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EFFECT OF FEEDING VARYING LEVELS OF GROUNDNUT HAULMS ON BODY WEIGHT AND HAEMATO-BIOCHEMICAL PROFILE IN BROILER BIRDS

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Abstract: The present study was undertaken to evaluate ground nut haulms as alternate feed resource by its incorporation in the diets of broiler birds. A total 240 one-day-old Cobb-400 broiler chicks were randomly assigned into four dietary treatments each with three replicates (n = 60). Experimental Birds in group T1 were fed with conventional concentrate mixture while birds in T2, T3, T4 were fed with feed containing 2%, 4% and 6% of ground nut haulms (GNH) replacing maize and soya bean on iso-nitrogenous basis. Feed intake increases significantly ($P > 0.05$) with increasing level of GNH in the diets of experimental birds. Highest feed intake was recorded in T4 (6% GNH) followed by T3 (4% GNH) than T2 (2% GNH) and T1 (control). Birds fed groundnut haulms gained significantly ($P < 0.05$) higher body weight than birds fed the control diet. Birds in T4 (6% GNH) gained highest body weight followed by T3 (4% GNH) than T2 (2% GNH) and T1 (control). However, feed conversion ratio remained non-significant for all treatment groups. Regarding blood biochemical parameters, values of TEC and TLC showed non-significant difference. However values of Hb, PCV, AST and ALT were significant ($P<0.05$) among experimental groups but they were in normal range suggesting that groundnut haulms do not have any adverse effect on overall health and liver function in groundnut haulms fed birds. Based on results of the study it is concluded that supplementation of GNH can successfully replace costly ingredients like maize and soy bean meal in the diets of broiler birds up to the level of 6 % without any harmful effects on feed intake, growth and feed conversion ratio and Haemato biochemical profile.
Keywords: body weight, feed intake, groundnut haulms, Haemato-biochemical profile.

Introduction

Over a period of time due to the combined efforts of government, private players and farmers, poultry industry has become a full-fledged organized sector and now stands as one of the fastest growing industries in India. Poultry occupies an important place in Indian economy by contributing more than Rs. 11,000 crores to the national Gross Domestic Product (GDP). It also ranks 3rd and 5th with respect to production of egg and meat in world (BAHS, 2012). However, a major constraint to poultry production in India is the very high cost of

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conventional feeding stuff and therefore cost of poultry production has gone up substantially in recent years (Raghavan, 2009). Since feed cost is a major expense in poultry production, accounting for 60 to 70% of total production cost (Chang, 2005), search for cheap, locally available and equally nutritive feed source to partially substitute commercial poultry diet is ever increasing (Preston, 1995; Wong and Tan, 2009). Leaf meals is one of the alternative feed which has been incorporated in the diets of poultry as a means of reducing the high cost of conventional protein sources (Nworgu *et al.*, 2003). There is evidence in the literature of the beneficial effects of using leaf meal from different sources in poultry production (D'Mello *et al.,* 1987, Egbenwade and Olorede, 2003, Fasuyi and Aletor, 2005 and Iheukwumere *et al.*, 2008). Groundnut (*Arachis hypogaea*) haulms (GNH) are the residue left after harvesting groundnut and are produced at very high quantity in saurashtra which can be used in a similar way to different leaf meals in the diet of poultry. It is a good source of protein and calcium (Shukla *et al.*, 1985) and is referred in vernaculars language as gotar. GNH have good nutritive value and contains about contain 12.4 percent crude protein on DM basis (Murthy *et al.*, 2004). Although abundant research has been carried out on feeding GNH in ruminants very few information is available on feeding GNH in poultry. So, present study has been carried out to assess the effect of feeding varying levels of groundnut haulms on feed intake and growth performance in broiler birds.

Materials and Methods

The experiment was carried out at the Shambhu poultry farm at dhoraji, Dist. Rajkot. Groundnut haulms used in this study was bought from Cattle Breeding Farm, Junagadh Agricultural University, Junagadh. Four experimental starter diets and finisher diets were formulated such that diet T1 which served as the control contained 0 % GNH, while diets 2, 3, and 4 contained 2%, 4% and 6% GNH and designated as T1, T2, T3 and T4 diets respectively. Day old 240 broiler chicks of cobb-400 breed were wing banded, weighed individually and distributed randomly to the four experimental diets. Each group was further subdivided into three replicates of 20 birds each. The birds were housed in deep litter pens. They were reared under similar managerial conditions. The experimental diets and clean drinking water were supplied to the birds ad libitum throughout the study period. The body weights of all the birds were recorded weekly in the morning, before feeding and watering. The amount of feed offered and residue left after 24 hr was measured to find out feed intake of feed. Feed conversion ratio was calculated by dividing the feed intake by weight gain. At the end of the feeding trial, two chicks per replicate (six birds per group) were starved overnight so as to empty the crop and the birds were weighed and sacrificed. The blood was collected into labeled vial containing ethylene diamine tetra acetic acid (EDTA) as anticoagulant from wing vein. Hemoglobin (Hb) was estimated by Sahli's acid hematin method, Packed cell volume (PCV) by micro hematocrit method, while Total leukocyte count (TLC) and Total erythrocyte count (TEC) are counted by hemocytometer (Jain, 1986). Blood samples were centrifuged at 3000 rpm for 10 minutes for plasma separation. Plasma were collected and stored immediately at -20°C for determination of Aspartate Transaminase (AST) and Alanine Transaminase (ALT) by Merck's kit by using serum biochemical analyzer (Microlab-300, Merck) as per (Tietz *et al.,* 1976). The data collected on various parameters were analyzed using the method of Snedecor and Cochran (1994).

Results and Discussion

Feed Intake (g):

The average total feed intake showed significant difference ($P<0.05$) amongst different dietary treatments (Table 1). Feed consumption of birds in different groups was increased significantly ($P<0.05$) with increased inclusion level of GNH. Highest feed consumption was recorded in birds fed T4 diet followed by T3, T2 and T1 group. Inclusion of higher levels GNH from 0 to 6 percent (from T1 to T4 groups) has also leads to linear increase in crude fibre content of different ration which might have lowered dry matter digestibility and thus responsible for increase feed intake on higher level of supplementation of GNH in broilers (Fasuyi, *et al.*, 2008). Onu and Aniebo (2011), Ncube *et al.* (2012) and Melesse *et al.* (2013) reported similar findings on feeding *Moringa oleifera* leaf meal, *Acacia angustissima* and *Moringa stenopetala* leaf meal respectively in the diets of broilers.

Body weight gain (g) and feed conversion ratio:

Total body weight gain (g) and weekly body weight gain (g) for the period of 42 days were significantly ($P<0.05$) higher in GNH supplemented groups (T2, T3 & T4) than control (T1) group with increasing trend from T1 to T4 groups (Table 1). While, feed conversion ratio (kg DMI/ kg gain) of the experimented birds showed non-significant difference among different groups. Improvement in body weight in treatment groups T4, T3 and T2 might be due to the better feed intake and nutrient availability as groundnut haulms is a good source of vital nutrients like ether extract and calcium (Murthy *et al.*, 2004) resulting in better performance. Onu and Aniebo (2011) conducted an experiment by using *Moringa oleifera* Leaf Meal (MOLF) and found that increased body weight in treatment groups. Similarly, Onyimonyi *et* *al.* (2009) studied effect of sun dried neem leaf meal in Ross birds and found increased body weight in treatment groups.

Haemato biochemical Profile:

Values of Haemato biochemical parameters are given in Table 2. Analysis of Hb values showing non-significant difference between Hb values of T2, T3 and T4, but it was significantly ($P<0.05$) lower than value of T1. Hb values were within normal range of bird's blood value which suggesting that groundnut haulms did not much affects Hb value. Analysis of TLC values showing non-significant difference among all experimental groups. The average mean values of TEC and TLC did not differ significantly suggesting that groundnut haulms did not affect quality of blood of broilers. Similar findings were reported by Fasuyi *et al.* (2008) and Onu and Aniebo (2011) while studying effect of *Moringa oleifera* Leaf Meal (MOLF) and Tropical vegetable (*Amaranthus cruentus*) leaf meal (ACLM) respectively. Values of PCV were showed within normal range of bird's blood value which suggesting that groundnut haulms did not much affects PCV value. While ALT and AST values also showing significant ($P<0.05$) difference but due to lack of definite trend, it couldn't conclude that groundnut haulms affect ALT and AST values or not. ALT and AST values were also found in normal range. Soltan *et al.* (2008) and Aderinola *et al.* (2013) concluded non-significant effect in ALT and AST values of experimental Abor Acre birds while feeding of Anise seed and *Moringa oleifera* leaf meal (MOLM).

Conclusion

At the end, on the basis of the performance of experimental birds in respect to feed intake, body weight, body weight gain, FCR and Haemato biochemical profile it seems to appear that incorporation of groundnut haulms at 6% level in the broilers ration, can successfully replace costly ingredients like maize and soy bean meal in the diets of broiler birds without any harmful effects on feed intake, growth and feed conversion ratio and blood.

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Table 1. Feed intake and performance of experimental birds

Attributes	**Treatments**				**SEM ±**
	T1	**T2**	**T3**	**T4**	
Body weight (kg)					
Initial	45.80	45.17	46.47	45.58	0.30
Final	1376.88^{d}	1422.00^{c}	1526.78^{b}	1596.82^{a}	13.63
Av. final body weight gain (g)	1331.08^{d}	1376.84^{c}	1480.31^{b}	1551.23^{a}	25.38
Av. weekly weight gain (g)	210.35^{b}	213.55^{b}	234.00^{a}	245.23^{a}	3.69
Av. total feed intake	2684.22^{d}	2808.99^{c}	3026.65^{b}	3268.39^{a}	40.37
Feed conversion ratio	1.96	1.95	1.98	2.00	0.01

^{abcd}*Means with different superscript differ significantly (P<0.05)*

Table 2. Haemato Biochemical Profile of Experimental Birds

Para meters	**Treatments**				**SEM ±**
	T1	**T2**	**T3**	**T4**	
Hb (g/dl)	$13.57^{a} \pm 0.05$	$13.03^{b} \pm 0.15$	$13.00^{b} \pm 0.12$	$13.00^{b} \pm 0.23$	0.10
TEC ($\times 10^3$/μl)	3.04 ± 0.09	3.05 ± 0.18	3.05 ± 0.02	3.08 ± 0.01	0.20
TLC ($\times 10^6$/μl)	12.84 ± 0.21	12.88 ± 0.02	12.88 ± 0.06	12.88 ± 0.07	0.17
PCV (%)	$39.93^{a} \pm 0.12$	$39.37^{ab} \pm 0.64$	$39.00^{b} \pm 0.50$	$39.07^{b} \pm 0.52$	0.18
ALT (U/I)	$26.33^{b} \pm 0.88$	$26.00^{b} \pm 0.58$	$26.67^{ab} \pm 0.88$	$27.33^{a} \pm 0.88$	0.14
AST (U/I)	$184.67^{a} \pm 1.76$	$183.67^{ab} \pm 2.96$	$181.67^{c} \pm 1.20$	$182.00^{bc} \pm 1.15$	0.07

^{abcd}*Means with different superscript differ significantly (P< 0.05)*