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COMPARATIVE CARCASS CHARACTERISTICS OF INDIGENOUS TURKEY POULTS FED DIFFERENT AGRO-INDUSTRIAL BY-PRODUCTS

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Target audience: Animal nutritionists, Feed millers, Turkey farmers, Consumers, and Meat processors

ABSTRACT

This work was undertaken to evaluate the effect of three agro-industrial by-products on the carcass characteristics of indigenous turkey poults. Sixty indigenous poults were brooded and fed broiler starter feed for the first 4 weeks of life. At the end of 4 weeks, forty-eight poults were randomly selected and distributed into four treatment diets. Each dietary treatment had twelve poults with six poults per replicate. The experiment lasted ten weeks. The result showed that poults fed palm kernel meal had significantly (P<0.05) higher body weight (3175.0g) when compared with others (Diet 1 = 2275.0g, Diet 2 = 2425.0g, and Diet 3 = 2625.0g). This same pattern was noticed in the mean dressed weight though not significant. The cut-parts showed no significant (P>0.05) difference and followed no definite pattern. The replacement of 40% of maize with palm kernel meal in turkey poult's grower ration proved more advantageous than replacement with wheat offal, rice husk and the control diet.

Key words: Turkey poults, carcass characteristics and agro-industrial by-products

DESCRIPTION OF PROBLEM

An array of agricultural and industrial by-products that can be used as poultry feed ingredients abound in the country. They are cheap, uncompeted for and commonly available, though, often times fibrous. In a series of experiments examining the digestibility coefficient of fibre for poultry, values of between 5 and 20% have been reported (1). In spite of the low feeding value of fibre, it is important that poultry rations should have a certain level of such nutrients. Fibre helps maintain normal structure and function of the intestinal tract of chickens. It also helps maintain mineral balance of the body, prevent some behavioral problems and reduce processing yield and carcass value (1, 2). From all indications and in spite of their limitations, they constitute a sustainable resource pool for the livestock feed producing industry. There is limited information available on the use of agro-industrial by-products. However, some by-products have been used occasionally in turkey feeds for a number of years(3, 4, 5). For instance, (5) observed that by-products such as Corn gluten feed was used successfully up to 10% of the diet of growing turkeys without negatively

influencing growth performance and carcass factors. The authors opined that, to obtain carcasses relatively high in protein and low in fat, the birds should be slaughtered as early as 14 week of age. Determination of the energy value of by-products from the wet milling of corn with various species of animals showed that they were not well utilized by chickens, roosters, or young turkeys (6). It was also observed that there was a decrease in dressing percentage and abdominal fat with increase in dietary fibre (7, 8). Turkey meat yield could be influenced by a number of factors (5, 9, 10). Some may be genetic in origin but quite a number is associated with environment including food (9, 10). It is therefore, possible for the farmers to improve the yield of turkey meat if the different factors concerned can be made to work together. And because the consumer is becoming far more health conscious (9), there is the need for producers to pay more attention to the composition of the end product.

This experiment was therefore designed to examine the carcass yield and various cut-parts of indigenous turkey poults fed three by-products; wheat offal, Rice husk and Palm Kernel meal during their growing phase.

MATERIALS AND METHODS

Composition of Diets

Four treatment diets were formulated for this trial. Diet 1 was the control, while diets 2, 3 and 4 contained Wheat offal, Rice husk, and Palm kernel meal, respectively. Fish meal was the major source of animal protein while full fat soyabean was a major supplier of plant protein. The diets were further supplemented with synthetic amino acids, Viz: lysine and methionine at 0.2% inclusion for each. The composition of the diets is shown in Table 1.

Experimental design

A total of 60 indigenous poults was brooded and fed broiler starter feed for the first 4 weeks. At the end of 4 weeks, 48 poults were randomly selected and distributed into four treatment diets in a completely randomized design (CRD) experiment. Each dietary treatment had 12 birds with six birds per replicate. Birds were fed the four diets *ad-libitum*. Apart from feeding the birds, other management practices such as routine vaccination, drug administration and maintenance of cleanliness in and out of the poultry house were observed.

Carcass Evaluation

At 14 weeks of age, 2 birds (having weights closest to the mean) from each of the replicates were randomly selected, starved for 24hrs, weighed and slaughtered by severing the jugular vein. Birds were bled, dipped in hot water, de-feathered and head, neck, feet and viscera were separated. The wings were removed by cutting anteriorly, severing at the humeo-scapular joint, the cuts were made close to the body line. Lateral cuts were made close to and above the head of ribs to the shoulder girdle and the breast was removed intact by pulling from the anterior end of the carcass. Thighs, drums, and backs were also dissected from each carcass and weighed separately. Meat from the yield was manually separated from the bone to obtain meat: bone ratio.

Table 1: Percentage Composition of Experimental Diets Fed to Indigenous Turkey Poults from 4 - 14 weeks of Age

Ingredients (%)	Diet 1	Diet 2	Diet 3	Diet 4.
Yellow maize	50.0	30.0	30.0	30.0
Wheat offal	-	20.0	-	-
Rice husk	-	-	20.0	-
Palm kernel meal	-	-	-	20.0
Full fat soya bean	34.1	34.1	34.1	34.1
Blood meal	5.0	5.0	5.0	5.0
Bone meal	3.0	3.0	3.0	3.0
Oyster shell	2.0	2.0	2.0	2.0
Salt	0.25	0.25	0.25	0.25
Vit. Min. Prexim[1]	0.25	0.25	0.25	0.25
Lysine	0.2	0.2	0.2	0.2
Methionine	0.2	0.2	0.2	0.2
Total	100.0	100.0	100.0	100.0
	Determined composition			
Crude protein (%)	21.5	20.3	20.3	21.8
Crude fibre (%)	3.5	5.3	8.0	5.0
Ether extract (%)	7.2	7.5	5.2	8.2
Metabolizable energy (Kcal/kg)	2980.0	2800.0	2650.0	2810.0
Ash (%)	10.1	10.9	14.2	18.2

Composition per 2.5kg (Bio-mix) premix: Vit A I. U. 4,000,000, vit D_3 iu 800,000, vit E mg 10,000; vit K mg 1,200; vit B_1 mg 1,000; vit B_2 mg 1,500; vit B_6 mg 1,500; Niacin mg 10,000; Pantothenic acid mg 3,500; Biotin mg 15, vit B_{12} mg 10, Folic acid mg 200; Choline chloride mg 120,000; Manganese mg 60,000; Iron mg 15,000; Zinc mg 15,000; Copper mg 800; Iodine mg 400; Cobalt mg 80; Selenium mg 400; Antioxidant mg 40,000.

Statistical analysis

All data were subjected to analysis of variance according to procedures described by (9). Least significant difference test was employed to compare treatment means found to be statistically significant.

RESULTS AND DISCUSSION

Table 2 shows the carcass characteristics of 14week old indigenous turkey poults fed palm kernel meal, rice husk, wheat offal and control diets. The mean final live weight was significantly ($P<0.01$) influenced by the treatment diets while dressed weight and the different cut-up parts were not. The mean body weights of the turkey poults at the

Table 2: Effects of Agro-industrial by-products on the carcass characteristics of indigenous Turkey poults (4-14 weeks).

Parameter	Diet 1	Diet 2	Diet 3	Diet 4.	SEM
Mean initial weight(g)	204.0	194.5	176.0	175.0	20.0^{ns}
Mean live weight (g)	2775.0^{b}	2425.0^{d}	2625.0^{c}	3175.0^{a}	43.3^{**}
Mean dressed weight(g)	1868.0	1690.0	1773.0	2204.0	112.6^{ns}
Mean dressed weight(%)	67.2	69.7	67.5	69.4	3.1^{ns}
Cut-parts					
Drumstick (%)	16.4	14.1	16.2	14.1	0.5^{ns}
Thigh (%)	13.9	15.3	14.9	14.5	0.6^{ns}
Wing (%)	15.8	13.4	12.8	14.4	10.0^{ns}
Breast (%)	31.0	27.8	28.2	27.1	2.2^{ns}
Back (%)	26.8	23.7	22.6	23.0	1.4^{ns}
Skin (%)	5.9	5.8	5.5	5.6	1.0^{ns}
Bone (%)	29.8	26.8	29.9	31.6	1.7^{ns}
Flesh-to-Bone ratio	1.7^{bc}	2.1^{a}	1.9^{ab}	1.5^{c}	0.1^{*}

Where; Dressed weight is expressed as percentage of live weight while cut-parts are expressed as percentage of dressed weight.

SEM - Standard error of mean
ns - Not significantly different (P>0.05)
* - Significantly different (P<0.05)
** - Significantly different (P<0.01)

beginning of the experiment were 204.0; 194.5; 176.0; and 175.0g for the groups on diet 1, 2, 3 and 4, respectively. At the 14th week of age the live weights were 2775.0, 2425.0, 2625.0 and 3175.0g, for the respective groups. The Table also shows that at the end of the 14th week turkey poults fed diet 2 had significantly (P<0.05) lower body weights compared with poults fed diet 4. The same pattern was reflected in the mean dressed weight though not significant. All the different cut-parts were also not significantly (P>0.05) influenced by the treatment diets. Values for drumstick, thigh and breast ranged from 14.1-16.4; 13.9-15.3; and 27.1-31.0, respectively. When the three agro-industrial by-product based diets are compared, poults fed diet 4 exhibited the highest percent bone while those on diet 2 gave the least percent. The percent carcass yield ranged from 67.2-69.7, having a direct relationship with the live weight of the birds.

This study suggests that the best live weight and carcass yield exhibited by poults on diet containing palm kernel meal (PKM) could be attributed to better utilization of its fibre, its higher protein content, as well as its better amino acid profile (11) than the cereal-based by-products. The observed high mean live weights also resulted in high dressed weights. This is in agreement with (14), who confirmed that heavier birds produced a greater eviscerated yield. The percent carcass yield observed was also in agreement with (15) who obtained a ranged of 61.4-69.5 dressing percent for broilers. The cut-parts on the other hand followed no definite pattern, thus at variance with (16) who reported that volumes and dimensions of broiler parts were directly related to the carcass weights. The percentage bone of the

eviscerated carcass increased as bird's live weight and dressed weight increased, an evidence that strong tapering framework for powerful muscle and protection against shock and impact for internal organs is needed to carry the weight of the birds (17).

CONCLUSION AND APPLICATION

In conclusion, replacement of 40% of dietary maize with palm kernel meal in the diets of growing indigenous turkey poults resulted in a strong tapering framework and higher final live weight and dressed weight. Turkey farmers and feed millers could therefore be encouraged to replace the competitive and costly maize with up to 40% of palm kernel meal, a less costly ingredient.

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