

APPARENT NUTRIENT DIGESTIBILITY OF BROILER CHICKENS FED ON VARYING LEVELS OF WATER LEAF (*Talinum triangulare*) AQUEOUS EXTRACT.

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ABSTRACT

*In order to reduce the high cost of feeding the birds and at the same time maintain the quality of the feeds, there is need to feed the broiler chicken with leaves, herbs or spices which could enhance their growth rate, reduce their susceptibility to pathogenic attack thereby improving the quality of the meat. To assess this. A total of one hundred and fifty (150) day old Anak 2000 broiler chicks were used to evaluate the apparent nutrient digestibility of broiler chickens varying levels of water leaf (*Talinum triangulare*) aqueous extract (WLAE). Thirty chicks were randomly selected based on their average initial weights and placed on five oral treatment diets (T₁ to T₅). T₁ was ordinary water serving as the control, T₂ was with the inclusion of 0.5mls per liter of multivitamin while T₃ to T₅ had an inclusion level of the aqueous extract of Waterleaf at 50, 75, 100mls^{-L} respectively in a complete randomized design (CRD). Each treatment group contained three replicate with ten birds per replicates. Results revealed a significant ($p < 0.05$) variation in the digestible crude protein, crude fibre, ash, ether extract and Nitrogen free extract (NFE) while dry matter content were similar ($p > 0.05$) across the treatment groups. Digestible crude protein (25.53%), crude fibre (12.46%) and ash (7.60%) were significantly ($P < 0.05$) highest in broiler chickens placed on 50mLs of WLAE, Apparent digestible ether extract was significantly ($P < 0.05$) highest in birds on 100mLs of WLAE comparable to those on 50% WLAE. Least nitrogen free extract values was recorded in birds on 50% WLAE and highest significantly ($P < 0.05$) in birds placed on (0.5mLs) of multivitamin (T₂). It is therefore concluded that Waterleaf aqueous extract (WLAE) can successfully be included orally in broiler chickens diet up to 50mls without any deleterious effect on the nutrient digestibility.*

Keywords: Broiler chickens, Waterleaf, Nutrient Digestibility

INTRODUCTION

The demand for animal protein for human nutrition in developing countries of the global village is still on the increase (OCED and FAO, 2010). In Nigeria, the poultry sector has turned into a promising and dynamic industry with potentials for economic empowerment, poverty reduction, employment and income generation and reduction in youth restiveness (Ajala *et al.*, 2021). However, major problems of poultry production in Nigeria are high cost of feed ingredients and feeds, poor quality feeds, high cost of day-old chicks and poultry diseases (Akintunde and Adeoti, 2014). Feed cost accounted for 70% of the total costs of production for poultry in Nigeria (Oladokun and Johnson, 2012). In order to reduce the high cost of feeding, there is need a to feed chickens with non-conventional feedstuff such as green/leaves, herbs or spices which could enhance their growth rate, reduce susceptibility to pathogenic attack thereby improving the quality of the meat. The utilization of plant and leaf extracts in animal production has found widespread scientific and commercial acceptance as a strategy to improve the health status and performance of the animals (Al-Kassi and Witwit, 2010; Okereke, 2003). The use of feed additives such as ginger or other leaves or herbs which is a substitute for antibiotic growth promoters is desirable for greater productivity in poultry, increased palatability of feed, nutrient utilization, appetite stimulation, increased gastric juice flow etc (Osho *et al.* 2014; Owen and Amakiri, 2012) reported that bitter leaf could be included in broiler diets and its extract could be used as medicinal application in water for poultry without any adverse effect on the performance and blood quality of broiler chickens.

They are also rich in potassium, calcium, and magnesium. Waterleaf (*Talinum triangulare*) is an important staple leafy vegetable grown in Africa in general and Nigeria in particular (Ndaeyo *et al.*, 2013). Waterleaf cultivation

like other leafy vegetables cultivation in home gardens improve nutritional quality for the family and may provide additional income for female farmers (Billa et al.,2024). As a result of its high nutritional value that provide good source of crude protein (22.1%), and vitamins, waterleaf is playing amajor role in efforts to eradicate malnutrition in Africa (Tata *et al.*, 2016). The study was therefore set up to evaluate the apparent nutrient digestibility of broiler chickens fed varying levels of Water leaf (*Talinum triangulare*) aqueous extract.

MATERIALS AND METHODS

Location and duration of the study

The experiment was carried out at the Poultry Unit of the Livestock Section, Teaching and Research Farm, Edo State College of Agriculture and Natural Resources, Iguoriakhi, Benin City for a period of eight (8) weeks.

Sourcing and processing of Experimental Materials

Fresh Water leaf leaves being a weed were collected in the Teaching and Research Farm environ as well as various farm sites in Iguoriakhi. The leaves were air dried for about 30minutes after which two kilograms (2kg) of freshly cut *Talinum triangulare* leaves were separated from the stem, washed with clean water to remove contaminants like dust, dung, dirt and sand. It was then be drained, chopped, blended and sieved. The aqueous extract will then be filtered and collected in a clean container and then measured quantity of filtrate will be taken subsequently in accordance with the experiment.

Experimental birds, Design and Management

A total of one hundred and fifty (150) day old Anak 2000 broiler chicks were used for this experiment. thirty chicks were randomly selected based on their average initial weight to each of the five oral treatments. Each treatment group contained three replicates with ten birds per replicate and they were assigned to the five treatments (T₁ to T₅) with T₁(ordinary water) serves as control, T₂ had the inclusion of 0.5mLs of multivitamin while T₃ to T₅ had an inclusion levels of the aqueous extract of Water leaf at 50, 75, 100mLs^{-L} respectively and were laid in a complete randomized design (CRD). The chicks were brooded and fed for three weeks without the oral treatment but fresh pure water. Thereafter, the birds were fed commercial finisher diet for 5 weeks with the administration of the oral treatments. The birds had free access to feed and the oral treatment *ad-libitum* throughout the duration of the study. Routine medication and vaccination were provided.

Chemical Analysis

Water leaf aqueous extract samples were collected and kept in an airtight container then taken to the laboratory to be analysed for proximate composition according to the method of AOAC (1990).

Apparent digestibility of nutrients

At the expiration of the experiment, two birds per replicate were randomly selected and housed individually in a metabolic cage. They were fed and given fresh water for 5 days to acclimatize before they were fed commercial diet and the oral treatment for 7 days and faecal samples collected for the 7 days feeding period. Daily excreta voided (100g) per bird were collected and oven dried over night at 60°C for 12 hours and kept frozen (-20°C) until it's ready for analysis. Prior to analysis, Excreta sample were ovedried at 65°C in an air-tight oven and ground through a 1mm screen for proximate analysis. Ground voided faecal samples was analysed for their respective proximate constituent according to (AOAC 1990). Apparent digestibility of dry matter, crude protein, crude fibre, ether extract, ash and Nitrogen free extract were estimated using the formular below.

$$\text{Apparent nutrient digestibility} = \frac{\text{Nutrient in feed} - \text{Nutrient in feaces}}{\text{Nutrient in feed}} \times \frac{100}{1}$$

Statistical analysis

All the data collected were subjected to analysis of variance (ANOVA) and differences between means and treatments were determined using Duncan's multiple range test (DMRT) at 5 percent level of probability. All statistical procedures were according to (Steel and Torrie, 1990) with the aid of SPSS version 20.

RESULTS AND DISCUSSION

Apparent nutrient digestibility of broiler chickens as influenced by varying dosages of *Tallinum triangulare*.

Table 2 revealed that the varying dosages of the oral treatments has no significant ($P>0.05$) effect on the dry matter content but a significant ($P<0.05$) variation was observed for crude protein, crude fibre, ash, ether extract and Nitrogen free extract (NFE). Apparent digestible crude protein was significantly ($P<0.05$) highest (24.53%) in birds placed on 50mLs of WLAE while least value (20.47%) was recorded in birds placed on 0.5mLs of multivitamin. The similarity recorded in the dry matter content showed that the various inclusion of the varying levels of Waterleaf extract did not affect the moisture content of the birds and water leaf is also known to contain high amount of water Amusat *et al.*, (2018). This finding however negates the report of (Mustafa and Baurhoo, 2017) who report a significant difference in the dry matter digestibility broiler chickens placed on varying levels of dried vegetable residue. The significant variation showed for apparent digestible crude protein among birds placed on the various dosages of Waterleaf extract with highest content recorded among birds on 50mLs of WLAE showed that the dosage (50mLs of WLAE) improved the protein quality of the birds and this could be as a result of the high protein content of the test ingredient as apparent crude protein digestibility has been reported to depend on the source and concentration of the protein in the feed stuff (Mc Donald *et al.*, 1991).

Table 1: Proximate composition of water leaf

Parameters (%)	Composition
Dry matter	85.32
Crude protein	15.55
Crude fibre	6.52
Crude ash	4.73
Ether extract	1.68
NFE	58.55

*Analysed

Table 2: Apparent Nutrient digestibility of broiler chickens as influenced by the varying dosages of the oral treatments

Parameters (%)	Dosages of WLAE (mls)					SEM±
	Wo	Wv	50	75	100	
	1	2	3	4	5	
Moisture content	89.85	89.94	90.14	90.28	90.35	14.47
Digestible crude fibre	20.65 ^c	20.47 ^c	24.53 ^a	22.28 ^{ab}	20.62 ^c	3.63
Digestible crude protein	8.67 ^c	8.28 ^c	12.46 ^a	9.22 ^b	9.25 ^c	2.07
Digestible crude ash	6.21 ^b	6.75 ^b	7.60 ^a	6.45 ^b	6.28 ^b	0.76
Digestible ether extract	4.45 ^d	5.36 ^c	9.66 ^{ab}	7.25 ^b	12.35 ^a	3.28
Digestible NFE	54.32 ^a	49.08 ^{ab}	36.03 ^d	44.85 ^b	41.85 ^c	7.2

^{abc}: means within the same row having different super script differ significantly ($P<0.05$),

SEM±: Standard error of mean, WLAE: Water leaf aqueous extract

This finding is also supported by the reported of (Mustafa and Baurhoo, 2017) who reported a significant difference in the crude protein content of broiler chickens placed on varying levels of dried vegetable residue. Apparent digestible crude fibre was significantly ($P<0.05$) highest with an average value of 12.46% in birds placed on 50mLs of WLAE while lowest value of 8.28% was recorded in birds placed on control. Higher fibre digestibility recorded in those on 50mLs of WLAE is traceable to the succulent nature of waterleaf and being a plant that its not too fibrous which could aid its digestibility. The fibre content of water leaf and other vegetables could be a beneficial factor in aiding effective digestion process (Agboola *et al.*, 2018). Apparent digestible ash was also significantly ($P<0.05$) highest with a mean value of 7.60% in birds placed on 50mLs of WLAE while lowest value of 6.21% was recorded in birds placed on 0.5mLs of Multivitamin. This higher ash digestibility is a pointer to the fact that the birds optimally utilize the mineral content of the treatment. This finding agrees with the report of (Mustafa and Baurhoo, 2017). Apparent digestible ether extract was significantly ($P<0.05$) affected

with highest value of 12.35% in birds fed placed on 100mLs of WLAE comparable to those on 50mLs of WLAE while lowest value of 4.45% was recorded in birds placed on the 0.5mLs of multivitamin. Higher ether extract digestibility shows that the birds on this treatment utilizes the energy content of the treatment optimally. This finding also agrees with the report of (Mustafa and Baurhoo, 2017). Nitrogen free extract values were also significantly ($P < 0.05$) lowest in broiler chicken placed on 50 mLs of WLAE with an average value of 36.03% while highest value of 54.32% was recorded in birds placed on 0.5mLs of Multivitamin. This finding is in tandem with the report of Aderemi, 2007.

CONCLUSION

It is therefore concluded that Waterleaf aqueous extract (WLAE) can successfully be included orally in broiler chickens diet up to 50mls. It is also recommended that further studies be carried out to ascertain its effect on the blood chemistry of the birds

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