significant effect on growth performance in broiler chickens ($p<0.05$). Table (1-2-3-4)

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