

**Feeding different feed forms to broilers during the finishing period:
Effect on performance carcass traits and non-carcass components**

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SUMMARY

400 male broiler chickens of Hybro-type were used in this experiment. They were randomly distributed in 20 pens which were randomly allocated to 4 experimental rations that include: complete mash method with ground dura (*Sorghum vulgare*); -complete mash with unground dura; free choice with ground dura; and free choice with unground dura grains. At the end of the experiment which lasted for nine weeks, the birds were slaughtered and the different parameters were studied.

No significant difference on total feed intake, feed efficiencies and dressing percentage between treatments were found. However birds fed on free choice method with unground dura grains produced significantly ($p < 0.05$) higher body weight gain and eviscerated carcass weight as compared to others. Birds fed on both free choice and complete mash methods with unground dura grains produced significantly ($p < 0.05$) higher gizzard and crop percentage compared to others. No significant difference was found between the treatments with regard to the percentages of commercial cuts.

INTRODUCTION

Conservation of energy is of high priority in many countries. The rising prices of energy and protein sources in poultry feed have reviewed producers interest in the old method of feeding layers on whole

(unground) grains and a concentrate mixture on a free choice basis.

The energy cost of grinding and mixing could be saved if poultry could utilize whole grains. McIntosh et. al. (1962) found that, in two of three experiments, whole wheat yielded more metabolizable energy than ground or pelleted wheat. Also they found that no consistent increase in metabolizable energy resulted from grinding or pelleting wheat, barley, oats and maize. Several workers have shown that replacement pullet can grow successfully when offered a choice of a high-protein food and whole wheat or whole barley (Cowan et. al., 1978); whole maize and whole oats (Fuller, 1962) and whole sorghum (Berg, 1959).

The objective of this experiment was to study the effect of food forms and choice-fed diets, during the finishing period, on the performance, carcass traits and non-carcass components of broilers.

MATERIALS AND METHODS

450 one - day old male broiler chicks of commercial strain (Hybro-type) were used. They were fed for 4 weeks on starter ration. Thereafter 400 healthy chicks were selected and randomly distributed into 20 pens each containing equal weight and number of chicks. The pens were then randomly allocated to 4 experimental rations which included complete mash with ground dura (*Sorghum vulgare*) grains, complete mash with unground dura grains, free choice with ground dura grains and free choice with unground dura grains.

The formulation and chemical composition of the rations are shown in table 1 and 2. Food, light and clean water were available all the time. Feed intake, mortality and liveweight gain of each pen was recorded weekly.

At the end of the 9th week the birds were individually weighed after overnight fast (except for water) and slaughtered without stunning. They were then scalded, manually plucked, washed and allowed to drain on wooden tables. Evisceration was performed by a ventral cut and visceral as well as thoracic organs were removed. After evisceration internal organs, head and shank were removed weighed individually and expressed as percentage of slaughtered weight. Eviscerated carcasses

were weighed and then chilled in a refrigerator for' 24 hours at 4 'C. Cold carcasses were recorded.

-. All the slaughtered birds were used for dissection. The breast, thigh and drumstick of the left side of each carcass were dislocated, weighed and expressed as percentage of cold carcass weight.

The data were subjected to statistical analysis using randomized complete block design according to Steel and Torrie (1960).

Table 1: Starter and experimental finisher rations composition (%) and analysis, as fed basis.

Ingredient	Starter ration %	Finishing ration %
Sorghum	55	65
Wheat bran	2	2
Ground nut cake (decorticated)	15	10
Sesame cake	20	15
Super concentrate	5	5
Oyster shell	2.75	2.75
Common salt	0.25	0.25
Calculated analysis. as fed		
Crude protein	25.18	22.29
Crude fibre	4.18	3.6
Phosphorus	0.74	0.6
Calcium	1.98	1.85
Methionine + cystine	0.88	0.76
Lysine	1.16	1.15
Metabolizable energy (Kcal/ kg)	3.16	3.23
Determined analysis:		
Crude protein	23.20	19.69
Crude fibre	6.83	4.46
Ether extract	4.35	4.44

Table 2: Determined analysis (%) of balanced finishing ration used in the free choice method.

Ingredient	Percentage
Dry matter	94.36
Ash	15.66
Crude protein	40.55
Crude fibre	7.48
Ether extract	24.18
Ca	3.6
Mg	0.45

RESULTS

Table 3 shows the broiler performance during the finishing period (5 - 9 weeks). No significant difference was observed in the parameters measured except the final weight and live weight gain. Birds fed on free choice method with unground dura grains produced the highest final weight and live weight gain as compared with the other treatments.

Only 2 birds from complete mash with ground dura, free choice with dura either ground or unground and 7 birds from complete mash with unground dura died during the finishing period and that was attributed to mis-handling.

Table 4 shows the effect of feeding methods and feed forms on carcass characteristics of the broilers. There was no significant difference ($p > 0.05$) in all the parameters measured except the hot eviscerated carcass weight. Birds fed on free choice with unground dura gave significantly ($p < 0.05$) heavier hot eviscerated carcass weight (approximately 1800 g/ bird) while birds fed on free choice with ground dura gave lighter weight (1685 g/ bird).

Table 3; Broiler performance during the finishing period (5 - 9 weeks).

Parameter	Complete mash ground dura	Complete mash unground dura	Free choice ground dura	•Free dike unground dura	SE of marts
Number of chicks	100	100	100	100	-
Initial Wt. g/ chick	812.25	825.80	786.20	818.83	15.67NS
Final Wt. g/ chic	2486.90 ^b	2470.66 ^b	2451.20 ^b	2595.82 ^a	6.60*
Live Wt. gain g/ chick	1674.60 ^b	1644.86 ^b	1665.00 ^b	1777.00 ^a	6.73*
Total feed intake g/ chick	4072.42	4157.90	3826.27	4113.00	30.9NS
Feed conversion ratio	2.424	2.524	2.292	2.312	0.018NS
Dura eaten as a proportion of total intake	65	65	72.56	71.83	

Means within each treatment row with different superscripts are significantly different (p < 0.05).

Table 4: Mean values for the dressed carcass percentage, dressing percentage and commercial cuts of broiler carcasses.

Parameter	Complete mash ground dura	Complete mash unground dura	Free choice ground dura	Free choice unground dura	SE of means
Hot eviscerated carcass WL/g/bird	1733.38 ^b	1716.58^b	1685.0 ^b	1799.98 ^a	4.66
Cold eviscerated carcass WL g/bird	1706.93	1697.53	1672.11	1749.17	4.74 NS
Eviscerated carcass % Dressed carcass %*	69.408	69.186	68.797	69.342	1.36 NS
Breast as % of cold carcass	89.83	89.97	98.86	90.05	0.032 NS
Drumstick as % of cold carcass	26.80	26.26	26.47	27.14	0.05 NS
Thigh as % of carcass	15.21	15.32	15.03	14.94	0.02 NS
	16.76	17.12	16.80	16.78	0.027 NS

Means within each treatment row with different superscripts are significantly different (p < 0.05).

* means undrawn carcass percentage as the proportion of live weight.

Table 5 shows the effect of feeding methods and feed forms on the non-carcass components as a percentage of body weight. There was no significant difference ($p > 0.05$) in the percentage of total viscera, abdominal fat, liver, heart, head and shank of the four treatments measured. However, there was a significant ($p < 0.05$) difference between the four treatments in the percentages of the gizzard and oesophagus + crop + trachea,

Table 5: Body weight and organ proportions of broiler chickens..

Parameter	Complete mash ground data	Complete mash in ground data	Free choice ground data	Free choice un-ground Jura	SE of means
Final body Wt. g	2486.90	2470.66	2451.20	2595.82	6.60 *
% of body Wt.:					
Total viscera	14.920	14.950	14.750	14.956	0.026 NS
Abdominal fat	1.816	1.934	2.068	2.152	0.026 NS
Liver	2.014	2.126	2.054	2.178	0.010 NS
Heart	0.568 ^o	0.58	0.578	0.616	0.262 NS
Gizzard	1.972 ^o	2.304 a	2.166 c	2.304 a	0.274 *
Oesophagus + crop + trachea	0.676 b	0.692 a	0.656 b	0.694 a	0.0037 *
head and shank	7.828	7.674	7.656	7.624	0.017 NS

Means within the same row with different superscripts are significantly different ($p < 0.05$).

.NS means not significant ($p > 0.05$).

DISCUSSION

The results indicated that there was no significant difference between the four treatments in total feed i.e. 7.4t/ke during the finishing period as shown in table 3. These results partially support the findings of other workers (Rose et. al., 1986) who reported that feed form had large ef-

fect on diet selection although there was no effect on total feed intake and weight gain.

Feed efficiency was not influenced by the methods of feeding and processing and the differences between the treatments were insignificant. These findings partially agree with Rose et. al. (1986). However weight gain differed significantly ($p < 0.05$) between the various treatments as shown in table 3. Birds fed on free choice method with unground dura grains produced significantly ($p < 0.05$) higher body weight gain as compared to others. These might be due to the fact that, birds fed on free choice methods with unground dura grains had a tendency to gain more weight and were able to utilize dietary energy more efficiently than those given ground dura in mash diets. This is supported by the findings of McIntosh et. al. (1962) that whole wheat tends to yield more metabolizable energy than pelleted or ground wheat.

The increased eviscerated yield obtained from birds that were fed on free choice method with unground grains might be due to the heavier slaughter weight (table 3). Similarly Preston and William (1973) reported that heavier birds had greater eviscerated yield. Although the free choice method with unground dura grains produced significantly heavier slaughter weight and eviscerated carcass, the dressing percentage was found to be not significantly different between the different treatments. This could be attributed to the fact that free choice methods favoured the deposition of more abdominal fat, produced heavier heart and liver. Also it produced significantly larger gizzard as compared to the complete mash methods.

As shown in table 5 there was slight decrease in head and shank percentage with increase in body weight for birds fed on free choice with unground dura grains compared with other treatments, although the difference was insignificant. These findings agree with the report of Crawly et. al., (1980) that there was a decrease in the proportion of head and shanks as live weight of the bird increased and attributed the trend to the fact that other carcass tissues increased at greater rates than the head and shanks.

There was no significant effect on percentages of total viscera, abdominal fat, liver and heart while there was a significant difference ($p <$

0.05) on gizzard and crop percentages among different treatments. Birds fed on both free choice and complete mash methods with unground dura grains produced significantly larger gizzard than other treatments. These might be due to the fact that birds fed on larger foods had their gizzards developed faster to cope efficiently with the feed. These findings agree with those of Mastika and Cumming (1981) that choice fed broilers tended to have larger gizzard than those given mash or pelleted diet.

Conclusion

No significant difference on total feed intake, feed efficiencies and dressing percentage between treatments were found. However, birds fed on free choice method with unground dura grains produced significantly ($p < 0.05$) higher body weight gain and eviscerated carcass weight as compared to others. No significant difference was found between the treatments with regard to the percentage of commercial cuts.

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