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Research Article

Growth Characteristics of Abor-Acre Broilers Administered Neem Leaf (*Azadirachta indica*) and Pawpaw Leaf (*Carica papaya*) Extracts

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Abstract

One hundred and twenty-seven days Abor-acre broiler birds were used to determine the effect of neem and papaya leaf extracts on the growth characteristics of broilers. They were randomly assigned to four treatments (T_1, T_2, T_3 and T_4) and three replicates of 10 birds per replicate. In T_1 (control), conventional vaccines and drugs were administered; in T_2, neem leaf extract was used; in T_3, pawpaw leaf extract was given and in T_4, a mixture of neem and pawpaw leaf extracts was administered through the drinking water. The experiment lasted for seven weeks during which the effect of neem and pawpaw leaf extracts on weight gain, feed intake, and feed conversion ratio were determined. The result showed that there were significant differences ($p < 0.05$) in the weekly weights T_4 (994.55g), FCR T_3 (2.74) and feed intake T_3 (0.73kg) of broilers administered neem +pawpaw leaf extracts (T_4) but there was no significant difference ($P > 0.05$) in the weight gain T_4 (2101.93g). Hence it can be concluded that neem and papaya leaf extracts increased the live body weight and improved the weekly body gain and feed efficiency when compared to that of control. This could be as a result of nutrients that the leaves contain which acts as a natural growth promoter. Also crude fiber and other bioactive compounds such as Tanin, Salanin, Azadirachtin and Limonodois found in Neem leaf could be a contributing factor.

Keywords: Pawpaw Leaf Extracts; Neem Leaf Extract; Neem and Pawpaw Leaf Extract; Abor-Acre Broilers

Introduction

The production of broiler has grown immensely in the past few years. This is partly as a result of trend in market demand and or partly due to constant researches and breeding programs which further enhanced feed utilization and invariably growth rate. In order to achieve this, poultry farmers make use of synthetic and antibiotic growth promoters to enhance feed utilization and growth performance of broilers. The term "antibiotic growth promoter" (AGP) is used to describe any medicine that destroys or inhibits bacteria and is administered at a low, sub-therapeutic dose [1].

Due to the emergence of drug resistance microorganisms, side effects of antimicrobials and the harmful residual toxicity effects of drugs observed in the food chain of broilers, there is an increasing trend towards the use of alternative or complementary medicines for the general health maintenance, immuno modulation and therapeutic purposes for treating various diseases and disorders including cancers and growth promoters. Particularly, the utilization of the plants, herbs, fruits and vegetables, nutritional immunomodulators, fewer side effects, being cost-effective and other beneficial advantages for safeguarding health of humans and their companion animals including poultry [2]. Neem leaf contains antibiotic and growth promoters which have been helpful in improvement of growth performance and feed conversion ratio in birds treated with Neem extracts. Similar results have been reported by other researchers [3-5]. Neem leaf has been reported to contain several biologically active constituents such as Azadirachtin, Meliantrol, Salanin, as well as Nimbin and Nimbidin [6].

Materials and Methods

The experiment was carried out at Teaching and Research Farm of the Department of Animal Science and Technology, Faculty of Agriculture, Nnamdi Azikiwe University, Awka. The farm lies within the latitude of $6^0$15'10.1" N and longitude of 7^0 08' 31.9" E.

Fresh Neem and Pawpaw leaves were harvested from the Nnamdi Azikiwe University environment using table knife. 500g (0.5kg) of Neem leaf was weighed using electronic sensitive scale. It was properly washed and manually crushed using wooden mortar in a clean environment for five (5) minutes. 500g of Pawpaw leaf was weighed, properly washed and manually crushed using wooden mortar. It was extracted using one litter of clean water. 150ml of the Neem leaf and Pawpaw leaf extracts were obtained respectively using syringe of 10 ml to collect the extracts. The combination of both Neem and Pawpaw extracts were 75ml for Neem and 75ml for Pawpaw extract, extraction method[7]. The following treatment (T1 - T4) were given to the birds

- T1 (vaccine +drugs),
- T2 NLE (150ml+1L of water),
- T3 PLE (150ml+1L of water) and
- T4 NPLE (75ml +75ml +1L of water).

At the end of the feeding trail, data on growth traits were collected and subjected to Analysis of variance (ANOVA) using Statistical Package for Social Science (SPSS) version 20. The separation of mean was done using DUNCAN multiple range test.

Results and Discussion

The data presented in Tables below show that statistically, there was no significant difference among the treatments in the weekly mean weight, Specific Growth Rate (SGR), Feed Intake, and Feed Conversion Ratio (FCR) but there was numerical difference among the treatments. The birds in T_4 recorded a final body weight than the control, this can be attributed to the antimicrobial properties of Neem which may have aided in reducing the harmful microorganism in the intestine of the birds there by increasing absorption of digested feeds. Similar suggestions have been made [8,9].

The result of this study is in agreement with the study carried out by Nusrat[10], that the use of neem and papaya leaf extract and turmeric rhizome extract as growth promoter improved the weight gain of broilers and it is also in agreement with the findings of Onyimonyi., *et al.* [9] who reported that papaya leaf extract improved the weight gain of the broilers, Allinson., *et al.* [11] reported that herbal extracts enhances the performance in poultry, increases the feed intake and weight gain ratio by significantly decreasing the bacterial and oocyte count. It also agreed with the work of Mostofa., *et al*. [12] effect of Neem, Nishyinda and Papaya extract to growth performance of broiler. Similar findings were observed by Mahejabin., *et al*. [13-15] who reported that supplementation of neem, turmeric and papaya leaf extract in the treatment group caused improvement in the feed efficiency as compared to that of control group.

Treatments	W1	W2	W3	W4	W5	W6	W7	Mean Body Weight	Weight Gain
T1	129.17 ± 13.547	323.83 ± 30.697	516.20 ± 44.230	810.57 ± 58.776	1058.73 ± 57.642	1586.20 ± 188.494	2119.20 ± 246.112	934.84 ± 89.063[a]	1990.03 ± 233.527[a]
T2	112.03 ± 10.174	307.87 ± 23.131	496.23 ± 21.374	748.77 ± 70.400[a]	1069.63 ± 76.735	1602.37 ± 115.270	2055.13 ± 147.990	913.15 ± 65.03[a]	1943.10 ± 138.445[a]
T3	125.17 ± 3.439	333.33 ± 9.166	552.27 ± 22.432	843.77 ± 31.377	1167.90 ± 22.257	1658.87 ± 46.730	2060.27 ± 20.747	972.24 ± 3.43[b]	1999.10 ± 17.344[a]
T4	126.53 ± 6.957	321.47 ± 9.433	517.50 ± 24.129	847.53 ± 35.398	1140.23 ± 93.592	1780.10 ± 62.661	2228.47 ± 112.817	994.55 ± 47.304[c]	2101.93 ± 107.954[a]
SEM									

Table 1: Columns sharing similar superscripts are not significantly different at (P > 0.05).

[1]W= Week; T1 =Control; T2=Neem leaf extract; T3=Pawpaw leaf extract; T4=Neem + pawpaw leaf extracts.

Treatments	$Log_e W_1$	$Log_e W_2$	SGR
T1	4.86	7.66	0.0571
T2	4.72	7.63	0.0594
T3	4.83	7.66	0.0578
T4	4.84	7.71	0.0585

Table 2: Specific Growth Rate of Broiler Chicks Treated with Vaccine and Leaf Extracts for 7 Weeks.

Treatment	Weekly feed intake							
	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Mean Feed Intake ± SD
T1	0.14	0.35	0.43	0.51	1.19	1.00	1.24	0.69 ± 0.44
T2	0.14	0.31	0.40	0.50	1.18	1.02	1.21	0.68 ± 0.43
T3	0.13	0.35	0.44	0.52	1.21	1.21	1.24	0.73 ± 0.44
T4	0.14	0.34	0.43	0.54	1.20	1.03	1.25	0.70 ± 0.43

Table 3: Mean Feed Intake of Broiler Chicks Treated with Vaccine and Leaf Extracts for 7 Weeks.

Treatment	Mean Feed Intake (g)	Mean Weight Gain (g)	FCR
T1	694.29	1990.03	2.87
T2	680.00	1943.10	2.86
T3	728.57	1999.20	2.74
T4	704.29	2101.93	2.98

Table 4: Feed Conversion Ratio (FCR) of Broiler Chicks Treated with Vaccine and Leaf Extracts.

Conclusion

The experiment carried out showed that plant parts serve as growth promoting factor which helps to increase the growth rate, body weight gain and the feed efficiency and conversion ratio which is the most important part of poultry production. These plants parts are easily available even to the rural farmers, not costly and not competitive food items for man.

Recommendation

Due to the residual effect of synthetic antibiotics in broilers and its consequent harmful effect on humans that consume the product. I recommend that natural herbs and plant parts such as Neem and Pawpaw leaves should be used either as feed additive, oral supplementation for raising of poultry. The use of these plants will encourage organic farming and also reduce the effects of these drugs to man and the environment as a whole. It can also serve as growth promoting factor as shown in this study.

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