

MON -34

Growth and Hematology of Broiler Birds Fed *Ocimum gratissimum* (Sweet Basil) Leaf Extract

S.O. Ereke¹, B.O. Nweze², J.C.R. Eze³, E.N. Ikeh⁴, F.U. Samuel¹, I.U. Gadzama¹

¹National Animal Production Research Institute, Ahmadu Bello University, Zaria, ²Department of Animal Science Ebonyi State University, Abakaliki, ³Department of Animal Science, Michael Okpara University of Agriculture, Abia State, ⁴Department of Animal Science, University of Nigeria Nsukka

Correspondence: soereke@napri.gov.ng or soereke@abu.edu.ng, +2348109947061

Abstract

Growth and heamatology of broiler birds fed *Ocimum gratissimum* (sweet basil) leaf extract was studied using forty-eight Anak broiler birds. The birds were grouped into four treatments (12 birds / treatment) with three replicates (4 birds per replicate) per treatment in a completely randomized design. The extract was obtained by pounding fresh *O. gratissimum* (Sweet basil) leaves using mortar and pestle and then divided into 100, 200 and 300 g. Each portion was mixed with a litre of water, squeezed and filtered. The filtrates from the 100, 200 and 300 g of the pounded leaves were administered to the birds in the treatment groups (2, 3 & 4 respectively) while the birds in treatment one (the control group) were given ordinary drinking water. Feed and water were provided *ad-libitum* while other routine management practices were strictly adhered to throughout the duration of the study (28 days). From the result, birds in the experimental groups performed better than the control group ($p < 0.05$) in all parameters measured. Feed conversion ratio and final weight were found to decrease and increase respectively as the intake of the leave extract increased. Also, the hematological indices (PCV, Hb and RB C) followed the same trend and differed significantly ($p < 0.05$) across treatments. Hence, it was noted that *O. gratissimum* leave extract has great morphogenic effect as the broiler birds fed 300 ml of the leave extract had higher weight gain, lower feed conversion ratio and lower feed intake. Hence, the leave extract was noted to have improved growth and haematological indices of the birds in the experimental group.

Keywords: *Ocimum gratissimum*, leave, extract, broiler, growth.

Introduction

The profitability of the poultry industry has been threatened by a lot of factors, one of which is the continued increasing cost of production due to high cost of feed which constitutes over 70% of the production cost (Felix, 2013). The societal concern about the use of antibiotic growth promoters in animal production due to its associated residual effects (Lutful-Kabir, 2009) has led to the quest for alternative ways to improve the health and performance of animals. The use of feed additives in poultry industry over the years has proven to be profitable in the production system. Research has shown that probiotics confer great economic benefits on the farmer, the animal and the consumers (Dawson, 2001). However, *Ocimum gratissimum* (sweet basil), may serve as a potential replacement for antibiotic growth promoters in the livestock industry because of some beneficial phytochemical properties in the plant (Charis, 2000). The leaves of these herbs have been used locally over the years to treat diseases in humans (Samresh *et al.*, 2003). Therefore, the leave extracts from this plant can be of special interest in livestock feeding as Cardozo *et al.* (2004) reported that *Ocimum gratissimum* leave meal has no drug residue in livestock products such as in milk and meat.

Based on this and other scientific evidence surrounding the potentials of *Ocimum gratissimum* plant, this study aimed at evaluating the growth and hematology of broiler birds fed different levels of *Ocimum gratissimum* leave extract.

Materials and Methods

Experimental site: This experiment was conducted at the Poultry Research Farm, Department of Animal Science, Ebonyi State University, Abakaliki, Ebonyi State.

Experimental animals and management Forty-eight brooded Anak broiler birds (four weeks old) were used for this study. The experimental birds were obtained from Safari Farm in Abakaliki, Ebonyi State. The chicks were reared under the conventional deep litter system, vaccination and other disease preventive measures were carried out during the brooding stage. The birds were fed and drinking water was provided *ad-libitum* throughout the duration of the study (twenty-eight days).

Experimental materials and procedure: Fresh leaves of *Ocimum gratissimum* were collected in large quantities from Egugwu Agbaja, a village close to Abakaliki town in Ebonyi State. The leaves were pulverized with mortar and pestle in order to obtain the extract. The pulverized leaves were divided into three portions; 100g, 200g and 300g and each portion was mixed with a litre of water. The mixture was filtered, the filtrate of each portion were administered to the birds in the experimental group as their daily

source of water while the birds in the control group were given only ordinary water. At the end of the feeding trial, three blood samples were collected from the wing veins of the birds on each replicate into EDTA treated bottles using syringes and needles under aseptic conditions for haematological analysis (Okeke and Elewa, 2006)

Experimental design: Complete randomized design (CRD) was used for this study. Each treatment was subdivided into three replicates consisting of four brooded chicks per replicate which were randomly assigned.

Data collection: Data were computed on daily feed intake, weight gain, feed conversion ratio, final weight gain and hematological indices.

Data analysis: Data collected were analyzed using analysis of variance (ANOVA). Significant means were separated using Duncan Multiple Range Test according to Obi (1990).

Results and Discussion

Table 1 shows the ingredient and proximate composition of the experimental diet. Table 2 shows the feed intake and growth performance of broiler chicks fed *Ocimum gratissimum* leave extract while table 3 shows the information on the haemogram of broiler chicks fed *Ocimum gratissimum* leave extract. There were significant differences ($p < 0.05$) in the final body weight gain, average daily weight gain, average feed intake and feed conversion ratio across treatments. The gradual increase in weight gain could be as a result of the antimicrobial and antioxidant effects of the leave extract which might have improved the overall health status of the birds and depopulated the harmful microbial guts leading to a better feed efficiency. This result is similar to the findings of Jamine *et al.* (2005), Ogbu and Amaefula (2015) who reported that birds fed *ocimum gratissimum* leave meal performed better than the control.

Table1: Composition of the experimental diet

Ingredients	%
Maize	55.00
Palm Kernel Cake	7.50
Soya bean Meal	25.00
Fish meal	8.00
Bone meal	3.50
Vitamin/mineral premix	0.25
Lysine	0.25
Methionine	0.25
Common salt	0.25
Chemical Composition (% DM)	
Crude Protein (%)	20.05
Crude fibre (%)	2.47
M.E (Kcal/kg)	2840.00

****Biomix premix supplied per kg of diet:** Vit.A, 10,000 iu; vit D₃, 2000 iu; vit E, 23 mg; vit.k, 2mg, vit B₁, 1.8; vit B₂, 5.5 mg; Niacin, 27.5mg; pantothenic acid,7.5mg; vit B₁₂, 0.015mg; Folic acid, 0.75mg; Biotin, 0.06mg; chloride, 300mg; cobalt, 0.2; Copper, 3mg; Iodine 1mg; Iron, 20 mg; Manganese, 40 mg; selenium, 0.2 mg; Zinc, 30 mg; Antioxidant, 1.25mg.(Manufactured by: Bio-organics Nutrient System Limited, Ibafo Ogun State, Nigeria)

Table 2: Performance of broiler chicks fed *Ocimum gratissimum* leave extract

	0g/ml	100g/ml	200g/ml	300g/ml	SEM
Initial weight (g)	900.00	850.00	880.00	900.00	53.03
Average final body weight (g)	2572.22 ^a	2773.60 ^b	2807.60 ^b	2994.43 ^c	109.08
Average daily weight gain (g)	59.72	68.70	68.84	74.80	45.10
Average feed intake (g)	1734.74 ^a	1510.56 ^{ab}	1516.85 ^{ab}	1090.96 ^c	258.39
Average feed conversion ratio	1.03 ^a	0.78 ^{ab}	0.77 ^{ab}	0.52 ^c	0.30

a,b,c means in the same row with different superscript are significantly different ($P < 0.05$).

Table 3 Shows the haemogram of broiler chicks fed *Ocimum gratissimum* leave extract. The blood microscopy revealed increasing levels of white and red blood cell as the *Ocimum gratissimum* leave extract increased from 0-300 ml. The leave extract might have stimulated hematopoiesis in the bone marrow, improved the health status and immunocompetency of the

broiler birds in the treatment groups, hence, the improvement on the hematological indices. This observation also agreed with the work of Ogbu and Amaefula (2015) who reported that *Ocimum gratissimum* leaf meal improved the hematological parameters of broiler birds. The birds on the gest ingredient performed better than the control in terms of growth and hematological parameters measured. Therefore, it is recommended that *ocimum gratissimum* (sweet basil) leave extract should be added or administered alongside the drinking water of broiler birds as a substitute for antibiotics for improved performance and human welfare. It is recommended that further studies should be examined to evaluate the effect of higher levels of the leave extracts administration and other vegetative parts of the plant in broiler production for sustainable development in the poultry industry.

Table 3: Hematology of broiler chicks fed *Ocimum gratissimum* leave extract

Parameter	0g/ml	100g/ml	200g/ml	300g/ml	SEM
PCV (%)	24 ^a	35 ^c	39 ^b	40.90 ^b	0.03
Haemoglobin (g/dl)	7.50 ^a	8.10 ^b	9.30 ^c	8.90 ^b	0.07
RBC (x10 ⁶ /ul)	2.50 ^a	2.90 ^b	3.50 ^c	3.0 ^b	0.02
WBC (x10 ⁶ /ul)	10.32	11.45	13.00	13.70	2.70
Neutrophils (%)	33.10	34.50	32.46	34.10	1.13
Lymphocytes (%)	32.56	30.10	42.19	38.65	0.39
Monocytes (%)	6.00	3.30	2.40	3.01	1.30
Eosinophils (%)	3.62	3.81	4.12	3.75	0.96
Basophils (%)	-	-	-	-	-

PCV = packed cell volume, RBC= red blood cell, WBC= white blood cell, a, b,c means in the same row with different superscript are significantly different (P <0.05)

References

- Ani, A.D. and Okorie, A.U. (2005). The effects of graded levels of de-hulled and cooked castor oil bean (*Ricinus communis* L) meal on performance of broiler chicks. *Nigeria Journal of Animal production* 32(1): 54-60.
- Esonu, B.O., Emenalom, O.O, Udedebie, U, Herbert, D.F. Ekpori, Okoli, I.C. and Iheukwumere, F.C (2001). Performance and blood chemistry of weaner pigs fed raw mucuna bean (velvet bean) meal. *Tropical Animal Production Investment*, 4: 49-54.
- Ijaz, A., Gohar, N.A. and Ahmad, M. (2003). Haematological profile in cyclic and non-cyclic and endometric cross-breed cattle. *International Journal of Agricultural Biology*, 5(3): 332-33.
- Jamine de Aquino Lemos, XS Passos, Ode Fatima Lisboa Femande, J.R. de Paula, P.H. Ferri, L., Kioko, H., de Souza, A., de Aquino Lemos, M. and de Rosario, R Silva (2005). Antifungal activity from *Ocimum gratissimum* L. towards *Cytococcus neoformans*. *Mem. Inst. Oswaldo Cruz.*, 100(1): 55 – 58.
- Mcmullin, P. (2000). The future of antimicrobial growth promoters' alternative for poultry production in the new millennium. *International Poultry Production*, 8(7): 30.
- Obi, U. (1990). *Statistical methods of detecting differences between treatments means*. Snaoress, Enugu, Nigeria.
- Ogbu, C.C and Amaefula, P.C. (2015). Performance and haematological indices of broiler chickens fed supplements of *Gongronema latifolium*, *Ocimum gratissimum* and *Telfaria occidentalis*, *Global Journal of Poultry Farming and Vaccination*, 3(2): 140-145.
- Okeke, C.U. and Elewa, I. (2006). The study of common spices. *Nigerian Journal of Botany*, 19(1): 138-146.
- Pienado, V.I., Celdran, J.F. and Palomeque, J. (1999). Basic haematological values in some wild ruminants in captivity. *Comparative Biochemical and Physiology Part A*, 124: 199-203.
- Ratchiff, J., (2000). Antibiotics ban. A European perspective. *Proceedings of the AFMA Symposium on Improving Animal Performance through Nutrition*. Protoria, South Africa.
- Samresh, D.A., Srivastava, V., Singh and Sharma, A. (2003). An overview of ocimum chemistry and pharmacological profile. *Handard Medicus*, 45(4): 43.