CARCASS CHARACTERISTICS OF BROILER FINISHERS FED GINGER WASTE MEAL AS AN ENERGY SOURCE

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Abstract

This study was designed to examine the carcass traits of broiler finisher chicks fed varying levels of ginger waste meal (GWM) as a replacement for maize in a four-week feeding trial. The GWM was incorporated in the diets at 7.5%, 15.0%, 22.5%, and 30.0% as a replacement for the maize used in the control diet. A total of three hundred and seventy five (375) four-week-old Abor-Acre chicks were assigned to five treatment groups using a completely randomized design. Each treatment group contained 75 chicks and was replicated three times with twenty five chicks per replicate. At the end of the four week feeding trial, carcass analysis was carried out, parameters such as slaughtered weight, carcass weight, dressing percentage and organs weight were measured The results showed that dietary levels of inclusion of GWM had significant ($P<0.05$) effect on these parameters. The dressing percentage, carcass, thigh, breast, wing and back weights were higher for the birds fed 0, 7.5%, 15.0%, and 22.5%, GWM based diets. It was concluded that inclusion of GWM in the diets of broiler finisher chicks has beneficial effects and 22.5% level of inclusion is recommended

Keywords: Ginger Waste Meal; traits; Inclusion levels, replicates; Broiler Finisher.

Introduction

Broiler chicken is usually raised for meat and the meat is known to be as source of protein, however, the meat is not readily available on Nigerian tables, this is so because of its high price. In December 2022 a live chicken of about 3kg was selling for six thousand naira (#6,000) in Kano. Akure, C.O. (2022). The high cost may be attributed to its high cost of production which is because of high cost of feed. successful production of these birds requires adequate feeding which is estimated to stand at about 60 -80% of the total cost of production (Akure,*et al.*, 2020) . This is because the conventional feed ingredients such as maize, soybean and groundnut which are in high demand by man, therefore,There is a need to look for alternative feed ingredients for poultry industry in order, to reduce the cost of feed, increase the profit margin for farmer and to secure its future. Ginger waste from ginger is one of such alternative Ingredients identified. However there is scanty information on use of ginger waste meal as a supplement in broiler diets.

The ginger waste meal is the residues left after super critical fluid extraction to produce ginger oil, ginger oleoresin and ginger total extract.The by-product here is referred to as ginger waste meal (Onimisi *et al.*, 2006). Omage *et al.*, (2007) stated that ginger waste meal is obtained from the extraction of oleoresin using ethanol. Spent ginger obtained after the extraction of oleoresin constitute more than 90% of the material and is rich in carbohydrate (Konar *et al.*, 2013) and could therefore be a cheap and locally available substitute for maize in livestock diets (Omage *et al*., 2007).This study was, therefore, carried out to evaluate the influence of ginger waste meal on performance of broilers starter, and therefore look at the possibility of partially substituting ginger waste meal for maize as a potential feed ingredient to lower the demand for maize and other grains while also meeting their nutritional requirements. This study will further provide a fair knowledge for monogastric nutritionists, farmers and the feed industries at large on how to economically substitute maize and other grains with ginger waste meal in broiler finisher diets, thus reducing the cost of producing the feed and overall cost of production of broiler chickens.

Materials and methods

The experiment was conducted at the Poultry Section, Department of Livestock, Ministry of Agriculture, Mariri, Kumbotso Local Government Area of Kano State, Nigeria. Ginger waste meal (GWM) was procured from Neighborhood, Kano, Kano State. The GWM was sun-dried to reduce the moisture content and then milled before being homogenized with other feed-stuffs. GWM. The GWM was included in the experimental diets at graded level of 0, 7.5. 15.0, 22.5, and 30%. A total of three hundred and seventy five (375) one-day-old Abor-Acre chicks were assigned to five treatment groups using a completely randomized design. Each treatment group contained 75 chicks and was replicated three times with twenty five chicks per replicate.

The finisher diet was formulated to be iso-nitrogeneous and iso-caloric and to meet standard requirement as recommended by NRC, 1994). The composition of experimental diet is shown in Table 1.

At the end of the experiment, one bird per pen (3 per treatment) was selected with each bird reflecting the average pen weight. The birds were deprived of feed overnight but given water *ad libitum*. Birds were weighed and slaughtered by ventral neck cut. They were bled thoroughly, weighed and defeathered by dipping in hot water (scalding) at 65^0C to soften the feathers for easy removal. The defeathered birds were labeled and eviscerated. Hot carcass weight was taken and expressed as dressing percentage. Also, the weights of prime cuts such as thigh, breast, wing and back, the weights of liver, gizzard, spleen and gizzard were taken and expressed as percentages of dressed weight. The experiment lasted for four weeks. All data were recorded and analyzed using analysis of variance (ANOVA) according to the procedure of Gen Stat,(2014) Means were separated by Duncan Multiple Range Test .

Results and discussion

The composition of broiler finisher diet and the proximate composition and mineral composition of the ginger waste meal (GWM) are presented in table 1 and 2 respectively.

Table 1: Composition of Broiler finisher diets containing Ginger waste meal (GWM)

Ingredients	T1 0%	T2 7.5%	T3 15%	T4 22.5%	T5 30%
Maize	55.00	53.80	51.95	46.00	42.25
Ginger Waste Meal	0.00	7.50	15.00	22.50	30.00
Fixed Ingredients	0.00	7.50	15.00	22.50	30.0
Total	**100**	**100**	**100**	**100**	**100**
Calculated Analysis					
ME Kcals/kg	3001	3000	3112	3020	3025
Crude Protein (%)	20.00	20.00	20.00	20.00	20.00
Crude fibre (%)	4.35	4.78	6.46	7.85	7.95.
Ether Extract (%)	7.80	7.92	7.45	7.00	6.95
Ash(%)	6.40	6.45	6.40	6.42	6.35
Calcium (%)	1.65	1.69	1.67	1.68	1.69
Av.Phosphorus (%)	0.78	0.79	0.70	0.74	0.74
Lysine (%)	1.20	1.22	1.24	1.20	1.22
Methionine (%)	0.47	0.49	0.41	0.47	0.48
Methio. + Cyst. (%)	0.75	0.72	0.70	0.72	0.70
Cost/kg diet (₦)	71.15	68.22	67.45	63.75	60.50

*Biomix Premix supplied per kg of diet: Vit. A, 10000 i.u; vit.D_3, 2000 i.u; Vit.E, 23mg; Vit.k, 2mg; vit. B1(Thiamine), 1.8mg; vit.B2(Riboflavin), 5.5mg; vit.B6(Pyridoxine), 3.0mg; vit. B12, 0.015mg;

pantothenic acid, 7.5mg; Folic acid, 0.75mg; Niacin, 27.5mg; Biotin,0.06mg; Choline chloride, 300mg; Cobalt, 0.2mg;Copper, 3mg; Iodine,1mg; Iron,

The result of proximate composition and mineral composition of the ginger waste meal (GWM) is shown in Table 2 GWM contains 92,80% dry matter and 2,00% crude protein; 6,86% crude fibre; 2,83% crude fat (ether extract), 8,74% ash and 80,85% nitrogen-free extract (NFE). The NFE which represents the soluble carbohydrate portion of the meal was relatively high. This makes it a potential livestock feedstuff especially as an energy source

Table 2: Proximate and mineral composition of Ginger waste meal

Nutrient	**Composition**
Dry matter (%)	92.73
Crude protein (%)	1.99
Crude Fibre (%)	6.91
Ether Extract (%)	2.18
Ash (%)	8.68
N.F.E. (%)	80.25
Calcium (g/kg)	4.01
Potassium (g/kg)	26.73
Sodium (g/kg)	0.38
Phosphorous (g/kg)	2.74

Table 3 shows the result of the carcass characteristics of broiler finisher birds fed GWM based diets. There were significant ($P<0.05$) differences between the treatment means for all measurements except relative weights of liver, heart, gizzard spleen and abdominal fat. The results of the control, 7.5%, 15.0% and 22.5% GWM diets were similar and gave the best result for the dressing percentage when compared with other treatments. Birds on the control 7.5%, 15.0% and 22.5% GWM diets also gave the best result for the cut parts such as thigh, breast, wing, and back weights. The weights of liver, heart, spleen gizzard and abdominal fat.were similar for the birds across all treatments, this result could infer that GWM was not deleterious to the birds. The results of the carcass weight, dressing percentage and cut parts such as thigh, breast, wing, and back weights of the control, 7.5%, 15.0% and 22.5% GWM diets being higher when compared with other treatments could be an indication that there was an efficient utilization of feed by the birds on these diets and efficient conversion of feeds to meat. This led to better carcass development and meat yield on these four diets. The reduction in carcass weight from 22.5 to 30% levels of ginger waste meal (GWM) boiled *Mucuna* seed meal inclusion could be due to low feed intake. Fetuga, (1975) indicated that carcass quality were closely related to the intake level of nutrients especially protein and energy.

*C*arcass and organ characteristics of broiler finishers fed dietary levels of GWM

Parameters	T1	T2	T3	T4	T5	SEM	LOS
Live weight	2772.45	2792.65	2800.50	2822.00	2779.55	19.43	NS
Carcass weight(g)	2298.33	2291.67	2294.00	2298.33	2285.23	18.97	NS
Dressing (%)	76.38[a]	76.39[a]	75.37[a]	76.02[a]	76.37[a]	1.25	NS
Thigh weight (%)	26.49[a]	26.49[a]	26.49[a]	26.49[a]	26.49[a]	0.86	*
Breast weight (%)	22.64[a]	22.64[a]	22.64[a]	22.64[a]	22.64[a]	0.09	*
Back weight (%)	20.18[a]	20.18[a]	20.12[a]	20.10[a]	20.11[a]	0.11	*
Wing weight (%)	10.09[a]	10.19[a]	10.22[a]	10.16[a]	10.11[a]	0.06	*
Abdominal fat (%)	3.58	3.67	3.56	3.51	3.44	0.06	*
Gizzard weight (%)	2.77[a]	2.79[a]	2.98[b]	3.73[c]	2.83[a]	0.00	*
Liver weight (%)	2.68	2.68	2.69	2.55	2.70	0.00	NS
Kidney wt (%)	0.20[a]	0.58[b]	5.87[b]	0.029	0.58[a]	0.02	*
Spleen wt (%)	0.22[b]	0.22[b]	0.22[b]	0.00	0.22[a]	0.00	*

[abc]Means within the same row with different superscripts differ significantly (P<0.05)
SEM = standard error of mean *= significant difference

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