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Carcass Yield of Broiler Chickens Fed Turmeric (*Curcuma Longa*) Powder and Cayenne Pepper (*Capsicum Frutescens*) Powder

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Abstract

This study was conducted to determine the carcass yield of broiler chickens fed turmeric (*Curcuma longa*) powder (Tp) and cayenne pepper (*Capsicum frutescens*) powder (Cpp). Two hundred and forty-three (243), two-weeks old broiler chicks were randomly allotted to nine treatment groups of 27 selected birds each and three replicates of nine birds each in a completely randomised design. Three levels of Tur (0, 2 and 4 g/kg) and three levels of Cay (0, 1 and 2 g/kg) were used to provide nine dietary treatments, and were fed to each group in two phases, starter (3 to 4 weeks) and finisher (5 to 8 weeks) phases. Carcass was measured and determined at the 8th week. Results showed that dressed weight was most positively influenced in birds fed 2 g/kg Tp, but thigh and drumstick values were high for birds fed 4 g/kg Tp + 1 g/kg Cpp. Feeding broilers up to 4 g/kg gave good carcass yield.

Keywords: Turmeric, cayenne pepper, carcass.

Introduction

Broiler is a type of chicken (*Gallus gallus domesticus*) raised specifically for meat production. Broiler lines are superior in efficient economical meat production but have a lower egg-producing ability than the egg-production lines. Both male and female broilers are slaughtered for their meat. Chicken meat is healthier than other meat sources for human consumption because of its low cholesterol and fat content (Ponte *et al.*, 2004). Broilers produce white meat and spices have been incorporated into diets of broilers to further improve it, by enhancing acceptability of broiler meat. Kanner (1994) deduced that meat quality can be improved by incorporating natural antioxidants to animal diets, adding these compounds onto the meat surface, or using active packaging. Researchers have focused on the beneficial effects of phytochemical substances in broiler chickens. Curcumin is the main phenolic compound of turmeric rhizome powder, which has antioxidant effect. Capsaicin, a thermogenic substance and most active substance among capsaicinoids is capable of stimulating metabolism which helps to burn energy from food, especially food with high - fat content, thereby stimulating growth and reducing fat deposition (Govindarajan and Sathyanarayana, 1991). Galib *et al.* (2011) fed broiler chickens hot red pepper (*Capsicum annum*) at inclusion levels of 0.25%, 0.50%, 0.75% and 1%. Body weight gain, feed conversion ratio and overall performance was improved at levels 0.50%, 0.75% and 1%. Capsinoids have been demonstrated to exhibit protective covering against mutagens and carcinogens, cholesterol, obesity and pains (Suk-Hyun Choi *et al.*, 2006).

This study is therefore designed to see the effects of turmeric (*Curcuma longa*) powder and cayenne pepper (*Capsicum frutescens*) powder on growth performance of broiler chickens.

Materials and Methods

The experiment was carried out at the Poultry Unit of Directorate of University Farms (DUFARMS), Federal University of Agriculture Abeokuta, Ogun State, Nigeria. Fresh Cayenne pepper and dried turmeric rhizomes were purchased from a commercial market which was cleaned and dried. They were then milled when constant weight was attained, which was then added to the basal diet at appropriate levels of inclusion. A total of 243 - day old broiler (Arbor acres) chicks were obtained from a reputable hatchery. Birds were brooded together for the first two weeks in a deep litter pen. Wood shavings were spread on the floor of the pen as litter material. Vaccinations and medication required were administered following a recommended schedule of an established farm during the experiment.

At the end of 2 weeks of collective brooding, the birds were randomly assigned into nine treatment groups, each consisting of 27 birds. Each treatment was further replicated thrice, containing 9 birds per replicate. Experiment consisted of starter (3-4 weeks) and finisher (5 to 8 weeks) phases, and experimental diets were assigned to each of the 9 treatment groups while feeding *ad libitum*. Clean water was adequately provided daily. The basal diets given are shown. Treatment: T1- Basal diet (No dietary Supplementation); T2 - Basal diet + 2 g Turmeric powder/kg; T3 - Basal diet + 4g Turmeric powder /kg; T4- Basal diet + 1 g Cayenne pepper powder/Kg; T5 - Basal diet + 2 g Cayenne Pepper powder/kg; T6 - Basal diet + 2 g Turmeric powder + 1g Cayenne pepper powder/Kg; T7 – Basal diet + 4 g Turmeric powder + 1g Cayenne pepper Powder/Kg; T8 – Basal diet + 2 g Turmeric Powder + 2 g Cayenne pepper Powder/kg; T9 – Basal diet + 4 g Turmeric powder + 2g Cayenne pepper/kg. Standard basal diet was formulated using conventional feed ingredients at starter and finisher phases.

At the end of the 8th week of experiment a bird whose weight is a representative of the treatment were randomly picked from each of the replicate and starved for 12 hours prior to slaughter to clear the gut, the live weight before slaughter was noted and then the birds were slaughtered, defeathered by scalding (dipping in a water temp. of about 60°C). The visceral organs (the heart, the gizzard, liver, kidney, lungs, and gastrointestinal tract) were removed and weighed, the carcass weight (the body with the head after the removal of the visceral organs) was determined as well, percentage weight of the cut up parts (wings, drumstick, thigh, breast muscles, etc) was also determined. These were done in order to be able to achieve the desired objectives of the study.

Data obtained were subjected to one way analysis of variance and analyzed using Statistical Analysis System. Means were separated using the same package.

Results and Discussion

Carcass indices of broiler chickens fed dietary additives are presented in Table 1. It depicts significant ($p < 0.05$) differences among parameters, except for head, shank, breast, back, wings, spleen and abdominal fat values. Dressed percentage was highest among chickens fed 2 g/kg turmeric and 2 g/kg cayenne additive levels. This disagrees with the reports of Mehala and Moorthy (2008) and Nouzarian *et al.* (2011) that turmeric application as feed additive up to 10 g/kg dietary inclusion of had no significant impact on carcass dressing percentage of broiler chickens. This may have a bearing with what was stated by Sasikumar, (2005), that soil factors, feed nutrient, level of acidity as well as the genus diversity, may affect the content of curcumin in turmeric

Table 1: Effect of feeding dietary turmeric powder and cayenne pepper powder on carcass yield of broiler chicken

Parameters	T1	T2	T3	T4	T5	T6	T7	T8	T9	SEM
Live weight (g)	1508.33 ^{ab}	1566.67 ^{ab}	1583.33 ^{ab}	1555.00 ^{ab}	1500.00 ^b	1603.33 ^a	1575.00 ^{ab}	1533.33 ^{ab}	1583.33 ^{ab}	29.75
Carcass Yield										
Dressed (%)	59.69 ^c	68.94 ^a	64.55 ^{abc}	62.14 ^{abc}	68.60 ^a	63.74 ^{abc}	64.89 ^{ab}	60.37 ^{bc}	62.19 ^{abc}	2.10
Cut-up parts										
Neck (%)	5.74 ^a	4.98 ^{bc}	4.46 ^c	4.57 ^c	4.92 ^{bc}	4.94 ^{bc}	5.14 ^{abc}	5.29 ^{ab}	5.09 ^{abc}	0.21
Thigh (%)	10.4 ^{ab}	11.16 ^a	8.38 ^b	11.11 ^a	10.32 ^{ab}	10.20 ^{ab}	11.12 ^a	10.67 ^{ab}	8.68 ^{ab}	0.74
Breast (%)	16.81	17.11	16.84	16.86	17.19	16.44	14.51	16.25	15.20	1.41
Back (%)	13.31	13.69	13.22	13.81	15.26	14.07	15.06	13.36	13.09	0.66
Wings (%)	7.98	7.61	7.13	7.94	7.92	7.68	8.12	7.29	7.54	0.29
Drumstick (%)	10.17 ^{ab}	9.76 ^{ab}	8.94 ^b	9.13 ^b	10.68 ^{ab}	10.22 ^b	11.22 ^a	10.11 ^{ab}	10.83 ^{ab}	0.61
Internal Organs										
Heart (%)	0.39 ^b	0.41 ^{ab}	0.42 ^{ab}	0.36 ^b	0.39 ^{ab}	0.43 ^{ab}	0.48 ^{ab}	0.50 ^a	0.45 ^{ab}	0.04
Kidney (%)	0.16 ^c	0.16 ^{bc}	0.23 ^{ab}	0.17 ^{bc}	0.22 ^{abc}	0.18 ^{abc}	0.18 ^{abc}	0.20 ^{abc}	0.24 ^a	0.02
Liver (%)	2.11 ^b	2.59 ^a	2.47 ^{ab}	2.42 ^{ab}	2.63 ^a	2.05 ^b	2.08 ^b	2.44 ^{ab}	2.4 ^{ab}	0.14
Lungs (%)	0.44 ^b	0.50 ^{ab}	0.65 ^a	0.46 ^b	0.41 ^b	0.46 ^b	0.51 ^{ab}	0.46 ^b	0.51 ^{ab}	0.05
Gizzard (%)	2.25 ^b	2.23 ^b	1.86 ^b	2.22 ^b	1.99 ^b	1.85 ^b	2.22 ^b	1.99 ^b	2.98 ^a	0.16
Spleen (%)	0.16	0.15	0.14	0.15 ^{ab}	0.17	0.13	0.14	0.17	0.13	0.01
Small Intestine (%)	0.30 ^a	0.25 ^b	0.26 ^{ab}	0.29 ^{ab}	0.27 ^{ab}	0.25 ^b	0.27 ^{ab}	0.26 ^{ab}	0.25 ^b	0.01
Large Intestine (%)	8.08 ^{abc}	8.25 ^{abc}	8.14 ^{abc}	8.07 ^{ab}	9.00 ^a	7.87 ^{bc}	7.87 ^{bc}	8.27 ^{abc}	7.54 ^c	0.295
Caecum (%)	1.55 ^{ab}	1.37 ^{ab}	1.31 ^b	1.30 ^b	1.71 ^a	1.28 ^b	1.51 ^{ab}	1.4 ^{ab}	1.42 ^{ab}	0.10
Abdominal Fat	12.50	21.00	19.00	15.25	11.00	15.55	15.10	14.45	16.10	3.26

a,b,c: Means in the same row with different superscripts differ significantly ($p < 0.05$)

Concurrently, cayenne pepper is high fibre. Coarse particles may however slow the passage rate of digestion to the gizzard (Nir *et al.*, 1994), thereby increasing the exposure time of nutrients to digestive enzymes in the proventriculus, which in turn may improve energy utilization and nutrient digestibility (Carre, 2000). The result of cut-up parts was also significant, with thigh weight highest at 2 g/kg turmeric addition. This is contrary to what was stated by Basavaraj *et al.* (2011) and Durrani *et al.* (2006) that only at 5 g/kg did turmeric improve the

dressings percent of birds, increased breast weight and mean thigh weight. Drumstick was best influenced in groups fed 4 g/kg Tp + 1 g/kg Cpp. additive. This is similar to result obtained by Durrani *et al.* (2006) who observed that dietary inclusion of turmeric at 5 g/kg stimulated protein synthesis by bird enzymatic system. In conclusion, adding broiler birds up to 4g/kg turmeric and cayenne pepper powder as additives either as single or combined forms will enhance carcass yield .

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