

Effect of Aqueous *Tetrapleura tetraptera* (African Porridge Fruit) on Carcass Characteristics and Organ Weights of Broiler Chickens

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Abstract

This study was carried out to determine the effect of Aqueous *Tetrapleura tetraptera* on carcass value and organ weights of broiler chickens. One hundred and fifty day old Arbor acre broiler chicks were randomly allotted to five treatments having 30 birds each, each group had five replicates with six birds each. Treatment 1 (the control) had no additive, treatment 2 had antibiotics, treatments 3, 4 and 5 had 3ml, 6ml and 9mls of *Tetrapleura tetraptera* extract respectively in their water. Results indicate that percentage carcass weights of the broilers were significantly influenced by the addition of extracts of *Tetrapleura tetraptera* in their diets for breast muscle range from (22.81-28.42) and wings from (11.12-12.80) % of Dressed Weight (DW) respectively. It also shows that there were significant differences ($p \leq 0.05$) in the data recorded for liver (3.25-4.24) and gizzard (4.70-5.73) % of DW respectively. This study demonstrated that 3ml/litre *Tetrapleura tetraptera* aqueous inclusion for broilers was the most effective as it significantly influenced some carcass characteristics and organ weights as indicated above.

Keywords: Broilers, *Tetrapleura Tetraptera*, Organ weights, Carcass characteristics.

INTRODUCTION

Nigeria is a country with a teeming population and this population is continuously on the rise. This increase had led to the high demand for the available animal and poultry products in all parts of the country. Among the cheapest and highly affordable protein source for this teeming population is the poultry meat. Poultry, particularly chickens are very important and has been recognized as an important genetic resource among the avian species. However orthodox drugs such as antibiotics, antihelminth, coccidiostat and vitamins are some of the popular medicine for preventing and treating various pathogenic diseases which affect the health of farm animals. The side effect of these drugs to farm animals especially in some areas where drug adulteration is prevalent has made many animal health experts begin to think of alternative, less harmful and accessible drugs for livestock disease prevention and treatment (Dipeolu *et al.*, 2000).

Tetrapleura tetraptera is a plant that belongs to the family *mimosaceae*, it is locally called "aridan" in Yoruba land and "oshosho" in Ibo. It is generally found in the lowland forest of tropical

Africa. The plant species has the potential of providing alternative drug therapy because it has some antibiotics property (Jithendran, 1997). The adverse effects posed by drugs particularly antibiotics in livestock production is assuming a worrisome dimension in public health so that many countries are currently banning the use of drugs because of public health implication (Ibrahim *et al.*, 1997). The use of alternative drug therapy in animal health is necessary due to the fact that pathogenic organism are becoming resistance to antibiotics drug therapy, therefore the use of these medicinal plant becomes necessary (Adewunmi *et al.* 2001). Thus the objective of this study was to observe the effect of extracts of *Tetrapleura tetraptera* on carcass quality and organ weights of broilers.

MATERIALS AND METHODS

One hundred and fifty Day-old (Abor-Acre) broiler chicks were randomly allotted to five treatments replicated five times, with each replicate having six birds (thirty birds per treatment) in a completely randomized design. The replicate birds were separated in pens and reared on a deep litter system, with feed and water

provided *ad-libitum*. The birds were weighed on arrival and this was subsequently carried out on a weekly basis for a period of eight (8) weeks. Five iso-nitrogenous and iso-caloric starter and finisher diets were compounded (Table 1) and fed to the birds throughout the trial period. Plant extracts and antibiotics were administered via drinking water. Experimental treatments were designated as follows: treatment 1 (control - no antibiotic/extract); treatment 2 (antibiotics); treatment 3, (3ml/litre *T. tetraptera* extract); treatment 4 (6ml/litre *T. tetraptera* extract) and treatment 5 (9ml/litre *T. tetraptera* extract).

Table 1: Gross composition of experimental diets fed to broilers

Ingredients	Starter	Finisher
Maize	55.50	56.00
Soybean meal	26.50	14.50
Groundnut cake	15.00	13.00
Wheat offal	-	12.50
Fish meal	0.35	0.35
Bone meal	2.00	1.00
DCP	1.00	1.00
Broiler premix	0.25	0.25
Methionine	0.15	0.15
Salt	0.25	0.25

Carcass characteristics determination

At 8 weeks of age, 24 birds were selected randomly from each replicate and they were deprived of feed and water overnight after which they were weighed and exsanguinated. Evisceration was done manually after defeathering and weighing. Each carcass was cut into primal parts and each part weighed accordingly. The dressed carcass weight was used to determine the dressing percentage as

$$\text{Dressing weight percentage \%} = \frac{\text{weight of dressed carcass}}{\text{weight of live birds}} \times 100$$

Internal organ weight determination

Evisceration was done manually after defeathering and weighing. Each internal organ of interest was harvested and weighed accordingly.

The organ weights were determined as percentages of the dressing weights.

Preparation of plant extract

Tetrapleura tetraptera fruits were purchased from a local market in Ibadan. The fleshy parts were cut into pieces and oven dried at 500°C until it was crispy enough for milling. Twenty grams of the milled *Tetrapleura tetraptera* was dispensed in 200ml of water (ratio 1:20) with subsequent stirring for 30 minutes and allowed to stand for 2 hours before filtering it using muslin cloth. The filtrate was then allowed to pass through filter paper. The filtrate was dispensed in water at varying concentrations of 3mls/litre, 6mls/litre and 9mls/litre respectively.

Statistical Analysis

The data obtained were subjected to Analysis of Variance (ANOVA) and significant means were separated using the Duncan New Multiple Range Test.

RESULTS AND DISCUSSION

Live weights

Live weights of broilers in this study showed no differences in their weights, however birds offered 3ml/litre of *Tetrapleura tetraptera* extract had a 4% increase in weights compared with those on antibiotic treatment.

Carcass characteristics

Table 2 shows the results for carcass characteristics of broilers given *T. tetraptera* extracts.

There were no significant differences ($p > 0.05$) in values obtained for live weights, dressed weights, thighs, drumsticks and back weights. There was however significant influence of the treatments on breasts and wing weights ($p < 0.05$).

Table 2: Carcass characteristics of broiler administered varying levels of *Tetrapleura tetraptera* treatments

Parameters (%)	T1(control)	T2(antibiotic)	T3(3ml)	T4(6ml)	T5(9ml)	SEM
Live Wt(LW, g)	1637.60	1620.00	1700.00	1410.00	1520.00	125.09
DW(% of LW)	65.18	66.05	67.65	71.15	67.93	5.97
Breast(% of DW)	27.17 ^{ab}	24.20 ^{ab}	28.42 ^a	22.81 ^b	25.53 ^{ab}	5.61
Thigh(% of DW)	15.61	14.99	16.46	14.09	17.39	3.30
Drumstick(% of DW)	15.14	14.90	14.27	13.32	15.39	2.07
Wing (% of DW)	12.80 ^a	12.22 ^a	12.36 ^a	11.12 ^b	12.43 ^a	1.68
Back (% of DW)	23.59	24.49	22.83	23.41	23.80	1.66

^{a, b} - means in the same row with different superscripts are significantly different

Keys: Live Wt = Live Weight

DW = Dressed Weight

Table 3: Organ weights of broilers administered varying levels of *Tetrapleura tetraptera* extracts treatments

Parameters	T1(control)	T2(antibiotic)	T3(3ml)	T4(6ml)	T5(9ml)	SEM
Liver	3.84 ^{ab}	3.83 ^{ab}	4.24 ^a	3.47 ^b	3.25 ^b	0.99
Gizzard	5.73 ^a	5.48 ^{ab}	5.09 ^{ab}	4.70 ^b	5.31 ^{ab}	1.03
Heart	0.77	0.73	0.76	0.74	0.93	0.20
Pancreas	0.43	0.45	0.42	0.46	0.43	0.04
Spleen	0.22	0.22	0.24	0.28	0.29	0.07

^{a, b} – means in the same row with different superscripts are significantly different

SEM – standard error of mean

Internal organ weight

Results presented in Table 3 show that *Tetrapleura tetraptera* extract had significant effect on liver and gizzard weights of broiler ($p < 0.05$). Liver weights were significantly lowest on T5 (9ml/liter) and highest on T3 (3ml/liter). Heart, pancreas and spleen did not differ significantly as a result of the additive

DISCUSSION

According to Javed *et al.* (2009), it was observed that aqueous extract of *Berberis lycium* and *Withania somnifera* at the rate of 10 ml of drinking water produce positive results in broiler chicks. Nweze *et al.* (2011) reported that the dressed carcass weight was significantly ($p < 0.05$) reduced in the broilers fed diets without *Tetrapleura tetraptera*. Dressing out percentage was also lowest in the diet without *Tetrapleura tetraptera*. However in this study the birds with the lowest weights were those who received 6mls/litre of the extract. According to Amouzmehr, Anvar *et al.* (2012) application of two herb extracts, garlic and thyme, had no significant effect on performance and percentage of carcass components: thigh, breast, abdominal fat, and carcass weight. Nweze *et al.* (2011) observed that the inclusion of *Ocimum gratissimum* at 1% in broiler diets generally improved body weight gain, dressing percentage and significantly ($p < 0.05$) promoted higher dressed weights and carcass quality. Dressed weight which was numerically lower in the control and antibiotic treatment compared with 3mls/liter of *Tetrapleura tetraptera* correlated with the report of Nweze (2011) who observed that dressed weight was lowest in the broilers fed diets without *Tetrapleura tetraptera* inclusion. Organ weights of broilers were significantly influenced by addition of extracts of *T. tetrapleura* in the diets for liver and gizzard. At 3mls/liter larger liver weights were observed, which is in agreement with Al-Kassie (2009) who observed that the addition of the extracts of Thyme and cinnamon significantly improved liver

weights and reduced abdominal fat content. They also observed effect of spice extracts on heart and gizzard weights. These results also agree with the work of Langhout (2000), who showed that oil extracts could stimulate the digestion system in poultry, improve the function of liver and increase the pancreatic digestive enzymes. Hernandez *et al.* (2004) however found no significant differences for proventriculus, gizzard, liver and pancreas weights, when extracts of oregano, cinnamon and pepper were included in the diets of broilers.

CONCLUSION

It was observed that at 3ml/litre *Tetrapleura tetraptera* significantly improved breast weights. Organ weights were also significantly improved with the inclusion of *Tetrapleura tetraptera* extracts in the diets of broilers. Therefore, the extracts of *Tetrapleura tetraptera* compared favorably with antibiotics when administered to broilers and can be used to replace antibiotics at 3ml/litre.

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