



Original Research Article

Comparative Efficacies of Vitamin C in Water and in Feed on Humoral Immunity of Newcastle Disease Vaccinated Broilers

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ABSTRACT

Keywords

Newcastle disease, Vaccination, Humoral immunity, Vitamin C, Broilers

The study was conducted to determine the comparative efficacies of vitamin C in water and in feed in broilers vaccinated against Newcastle disease. 100 days-old broilers were used for this study and given commercial feed. The birds were allotted into 5 treatment groups namely T1, T2, T3, T4 and T5 with 20mg, 40mg vitamins in water, 20mg, 50mg vitamin C in feed respectively and T5 serving as the control. The birds were vaccinated with LaSota at 3 weeks old. Blood samples were obtained from the wing vein of birds per treatment at weeks 5 and 6. Sera obtained were subjected to HI test. The results varied significantly ($P < 0.05$). Vitamin C fortified groups had higher ($P < 0.05$) HI titres than the control. The feed fortified groups T3 and T4 had higher titres than the water fortified groups T1 and T2. Vitamin C supplementation of either feed or water in addition to vaccination against Newcastle disease is highly recommended.

Introduction

Poultry are kept for the production of eggs and meat. In most areas of the world poultry provide an acceptable form of animal protein to most people (Al – Garib *et al.*, 2003).

Poultry production in the developed countries is faced with the challenge of getting cheap feed materials and diseases. One of the diseases affecting poultry in Nigeria which is also global in nature is the Newcastle disease (ND).

Newcastle disease is an acute, mild to severe, highly infectious and contagious disease of domestic poultry, caged bird as

well as wild birds caused by specified viruses of the Avian *Paramyxovirus* type 1 (APMV - 1) (Alexander, 2003). It is reported as the most important viral disease and a major threat to poultry production in the world (Alder *et al.*, 2001).

Newcastle disease is very important because it is associated with high flock mortality and loss of edible and breeding eggs (Chansiripornchai and Sasipreeyajan, 2006).

There is no cure for Newcastle disease and vaccination and biosecurity are the major measures of control of the disease (Senne *et al.*, 2004; Sanda *et al.*, 2008).

Despite vaccination of broiler flocks, disease outbreaks are rampant (Sanda *et al.*, 2008). There is therefore need for feed enhancement with immunostimulants either in feed or their drinking water to boost the immunity of vaccinated birds. Many researchers have reported that vitamin C enhanced the immunity of vaccinated broilers (Balnave and Brake, 2002; Sanda and Ebiloma, 2013; Sanda and Oyewole, 2015).

This study was therefore designed to compare the efficacies of vitamin C in water and in feed on Humoral immunity of Newcastle disease vaccinated broilers.

Materials and Methods

Experimental location

This study was carried out at the Poultry Unit of the Livestock Teaching and Research Farm of Kogi State University, Anyigba, Kogi State, Nigeria. Anyigba is located in the derived savannah of Nigeria on latitude 7° 30'N and longitude 7° 30'E.

Experimental animal

100 day – old broiler chicks were obtained for this study and allotted into 5 treatments namely T1, T2, T3, T4 and T5. Water and feed were given to the broilers *ad libitum*. The birds were fed a commercial feed. T1 and T2 were fortified with 20mg and 40mg Vitamin C in drinking water respectively while T3 and T4 were fortified with 20mg and 40mg Vitamin C in feed respectively and T5 served as the control, with no vitamin fortification.

Vaccination

B1 strain was administered to the chicks intraocularly (i/o) at the first week, also

Gumboro vaccine was given at the age of 2nd week of age. The test vaccine, LaSota was reconstituted in 2 litres of water and 400ml of the reconstituted vaccine was given to each group.

Blood collection

A total number of 5 birds from each treatment were selected and blood samples collected via the wing veins at the 5th and 6th weeks of age. The Sera obtained were analysed using haemagglutination inhibition (HI) test on described by OIE (2002).

Statistical analysis

Data obtained from the HI test were analyzed using one way analysis of variance (ANOVA) outlined in MINITAB statistical software.

Results and Discussion

The results of the study are presented in table 1. The effect of Vitamin C in water and in feed of broilers vaccinated with Newcastle disease vaccine (LaSota) were highly significant ($P < 0.05$).

T3 (20mg vitamin C in feed) was significantly higher in antibody titre ($P < 0.05$) than T4 (40mg vitamin C in feed), likewise T4 and T1 (20mg vitamin C in water) were significantly higher ($P < 0.05$) in immunity than the control (T5). However, all the groups had HI titres above the protective level 32 (Schmidt and Schmidt, 1955) reported that ND HI titres of more than 32 considered sufficient to protect birds from ND infection. Sanda and Oyewole (2015) observed that broilers on feed fortified with Vitamin C showed significantly higher ($P < 0.05$) HI titres at the age of 6 and 8 weeks than birds supplemented with Vitamin A and birds with the combination of vitamins A and C.

Table.1 The mean Haemagglutination Inhibition (HI) titres of Newcastle Disease Virus (NDV) in broilers fortified with vitamin C

Age in weeks	T1 (20mg Vitamin C in water)	T2 (40mg Vitamin C in water)	T3 (20mg Vitamin C in feed)	T4 (40mg Vitamin C in feed)	T5 (Control)	SEM
5	70.96 ^b	66.15 ^c	75.01 ^a	69.73 ^b	54.83 ^d	1.52
6	69.99 ^c	63.23 ^d	71.65 ^b	73.57 ^a	56.43 ^e	2.35

a, b, c, d, e = means on the same row with different superscript differ significantly (P<0.05)
SEM = Standard Error of Means

At the age of 6 weeks, T4 was significantly higher (P<0.05) than T1, T2 T3 and T5. Also, T3 (20mg of vitamin C in feed) and T4 (40mg vitamin C in feed) were significantly higher than (P<0.05) T1(20mg vitamin C in water) and T2 (40mg vitamin C in water) and also T1 & T2 were significantly higher (P<0.05) than the control (T5).

At 6 weeks old all the Vitamin C fortified groups had better immunity (P<0.05) than the control.

From the results of this study, feed supplementation with Vitamin C was more beneficial to the broilers than vitamin C in water. The results also revealed that vitamin C supplementation either in water or in feed were both immunogenic and better than vaccination without supplementation. It is therefore recommended that the feed or drinking water of broilers be fortified with vitamin C in addition to Newcastle disease vaccinations.

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