
EFFECT OF PAWPAP (*CARICA PAPAYA*) AND FLUTED PUMPKIN (*TELFAIRIA OCCIDENTALIS*) LEAVES EXTRACTS AS ADDITIVES ON CARCASS CHARACTERISTICS AND ORGANOLEPTIC PROPERTIES OF BROILER CHICKENS

*Adegbe, J. Y. and Ogbu, O. C.

Department of Agricultural Technology, Federal Polytechnic, Oko, Anambra State Nigeria

*Corresponding author email: adegbejohnneekoojo@gmail.com Tel: 09027300272

ABSTRACT

Experiment was conducted to study the effect of pawpaw and fluted pumpkin leaves extracts as additives on carcass characteristics and organoleptic properties of broiler chickens. 500g of fresh Pawpaw and fluted Pumpkin leaves were pounded separately in 50cl of water each to obtain a homogeneous extracts of pawpaw leave extract (PLE) and fluted pumpkin leave extract (FPLE) and were administered in their drinking water of broilers across the treatments groups at 48 hours interval as follows: T1: 0ml of PLE/ FPLE [commercial vitamins/minerals premix (control)], T2: 80ml PLE in 1 liter of water, T3: 80ml FPLE in 1 liter of water and T4: 40ml PLE + 40ml FPLE in 1 liter of water. ANOVA result indicated that the leaves extracts affected significantly ($P < 0.05$) the carcass cuts of drumstick, thigh, neck, breast, feet, head and wing across all the treatment groups as this is favorably comparable to the birds in the control group without the extract treatment. Organoleptic properties scores of color, aroma and juiciness scores were significantly different ($P < 0.05$) across the treatment groups but are all statistically similar as compared to the control group. The scores for flavour, tenderness, texture, appearance are not significantly different ($P < 0.05$) across all the treatment groups. The overall acceptability score across the treatment groups as compared to the control groups was not significantly different ($P < 0.05$). This implies that the leaves extracts treatments on the birds do not affect negatively the meat quality as well as the consumption of the birds.

Keywords: Pawpaw leaf extract, Fluted pumpkin leaf extract, Carcass characteristics, Organoleptic properties, Broiler chickens.

INTRODUCTION

The actual goal of poultry farmers is to maximize production and also to achieve a satisfactory economic return, therefore all nutrient requirements must be met particularly for minerals and vitamins. While the NRC (1994) recommended small or minute level of mineral- vitamin (M-V) that are necessary for optimum productivity of livestock, commercial feed manufacturers as well as farmers use much higher concentration than those specified by NRC (1994) with an intention to maximize profitability.

Commercial feed manufacturer use from 2-10 times more of these nutrients than those specified by the NRC. This practice on a long run poses a great risk to the health of the final consumers of the animals thereafter (Inal *et al.*, 2001). The cost of the premix supplementation may contribute up to 2-3% of the total cost of the feed however augmenting the feed with higher level of M-V could lead to nutrient mineral interactions (Abudabos *et al.*, 2013).

Exploitation of herbal supplements is now being considered as a replacement for inorganic chemical substances as growth promoters used in poultry production (Fallah *et al.*, 2013). Herbs as growth booster which is essential in protein, Fatty acids, vitamins, minerals and antimicrobial properties can therefore be employed in poultry feeding to boost output. (Ikpeme *et al.*, 2012)

Pumpkin leaves extract is regarded as blood tonic in Nigeria where it is taken either solely or with addition of honey or milk for stressed and anemic patients (Nworgu, 2004). Nworgu *et al.* (2006) reported that broiler chicken served 60ml fluted pumpkin leaves extract (FPLE) per litre of water had improved feed intake, higher weight gain, elevated PCV, Hb, and RBC over control and 120ml FPLE/ litre of water.

Pawpaw leaves as well as its seeds are excellent sources of minerals, antioxidants, vitamins and enzymes which aids in protein, fat and carbohydrate digestions and helps to control microbial loads and used as antibiotics and growth enhancers in poultry production (Nath *et al.*, 2012). Growth

performance, carcass and organoleptic indices of broiler chickens were reported to have been improved by pawpaw leaf meal at 2% inclusion level (Onyimonyi and Onu, 2009).

From the reports of various authors as highlighted above, pawpaw and fluted pumpkin leaves no doubt have been proven to be beneficial to both animals and man for their nutritional and therapeutic potentials. However, information on the combination effect of leaves extracts from these plants (pawpaw and fluted pumpkin) on carcass and organoleptic properties of broiler chickens is lacking or grossly inadequate.

MATERIALS AND METHODS

Experimental Location

This research study was conducted at the Livestock Research and Demonstration unit of the department of agricultural technology Federal Polytechnic, Oko, Ufuma Campus. Ufuma is located in Orumba North Local Government area of Anambra State with geographical coordinates of 6° 51' North, 7° 11' East (Wikipedia, 2012 retrieved).

Collection and Preparation of Leaves Extracts

Fresh leaves of organically grown pawpaw and fluted pumpkin were separately obtained locally from the research farm, weighed, rinsed in a clean water to remove all impurities then pounded in a mortar, sieved to obtain a homogeneous extract, measured before administration to the chickens in their drinking water.

Experimental Diets, Birds, Procedure and Management

Forty-eight (48) one day old chicks sourced from a reputable hatchery (CHI Ltd, Ibadan) were used for the study from a day old to four weeks of age upon which the commencement of the trial at finisher phase of four (4) weeks to eight (8) weeks of age.

The birds after brooding for two (2) weeks were weighed and assigned to four (4) treatment groups (T₁, T₂, T₃ and T₄) of six (6) birds per replicate in a Completely Randomized Design (CRD). Each of the treatments was replicated three times.

500g of fresh Pawpaw and fluted Pumpkin leaves were pounded separately in 50cl of water each, to obtain a homogeneous extract of pawpaw Leave Extract and Fluted Pumpkin Leave Extract as PLE and FPLE respectively and were administered in their drinking water across the treatments as follows: T₁: 0ml of PLE/ FPLE [commercial vitamins/minerals premix (control)], T₂: 80ml PLE in 1 litter of water, T₃: 80ml FPLE in 1 litter of water and T₄: 40ml PLE + 40ml FPLE in 1 litter of water. This was administered to the bird at an interval of every forty-eight (48) hours.

Table 1: Nutritional Composition of a Branded Commercial Feed Used for the Experiment.

Nutrients	Starter	Finisher
Crude Protein (%)	21.00	17.00
Crude Fat (%)	4.09	4.00
Crude Fibre (%)	5.09	5.00
Calcium (%)	19.00	0.85
Phosphorus (%)	0.47	0.42
Lysine (%)	1.15	0.90
Methionine (%)	0.5	0.4
ME (Kcal/Kg)	2900	3000

Carcass Characteristics

At 8th weeks, birds were randomly selected from each replicate across the four (4) treatment groups, tagged and fasted for 12-18 hours and later taken to the laboratory for slaughtering and further analysis.

Organoleptic Properties

Sample for organoleptic properties were obtained from the thigh of the birds. Meat preparation was done using a wet cooking method. The meat samples were cooked in boiling water for 20 minutes using cooking pot. The meat was then served to 10 trained panelists. The trained panelists evaluated the samples for colour, appearance, aroma, texture, flavour, juiciness, tenderness and overall acceptability, the assessment was based on 9-point hedonic scale. The score was arranged in an

ascending order; the maximum score was given to extremely like condition while the lowest score was for the poorest condition.

Statistical Analysis

Data obtained were subjected to Analysis of Variance (ANOVA) as described by (SAS, 2002).

Means were separated using Duncan Multiple Range Test (DMRT) at 5%.

RESULTS AND DISCUSSION

Results

Table 2: Proximate Analysis of Pawpaw and Fluted Pumpkin Leaves

Parameters	Pawpaw	Fluted Pumpkin
Dry Matter (%)	23.10	25.20
Ash (%)	8.50	5.50
Crude Fibre (%)	10.55	9.50
Crude Protein (%)	24.00	27.50
Ether Extract (%)	0.50	1.30
Crude Fat (%)	39.80	35.30
Nitrogen Free Extract (%)	40.30	44.32

Table 3: Effect of Pawpaw and Fluted Pumpkin Leaves Extracts as Additives on Carcass Characteristics of Broiler Finishers

Parameters (g)	T ₁	T ₂	T ₃	T ₄	SEM
Drumstick	186.00 ^b	198.00 ^a	141.00 ^d	158.00 ^c	0.02
Thigh	213.33 ^a	210.00 ^a	157.00 ^b	158.00 ^b	0.44
Neck	167.67 ^b	175.00 ^a	142.00 ^d	148.00	0.48
Breast	872.00 ^a	805.00 ^b	786.00 ^c	806.00 ^b	1.02
Feet	76.33 ^a	65.00 ^b	47.00 ^c	45.33 ^c	0.33
Head	69.67 ^a	66.00 ^a	48.00 ^b	49.00 ^b	0.32
Wing	135.33 ^b	185.00 ^a	109.00 ^d	115.00 ^c	0.42
Waist	343.00 ^a	325.00 ^b	314.00 ^c	258.00 ^d	0.38

a,b,c,d: Means with different superscripts on same row differs significantly ($P < 0.05$). **SEM:** Standard Error of Mean **Treatments:** T₁: commercial Premixes, T₂: 80ml PLE/1l H₂O, T₃: 80ml FPLE/1l H₂O, T₄: 40ml PLE+ 40 FPLE/1l H₂O

Table 4: Effect of Pawpaw and Fluted Pumpkin Leaves Extracts as Additives on Organoleptic Properties of Broiler Finishers

Parameters	T ₁	T ₂	T ₃	T ₄	SEM
Colour	6.20 ^{ab}	6.80 ^{ab}	7.10 ^a	5.80 ^b	0.03
Aroma	4.40 ^b	5.50 ^{ab}	6.60 ^a	4.40 ^b	0.12
Flavour	4.50	5.50	6.40	5.80	0.01
Juiciness	6.80 ^b	6.80 ^b	8.30 ^a	6.20 ^b	0.04
Tenderness	6.30	6.90	6.10	5.70	0.08
Texture	6.30	6.10	6.30	5.90	0.10
Appearance	2.80	2.90	2.50	3.50	0.07
Overall Acceptability	7.40	7.80	8.10	7.50	0.06

a,b,c,d: Means with different superscripts on same row differs significantly ($P < 0.05$). **SEM:** Standard Error of Mean **Treatments:** T₁: commercial Premixes, T₂: 80mL PLE/1l H₂O, T₃: 80ml FPLE/1l H₂O, T₄: 40mL PLE+ 40 FPLE/1l H₂O

DISCUSSION

Carcass Characteristics

The carcass characteristics as shown in Table 3 indicates that there were significant difference ($P < 0.05$) in all the parameters measured across all the treatment groups except the tail. Down the

group, T₂ recorded the highest score for drumstick, tail, neck, head and wing. T₁ (control) had the highest record for Thigh, breast, feet head and waist.

These scores are closely followed ($P<0.05$) by T₂ group. T₃ has the least score for drum stick, neck, and wing. This is also true with T₄ for the waist. T₃ and T₄ are statistically ($P<0.05$) similar for feet and thigh. T₁ and T₂ were also statistically related for thigh and head. This is in agreement with the report of Amao *et al.* (2015) who reported a significant difference ($P<0.05$) for thigh, breast and head primal cut of broiler birds. However, this is contrary to the findings of Banjoko *et al.* (2002) who reported a non-significant difference in carcass parameters of broiler chickens. The difference ($P<0.05$) in the carcass parameters in this study may be attributed to variations in age and topographic location of the pumpkin and pawpaw plants used, as well as the inclusion level which may have affected the phytochemical constituents like minerals, antioxidants, vitamins, enzymes, alkaloids, flavonoids and glycosides of the leaves extracts which are important for their therapeutic and nutritive role in the life of the animals (Nath *et al.*, 2012).

Organoleptic Properties

As shown in Table 4 above, the color, aroma and juiciness scores were significantly different ($P<0.05$) across the treatment groups but are all statistically similar as compared to the control group. This is in agreement with Adomeh *et al.* (2019) who reported a significant difference ($P<0.05$) in the organoleptic properties of broiler chickens treated with ginger and garlic extract mixture. However, the findings in this study disagreed with the report of Rahman *et al.*, (2022), who reported that pawpaw leaf extract did not affect ($P>0.05$) meat quality of broiler chickens. The difference ($P<0.05$) in the organoleptic properties in this study may be attributed to concentration level (high) of the leaves extracts as well as the presence of bitter taste of alkaloids which may have a resultant effect on the meat taste (Zhang *et al.*, 2021).

The overall acceptability score across the treatment groups as compared to the control groups was not significantly different ($P<0.05$). This implies that the Pumpkin and Pawpaw leaves extracts treatment on the birds does not affect negatively the meat quality as well as the consumption of the birds.

CONCLUSION AND RECOMMENDATION

Conclusion

Findings from this study showed that birds in the treatment groups performed favorably well in no regular trends as compared with the birds in the control group in Carcass Characteristics and Organoleptic Properties of broiler finisher chickens. Therefore, Pumpkin and Pawpaw leaves extracts are safe, cheap and natural vitamins and minerals alternative sources when compared to their conventional industrial counterpart in poultry production.

RECOMMENDATION

Further research is recommended to establish an appropriate range of leaves extracts concentration, mixture ratio and inclusion levels for overall maximum performance of the animals.

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