

Growth Performances of Broiler Chicken Fed Diets Supplemented with Graded Levels of Neem Leaf Meals

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ABSTRACT

A hundred and twenty five-days-old unsexed Arbor acres broiler chickens were allotted to six dietary treatments of 20 birds, replicated four times (5 birds each) to evaluate the effects of feeding graded levels of Neem (*Azadirachta indica*) leaf meal (NLM) on feed consumption, weight gain and feed conversion. The experimental birds were arranged in a completely randomized design and managed for 5 weeks. The dietary treatments were: P1 (control), P2 (supplemented with antibiotics/sulfamix), P3, P4, P5 and P6 were respectively supplemented with 1, 3, 5 and 7% Neem leaf meal (NLM). Drinking water was always available and the feed in mash form was offered *ad-libitum*. No significant difference ($P>0.05$) in weekly feed consumption and feed conversion ratio among treatment means were observed. The weekly body weight gains of chickens fed on diet supplemented with 5 and 7% NLM were significantly lower ($P<0.05$) than those fed on diet supplemented with 3% NLM but not different from control and those fed on diet containing sulfamix. Results of our study indicate that the optimum inclusion tolerance level of NLM in broiler chicken diet is 3%.

Keywords: *Azadirachta indica*, weight gain, feed conversion ratio, broiler chicken

INTRODUCTION

Broiler chicken is an efficient converter of cereal and other feed ingredient into animal protein. However the condition of farming especially in the humid tropics such as Indonesia makes it very susceptible to diseases caused by microorganisms such as *Salmonella sp.*, *Mycoplasma galisepticum* and *Escherichia coli*, *Coliform* dan *Staphylococcus sp* which are normally present in its body. Therefore farmers usually include small amount of antibiotics in diets to stabilize intestinal micro flora, improve growth and feed conversion (Sarica *et al.* 2005; Adil *et al.*, 2011) and this has been practiced for a long time. Mellon *et al.* (2001) estimated an increase of up to 307% use of antibiotics in poultry industry since 1980. However increasing concern about the potential for antibiotic resistant strains of bacteria in human and in farm animals has urged the researchers to investigate other non therapeutic alternatives like, herbs, essential oils, and probiotics as feed additives (Adil *et al.* 2011). Some herbs and their bio-active constituents possess a broad antimicrobial activity The neem (*Azadirachta indica*) for example has long been applied in agriculture as insecticide and disinfectant, and could be useful in poultry industries because of it's antimicrobial activities (Devegowda, 1996; Tipu *et al.*2006). Esonu *et al.* (2005) reported that in layer diets neem leaves meal (NLM) could be added up to 5 – 15%. Studies in Nigeria (Olabode *et al.* 2013) showed that the inclusion of NLM up to 8% in layer diet is beneficial. Manwar *et al.* (2005) and Khan *et al.* (2005) showed that NLM could be added at the rate of 1 – 2g/kg, Whilst Studies in Ghana showed that body weight gain was significantly ($P<0.05$) depressed in birds fed the diets containing

1.5%, 2.0% and 2.5% dietary levels of NLM when compared with the control which adversely affected the conversion efficiency ratio (Bonsu et al. 2012). There is no clear explanation for this discrepancy. But it is well understood that chemical composition of a plant varied greatly depending upon part of a plant, stage of growth, and the environment where it grows. The objectives of the present study were to evaluate the effects of supplementing graded levels of local NLM into diets on daily gain, feed conversion, carcass weight, and abdominal fat of broiler chicken.

MATERIALS AND METHODS

Materials and design of the experiment

The study was carried out in the Poultry Unit of the Teaching and Research Farm and the Laboratory of Animal Nutrition and Biotechnology of the Faculty of Animal Sciences, University of Mataram, Indonesia. Iso energetic and iso protein diets both for starter and finisher periods were formulated using local available feedstuffs (Table 1). Fresh green Neem leaves used for the experiment were harvested within the University environment, air-dried till they became crispy to the touch. They were then milled, using a hammer mill with 2mm sieve, to produce Neem leaf meal (NLM).

Table 1. Composition of starter and finisher diets

Ingredient (%)	Starter	Finisher
Corn	42	43
Rice bran	17	17
Fish meal (local)	13	12
Soybean*	26	26
Cocconut oil	1	1
Limestone	1	1
Total	100	100
Calculated analyses (% DM)		
Crude Protein (%)	22.59	22.13
Metabolizable Energy (MJ/kg)	13.72	13.74
Crude Fiber	4.86	4.82
Calcium	1.15	1.10
Phosphor	0.89	0.86

*Soybean was steam heated, dried and ground using hammer mill

A hundred and twenty five-day-old broiler chicks were randomly allocated into 6 dietary treatments (T1 = control diet; T2 = control diet supplemented with antibiotics based on recommended dose; T3, T4, T5 and T6 were control diet supplemented with 1, 3, 5 and 7 g/kg NLM respectively) according to completely randomized design. Each treatment consisted of 4 replicates with 5 chicks each. Feed was provided *ad libitum* and drinking water was always available. Feed intake was noted daily and body weight was measured weekly.

The differences in feed intake, weight gain, and feed conversion ratio (FCR) were subjected to analysis of variance using General Linear Model (GLM) procedures of SAS software (SAS Institute, 1990). When the model was significant, Duncan multiple range test was run to separate treatment means.

RESULTS AND DISCUSSION

Health condition of chicken was generally good. The mortality rate was zero indicating there was no harmful effect of supplementing NLM up to 7g/kg into diet. Feed consumption, weight gain, feed conversion ratio are presented in Table 2.

Table 2. Feed intake, weight gain and feed conversion ratio (FCR) in broiler chicken given diet containing different levels of NLM.

Variable	Dietary Treatments					
	Control	Antibiotics	0.1% NLM	0.3% NLM	0.5% NLM	0.7% NLM
Feed intake (g)	507.84 ^a (±199.6)	432.84 ^b (±148.1)	466.84 ^{ab} (±165.9)	502.48 ^a (±196.2)	454.76 ^{ab} (±147.6)	450.96 ^{ab} (±172.3)
Weight gain (g)	231.04 ^{ab} (±92.0)	215.56 ^{ab} (±85.0)	250.56 ^a (±112.1)	242.04 ^a (±100.5)	196.64 ^b (±76.6)	201.12 ^b (±80.6)
FCR	2.20 ^{ab} (±0.20)	2.08 ^{ab} (±0.43)	1.94 ^b (±0.33)	2.10 ^{ab} (±0.13)	2.38 ^a (±0.31)	2.28 ^a (±0.36)

^{a,b}Means at the row without a common superscript are significantly different (<0.05)

Feed intake in chicken fed on diet containing NLM was not significantly different ($P>0.05$) from those given control diet. However there was a trend that feed intake decreased as the levels of NLM increased above 0.3% in diet. The intake of chicken fed on diet with 0.5% and 0.7% NLM were 9 and 10% lower than the chicken given diet containing 0.3% NLM. This might be due to the bitter taste associated with increasing levels of NLM in diets.

Similar patterns were observed in weekly weight gain. Weight gain of chicken fed on diet with 0.1 and 0.3% NLM were not significantly different from those of control diet. This is in line with the results of study by Alam *et al.* (2015). They reported that feed consumption, weekly weight gain and FCR of broiler chicken given diet containing 3 g/kg neem leaves powder is not significantly different from chicken given control diet. The results of our study also in agreement with those reported by Manwar *et al.* (2005) and Khan *et al.* (2005). Feeding NLM above 0.3% significantly decreased weight gain and depressed FCR. This indicates that NLM can be used in broiler feed up to 0.3%.

CONCLUSIONS

Neem leaves meal is a good growth promoter for broiler chicken and can be included in the diet up to 0.3%

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