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## **EFFECTS OF WATERLEAF (*TALINUM TRIANGULARE*) EXTRACT ON PERFORMANCE AND IMMUNE RESPONSES OF BROILERS VACCINATED WITH NEWCASTLE DISEASE VACCINE (LaSota)**

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### **ABSTRACT**

The study was conducted to evaluate the effects of waterleaf (*Talinum triangulare*) extract (WLE) on the performance and immune responses of broilers vaccinated with Newcastle Disease Vaccine (LaSota). 100 unsexed day-old broiler chicks of Isa white were allotted to five treatments; A, B, C, D and E with twenty chicks in each treatment and with two replicates in each. The birds were placed on commercial diet. The treatments contained 0.0 (Control), 100, 200, 300 and 400ml water leaf extract per litre of drinking water respectively in a completely randomized design. The birds were vaccinated against Newcastle disease (ND) using LaSota vaccine at 21 days old. Twenty-five birds were randomly selected from the different treatments at the 5th and 6th week of age and bled, sera were analyzed using Haemagglutination Inhibition (HI) test. The HI titres, the feed intake, the feed conversion efficiency and the live weight were statistically analyzed using MINITAB. The live weight gain of the group that received the highest quantity of water leaf extract (WLE) was significantly higher ( $p < 0.05$ ) than those that received lower quantity of WLE. In addition, final weight gain increased and feed conversion efficiency was significantly higher ( $P < 0.05$ ) because of the inclusion of waterleaf extract in the drinking water of broilers. There was no significant difference ( $p > 0.05$ ) in the feed intake of T1, T2, T3 and T4 but T5 was significantly higher ( $P > 0.05$ ) than T3. It was also discovered that at the 5th week the immunity of T4 (300ml WLE) was significantly higher ( $P < 0.05$ ) than that of T3, (200ml WLE). In the 6th week there was no significant difference ( $P > 0.05$ ) between T1, T4 and T5 but T1, T4 and T5 were significantly higher ( $P < 0.05$ ) than T2 and T3. The result of this study indicates that WLE increased performance and improve the immune responses of broilers to Newcastle Disease virus.

**Keywords:** Immune Response, Waterleaf, Broilers, LaSota Vaccination, Newcastle Disease

### **INTRODUCTION**

#### ***Poultry Production and Newcastle Disease***

Poultry have been domesticated for thousands of years; archaeological evidence suggests that domesticated chickens existed in China 8,000 years ago (Alders, 2004).

Decreased weight gain, management problems and infectious diseases are major constraints in the poultry sector (Jawad *et al.*, 2013). Poultry industry is one of the most dynamic of the world's agribusiness.

Newcastle disease (ND) is a viral disease of birds caused by Newcastle disease virus (NDV) also known as *Paramyxovirus 1* belonging to the family *Paramyxoviridae* (Alexander, 1997). It is a peracute, acute and sometimes subclinical contagious disease of poultry (Health *et al.*, 1991).

There is no chemotherapeutic agent for ND, and control is by vaccination and biosecurity measures. Despite the vaccination, outbreaks of ND are common (Sanda *et al.*, 2008).

#### ***Waterleaf (Talinum Triangulare)***

Waterleaf (*Talinum triangulare*) is an herbaceous annual and perennial plant with a broad, worldwide distribution. Waterleaf crude protein content compares favourably with that of cowpea, peanut, millet and cashew nuts (Ofusor *et al.*, 2008).

Akachuku and Fawusi (1995) investigated the crude protein content of waterleaves and tender stems and found it to be as high as 29.4% and 13.4% respectively. Sridhar and Lakshminarayana (1993) also gave a report on high total lipids, essential oils and alpha-tocopherols and beta-tocopherols in *Talinum triangulare*.

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### **Significance and Objectives of this Study**

The paucity of information about the subject matter has necessitated this research work, thus making this study relevant. The rampant outbreak of ND despite vaccination also justifies this study.

Attempt was therefore made in this study to determine the effects of waterleaf (*Talinum triangulare*) on the performance and immune responses of broilers vaccinated with Newcastle disease vaccine (LaSota).

### **MATERIALS AND METHODS**

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 7030'N and longitude 7090' E. The zone is characterized by 6 – 7 months of annual rainfall ranging from 1400 – 1500mm and day temperature range of 250C – 350C with the highest temperature being in March and April (Kowal and Knabe, 1972).

The fresh water leaf were collected from farms including the Livestock Teaching and Research Farm of Kogi State University, after which one kilogram (1kg) of freshly cut *Talinum triangulare* leaves was separated from the stem, washed with clean water to remove contaminants (dust, dung, dirt and sand), drained, chopped, blended and sieved.

A total of 100 unsexed day-old broiler chicks of Isa white breed were obtained for the study. After brooding, the chicks were allotted to five treatments; A, B, C, D and E with twenty chicks in each treatment.

The treatments contained 0.0ml (control), 100ml, 200ml, 300ml, and 400ml of water leaf extract per liter of drinking water respectively, in a completely randomized design, there were two (2) replicates per treatment. The necessary vaccination and routine care was given throughout the study.

The birds in all the treatments were offered a commercial feed called “Animal care” using the starter from 1 to 4 weeks and the finisher from week 5 to 8. The nutrient composition of the feed as indicated on the label for starter and finisher are; crude protein (CP) 23%, 20% and energy 2800kcalME and 3000kcalME respectively.

The birds were vaccinated against Newcastle Disease at the age of 3 weeks with Newcastle disease vaccine (LaSota), which was reconstituted in 2 litres of drinking water and served to the birds.

Blood samples were collected via the wing vein from five broilers per treatment for serology at 5th and 6th week post vaccination (PV). The Sera samples were subjected to Haemagglutination Inhibition (HI) test to determine the immune response as described by OIE (2002).

The samples collected were kept immediately in slanting position to allow the blood to clot. The sera samples were as much as possible prevented from direct contact with any source of heat and the clear sera were obtained after 6 hours. Sera samples were also stored at -200C in the freezer and were later taken for HI analysis at the Veterinary Medicine Laboratory of the Veterinary Teaching Hospital, UNN, Nsukka, Nigeria.

Feed and water intake on daily basis were recorded, while weight gain were determined on weekly basis and feed conversion ratio were calculated for each phase.

Data obtained from the study (HI titres and performance characteristics) were subjected statistically to one way Analysis of Variance (ANOVA) outlined in the MINITAB statistical software for completely randomized design (MINITAB, 1991).

### **RESULTS AND DISCUSSION**

Table 1 shows the results of the effects of water leaf extract on broilers from 3-8 weeks. The results as shown in Table 1 indicates that inclusion of water leaf extract in drinking water significantly ( $p>0.05$ ) increased weight gain, final live weight and feed conversion efficiency.

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**Table 1: Performance of Broilers Served Waterleaf Extract From 3-8 weeks**

Parameters	T1 (0.00ml)	T2 (100ml)	T3 (200ml)	T4 (300ml)	T5 (400ml)	SEM	LOS
Initial weight (g)	399.6	399.4	399.60	399.5	399.50	0.7	NS
Final weight (g)	1715 <sup>e</sup>	1875 <sup>d</sup>	1900 <sup>c</sup>	1960 <sup>b</sup>	2015 <sup>a</sup>	26.37	X
Average daily weight (g)	37.67 <sup>d</sup>	42.20 <sup>c</sup>	43.30 <sup>c</sup>	44.60 <sup>b</sup>	46.20 <sup>a</sup>	0.9	X
Average daily feed intake (g)	111.79 <sup>ab</sup>	111.81 <sup>ab</sup>	109.87 <sup>b</sup>	110.87 <sup>ab</sup>	113.20 <sup>a</sup>	2.50	X
Feed conversion ratio	2.97 <sup>c</sup>	2.67 <sup>b</sup>	2.55 <sup>b</sup>	2.51 <sup>a</sup>	2.50 <sup>a</sup>	0.12	X
Mortality (%)	0	0	0	0	0		

*a, b, c, d = Different superscripts along the rows indicate significant difference between means along the rows*

*NS – No significant difference (P > 0.05)*

*NS = Not Significant*

*X = Significant*

*SEM= Standard error of means*

The final weight of birds in T5 (400ml WLE) was significantly higher ( $P < 0.05$ ) than those of the other groups. There was no significant difference in the feed intake of T1, T2, T3 and T4, but T5 was significantly higher ( $p < 0.05$ ) than T3. It was discovered that the increase in the levels of water leaf extract led to an increase in body weight and feed conversion efficiency as shown in table 1. This result is in agreement with Nworgu *et al.*, (2007) who fed aqueous wilted water leaf (*Talinum triangulare*) to broiler chickens and observed that the body weight gains of the broiler chickens fed higher quantity of WLE were significantly higher ( $P < 0.05$ ) than those fed with lower quantity. T5 had the highest feed intake, the best feed conversion efficiency and the best final weight.

Furthermore, the increase in weight gain can as well be traced to the fact that water leaf extract has appetizing and digestion stimulating properties which are confirmed by Langhout, (2000) in his work titled “New additives for broiler chicken”. This digestion and stimulating properties must have aided in the utilization of feed thus resulting in enhanced growth.

**Table 2: The Haemagglutination Inhibition (HI) Titres of NDV in Vaccinated broilers given water leaf extract.**

Parameters	T1 (0.00ml)	T2 (100ml)	T3 (200ml)	T4 (300ml)	T5 (400ml)	SEM	LOS
Week 5	20.56 <sup>b</sup>	33.90 <sup>b</sup>	21.32 <sup>b</sup>	50.85 <sup>a</sup>	50.45 <sup>a</sup>	6.08	*
Week 6	19.70 <sup>b</sup>	19.80 <sup>b</sup>	24.42 <sup>b</sup>	61.69 <sup>a</sup>	78.51 <sup>a</sup>	25.01	*

*a, b, c, d – means on the same row with different superscript differs significantly*

*SEM – Standard error of means*

*LOS – Level of Significance*

*\* - Significant difference at  $P < 0.05$*

Table 2 shows the result of HI for broilers served water leaf extract from 3-8 weeks. The result from haemagglutination inhibition (HI) test shows T2 (100ml), T4 (300ml) and T5 (400ml) had immunity above the protective HI titre of 32.

In the 5th week, the immunity of T4 (300ml WLE) was significantly higher ( $P < 0.05$ ) than T1 (0.00ml), T2 (100ml) and T3 (200ml) WLE and there was no significant difference ( $P > 0.05$ ) between T1 and T2.

In the 6th week there was no significant difference ( $P > 0.05$ ) between T1, T2 and T3 but T4, T4 and T5 had significantly higher HI titre ( $P < 0.05$ ) than the other groups

It has been reported that certain vitamins have immune-stimulating properties and can boost immunity. This study agrees with the work of (Ezekwe *et al.*, 2001), who stated that water leaf possess the essential

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nutrients like  $\beta$ -carotene which is a precursor of vitamin A, minerals (such as magnesium, calcium and potassium), pectin, protein and vitamins. These properties must have helped to boost the immunity of broilers in this study. Furthermore, the result of this study is in agreement with McDowell and Ward (2009) who reported in their work that certain minerals including vitamins A, C, E and minerals can give optimum performance and immunity in chicken.

### **Conclusion and Recommendations**

In conclusion, 300ml and 400ml of waterleaf extract gave the best weight gain, feed conversion ratio and immunity against ND virus.

It is recommended that for further study, the broilers should be challenged with ND virus to validate the immune stimulating properties of water leaf extract. For effective use of water leaf extract to boost the immune response of broilers against ND further work should be done with higher levels of water leaf extract.

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