

COMPARATIVE EFFECT OF DIETARY *OCIMUM GRATISSIMUM* AND ANTIBIOTIC GROWTH PROMOTER ON WEIGHT GAIN OF BROILER FINISHERS.

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ABSTRACT

The comparative effect of dietary *Ocimum gratissimum* (OG) and Feed - grade antibiotic growth promoter (Oxytetracycline HCl) on growth of finisher broiler birds was investigated using ninety six (96) broiler birds. The birds were randomly assigned to four treatments with each treatment comprising 24 birds replicated three times with 8 birds per replicate in a completely randomized design experiment. Four diets (T₁ control diet without Oxytetracycline HCl and *Ocimum gratissimum*; T₂ had Oxytetracycline HCl; T₃ had 1% *Ocimum gratissimum*; T₄ had 1.5% *Ocimum gratissimum*) were formulated and offered *ad libitum*. Data were collected on feed intake, body weight gain and feed conversion ratio (FCR). Results indicate that there was significant difference (P<0.05) in the feed intake as T₂ had the highest feed intake. However, there were no significant difference (P>0.05) in the body weight gain, feed conversion ratio. It can be concluded that *O. gratissimum* can replace antibiotic growth promoter (Oxytetracycline HCl) since their effect on performance were similar.

Keywords: *Ocimum gratissimum*, Antibiotic growth promoter, Weight gain, Broiler finishers

INTRODUCTION

Antibiotics used as growth promoters in animal feeds have been criticized and banned in many nations due to possible development of both drug resistance, cross resistance and multiple resistances by consumers (Mehala and Moorthy, 2008). Numerous additives are now being used or proposed as means to reduce or eliminate pathogens and to improve growth (Joerger, 2002). They include probiotics, organic acids, enzymes and phytogenics (Awad *et al.*, 2006). Herbs/spices and their extracts fall into the class of phytogenics, they are presently explored for use as feed additives and supplements to improve growth performance, manipulation of gut functions and microbial habitat of livestock intestinal tract (Odoemelam *et al.*, 2013). Herbs/spices and their extracts have been reported to have beneficial effects on broiler performance (Schleicher, *et al.*, 1998) and some of these herbs and spices are indigenous to Africa, they include Garlic (*Allium sativum*), Bitter leaf (*Vernonia amygdalina*)

and Scent leaf (*Ocimum gratissimum*) among others (Osuji *et al.*, 1995). *O. gratissimum* also called Basil leaf is an aromatic, herbaceous and perennial plant. Its vernacular names include Nchanwu, Daidoya and Efinrin in Igbo, Hausa and Yoruba languages respectively in Nigeria (Effraim *et al.*, 2000). If some of these spices and herbs are proposed to replace antibiotic growth promoters, it is therefore important to assess their effect on broiler performance in comparison to some antibiotic growth promoters. The objective of this study therefore, was to compare the effects of *Ocimum gratissimum* (Scent leaf) and antibiotic growth promoter (Oxytetracycline HCl) on growth of finisher broiler birds.

MATERIALS AND METHODS

The study was conducted at the Poultry unit of the Department of Animal Science, Federal University of Technology Owerri Imo State. Fresh leaves of *O. gratissimum* were collected spread and air dried until it became crispy while retaining its greenish coloration. The dried leaves were hammer milled through a 2mm screen to obtain a fine meal. Four experimental diets were formulated and designated as T₁, T₂, T₃ and T₄. T₁ (control) contained no scent leaf meal (SLM) nor the antibiotic growth promoter (Oxytetracycline HCl 25%), T₂ contained 0.25% antibiotic (Oxytetracycline HCl 25%), while T₃ and T₄ contained 1% and 1.5% Scent leaf meal (SLM), respectively (Table 1). Ninety six birds were weighed at the beginning of the experiment to obtain the initial weight and were randomly assigned to four experimental diets in a completely randomized design experiment and thereafter were weighed on weekly basis. Feed and water were offered *ad libitum*. Data on feed intake and body weight were collected and used to calculate feed conversion ratio and other performance parameters and the study lasted 28 days. Data collected were subjected to analysis of variance using SPSS (1996). Significant means were separated using the Duncan's multiple range Test (Duncan 1955).

Table 1: Percentage Composition (%) of Formulated Broiler Finisher Diet

Ingredient	T ₁	T ₂	T ₃	T ₄
White Maize	56.25	56.00	55.25	54.75
Soya Bean Meal	23.70	23.70	23.70	23.70
Palm Kernel Cake	12.00	12.00	12.00	12.00
Scent Leaf	0.00	0.00	1.00	1.50
Oxytetracycline HCl	0.00	0.25	0.00	0.00
Fish meal	3.00	3.00	3.00	3.00
Blood meal	1.00	1.00	1.00	1.00
Bone meal	3.00	3.00	3.00	3.00
Common salt	0.30	0.30	0.30	0.30
Vitamin/Mineral	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Total	100	100	100	100
Calculated Nutrient	Composition			
Crude Protein	20.3020.2820.2220.17			
ME (Kcal/kg)	2825.48	2791.14	2791.13	2773.97

RESULT AND DISCUSSION

Table 2 summarizes the growth performance of finisher broilers fed *O. gratissimum* and Oxytetracycline Hcl containing diets. There were significant differences ($P < 0.05$) observed in the final weight and feed intake of finisher broilers among treatment means. T₂ which contained Oxytetracycline Hcl had significantly higher ($P < 0.05$) feed intake. Kumaret al., (2010) reported that using antibiotics as feed additives enhances feed intake but the potential side effect which include host and cross drug resistance present a real public health concern globally. The result also shows a significant decrease ($P > 0.05$) in feed intake with increase in the inclusion level of *O. gratissimum* in the diets. This is not strange as Herbs and spices or their products are often indicated to affect feed intake positively or negatively through its influence on the palatability of the feed (Odoemelam et al., 2013). Dose-related depressions of palatability in pigs fed essential oils from some spices e.g. thyme and Oregano has been reported (Windisch et al., 2007). Nwaogu (2011) also reported that antinutritional factors like tannin and saponin which has been found in *O. gratissimum* can reduce palatability especially when they are used in high proportions. Results also show that Daily body weight gain and Feed conversion ratio (FCR) at the finisher phase were similar ($P > 0.05$) across the treatments. Values for Daily body weight gain obtained in this study are close and falls within the range of values (41.08 - 43.46g) reported by Nwaogu (2011) for broiler birds fed scent leaf meal. However, values obtained for FCR in this study are higher than the values (1.96 – 2.15) reported by Nwaogu (2011). This result is also in agreement with the findings of Ocaak et al. (2008) who reported non- significant influence of herbal plants on weight gain and FCR of broilers. However, this result contradicts the findings of Abbas,

(2010) who reported significantly higher body weight gain and better FCR for broilers fed diets containing Sweet basil seed (*Ocimum basilicum*). Results of research on the application of phytochemicals in nutrition of broiler chickens are not completely consistent. Some authors state significant positive effects on broiler performance (Ertas et al., 2005; Cross et al., 2007; Perić et al., 2008), whereas others established non-significant influence on weight gain, consumption or conversion of feed (Cross et al., 2007; Ocaak et al., 2008). The assumption is that differences in results are consequences of numerous factors which according to Yang et al. (2009) include ; Type and part of plant used and their physical properties, Time of harvest, Preparation method of phytochemical additive and compatibility with other dietary components. If we add influence of the quality of chickens, their health condition and environmental conditions in the production facility, then it can be concluded that positive effect of phytochemicals or phytobiotics can be influenced by a lot of factors. Also, for antibiotic growth promoters literature shows that its' use does not always result in positive or noticeable growth promoting effects (Klotin, 2011) and this is associated with a variety of factors which include feed composition, management practices/environmental conditions and the health status of the animals (Sarica et al., 2005; Klotins, 2011). Their greatest benefit is seen when these factors are not optimal. When these factors are optimal, no benefit is seen with the use of antibiotics. Prescott and Baggot (1993) showed that the effects of antibiotic growth promoters were much more noticeable in sick animals and those housed in cramped, unhygienic conditions. Research results also suggest that benefit may be limited to certain periods of time during the growth of the animal, such as the first 2 weeks after hatching for chicks (Klotins, 2011).

Table 2:Growth Performance of Finishing Broiler Birds fed Diets containing Oxytetracycline HCl and varying level of *Ocimum gratissimum*

Parameters	T ₁	T ₂	T ₃	T ₄	SEM
Initial body weight	1.100	1.224	0.992	0.956	0.338
Final body weight	2.286 ^{ab}	2.587 ^a	2.176 ^{bc}	1.883 ^c	0.086*
Total weight gain	1.186	1.363	1.184	0.927	0.061 ^{NS}
Av daily weight gain	0.042	0.049	0.042	0.033	0.001 ^{NS}
Total feed intake	3.928 ^b	4.349 ^a	3.553 ^c	3.153 ^d	0.141*
Av daily feed intake	0.140 ^b	0.155 ^a	0.126 ^c	0.112 ^d	0.005*
Feed conversion ratio	3.319	3.193	3.030	3.514	0.131 ^{NS}

T₁=control, T₂= Oxytetracycline, T₃=1% *Ocimum gratissimum*, T₄=1.5% *Ocimum gratissimum*

NS=Not significant (P>0.05)

*=significant difference (P<0.05)

a, b, c, d along the same row with different superscript are significantly difference (P<0.05).

SEM= Standard error of difference of means

CONCLUSION

The study of the comparative effect of antibiotic growth promoter (AGP)- Oxytetracycline HCL and *O. gratissimum* on growth performance of finisher broilers showed that treatments had no significant (P>0.05) effect on weight gain, feed conversion ratio, except for feed intake were T₂ (AGP) had higher feed intake and feed intake reduced with increase in inclusion of *O. gratissimum*. It can therefore be concluded that *O. gratissimum* compared favorably with the antibiotic growth promoter.

To reduce the risk of selecting resistant bacteria, the use of antibiotics must be restricted. The most attractive area for reducing the use of antibiotics is to ban their use as growth promoters in food animals. More efforts should be directed at optimizing factors like feed composition, hygienic conditions and other management practices.

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