

EFFECT OF SUPPLEMENTAL LEVELS OF LEMON GRASS LEAF MEAL ON THE GROWTH PERFORMANCE AND HAEMATOLOGICAL CHARACTERISTICS OF STARTER BROILER BIRDS (A CASE STUDY IN ISHIAGU, IVO, L.G.A OF EBONYI STATE)

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Abstract

The effect of supplementing lemon grass (*Cymbopogon citrates*) leaf meal on the growth performance and haematological profile of starter broiler birds formed the basis of this study. A total number of one hundred and twenty (120), one week old "Agric-tech" broiler chicks were randomly allocated to four dietary treatments, each replicated three times with ten birds per replicate in a completely randomized design (CRD). Four different diets were formulated such that the lemon grass leaf meal was incorporated into the diets at the rate of 0.75%, 1.50% and 2.25% respectively, while treatment 1 served as the control with 0% level of lemon grass leaf meal. Feed and water were given ad-libitum throughout the experimental period of twenty one day. Results obtained from the growth performance in terms of initial body weight, final body weight, average daily body weight gain, average daily feed intake and feed conversion ratio showed significant ($p < 0.05$) difference across the treatment group. Haematological profile results showed that there was significant ($p < 0.05$) effect of lemon grass leaf meal across the treatment groups. From the present results, it can be concluded that lemon grass leaf meal can be added up to the levels of 2.25% in the diet of starter broiler birds without any negative impact in terms of growth performance and no detrimental effect to the health of the birds at this phase of growth.

Keywords: Growth performance, starter broiler birds, lemon grass leaf meal, haematological indices

Introduction

High quality feed together with clean environment, clean water and subsequently good managerial qualities can ensure the production of nutritious animal products with desirable traits for man consumption. Thus the use of additives of natural origin as alternatives to antibiotics in animal and human nutrition has been encouraged recently. Feed additives like probiotics, prebiotics, organic acids and plant derivatives with their biochemical structures and physiological functions of various degrees have been reported. The subsequent consumption of medicinal herbs, aromatic plants and spices in man's nutrition for improvement of taste, aroma and colour of feed as additive have been carefully substituted into animal nutrition for growth and health of the animals. With the recent ban of antibiotics use in animal nutrition due to the emergence of microbes' resistance alternative growth promoters must be evaluated. Thus the removal of antibiotics as growth promoters has been reported (Ceylon and Fung, 2004). A wide range of herbs, spices and their extracts exerts beneficial effects within the digestive tract, such as laxative acid, spasmolytic effects and reduction of flatulence (Onyimonyi *et al.*, 2009). These active components effects largely depends on its dosage administered. Increased in quantity of doses can even be detrimental to animals and subsequent doses reduction in quantity poses no effect to the animal.

Lemon grass (*Cymbopogon citratus*) is an aromatic plant belonging to the gramineae family (Akhila, 2010). The compounds identified in *Cymbopogon citrates* are mainly terpenes, alcohols, ketones, aldehydes and esters. Studies indicate that *Cymbopogon citrates* possess various pharmacological activities such as anti-amoebic, antibacterial, antidiarrheal, antiparasitic, antifungal and anti-inflammatory properties. Other effects such as antimalarial, antimutagenicity, antimycobacterial, antioxidant and hypoglycemic have also been studied (Mirghani *et al.*, 2010)

Materials and Method

The experiment was conducted at the poultry unit of the Animal Production Department, Federal College of Agriculture, Ishiagu, Ebonyi State. The lemon grass leaf that was used for the experiment was sourced from Afikpo and Ishiagu, both in Ebonyi state. The lemon grass leaves were obtained fresh and washed, then air-dried for a week at room temperature after which it was sun-dried for about 2 hours to get a crispy-like leafy material. The crispy leaves were then turned to leaf meal by means of grinding. One hundred and twenty (120) day old broiler chicks were used for the research work. The birds were brooded for one week after which they were randomly distributed into four treatments. Each treatment was replicated three times in a completely randomized design (CRD) with ten (10) birds per replicate. The birds were purchased from a reputable farm in Enugu, Enugu state.

Prior to the arrival of the birds, the pens were washed and cleaned so as to avoid pathogenic and disease infection. A good source of light was provided, which served as an insulator to keep the chicks warm. Feeders and drinkers were thoroughly washed and cleaned. The birds were raised on a deep litter system with wood shavings which served as a source of litter. The chicks were brooded for one week after which they were randomly distributed to their various pens. The initial weight of the birds was obtained after distribution to their various pens. Feed and water were given *ad-libitum*. All the routine vaccination and medication necessary for the birds' good health during the entire growth cycle from day old to the end of the experiment were strictly adhered to according to specification.

Experimental diets

Four experimental diets were formulated with diet 1 containing 0% lemon grass leaf meal which served as the control. Diets 2, 3 and 4 contain the lemon grass leaf meal at the levels of 0.75%, 1.50% and 2.25% respectively..

Table 1. Composition of starter broiler diet fed supplemental levels of lemon grass leaf meal

Ingredients	Treatments			
	T1	T2	T3	T4
Maize	54.00	53.25	53.25	52.50
Wheat offal	7.25	7.25	6.50	6.50
Lemon grass leaf meal	0	0.75	1.50	2.25
TOTAL	100	100	100	100

Other feed ingredient had same value across treatment group: Soybean meal-7.00; Groundnut cake-22.15; Fishmeal- 3.00; Blood meal-2.50; Bonemeal-2.00; Limestone-1.00; Salt-0.25; Starter premix-0.30; Lysine-0.25; Methionine-0.30.

Feed intake was recorded as the difference between the quantity of feed given the previous day and the quantity that was left the next day. Feed conversion ratio was obtained as the ratio of feed intake divided by the body weight gain. Data collected were subjected to analysis of variance (ANOVA) and significant difference means were separated according to the method of Duncan multiple range test as outlined by Obi (2002).

Results and discussion

Table 2 showed the results of starter broiler birds fed diet supplemented with graded levels of lemon grass leaf meal. The result of final body weight showed that birds in treatment 4 had the highest value of 1193.33g which was similar ($p>0.05$) to those of birds in treatment 3 (1173.33g), but differed ($p<0.05$) from those in treatment 2 (1150.00g) and 1 (1113.33g) respectively. The significant increase in value of final body weight across the treatment group may be due to the ability of the birds' enzymatic system to stimulate protein synthesis and also optimized the antioxidant activities of lemon grass leaf meal. This present research work is similar with the work of Mmereole (2010) who observed significant ($p<0.05$) higher body weight and body weight gain when compared with the control in starter broiler birds fed diet supplemented with lemon grass leaf meal.

Table 2. Growth Performance Characteristics of Starter Broiler Birds fed Supplemental levels of Lemon Grass Leaf Meal (lglm)

Parameters	Treatments				SEM
	T1	T2	T3	T4	
*Initial Body Weight (g)	115.00	115.00	113.33	113.33	-
*Final Body Weight (g)	1113.33	1150.00	1173.33	1193.33	23.78
*Av. Daily Body Wt. gain (g)	47.5	49.29	50.48	51.4	1.11
*Av. Daily Feed Intake (g)	93.12	94.99	96.21	92.49	0.79
*Feed conversion ratio	1.96	1.93	1.91	1.80	0.04
*Packed Cell Volume (%)	30.09 ^{bc}	32.91 ^b	31.31 ^b	35.07 ^a	0.89
*Haemoglobin (g/l)	8.95 ^a	8.60 ^{ab}	8.99 ^a	9.13 ^a	0.09
*Red Blood Cell (x10 ¹² /l)	3.00 ^{ab}	3.70 ^a	3.40 ^a	3.72 ^a	0.11
*White Blood Cell (x10 ⁹ /l)	7.94 ^c	8.21 ^b	8.56 ^a	8.56 ^a	0.09

^{abc} Means on the same row with different superscripts are significantly (p<0.05) different.

SEM = Standard error of mean

Average daily feed intake showed significant (p<0.05) effect among treatment group. Values for birds in treatment 3 (96.21g) was significantly (p<0.05) different from those obtained for birds on treatment 2 (94.99 g), 1 (93.12g) and 4 (92.49g) respectively. The result was in variance with the observation made by Mehala and Moorthy (2008) where they claimed that there were no significant (p>0.05) difference between the control and the treatments groups, probably due to the iso-caloric and iso-nitrogenous nature of the experimental diets. The blood parameters for hematology were significantly (p<0.05) affected by lemon grass leaf meal across the treatment group, even though they did not follow a particular pattern. All values obtained for packed cell volume (PCV), hemoglobin (Hb), red blood cell (RBC) and white blood cell (WBC) studied falls within the normal ranges for broiler as reported by The Merck Veterinary Manual (2015). The improvement in the haematological constituents observed in the present study is an indication that the inclusion of lemon grass leaf meal did not show any pathological effect on the bird thus did not cause or create any haematological disorder.

Conclusion

Thus it can be concluded from the results obtained that the inclusion of lemon grass leaf meal in the diet of starter broiler birds up to 2.25% is acceptable by the birds without any decrease in growth performance and no negative effect in terms of their health status as reflected in the percentage mortality value and haematological profile results.

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