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Performance and Carcass Characteristics of Broilers Fed Selected Energy Source Feeds

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Abstracts: A total of 132 one day old mixed sex birds of Hubbard Classic broiler breeds were used. Specifically, 33 per a treatment and 11 birds per a replicate was also the arrangement of experimental birds for this trial. All experimental pens are opened sided and bedded with Teff straw. Based on the analyzed nutrient compositions of the ingredients, four broiler starters, grower/finisher-I and finisher-II diets were prepared as experimental treatments. Average feed intake was daily but weight gain was recorded weekly for every experimental pens. To evaluate the performances, 4 from each treatment with a total of 16 birds were randomly selected, weighed, slaughtered and properly dressed. Average feed intake and body weight gain were significantly ($p<0.05$) different for finisher I and II but no significant ($p>0.05$) difference was shown for feed intake to body wait ratio (FCR) of all phases of the experiments. Average live weight, the thigh and breast weights were significantly ($p<0.05$) different for treatment group that containing wheat grains. However, eviscerated weights and percentage of the carcass were significantly ($p<0.05$) different for treatment group that containing maize grains.

Key words: Selected energy sources feeds, broilers, performances, carcasses, weight, experimental pen

INTRODUCTION

The broiler chicken industry has now occupied the second place in volume in the world just after pork (Yang and Jiang, 2005) that representing about 29% of the total meat production from farm animals and is rising every year (Mckay *et al*., 2000). Thus, the growth of poultry production has been based on strong consumer demand for products that are cheap, safe and healthy. The intensification and commercialization of poultry sector was accelerated by discoveries in the field of breeding, nutrition, housing management and disease control (Sasidhar, 2006). However, the projected growth of industry depends to a great extent on the availability of feed ingredients to meet the requirements.

Energy and protein source feeds contributed >90% of all requited nutrients for poultry nutrition. Moreover, one of the major problems of poultry production in Ethiopia is availability and high cost of feeds that contributing >75% of all production costs. This problem has tended to reduce the rate of expansion of the poultry industry and has added to the low level of animal protein nutrition of the people of a country.

A possible way of increasing the supply of poultry products at cheaper prices is by reducing the cost of production through the use of cheaper, locally available sources of energy source feeds. Therefore, performance and carcass evaluation of broilers fed various energy source feeds is prioritized research area. Based on this outlined background, the objectives of this study were:

- To evaluate the effects of selected energy source feeds on the performances of broilers
- To evaluate the characteristics of broilers carcass fed selected energy source feeds

MATERIALS AND METHODS

A total of 132 one day old mixed sex birds of Hubbard Classic broiler were randomly selected and used for this experiment. These birds were again randomly divided into four equal treatment groups and these were further subdivided into three replicate groups of 11 birds each.

All birds were vaccinated for all suspected diseases. All experimental pens are opened sided and naturally ventilated. Moreover, all pens were disinfected and bedded with Teff straw. Individual infra red bulbs were placed with gradual height adjustments for every pen. Water was given at *ad libitum* situation with enough spacing for every experimental pen. Offered and refused experimental feeds were daily weighed for an individual

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Table 1: Ingredient composition of the diets

	Starter ration (0-14 days)				Grower/finisher-I rations (15-30 days)				Finisher-II rations (30-45 days)			
Ingredients	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
Maize grain	55.60	15.00	15.00	15.00	59.70	15.00	15.00	15.00	63.755	15.000	15.000	15.000
Wheat grain	-	40.60		-	-	44.70	-	-	-	48.755	-	-
Finger millet grain	-	-	40.60	-	-	-	44.70	-	-	-	48.755	-
Sorghum grains	-	-	-	40.60	-	-	-	44.70	-	-	-	48.755
Soybean cake	32.00	32.00	32.00	32.00	30.00	30.00	30.00	30.00	27.000	27.000	27.000	27.000
Fishmeal	8.00	8.00	8.00	8.00	6.00	6.00	6.00	6.00	5.000	5.000	5.000	5.000
Limestone	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.000	3.000	3.000	3.000
Premix	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.500	0.500	0.500	0.500
l-lysine	0.25	0.25	0.25	0.25	0.20	0.20	0.20	0.20	0.150	0.150	0.150	0.150
Dl-methionine	0.15	0.15	0.15	0.15	0.10	0.10	0.10	0.10	0.095	0.095	0.095	0.095
Salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.500	0.500	0.500	0.500
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.000	100.000	100.000	100.000
Cp (%)	23.15	23.83	22.12	22.88	21.10	22.52	20.31	21.47	19.640	19.640	19.640	19.640
ME in Kcal kg^{-1}	3192.08	3117.47	3075.65	3146.00	3410.98	3353.54	3307.95	3384.97	3423.550	3423.550	3423.550	3423.550

Result of chemical analysis was from Health and Food Research Institute of Ethiopian, 2009

pens thus, feed intake was calculated from these results. In addition to initial body weight, average weekly body weights of birds from all experimental pens were taken.

Three broiler starter, grower/finisher-I and finisher-II diets were prepared and used (Table 1). In all diets of the treatments, all factors were kept constant except grains of energy source feeds which were different while preparing treatment rations. It is therefore, diet 1 contained maze grain, diet 2 contained wheat grains diet 3 contained finger millet grains and diet 4 contained sorghum grains.

Birds were fed starter diets for the duration of 14 (0-14 age) days, grower/finisher-I diets for the duration of 15 (15-30 age) days and finisher-II diets for the duration of 15 (31-45 age) days. Efforts were exerted to formulating experimental rations as to National Research Council (1994) recommendations.

At the age of 45, 4 from each treatment with a total of 16 birds were randomly selected, weighed, slaughtered and properly dressed. Subsequently, the data for birds live weights, eviscerated carcass weights and eviscerated carcass percentages were properly collected and calculated. In this study, the eviscerated carcass weight contains the dressed and eviscerated carcass including heart, liver, gizzard and abdominal fats. Moreover, eviscerated carcass percentage was also calculated by dividing eviscerated carcass over live weights of a bird and multiplied by 100:

$$\text{Eviscerated carcass (\%)} = \left(\frac{\text{Eviscerated carcass weight of a bird}}{\text{Live weight of a bird}} \right) \times 100$$

Furthermore, parts of the carcass compositions were properly cut, weighted and calculated. Thus, the carcass of all randomly selected birds (16) were characterized and evaluated.

Analysis: The data collected were analyzed by using the GLM procedures of SAS Institute (2002).

RESULTS AND DISCUSSION

The nutrient compositions of the experimental diets are shown in Table 1. Crude protein content (CP%) of these experimental diets were ranging from the minimum of 19.0 CP% at a basal diets of finisher-II that containing finger millet grains to a maximum of 23.83 CP% for starter ration of a basal diets that containing wheat grains. Moreover, the calculated metabolic energy per a kilogram DM feed was also ranging from a minimum of 3075.65 Kcal ME kg^{-1} for starter ration of a basal diet that containing Millet grains to the maximum of 3423.55 Kcal ME kg^{-1} at a basal diets of finisher-II that containing maize grains. Average effects of selected energy source feeds on daily feed intake, body gain and Feed Conversion Ration (FCR) at 3 phases of broiler experiments are shown in Table 2. Average feed intake was significantly ($p<0.05$) different for finisher-I and II. Subsequently, body weight gain was also highly and significantly ($p<0.01$) different for both finisher-I and II.

Moreover, concerning to feed intake to body wait Rratio (FCR) of all phases of the experiments, no significant ($p>0.05$) different was shown. However, no significant ($p>0.05$) differences were seen between treatments in both feed intake and body weight gains at starter phases.

Characteristics and the composition of the carcass that evaluated at 45 days age of broilers and fed on various energy sources feeds are shown in Table 3. Average live weight (1554.0) was significantly ($p<0.05$) different for the treatment group that containing wheat grains. However, eviscerated weights (1155.6) of the carcass and eviscerated percentage (74.7%) were also significantly ($p<0.05$) different for treatment group that containing maize grains. Moreover, the thigh (164.93) and breast weights (363.4) of the carcass part compositions

Table 2: Mean±standard error of mean for feed intake, body weight and Feed Conversion Ration (FCR) for the 3 phases of feeding broilers

	Average daily feed intakes in the 3 feeding phases (g)			Average body weights (g)		Average daily body weight gain for the the 3 feeding phases			Feed intake/body weight gained ratio (FCR) for 3 feeding phases (g)		
Treatments	Starter	Grower/ finisher-I	Finisher-II	Initial	Final	Starter	Grower/ finisher-I	Finisher-II	Starter	Grower/ finisher-I	Finisher-II
1	31.84±1.0	75.9±1.2^{c}	102.7±5.1^{b}	44.1±0.3^{c}	1435.4±29.5^{ab}	14.7±0.6	41.0±1.4^{b}	54.6±1.1^{b}	2.17±0.11	1.85±0.0	1.88±1.0
2	35.1±0.6	85.0±0.8^{a}	120.4±3.4^{a}	46.4±0.3^{ab}	1643.7±43.9^{a}	16.1±1.0	46.8±2.1^{a}	62.7±1.1^{a}	2.19±0.0	1.8±0.0	1.9±0.00
3	33.5±0.4	60.0±2.7^{b}	68.8±3.1^{c}	47.1±0.3^{a}	1030.3±19.9^{b}	15.4±0.7	30.7±1.9^{c}	37.9±0.5^{c}	2.18±0.11	1.9±0.17	1.8±0.11
4	34.2±0.8	80.9±0.9^{b}	109.9±0.8^{ab}	45.1±0.7^{bc}	1450.6±28.3^{ab}	15.4±0.7	42.1±0.4^{b}	54.6±1.6^{b}	2.21±01.15	1.9±0.0	2.0±0.00

^{ab}Means, not followed by a common letter within a column are significantly different at $p<0.05$

Table 3: Mean±standards error of mean for various carcass parts of experimental broilers fed selected energy sources feeds

	Treatments			
Parameters	T1	T2	T3	T4
Live weight of sampled birds (g)	1546.08±66.7^{a}	1554.0±94.8^{a}	1134.4±123.8^{b}	1475.5±97.3^{ab}
Eviscerated weights of the carcass (g)	1155.7±55.00^{a}	1141.2±79.4^{ab}	775.8±98.20^{c}	1056.4±67.8^{b}
Eviscerated percentage of the carcass	74.7±0.750^{a}	73.3±1.20^{ab}	68.1±1.490^{c}	71.6±0.50^{b}
Thigh weights (g)	153.5±12.70^{ab}	164.9±10.70^{a}	109.8±14.60^{c}	141.7±6.30^{b}
Drumstick weights (g)	140.4±9.00	139.5±7.40	104.6±15.80	121.1±11.3
Breast muscle weights (g)	316.4±20.9^{b}	363.4±29.8^{a}	211.2±30.90^{c}	326.0±29.0^{b}
Wing weights (g)	124.0±5.80	122.6±4.10	112.5±8.800	111.9±3.20
Heart weights (g)	9.2±0.80	8.0±1.10	7.7±0.700	6.9±0.60
Liver weights (g)	36.6±2.14	37.4±0.60	31.8±2.400	39.4±3.20
Gizzard weights (g)	24.9±3.40	25.5±2.33	20.5±2.100	22.5±1.10
Abdominal fat weights (g)	12.9±3.40	16.3±5.90	.0±0.000	5.8±6.40

^{ab} Means, not followed by a common letter, within a column, are significantly different at $p<0.05$

were significantly ($p<0.05$) different for treatment group that containing wheat grains. The study revealed that the lowest results of all live weights as well as carcass parts were recorded from treatment group that containing millet grains. However, concerning to feed intake to body wait ratio (FCR) of all phases of the experiments weren't significantly ($p>0.05$) different between the treatments.

The depression in performance of broilers fed ration containing millet grains agrees with the physical form of diets and feed particle size have a great effect on poultry yield (Enbrahimi *et al*., 2010). The depressed body weight gain of the broilers particularly at finisher I and II that fed ration containing millet grains might be due to the fact that feed intake was low due to low particle size of the millet grains meal resulting in insufficient consumption of digestible nutrients particularly energy and proteins required to sustain the rapid growth. However, Abate and Gomeze (1984) reported that the chicks fed on the finger millet diets (60% replaced with maize) had the highest overall body weight gain of 1649 g per chick at 55 days. Performance on the finger millet diets was comparable to that on maize. Despite the fact that eviscerated carcass weights and eviscerated carcass percentage of birds were heavier for birds of containing maize grains in diets than other treatment groups, the major muscle parts of the carcass such as thigh and breast weights were heaviest for birds of containing wheat grains in diets than other treatments groups. But, Olver and Jonker (1997) reported that there were no differences between treatments that contain maize, sorghum and pellets with regard to body weight, food consumed, food efficiency, carcass ash, dressing percentage and mortality of broilers.

CONCLUSION

As a conclusion, it would appears that rations that containing wheat grains as energy sources feeds could be used in broiler finisher diets that improves the major carcass parts of the breast and thigh of birds. Moreover, considering cost and availability, millet grains could be used as energy sources feeds at starter phases of broiler production.

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